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March 14, 1994

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

HAND DELIVER

Mr. William Caton
Secretary
Federal Communications Commission
1919 M Street, NW #222
Washington, DC 20554

Re: GEN Docket No. 90-314
Ex Parte Presentation

Dear Mr. Caton:

Pursuant to Section 1.1206 of the Commission's rules, this letter is to advise you that in my capacity as counsel to PCS Action, Inc., a coalition of companies to promote the deployment of PCS services, I met today with Don Gips, Deputy Chief, Office of Plans and Policy, and Greg Rosston, Telecommunications Analyst, Office of Plans and Policy.

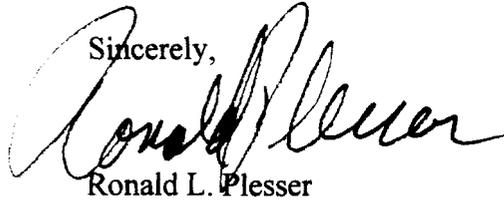
During this meeting, I discussed PCS Action's position with respect to the Commission's reconsideration of its Second Report and Order in the above-referenced proceeding, as reflected in previous filings of PCS Action in that proceeding. Copies of the following (attached hereto) were provided to Mr. Gips and Mr. Rosston at this meeting:

- A PCS Action memorandum entitled, A Vision of the Future;
- "White Paper on PCS Spectrum Issues;"
- A refutation of CTIA's recently submitted PCS "white papers";
- A memorandum concerning eligibility to bid for PCS licenses; and
- A PCS Action membership roster.

Mr. William Caton
March 14, 1994
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In accordance with the Commission's rules, I hereby submit one original and one copy of this letter and its enclosures.

Sincerely,

A handwritten signature in cursive script, appearing to read "Ronald Plesser".

Ronald L. Plesser

RLP/plq

cc: Don Gips
Greg Rosston

PCS ACTION, INC.

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September 8, 1993

A VISION OF THE FUTURE

The FCC faces a choice in the creation of new personal communications services ("PCS"). This is a choice of visions. Will PCS fulfill the vision of new wireless networks as an integral part of the new national infrastructure or will it be a little frosting on the cake of existing mobile voice services?

The members of PCS Action -- telecommunications equipment manufacturers, entrepreneurs, multi-media companies, an interexchange carrier and a cellular service provider -- believe the choice is clear:

An expansive vision of PCS will best serve the public interest and the dynamic needs of American telecommunications in the 21st century at a low cost by providing high-quality digital wireless communications to a mass market (60 million Americans within the next ten years).

The needs of American telecommunications in the 21st century are best served by a PCS industry capable of providing not only wireless and portable voice communications but increasingly sophisticated (though still inexpensive enough for a mass market) data and video transmission services as well.

This expansive vision requires a system of high-capacity, wide-area wireless networks: a system of 40 MHz licenses in large license areas.

Such a system would introduce vigorous competition into the wireless telecommunications market, saving the consumer billions of dollars and encouraging the service innovations that will keep the United States in the forefront of this burgeoning global industry.

Make no mistake: those who say they share this vision, but then demand limited band width and many small licenses, are either being short-sighted or disingenuous.

This has been the position of the Cellular Telecommunications Industry Association ("CTIA"). They have

two goals: one is to obtain additional spectrum for themselves and the second is to limit the creation of wireless services that will compete with them in a meaningful way. Nine cellular companies control 90 percent of today's cellular subscribers in the United States in large regional areas with license allocations of 25 MHz of clear spectrum.

It is not surprising, therefore, that the CTIA not only wants its members to get a total of 45 MHz but is promoting that the new competitors have only 20 MHz of cluttered spectrum broken down into 734 MSAs and RSAs and that there be so many of these fractionalized licenses in each market that none will be well financed. The consistent theme throughout their recently submitted "white papers" is to limit and fractionalize the emergence of competitors to these services. In our view, their statements have contained many misstatements and exaggerations.

The promise of new technologies has been realized by some in our society, but not by all. Cellular services are used by approximately 12 million Americans. The cost of cellular services remains outside of the grasp of most Americans today even as cellular provides the promise of digital communications tomorrow.

The vision of PCS shared by PCS Action members includes small, low-power telephones and data devices that can be shared by millions of individuals in a market with little capacity limitation. They will, therefore, be available to the mass market at mass market prices. This means 60 to 70 million PCS customers. Cellular prices, too, will come down as a result of competition.

This vision includes making routine the ability to perform any communications task at the time and place of one's choosing. It includes, for example, a portable newspaper with voice and video built in. A person in an office, in a car, in a train, in a house, or on a boat could, through the use of a portable device, call up a favorite newspaper, magazine, or new form of data service. The information would be current as of the time of the use, not as of when the newspaper went to press.

The choices faced by the Commission entail risks. On the one hand, the risk is that the Commission may grant more spectrum to PCS providers than they may ultimately need. We believe that this will not be the case and have demonstrated that even after microwave congestion is eased, 40 MHz will be necessary to enable PCS both to provide new data and imaging services and to compete with the local loop.

On the other hand, the risk of granting too little spectrum is that PCS will be stopped before it can even start. Too little spectrum will mean too little investment, too much interference with existing microwave users, too little channel capacity to accommodate a mass market, and too little bandwidth to make possible the wireless data and video transmission services that are part of the PCS promise. Again the choice is clear.

The amount of spectrum allocated to PCS will critically affect the timing of PCS deployment, which in turn will determine the viability of PCS as an industry. Delays in clearing spectrum due to a limited spectrum allocation will keep PCS from launching until the end of the decade. By then, PCS may find itself chasing a market that the current cellular duopolists will have captured. The loser here would be the American public with less competition, fewer new jobs, and a small vision of PCS. The choice is clear: to create PCS as a big vision.

Forty MHz Per License

Of all the issues facing the Commission as it authorizes personal communications services, the most crucial are the size of the spectrum allocation to be authorized for PCS licensees and the size of the market areas.

The amount of spectrum PCS licensees will be permitted to utilize will determine the number of Americans who can be served by PCS and the cost of that service, the speed with which PCS will be deployed, the voice quality PCS will be able to attain, whether highly demanded PCS data transmission will be feasible, and whether PCS will be a viable competitor to cellular telephony and, ultimately, the local exchange -- in short, whether PCS will succeed or fail.

The members of PCS Action believe strongly that an allocation of 40 MHz per PCS licensee is necessary. An allocation of 40 MHz per licensee is not excessive or extravagant; it is simply the allocation that the science underlying PCS demands. Many of the major manufacturers that will design and build PCS equipment agree that a 40 MHz assignment per licensee is imperative to permit PCS to be implemented quickly and efficiently in the United States, particularly given the Commission's Emerging Technology decisions grandfathering incumbent public safety microwave systems. This allocation is consistent with the vision American consumers hold for PCS, as well as with PCS assignments by our international competitors, which are moving ahead to implement PCS this year with allocations of clear

spectrum that are effectively larger than any option being considered by the Commission.

CTIA has taken particular aim at this issue, and has sought to attack the foundation of the 40 MHz argument and has asserted that 20 MHz is sufficient. They in particular accuse PCS Action of manipulating a study done by COMSEARCH. They base their attack on subsequent studies completed by COMSEARCH for Bell Atlantic and GTE. Attached to this paper is a detailed refutation of CTIA's attack of the April COMSEARCH study. The studies are totally consistent and indicate that 20 MHz licenses would significantly delay the introduction of PCS services. Moreover, the studies indicate that PCS will be implemented more rapidly and effectively with 40 MHz licenses.

Again, it is not surprising that CTIA is seeking 20 MHz for each license. That will result in 45 MHz for them if they obtain licenses and, for everyone else, 20 MHz of cluttered spectrum that will never be totally clear given the presence of public service users.

Size of License Area and Number of Licenses Issued

The size of the license area and the number of licenses assigned in each license area are additional important issues. Licenses should be assigned on the basis of large areas; MSAs, RSAs, and BTAs are far too small. It would be counterproductive to build a national infrastructure from many small license areas that are simply traded in a private auction after the public auction has taken place.

This was the case with cellular where 734 licenses were issued. Nine companies now control more than 90 percent of today's cellular subscribers in the United States. This consolidation was done in post-license acquisitions. The same thing might happen in PCS if too many small licenses are awarded. But, even if PCS can overcome obstacles never faced by cellular -- that is, consolidating while competing against entrenched wireless providers already in place -- this method of achieving large service areas is terribly inefficient and results in speculators pocketing sums lost forever to the federal treasury.

PCS can succeed only if it is able to realize the economies of scale that have proven necessary in the existing wireless industries. As the annual reports of various cellular providers show, wider area systems cost less to operate. The key to operating economies is a large service area.

Moreover, today's consumer expects wireless services to be completely mobile. Consumer demand has led cellular

evolution to wider geographic coverage with increasing movement toward the development of seamless nationwide roaming capabilities. Major providers of wireless services recognize that the geographic scope of their service must keep pace with consumer expectations. For example, in disclosing last month the nation's fifth largest merger ever, AT&T and McCaw announced their goal of nationwide wireless service.

Thus, large geographic areas for PCS are competitively essential. PCS cannot provide the effective price and service competition to existing mobile service providers if PCS is marginalized in small, ineffective licensing areas.

Moreover, each PCS market should be served by two, or at most three, PCS licensees. PCS will be launched in a market already dominated by wireline and cellular telephone services. Balkanizing PCS by issuing too many licenses would keep any PCS licensee from competing effectively. Too many licenses would consign our new industry to the margins of the marketplace. The very first page of CTIA's fourth so-called "white paper" illustrates the marginalization that would occur and the weak competition to entrenched service providers that would result from too many PCS licenses.

The issuance of too many PCS licenses will also slow service to the public. As the number of PCS providers grows, unit costs to the providers rise, or service quality declines, or both. As a consequence, licensees will conclude that their potential offering is not a viable business and will either withdraw from the market or seek to consolidate efforts with other licensees. The net effect is to delay entry and service to the public.

PCS License Eligibility

The rapid deployment of new technologies and the development of a new telecommunications infrastructure are critical national goals. PCS is an important element of both goals and could add significantly to the level of competition in less-than-fully-competitive telecommunications services markets, thereby benefitting the public. In particular, PCS could provide LEC-equivalent wireless local loop services and services competitive with the services currently provided by cellular. The encouragement of competition is a long-standing Commission goal.

Simply stated, existing cellular service providers do not have any incentive to fully develop services that will compete with the services they already provide. PCS Action believes that the Commission should adopt rules prohibiting potential PCS competitors from being eligible to hold a PCS

license in the markets where they provide and dominate competing services.

PCS Action believes that the FCC must take steps to ensure that PCS is a competitive service providing diversity in wireless communications. Because competition is nullified when an entity is pitted against itself, PCS Action believes that cellular incumbents and their affiliates should be free to apply for PCS licenses anywhere in the country except in their home region. A cellular incumbent or its affiliate should be able to apply for a PCS license only if the applicant serves less than 20 percent of the population to be served by the PCS license.

PCS Action's position on cellular eligibility echoes the recommendations of key federal agencies, which uniformly favor prohibiting cellular companies from bidding on PCS licenses covering their own service areas:

National Telecommunications and Information Administration:

"[W]e recommend that the Commission promote competition among PCS and cellular providers by initially prohibiting the acquisition of PCS licenses by cellular providers in their own service areas [T]he Commission should review this limitation, in light of subsequent market developments, three years after initially assigning PCS licenses."^{1/}

U.S. Department of Justice:

"[T]he FCC should not at this time permit any firm to control both a cellular and a PCS license in the same geographic area. That restriction, which should be reexamined in a definite time period (e.g., four years), we believe, should apply equally to both wireline and non-wireline cellular licensees."^{2/}

^{1/} Comments of the National Telecommunications and Information Administration at 27, FCC GEN Dkt. No. 90-314 & ET Dkt. No. 92-100 (Nov. 9, 1992).

^{2/} Comments of the U.S. Department of Justice at 29-30, FCC GEN Dkt. No. 90-314 & ET Dkt. No. 92-100 (Nov. 9, 1992).

U.S. General Accounting Office:

"In allocating the spectrum and granting licenses for the new personal communications services, the FCC should consider establishing a policy that gives first preference to firms that are not current cellular telephone service providers in a given market area"3/

The benefits that could be brought to PCS by experienced cellular service providers, moreover, would not be lost by adoption of this proposal. A cellular licensee and its affiliates barred from becoming a PCS licensee in one market would be eligible in other markets where it did not have an overwhelming presence. An out-of-region cellular licensee would have a greatly diminished incentive and opportunity to conduct its PCS operations in an anti-competitive manner, and therefore, should not be barred from participation under all circumstances.

Conclusion

The vision of a new competitive voice and data network requires the allocation of 40 MHz of spectrum for large market areas. The primary opposition to this proposal has been from various entrenched incumbents seeking to protect themselves from effective competition.

The public interest here dictates the creation of rules that will foster the vision of PCS as a large scale voice and data service available to a mass market. There must be 40 MHz licenses in large service areas to realize this vision.

3/ U.S. General Accounting Office, "Telecommunications: Concerns About Competition in the Cellular Telephone Service Industry" at 42 (GAO/RCED-92-220 July 1992).

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WHITE PAPER ON PCS SPECTRUM ISSUES

July 21, 1993

Of all the issues facing the Commission as it authorizes personal communications services ("PCS"), the most crucial is the size of the spectrum allocation to be authorized for PCS licensees. The amount of spectrum PCS licensees will be permitted to utilize will determine the number of Americans who can be served by PCS, the speed with which PCS will be deployed, the voice quality PCS will be able to attain, whether highly demanded PCS data transmission will be feasible, and whether PCS will be a viable competitor to cellular telephony and, ultimately, the local exchange -- in short, whether PCS will succeed or fail.

The members of PCS Action -- telecommunications equipment manufacturers, entrepreneurs, multi-media companies, an interexchange carrier and a cellular service provider -- believe strongly that an allocation of 40 MHz per PCS licensee is necessary. Those who advocate lesser allocations are merely attempting to prevent PCS from reaching its full potential in the marketplace, or fundamentally misunderstand the nature of PCS and the constraints facing its implementation in a shared spectrum environment. An allocation of 40 MHz per licensee is not excessive or extravagant; it is simply the allocation that the science underlying PCS demands. The major manufacturers that will design and build PCS equipment -- including Motorola, Northern Telecom, Omnipoint and Qualcomm -- agree that a 40 MHz assignment per licensee is imperative to permit PCS to be implemented in the United States, particularly given the Commission's Emerging Technology decisions grandfathering incumbent microwave systems. This allocation is consistent with the vision American consumers hold for PCS, as well as with PCS assignments by our international competitors, which are moving ahead to implement PCS this year with allocations that are effectively larger than any option being considered by the Commission.

I.
The American Vision for PCS

The decisions surrounding the implementation of PCS need not be made in a vacuum. The PCS industry has undertaken some 200 PCS technical and marketing experiments and has conducted a significant amount of research into the characteristics American consumers will demand of PCS. Each study establishes conclusively that American consumers will embrace a PCS that is fully featured and would reject any vision of PCS that delivers less.^{1/} American consumers demand high-quality voice and data services, high capacity, high-speed handoff, and wide-area coverage -- PCS with a capital "P". Systems offering only small service areas because of limited spectrum would be rejected out-of-hand by the American consumer.

Studies emphasize the importance for PCS of broad coverage, high voice quality, full functionality, and data applications.^{2/} Affordability and accessibility boosts usage of PCS services,^{3/} and the successful introduction of PCS will mean an acceleration in the penetration of all wireless services.^{4/}

International experience with the actual implementation of PCS corroborates the results of American PCS experimenters. In the United Kingdom, for example, four CT-2 licenses were issued in 1989 and only one CT-2 licensee now survives. CT-2 licensees could provide only services with limited coverage, mobility, and functionality. Licensees were unable to provide the full-fledged wireless services British consumers, like American consumers, demand.

These findings have led telecommunications companies developing PCS services to plan the deployment of affordable services that will enable individuals to communicate

1/ See PCS Trial Results: A Telocator Survey 1 (1993) ("users chafe at coverage restrictions and broad coverage is the top priority for trial participants . . . users want cellular-like service -- including two-way calling and the ability to hand off -- priced lower than cellular").

2/ See, e.g., id. at 1 & 4; Deloitte & Touche, User Perspectives on the Future of Wireless Communications (1992).

3/ See, e.g., American Personal Communications, Seventh Progress Report, FCC File No. 2056-EX-ML-91 (April 28, 1992).

4/ See, e.g., Deloitte & Touche, supra, at 6.

independent of location, access method, and information format, with a maximum of user call management control.

Multi-feature PCS services are projected to be available to individuals at any location, whether at home or office, or in transit or in public. PCS services will evolve from secure, high-quality voice and text transmission with national roaming, to fixed and mobile ISDN data, telemetry, broadband data, advanced intelligent network services, and multimedia. They will facilitate the freedom, security, efficiency, and control that result from specialized personal and business mobility.

PCS will mark the forefront of universal personal telecommunications services in which any communication an individual needs -- whether in high-quality voice, wideband data, or multimedia -- is available from any point.

II.

The Realities Facing PCS Implementation

PCS will be authorized in a band that now is populated by some 10,000 private operational fixed microwave users. These incumbents include, in the main, utilities, public safety licensees, governmental entities, and the railroad and petroleum industries. These interests have fought vigorously and effectively before Congress and the Commission for the right to remain in the 2 GHz band, protection from interference, and compensation for relocating microwave links. Even assuming full cooperation by both microwave and PCS licensees, however, the relocation process will span a number of years.

The Commission has decided to grandfather public safety and certain other licensees permanently and to require a "transition period" of three years before any other microwave incumbent can be relocated from the band involuntarily.^{5/} After the expiration of the "transition period," incumbents can be relocated involuntarily but only with the PCS licensee paying all the expenses of relocation (estimated at between \$135,000 and \$250,000 per path). Before the expiration of the "transition period," a PCS licensee can relocate an incumbent only by persuading it to relocate voluntarily -- that is, by paying it whatever the market will bear in exchange for it vacating frequencies needed for PCS. Even involuntary relocation is to be handled on a case-by-case basis, and is likely to be a lengthy process at best.

^{5/} See Procedures Adopted for Emerging Technology Access to 2 GHz Spectrum, FCC ET Dkt. No. 92-9 (News Release July 15, 1993).

The presence of incumbents that either will remain permanently in the 2 GHz band or that cannot be relocated for a period of years raises two key issues. First, how much spectrum is required to permit PCS licensees to inaugurate PCS, during the "transition period" and beyond? Second, what would a regime under which insufficient spectrum allocations force massive relocations imply for the consumer cost and timing of a nationwide roll-out for PCS?

A.

The Need to Share Spectrum. Every spectrum-availability study that has been performed has found conclusively that PCS spectrum allocations of 20 MHz, or even 30 MHz, would be insufficient for implementation of PCS in major markets. The need for a sufficient amount of spectrum to permit PCS to be implemented in a shared environment is simply a scientific fact of life PCS licensees and the Commission must face.

Early studies found, quite correctly, that there is a substantial amount of unused spectrum in the 140 MHz of the 1.85-1.99 GHz band that is available for PCS.^{6/} When the spectrum available in this total of 140 MHz is divided into discrete spectrum blocks, however, and microwave protection criteria now being crafted are applied, microwave congestion can become a true obstacle to PCS deployment. If the available spectrum is sliced too small, there will be significant geographic areas where no spectrum is available for PCS -- even in markets that are critical for effective PCS roll-out.

Sharing technologies have been developed to permit PCS licensees to put unused spectrum to work bringing PCS to the

^{6/} See American Personal Communications, Frequency Agile Sharing Technology ("FAST") Report on Spectrum Sharing in the 1850-1990 MHz Band Between Personal Communications Services and Private Operational Fixed Microwave Service (Gen. Docket 90-314, July 1991) (the "FAST Report"); see also National Telecommunications and Information Administration, Spectrum Usage Measurements in Potential PCS Frequency Bands, p. 149 (Washington, D.C.: Dep't of Commerce, NTIA Rep. No. 91-279, 1991) ("the busiest sites in all cities shows 88% of the band unused"). The FAST Report, in particular, found that at least 50 MHz in the 140 MHz band is available for implementation of PCS by "working around" microwave users in the 11 top U.S. markets. Reports by AT&T Bell Laboratories, PerTel, Inc., Digital Spread Spectrum Technologies, and Pacific Telesis also have supported these conclusions.

American public. For any sharing technology effectively to "work around" incumbent users, however, there must be at least some spectrum available. Just as one cannot drive a car around an obstacle if the obstacle blocks the entire road, it is physically impossible for a PCS licensee to share with microwave if all its spectrum is blocked by microwave incumbents.

Under a 20 MHz allocation, for example, one microwave licensee could block PCS from being implemented in a large portion of the geographic area covered by a PCS license.^{7/} Microwave licensees typically utilize two 10 MHz channels -- a total of 20 MHz -- that will correspond to PCS allocations. (When the use of IF filters on microwave receivers is taken into account, moreover, some microwave users can require interference protection for bandwidths of between 17 and 28 MHz per channel.) Microwave protection criteria, in their current versions, require consideration of systems within 250 miles in every direction. One microwave incumbent, then, can stymie the implementation of PCS for the entire service area of a PCS licensee if spectrum blocks are only 20 or 30 MHz wide. Because there are 10,000 microwave licensees, at least one-quarter of which will be permanently grandfathered, and because these licensees are spread throughout the United States, a 20 MHz allocation for PCS equates to zero spectrum available for PCS in significant portions of the country. The PCS industry would never develop under these constraints, and federal auction revenues for PCS licenses would be minimal.

Studies examining PCS implementation in specific markets confirm this result. In one study, American Personal Communications analyzed each microwave path in each of the largest 11 United States cities for each of the Commission's spectrum allocation proposals -- 40 MHz per licensee, 30 MHz per licensee, and 20 MHz per licensee. The study found that allocations of 20 MHz and even 30 MHz would yield too little

^{7/} See Comsearch, Analysis of the 20 MHz, 30 MHz, & 40 MHz PCS Block Allocations, filed with MCI Telecommunications Corp., Comments (Gen. Docket 90-314, Nov. 9, 1992). Comsearch is an independent frequency coordination firm. Comsearch found that a 20 MHz allocation would permit a single microwave effectively to block PCS. Even under a 30 MHz allocation, spectrum within a PCS allocation will be blocked more than 20 percent of the time.

usable spectrum to permit PCS to be deployed.^{8/} In Chicago, for example, an allocation of 20 MHz results in, depending upon the PCS licensee, between 33 percent and 57 percent of the area not having spectrum available for PCS.

In another study, Cox Enterprises analyzed each microwave path in San Diego, California, and concluded that 20 or 30 MHz allocations would render PCS an impossibility -- 10 of the 24 incumbents in San Diego are public safety licensees, and even a 30 MHz allocation would be insufficient.^{9/} Other markets show similar results.

Even if microwave paths can be relocated by private negotiation in the near term, the problem of spectrum congestion will not magically disappear. Even assuming that each PCS licensee can relocate the three worst-case microwave links from that PCS licensee's spectrum block in each major market -- which will not be possible in all cases^{10/} -- the amount of spectrum available for PCS use would increase, on average, only slightly. In Los Angeles, for example, a 30 MHz allocation would yield only an average of 16.9 MHz of useable spectrum even after the three worst-case microwave stations in each PCS licensee's spectrum block had been relocated and a 20 MHz allocation would yield only 12.1 MHz of useable spectrum, on average, under the same circumstances. Included in these averages, moreover, is a significant amount of area in which there would be no spectrum at all available even after all three worst-case microwave users are relocated -- under a 30 MHz allocation, up to 22.9 percent of the geographic area in Los Angeles has no spectrum available for PCS; under a 20 MHz allocation, up to 32.8 percent of the area of Los Angeles has no spectrum available. In Chicago, only 14.2 MHz of useable spectrum, on average, would be available under a 20 MHz

^{8/} See American Personal Communications, Report on Spectrum Availability for Personal Communications Services Sharing the 1850-1990 MHz Band with the Private Operational Microwave Service (Gen. Docket 90-314 & ET Docket 92-9, November 1992). Data for this study was obtained from Comsearch and FCC files.

^{9/} See Cox Enterprises, Inc., Reply Comments, pp. 10-11 & Comsearch Appendix (Gen. Docket 90-314, Jan. 8, 1993).

^{10/} If any of these licensees is a public safety entity, or would be entitled to remain in the 2 GHz band for technical reasons, or would simply refuse to move during the "transition period," the PCS licensee would be powerless to relocate them and any potential spectrum gains from a theoretical relocation would not be realized.

allocation after relocation of the worst three microwave stations by each licensee and up to 36 percent of the Chicago area would have no spectrum available. In Houston, only 13.5 MHz of useable spectrum would be available, on average, with a 20 MHz allocation after relocating the three worst-case incumbents in each PCS licensee's spectrum block and up to 35.2 percent of the Houston area still would have no spectrum available for PCS.^{11/} These results are, again, only averages; in each case, significant geographic portions of the market are blocked entirely by microwave users.^{12/}

Studies have focused on major markets for good reason. If PCS cannot be brought to the major population centers of the United States, it will never emerge as an effective telecommunications service. Moreover, some 50 percent of Americans live in or near the top ten major trading areas, where microwave congestion is and will be a significant problem. However, microwave usage is not solely a large city phenomenon. Microwave users operate throughout the United States, in mid-size cities, small towns, and rural areas. Cities such as Orlando, Florida (36 paths, 32 public safety) and even Tulsa, Oklahoma (24 paths, 11 public safety) and Bismarck, North Dakota (15 paths) have significant microwave usage.^{13/} Microwave congestion under allocations as small as 20 MHz will be a fact of life even in sparsely populated areas, because a single microwave user can block all spectrum in a PCS licensee's assigned frequencies. Microwave congestion in the 2

^{11/} See Engineering Supplement of J. Barclay Jones, Attachment A to Letter from Wayne N. Schelle to Chairman Alfred C. Sikes (Gen. Docket 90-314, Jan. 8, 1992).

^{12/} For this reason, it is meaningless to point out that the Hong Kong digital cellular system has been allocated only 5 MHz of clear spectrum. This allocation would be uniformly clear throughout the entire geographic area to be served; under an allocation that yields an effective average of 5 MHz, after sharing, entire geographic areas would be blocked out entirely by microwave use. Moreover, PCS is not digital cellular. Because of the size of this allocation (which may have to be supplemented to meet capacity demands when commercial service is inaugurated), the Hong Kong system will be limited to compressed voice service. PCS in the United States will be much more than simply a voice service (as will, for that matter, cellular).

^{13/} See Comsearch, Microwave Path Usage On 1850-1990 Band (Gen. Docket 90-314, April 1993).

GHz band is a nationwide problem demanding a nationwide solution.

The fact that some PCS applications will permit some use of microcells -- generally defined as base stations with radii of 1000 feet -- does not obviate the need for a sufficient spectrum allocation. To begin with, any vision of a PCS based entirely on microcells is not in the business plan of any PCS Action member (or any PCS proponent of which we know). Base station radii of up to three miles will be necessary for cost-effective deployment of PCS, even in metropolitan areas but especially in less densely populated areas; a vision of PCS based entirely on 1000-foot microcells no longer exists.^{14/}

B.

Delays Implicit in Relocation. PCS will enter a highly competitive marketplace in which entrenched cellular entities have achieved wide-area, regional coverage. To be competitive with cellular and wide-area ESMR services, PCS will be forced to build out entire systems for an initial launch. The vast majority of the base stations in a PCS system must be active when the service is offered to the public or PCS will fail to gain a competitive foothold. PCS, then, cannot afford the luxury of rolling out its service gradually as cellular did in the competition-free environment of the mid-1980s. Systems elsewhere in the world recognize the imperative of building virtually complete systems by the first day of commercial launch; in the United Kingdom, Mercury Personal Communications built 250 cell sites before turning on the first user, and in Germany, the PCS licensee will have to build thousands of cell sites before launching its wide-area service. PCS licensees must have a sufficient amount of spectrum to permit wide-area service to be initiated on the first day of commercial launch.

Beyond doubt, delay in the full inauguration of PCS must be avoided. Insufficient spectrum allocations, however, would

^{14/} And, of course, comparing digital PCS to analog cellular is misleading -- cellular carriers are converting to digital technologies with the same efficiency as PCS digital technologies and are implementing these technologies in 25 MHz of clear spectrum. The need to accommodate current analog users of spectrum may require part of a cellular carrier's spectrum to be reserved. However, the magnitude of that reservation will not approach the level of spectrum preemption that incumbent microwave users will cause to PCS licensees, and alleviation of the cellular reservation is entirely within the control of the cellular licensee.

stall PCS implementation and development in markets across the country because PCS licensees would not have access to the spectrum needed to implement PCS. PCS licensees would be forced to abandon the sharing technologies that the Commission has found so valuable and revert to a mandated band-clearing strategy. Forcing a clearing of the band would provoke delays of two types.

First, too-small allocations would prevent PCS licensees from having sufficient spectrum even to begin PCS implementation in the near term. Comsearch, an independent frequency coordination firm, has found that a 20 MHz PCS allocation would require 100 percent of public safety licensees and 50 percent of all licensees to be relocated during the first three years after PCS licensing.^{15/} PCS licensees thus would be forced for their very survival to begin negotiations with incumbent microwave users during the "transition period."

During this "transition period," microwave users would be under no obligation to relocate or to limit their demand for payment to their costs of relocating. PCS licensees, fresh from paying auction prices to attain PCS spectrum, would be forced to negotiate in an open market -- essentially, a second, private auction -- to gain access to the very spectrum they had been licensed. Microwave licensees, moreover, will have every incentive to attempt to reap the perceived market value of the spectrum they have been licensed. These negotiations would be inordinately time-consuming and expensive, delaying service to the consumer and driving up the cost of the service that ultimately will be provided. Under this scenario, PCS stands to lose the very characteristic that has driven the optimism of the PCS industry -- the ability to offer a low-cost, mass market service that will meet, for the first time, the tetherless telecommunications needs of the majority of the American public.

Second, even if negotiations can be completed successfully, the logistics of relocating microwave licensees would cause significant time delays. Too-small spectrum allocations would require all PCS licensees to be working to relocate microwave users at essentially the same time. Equipment for relocation bands, which are just now being rechannelized by the Commission, would have to be produced in mass quantities in time for this relocation; innumerable engineers would have to be deployed to effectuate the relocation. Although some have intimated that relocation of

^{15/} See Comsearch, Spectrum Allocations and Their Impact on Microwave User Relocations: A Case Study (April 12, 1993).

microwave users requires little more than switching microwave radios, this is not the case. Many systems are complex with multiple paths, and will require substantial time to perform the frequency coordination, engineering, licensing and installation. Today this process often takes 18 months for a single link. If relocations such as these will be necessary in every major market in virtually the same time frame, the industry will be unable to respond and the inauguration of PCS will be inevitably delayed.

The public interest demands that PCS be implemented as quickly as possible. Until PCS is implemented, cellular will not be subjected to full and direct price and service competition; American consumers will be harmed by delay.^{16/} As all the studies that have been performed show conclusively, PCS is a highly demanded service.^{17/} PCS will create 300,000 high-quality new jobs for Americans.^{18/} It will permit our service and manufacturing sectors to seize the lead in a \$214 billion industry wireless market by the year 2000.^{19/} PCS also will provide competition to existing telecommunications services, competition that the FCC has estimated will save consumers billions of dollars.^{20/} Because of the benefits PCS can bring to American consumers, our economy and our balance of trade, both houses of Congress have crafted legislation

^{16/} See General Accounting Office, Telecommunications: Concerns About Competition in the Cellular Industry (July 1992). In the United Kingdom, both cellular carriers lowered their prices between 12 and 16 percent six weeks before Mercury PCS was scheduled to be introduced to the public.

^{17/} See supra notes 2-4.

^{18/} See Letter from Kurt A. Wimmer to Cora Beebe, Office of Management and Budget, April 15, 1993 (PCS will create 280,867 jobs) (attached); see also Telocator, Why Personal Communications Services Need to Be at the Top of the Domestic Policy Agenda ("New, emerging PCS businesses promise to create 250,000 new jobs").

^{19/} "Global PCS," Presentations by James P. Caile, Vice President, Motorola, Inc., before ABA/FCBA International Telecommunications Seminar, June 8, 1993.

^{20/} See Letter from Alfred C. Sikes, Chairman, FCC, to President George Bush, April 28, 1992, at 14 (regulatory review finding that PCS will save American consumers between \$2 billion and \$5 billion per year by providing competition to cellular telecommunications).

requiring quick regulatory action to begin the licensing of PCS. Insufficient spectrum allocations would frustrate the very goals Congress expected to achieve by mandating quick regulatory action.

III.

Other Reasons for 40 MHz Assignments

As pivotal as the microwave congestion issue is to the debate over spectrum allocations, it is not, by any means, the sole reason for an allocation of 40 MHz per PCS licensee. Throughout the world, countries have forced incumbent microwave users to vacate the 2 GHz band altogether to accommodate PCS and then have granted 30-50 MHz of clear spectrum to PCS licensees. In the United Kingdom, for example, two PCS licensees each have been allocated 50 MHz of clear spectrum, and in Germany, one PCS licensee has been allocated 30 MHz of clear spectrum. This is not inefficient or uninformed spectrum management policy on the part of these countries, to be sure; rather, these countries are seizing the opportunity to permit PCS to provide much more than simply a digital cellular service. The same path should be followed here.

The Population to be Served. Cellular companies serve some 4 percent of the United States' population on 25 MHz of clear spectrum, and now claim to be at capacity in major markets. Independent marketing studies suggest that between 40 and 60 million Americans -- up to 25 percent of the population of the United States -- will subscribe to PCS. Even if clear spectrum were being assigned to PCS licensees, a significant amount of spectrum would be necessary to serve such a vast number of Americans even with efficient digital technology.^{21/} In fact, a comprehensive study on spectrum requirements performed by Telocator found that PCS operators will need

^{21/} Although PCS will utilize efficient digital technology, cellular carriers too are converting to technology promising the same degree of efficiency. The claim that "less is more" because PCS can utilize tiny microcells and even picocells to reuse spectrum more effectively is a complete red herring. No one questions that cellular licensees could install smaller cells as well. This vision, moreover, is based on the limited, small-cell-only vision for PCS held by our competitors. Even assuming such systems would be built, this requirement would significantly raise the cost of initiating PCS service.

between 36 and 49 MHz of clear spectrum each to service the public's demand for PCS.^{22/}

The Need for Wireline-Quality Voice. Voice quality is a crucial issue emerging from the American studies of the potential market for PCS. American consumers will demand wireline-quality voice transmission. If wireline-quality voice cannot be achieved, PCS will not be able to break the local exchange monopoly and provide competition in the local residential service. High-quality voice transmission demands high-capacity voice coders ("vocoders"). Vocoder rates providing high voice quality cannot be accommodated in very narrow spectrum allocations. The Telocator spectrum study also found that 36-49 MHz of clear spectrum per licensee would be required for an "optimistic" deployment of current technology using 32 Kbps voice coding.^{23/} The implementation of effective in-building PCS, or any other PCS uses that will require consumers to replace traditional wireline services with wireless service, will require wireline-quality voice transmission.

The Need for Data Transmission. PCS is, emphatically, more than a voice service. Wireless data transmission is one of the most highly demanded members of the PCS family of services. Wireless computing devices -- including laptop and notebook computers as well as "personal digital assistants" -- must be served by a robust and high-quality digital transmission system. Wireless facsimile services and data modem communications alone will require 32 Kbps transmission for acceptable performance; advanced digital interfaces such as wireless ISDN will require at least 64 Kbps per user. Given any significant level of penetration and usage, these services simply cannot be wedged into allocations smaller than 40 MHz per PCS licensee.

PCS is ideally positioned to provide an infrastructure for wireless computing. In addition, PCS can and should take the lead in facilitating the United States' next-generation information infrastructure by providing high-speed, high-capacity wireless data transmission. These services will

^{22/} See Telocator PCS Technical and Engineering Committee, Telocator Spectrum Estimates for PCS Report: An Analysis of Clear Spectrum Required to Support Emerging PCS Services 3 (1992). The study noted that its estimate "will understate the amount of spectrum needed if significant fixed microwave links remain in service after 2002." Id. at 8.

^{23/} See id. at 3.

encompass high-speed wireless facsimile services and large-capacity data transmission services. The new high capacity, wired computer networks are expected to be image and video driven. Newspapers, for example, will deliver news on personal digital assistants with on-command videos of events and sound recordings of speeches, not mere scrolling of text. More fundamentally, if the personal digital assistant of the future cannot match the wired computing network's ability to decompress a multimedia file on the fly or to support a video call, the future mobile user and the mobile network will be cut off from the standard way of doing business.

These new applications will require significant bandwidth. Using an asymmetric algorithm, for instance, every multimedia session would require occupying bandwidth that could have accommodated simultaneous voice channels ranging in number from approximately 10 (at vocoder rates of 32 Kbps) to 50 (at 9.6 Kbps). This demand for bandwidth makes it very unlikely that PCS can provide high-speed data services if these services must contend for less than 40 MHz of shared spectrum. PCS's potential data applications would be forever lost under 20 MHz and 30 MHz spectrum allocations.

The Potential for Information Services. PCS also can provide highly demanded information services, including graphics, imaging, and, in time, compressed video in real time. These applications will permit advances in health care delivery and education, particularly in less densely populated areas, and could revolutionize how businesses communicate. The potential for cutting-edge wireless multimedia applications is an important part of our vision for PCS; this vision will expand access to information to large sectors of the American public that have not yet been able to participate in the telecommunications revolution. These services will be lost to the American public if PCS does not receive an adequate spectrum allocation.

IV. Rural Allocations

Some may argue that rural areas will not require the same intensive use of the spectrum that will occur in densely populated urban areas. One should not, however, leap to the conclusion that it is an inefficient use of spectrum to allocate 40 MHz per licensee throughout the United States, including in rural areas. Rural telephone companies may put PCS spectrum to intense use by serving traveling and commuting subscribers from surrounding areas and using another portion of PCS spectrum to replace archaic wired infrastructures with advanced, cost-effective digital wireless voice and data

services. The flexibility of use inherent in PCS spectrum may finally permit those living in rural America to be every bit as advanced a part of our national telecommunications infrastructure as are our urban citizens.

The fact that all rural areas may not require 40 MHz per PCS licensee should not be seen as inefficient but instead should be viewed as a necessary side-effect of the manner in which the Commission has allocated spectrum for more than 60 years. It also could be argued, for example, that it is inefficient to protect the same 400 MHz of spectrum for VHF and UHF television in Truth or Consequences, New Mexico and New York City. It is undoubtedly more efficient to license PCS spectrum to some entity, even in rural areas, than to permit it to lie unassigned and fallow. It would make little sense to create a regional patchwork quilt of allocations, and it would make even less sense to define the services that will be available in cities by spectrum needs that are perceived in less-populated areas.

V. Conclusion

PCS can reach its full potential in the United States only if PCS licensees have access to a sufficient amount of spectrum to avoid interference to incumbent microwave users, provide high-quality voice and high-capacity data transmission services, and respond to the service demands of consumers in both urban and rural America. The studies objectively addressing PCS spectrum requirements unanimously point to the option of assigning PCS licensees 40 MHz each. With this allocation scheme, PCS can be implemented swiftly; it can reach millions of Americans; it can provide high-quality voice and data services; and it can energize the telecommunications marketplace, creating jobs, competition, and tax revenue. It will permit the United States to move ahead in world competition and strengthen our domestic economy. With the critical needs at stake, the Commission can afford to do no less.

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April 15, 1993

BY MESSENGER

Ms. Cora Beebe
Office of Management and Budget
New Executive Office Building
725 17th Street, N.W., Room 9202
Washington, D.C.

Re: Personal Communications Services

Dear Cora:

As we discussed last week, we have estimated that the inauguration of personal communications services ("PCS") would create 300,000 good new jobs. This estimate is consistent with an estimate by Telocator^{1/} that 250,000 service jobs and 50,000 manufacturing jobs would be created by the implementation of PCS. Telocator also has estimated that 60,000,000 Americans will subscribe to PCS by the year 2002.

Our specific analysis shows that PCS will create some 280,867 jobs by the year 2008 (or by 2002 under Telocator's projections). These jobs would be created in three broad categories: direct employment by PCS companies, indirect employment, and manufacturing employment.

Direct Employment (102,134 jobs). The analysis begins with employee-subscriber ratios drawn from other start-up telecommunications industries. At mid-point in the PCS industry's development, the analysis utilizes employee-subscriber ratios consistent with current cellular industry

^{1/} Telocator is a long-standing trade association representing companies in the cellular, paging and personal communications industries.

Ms. Cora Beebe
April 15, 1993
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employment.^{2/} Rather than continue with that ratio, the analysis utilizes more conservative ratios as the PCS industry grows to reflect greater efficiencies being realized.^{3/}

Indirect Employment (127,667 jobs). This category includes dealers, distributors, resellers, consultants, engineering, billing and maintenance contractors, and other types of jobs that are created indirectly by the activities of PCS licensees. It is based on ratios that have been experienced in the cellular industry, which provides a useful analogue for PCS. The use of cellular figures is conservative in that PCS may be significantly more infrastructure-intensive than cellular and thus produce more indirect employment in engineering and construction services in its growth years.

Manufacturing Employment (40,853 jobs). The analysis assumes an export-import ratio of only 1:1.25 (that is, we export 25 percent more than we import). This is also quite conservative; as you know, our balance of trade in wireless telecommunications equipment traditionally is quite good and will improve if we can implement PCS swiftly and thus gain a foothold in the immense international market for PCS.^{4/}

^{2/} This analysis is very conservative in that it begins with employment ratios associated with the cellular industry rather than significantly lower ratios associated with the landline telephone industry (which if applied to PCS would probably double our job estimate). Some would argue that the latter figures may be more appropriate for PCS in the long run, because PCS will become more of a competitor to local exchange telephony as it matures.

^{3/} This analysis is significantly more conservative than some analyses that analyze PCS at maturity based on current cellular employment figures (that is, the cellular industry has created 100,000 direct and indirect jobs with 11,000,000 current subscribers; if the PCS industry serves 60,000,000 subscribers at maturity, it should employ more than five times as many employees, or at least 500,000).

^{4/} Many would argue that this figure is very conservative because the types of PCS being developed in the United States will leapfrog over more rudimentary technologies being developed in the European Community and the Pacific Rim. If PCS is implemented swiftly, the United States will capture a greater share of the international equipment market, a