DOCKET FILE COPY ORIGINAL
RECEIVED
SEP 2 1997
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	)	CC Docket No. 97-160

COMMENTS OF TDS TELECOMMUNICATIONS CORPORATION ON CUSTOMER LOCATION ISSUES

Margot Smiley Humphrey
Koteen & Naftalin, L.L.P.
1150 Connecticut Avenue, NW
Suite 1000
Washington, DC 20036

TABLE OF CONTENTS

I.	Summary	2
II.	General Comments on the Customer Location Issues Related to Forward Looking Cost Proxy Development	5
III.	III.C.1.a. Customer Location Issues — Geographic Unit — ¶¶ 39-40	8
IV.	III.C.1.b. — Distribution of Customers — ¶¶ 42-47	10
V.	III.C.1.c. — Access Line Counts — ¶¶ 48-53	14
VI.	Conclusion	16

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	)	CC Docket No. 97-160

COMMENTS OF TDS TELECOMMUNICATIONS CORPORATION ON CUSTOMER LOCATION ISSUES

TDS Telecommunications Corporation (TDS Telecom or TDS), by its attorneys and on behalf of its 105 incumbent local exchange carriers (ILECs) in 28 states, submits these comments on the customer location issues discussed in the platform design section of the Further Notice of Proposed Rulemaking (FNRPM) in the above-captioned proceedings. TDS is participating because it believes decisions made here will affect its ILECs and their customers, even though the TDS Telecom ILECs, as "rural telephone companies" (rural ILECs), are not directly subject to the proposed universal service high cost proxy model under development and refinement in this phase of the 1996 Act implementation proceedings: TDS is concerned that the Commission will use the model developed here as a template for the rural LEC proxy model it has wisely decided should be considered in a separate proceeding. Equally troubling is the prospect that the

Commission will incorporate factual assumptions and resolve policy issues here in a fashion that will be adverse for rural ILECs and their customers because of important market and regulatory differences confronted by rural ILECs.

TDS will first lay out some general points about differences and dangers, from the perspective of rural ILECs and their customers, that the Commission should have in mind in validating and verifying the reliability of a model. TDS Telecom will then identify and discuss the three sets of customer location issues raised in the NPRM for comment in this round.

Summary

TDS Telecom believes that the Commission must keep the different needs and characteristics of rural ILECs in mind as it finishes developing a forward looking proxy cost model for non-rural LECs. It is likely that the Commission will regard what it does here as a model or, at the very least, that it will commit itself to factual and policy assumptions that may distort the later rural-LEC proxy cost development.

There are several general flaws in the approaches under consideration: The customer location analysis in the FNPRM, like the proposed proxies, misleadingly assumes <u>one</u> optimally efficient network designed to serve a customer base that reflects the chosen area, without taking into account competitive entry that will divide the customer base and divert some or all of the clustered customers. The network design assumptions also magnify the risks of network investments, since the proxy model will need to be regularly revised to base high costs on future optimally efficient network designs, reducing high cost support revenues below those computed under the optimal design that prompted a carrier's investment decision. The forward looking models actually reflect historical, not predicted, customer location patterns and cannot take into

that prompted a carrier's investment decision. The forward looking models actually reflect historical, not predicted, customer location patterns and cannot take into account developing network design strategies and customer location trends. Local exchange competition will not mirror interexchange market experiences, since the lower growth rate and the absence of a politically acceptable vehicle to shift costs directly onto customers (e.g., rate or SLC increases) leave this market more vulnerable to adverse impact from the transition to competition. And the models wrongly assume that the same optimally efficient network design and technology will be optimal for all competitors, in spite of different entry and marketing strategies and limited access to some technologies — such as spectrum to incorporate wireless technology.

Small enough geographic units are essential to capture the variation in costs even within low density markets, especially since CLECs may invest only in facilities where it will be profitable, using the ILEC's facilities elsewhere under state-approved terms and conditions. However, data disaggregated by census units are not available now, would involve collection costs, and are not useful for network design and operations. The design unit must reflect the constraints of a LEC's technology and service goals, which will require extensive individualized inputs because the model should not assume any particular technology or carrier characteristics.

An accurate model must reflect uneven population distribution, or clustering, as well as proximity to the serving wire center. However, the key distribution element is access lines, rather than population, and the Hatfield model's assumption that 85% of the population of an area lives in urban areas does not relate closely enough to network design and costs. Nor do that model's assumptions about multiple clusters take into account other factors, such as terrain, that often control population distribution. The Commission should encourage, but not require, geo-coding,

now available for some areas (though not for rural ILEC markets). It should also avoid requirements that will slow the evolution of this precise measurement tool, which will also advance network design and efficiency, as well as public safety programs.

Accurate line counts are essential, but they should relate to a service-related area, such as the DSA, which has relevance to the feasible length of loops — a major factor in identifying inherently high cost telephone service. A 10% margin of error seems too large for a cost formula that will determine how much customers nationwide ultimately have to pay to ensure universal service. An acceptably reliable model must also be accurate in identifying second lines, business and special access lines. These distinctions are important, but difficult. For example, choice of a Centrex rather than a PBX system involves many more predicted lines, but the decision is within customer discretion. Any closing factor should be approached with caution, since correcting for one type of inaccuracy could magnify other inaccuracies in the proxy cost model. Errors in access line predictions indicate the need for careful verification and validation of any model before its ultimate adoption.

TDS urges the Commission to consider carefully the effects of its customer location assumptions on rural ILEC markets and the rural parts of large LECs' service areas. Its proxy and the underlying assumptions must be sufficiently reliable to satisfy the Act's requirements for affordable nationwide service and reasonably comparable rural and urban rates, services and access to advanced telecommunications and information services.

General Comments on the Customer Location Issues Related to Forward Looking Cost Proxy Development

1. A fundamental difficulty with all the proxies that have been proposed so far is that they essentially embody a "natural monopoly" assumption that is totally at odds with the competitive environment the Act and implementation proceedings are intended to promote. Each is looking at the most efficient single network that could be designed to serve the customers under the predicted local conditions in a geographic area. The models have no means for dealing with the constraints on network design, choice of technology or costs that result when even one additional provider uses its own facilities or piggybacks on the ILEC's network to compete for the customers in a given area. By assuming one best-case, state-of-the-art, optimally efficient network, the TELRIC proxy approach necessarily ignores all the economic, technology and marketing evaluations and trade-offs that change the efficiency calculus when two or more LECs and technologies will be in simultaneous service. It also apparently intends that the most cost-efficient technology will be used, including wireline or wireless facilities depending on where cost savings can best be achieved, without taking into account the Commission's control over whether any individual ILEC or CLEC will have access to wireless frequencies to incorporate into its network design. These models will, for these reasons, inevitably provide the "false sense of precision" the Commission seeks to avoid in inputs to a proxy model (¶ 39). The Act's rural market safeguards (e.g., sections 251(f), 253(f?), 214(e)), recognize that the impact of competition in rural markets raises economic and public interest concerns that, in effect, may require relief from the Act's general aggressive promotion of competitive entry. Extending the inherent assumption of the proposed models that the costs of a single efficient network will

represent the cost of an efficient competitor in rural markets will, therefore, assume away the rural market problem recognized by Congress and cause the greatest distortion in rural ILEC service areas.

2. The models and the Commission's analysis also obscure the cost recovery dilemma presented whenever the "forward looking" model is updated to incorporate new, more efficient, lower cost technology and network design solutions. Each such update, the frequency of which remains a mystery, will likely diminish the available high cost recovery for state-designated "eligible telecommunications carriers" (ETCs), creating pressure to raise local rates and calling into question the revenue sources and cost recovery assumptions underlying its decision to invest. The cloud on recovery results in a disincentive to invest in infrastructure improvements in high cost markets, contrary to the intent of Congress in enacting section 254 for comparable rates, services and access to advanced telecommunications and information services in rural and urban areas.

3. A "forward looking" model cannot predict future population distribution or access line counts because today's population distribution was determined by complex historical forces, largely beyond the scope of network engineering models, consistent with the monopoly and universal service environment that the Act changes. It cannot predict future developments and trends in technology, network design strategies and cost trends taking shape on the leading edge of research and development efforts, which actual network design specialists are likely to follow and to take into account. The models do not even take into account the competitive market's effect on line counts. But a carrier designing the most efficient network for a multi-carrier market cannot engineer the network on the theory that it will serve all the customers or achieve

the same concentration of access lines in cluster areas that is embodied into the population distribution assumptions the Commission is exploring. In short, the "forward looking" costs the models predict are, in reality, based on a static, pre-competition snapshot.

4. The Commission may be expecting more congruence between the development of local competition and interexchange competition than the market facts warrant. One glaring difference is in the rate of growth of access lines, which lags far behind the growth in interexchange minutes that cushioned interexchange universal service providers from heavy revenue losses by, in effect, enlarging the interexchange market "pie." Moreover, interexchange competition was largely stimulated by shifting costs onto the end user, while Congress is loathe to move towards further local competition for some market segments at the expense of local rate or Subscriber Line Charge increases for others.

5. The models fail to reflect that the most efficient network design unit will not be uniform for carriers of different sizes, targeting different markets or market niches or designing their networks primarily to offer services such as cable television or mobile services. Regardless of what geographic unit the Commission selects to measure high costs, the model will unavoidably embody biases for or against specified technologies, carriers or service strategies.

The dilemma that these general observations seem to indicate is that, even if the Commission plugs up the more obvious holes that have been identified in proposed models, it will not succeed in modeling credible long run costs of service in discrete geographical slices in a competitive market served by carriers with many different business plans and regulatory constraints or freedoms.

III.C.1.a. **Customer Location Issues — Geographic Unit — ¶¶39-40**

TDS Telecom agrees that the geographic unit chosen for the cost proxy model should be small enough to reflect disparities in the conditions and costs within a LEC's service area. All ILECs serve areas that include customers that might well not have been served without the regulatory and industry policies that have required and supported the high subscribership, reasonably comparable rural and urban rates and widespread geographic scope of the public switched network today. CLECs can limit their costs by limiting their investment in their own "networks" to the areas and customers of their choice . Disaggregating ILECs' costs into smaller geographic units is necessary because there is currently a significant level of cost- and rate-averaging among locations with higher and lower service costs. If only the ILEC retains the ultimate carrier of last resort obligation to serve high cost areas with its own facilities, the disparity in network design and costs between ILECs and CLECs will continue to grow. Positing the same cost and network engineering constraints on both will involve a dangerous factual distortion.

Disaggregating high cost measurement and support into smaller, more homogeneous units will at least improve targeting. Current averaging may be distorting support flows because low cost portions of a study area mask the high costs of relatively small pockets of high cost service conditions. The TDS Telecom ILECs, with very few exceptions, serve sparsely populated rural areas.[1] These low density areas, although vastly smaller and lacking the large urban centers of most price cap ILECs, also vary internally in subscriber density and costs of

[1] See Attachment A.

service. These variations, shaped by many factors, result in differences in network design and plant costs . Thus, it will be especially difficult to design a generalized model that will differentiate among the many sets of market facts that exist from rural ILEC to rural ILEC and even within individual rural service areas.

While there are compelling reasons to limit the geographic area for which high costs are measured, what unit to use is a complex question.[2] The FNPRM is also correct (¶ 39) to raise the problem of data availability and usefulness. Network design information is not compiled for CBGs or CBs or other Census units. Instead, network planning units tend to reflect the technical constraints imposed by the facilities to be deployed, the local geographic conditions and the service requirements and market conditions of each particular location. For example, a wire center configured to be a Digital Service Area (DSA) must accommodate the limits and capabilities of the technology — such as whether the facilities are copper or fiber — as well as the break even costs for different installations and the balance between the desired kinds of service and the carrier's prospects of recouping the unsupported portions of its investment from the area's customer base. Moreover, the costs of different carriers are likely to differ significantly depending on what other geographic unit or units they are able to include in their network design.

---

[2] TDS Telecom and other rural ILECs have shown that this problem its raised for rural ILECs even before a forward looking proxy cost model takes effect for them. The transitional support for rural LECs, made portable for CLECs that win rural ILEC customers, distorts the transitional rural marketplace because the Commission has refused to permit disaggregcation of support to reflect the cost difernences within a rural ILEC's service area. A CLEC can reap a windfall if it serves the rural area's higher cost portions by reselling the supported service provided by the rural ILEC, and qualifies for portable support set at the rural ILEC's average cost for facilities in the densest, lowest cost hub of the rural ILEC's study area.

Thus, the dearth of information disaggregated to the level of many of the proposed geographic units reflects the practical reality that telecommunications network design is not performed on the basis of Census count units. Accordingly, the Commission should also consider the cost and administrative burden of collecting information that is not otherwise useful for network design and operation purposes, particularly for rural areas and rural ILECs that already experience high costs of service and have a small subscriber base to absorb new burdens and costs. The cost and availability of powerful computers to apply a model that is detailed enough and subject to adequate individualization through LEC-specific inputs, to which the FNPRM alludes (¶ 39) illustrates an economic feasibility consideration which could put small and rural ILECs at a disadvantage in qualifying for support that is particularly necessary for their high cost markets.

TDS urges the Commission to keep the concerns presented or aggravated by the characteristics of rural ILECs' serving areas in mind as it balances all of these factors to choose what geographic unit to use for high cost measurements. Mistakes in identifying high costs will jeopardize the Commission's ability to achieve the "just, reasonable and affordable" rates and "reasonably comparable" rural and urban rates and services section 254 requires it to ensure.

III.C.1.b. — Distribution of Customers — ¶¶ 42-47

Even if the Commission is able to use a fairly small geographical unit to measure high costs, it is highly likely that applying the selected unit to individual locations will not result in cost measurement areas that are uniformly dense in population and, thus, likely to be uniform in cost of service. Based on its ILECs' service territories, TDS agrees that the BCPM assumptions of uniform population distribution within a CBG and subscriber locations within 500 feet of a

road will not accurately model network costs. The NPRM properly recognizes (¶ 44) that distribution assumptions are a key component of a model to determine costs and target support to high cost service because much of the high cost that characterize rural service arises from long loops.

The TDS ILECs generally exemplify the non-uniform density and loop length disparities that have prompted the Commission to conclude that a clustering assumption, perhaps like that in the Hatfield proposal, would lead to more accurate loop length and cost predictions. Thus, TDS agrees that clustering will better comport with real world customer distributions. However, TDS Telecom suggests that the Hatfield model's assumption that 85% of the population should be clustered in a town does not provide the information relevant to network design and costs. Network design proceeds on the basis of access lines, and TDS Telecom believes that the proportion of an area's access lines located in the urban area is more typically in the 60-70% range. Moreover, the Hatfield model's further assumptions about clustering in low density areas, such as, when to predict two or more clusters within a given area, depend on — rather than model — the degree of non-uniformity in density in the area. Density disparities can vary significantly on the basis of terrain and other local characteristics. Support targeting will only improve if a proxy model is able to account reasonably precisely for such variances.[3]

The Commission's validation process for proposed model assumptions must be measured

---

[3] The NPRM also is right to emphasize the importance of how wire center locations relate to population clusters. TDS Telecom provided examples earlier in this proceeding of the flaws in the results of proposals then before the Joint Board in predicting central office assignments.

against actual loop lengths to ensure that the results are reliable. However, the availability of tools to obtain accurate data is in flux and will vary from LEC to LEC. TDS understands from discussions with the Wisconsin commission, for example, that some non-rural ILECs have developed data bases that will geo-code the households in their areas by latitude and longitude. TDS Telecom ILECs do not possess that capability yet, and rural areas like those they serve are likely to lag behind urban areas in the expensive process of developing geo-coding data. In spite of the benefits of such customer location accuracy, the costs and burdens will continue to outweigh them for a long time. This is not to belittle the benefits of moving toward geo-coding. That kind of information would dramatically improve the accuracy of network design and the efficiency of the resulting network configurations and the choice of technology.[4]

The Commission cannot require geo-coding because of the current costs and limitations on what areas can justify the expenditures. However, the Commission should not adopt any modeling requirements or procedures here that will retard progress in this direction or dampen ILEC and CLEC incentives to pursue such improvements in data. On top of the efficiency and cost containment enhancements that actual location data would provide, progress in more precise

---

[4] It is ironic, in view of the Commission's focus (¶ 46) on geo-coding as a potential cure for the problem that network design cannot readily be reconciled with Census boundaries, that the benefit to network design and cost predictions alike from moving toward the accuracy of geo-coding is that the information is closer to actual existing (i.e. historical) information about the individual local market facts that guide network engineering. The Commission would do well to consider whether these benefits of individual factual information indicate that the forward looking actual costs advocated by Professor Khan better identify and target support to high cost service. Letter from Alfred Kahn to Reed Hundt, filed December 14, 1996, in CC Docket No. 96-98.

identification of the location of customers and length of loops needed to serve them also has obvious potential benefits for public safety communications functions. Indeed, TDS Telecom is aware that subscribers in remote areas may not even have road addresses, much less locations within 500 feet of a public road.

Improved information sources such as geo-coding would also facilitate better network design and modeling by allowing more precise accounting for the technical constraints dictated by the available technology and the kinds and quality of service sought for particular markets and carrier business strategies. For example, as the demand for services in an area evolves, the engineering assumptions must move in parallel: Today's network configuration to provide service in a DSA will limit loop lengths for ADSL, as the NPRM indicates (¶ 46), to 18,000 feet. However, if universal service evolves to require increased bandwidth, the feasible length of loops will decrease, owing to the physical limitations of copper wire facilities. The bandwidth increase thus has the effect of shrinking the wire center boundaries. Given this relationship between service requirements, technology (also a dynamically evolving factor) and other local conditions, such as terrain, the Commission would risk distortions in cost and network configuration predictions if it based a model on "the technology constraints of electronic systems used to provide universal service" (¶ 46). Thus, while it is important to take into account the engineering decisions that shape actual networks, which have little or nothing to do with the "Census mapping conventions" developed for an unrelated purpose, the model must leave room for technology to change. However, as noted earlier, the frequency with which a "forward looking" cost model is updated to account for improved efficiencies that become available may also have a negative impact on investment incentives. If support and cost recovery for

investments made today assume today's most efficient technology, network configurations and constraints, but are constantly in danger of reductions when technologically efficient facilities or designs develop, neither an ILEC nor a CLEC can be confident that its high cost support and service revenues will continue to compensate it for its investments.

III.C.1.c. — Access Line Counts — ¶¶ 48-53

TDS Telecom agrees that accurate line counts are vital to any model that purports to predict the cost of serving a particular geographic unit and cluster of households or businesses However, for its ILECs, the relevant line counts would need to be taken at the DSA level, rather than at the CG or CBG level. A count would identify access lines that could be served by deploying equipment with specific technological capabilities and characteristics and exclude loops too long to be part of that serving configuration using that technology. Here again, once a segment of the industry has developed geo-mapping capabilities, the model could be quite precise in relating customer locations and loop lengths to predictions of costs.

The model would have to be sufficiently accurate in predicting costs to warrant the level of support that would ultimately be recovered from ratepayers throughout the nation. TDS questions whether the proposed 10% margin of error in the accuracy of line count predictions would ensure an adequate substitute for today's actual cost based support calculations. The accuracy of network design or carrier pricing decisions made without 10% of the relevant data would be unreliable. TDS designs networks today for a 2% margin of error; anything more may lead to degradation of service or later cost additions. It is not good husbandry of the resources of customers nationwide to provide support on the basis of a "proxy" with such limited reliability, compared to supporting the actual costs of the specific facilities that have been deployed to

provide service to a particular collection of access lines. The lack of accuracy would be greatest for CLECs that qualify for universal service support, since they have never been required to disclose or justify their costs, rates, scope of service and network procurement decisions, as ILECs historically have done. The distortion in line count and predicted cost per line would be magnified as competition fragments the access lines served by ILECs and their competitors. Indeed, the use of a "closing factor" driven by actual line count data in each of the models to adjust line count errors could magnify errors in other relationships in the models that are not "adjusted" to comport more closely with reality. A proxy or surrogate for network costs that does not even accurately predict the number of access lines needed to serve a specified geographic area under the conditions mapped by the other factors in the model does not meet the most elementary test for verifiability or reliability.

Residential line counts would be complicated by the need to identify second lines and the disparities in second line subscriptions in different parts of a geographic area. It might be worthwhile to pursue the relationship between income and age or other characteristics of subscribers, as the Hatfield model proposes. However, the difficulty of identifying second lines when, for example, a residential customer has both wireline and wireless access lines would increase in complexity as the number and type of local service alternatives increased. The Commission's intention to exclude "second lines" from non-rural high cost support again complicates the ability of a model to determine the "universal service" costs per line accurately for support-eligible lines.

Earmarking and counting business lines will also become increasingly difficult as home businesses and "telecommuting" proliferate. For example, a potential business customer's

choice of a PBX arrangement or multi-access-line Centrex service will depend on customer-specific criteria of all sorts. However, the serving arrangement the customer elects results in significantly different demand for access lines. It is difficult to perceive any accurate means for a model to predict such decisions within customers' discretion. Finally, the model will have to pinpoint the number and location of special access lines and predict when customers will choose that approach in the future to distinguish special access lines from universal service line counts and high cost calculations.

Conclusion

TDS Telecom continues to support the Commission's wise decision to devote more time and a separate proceeding to developing a valid, verifiable and reliable cost proxy for rural LECs' serving areas because of the profound differences and unique universal service concerns that characterize those areas. However, TDS also urges the Commission not to let its self-imposed deadline for implementing a forward looking proxy cost model for non-rural LECs dictate acceptance of an unreliable surrogate for the majority of the nation's telephone customers. The temptation to extend the model to rural LEC areas would be great, especially as the time targeted to start the transition to a proxy model for these areas — January 1, 2001 — draws closer. Any dilution or degradation of the statutory universal service standards or purposes in this proceeding would invite delays, investment-crippling uncertainty and litigation if pursued in the separate rural LEC proceeding. The Commission should thus keep in mind the effect of proposals here on smaller ILECs and their customers.

In addition, while their urban customers and costs are certain to dominate the network design and operations for large ILECs and most CLECs, the rural customers served by large

ILECs also merit the Commission's careful attention to ensure that universal service support will be sufficient to maintain the affordable, nationwide universal service provision and reasonably comparable rural and urban rates, services and access to advanced telecommunications services mandated by section 254. Accordingly, the laudable decision to conduct separate further proceedings on rural ILEC proxy issues does not absolve the Commission, in conducting this or the rural LEC proceeding, of the central three-part responsibility Congress charged it to satisfy: implementing the 1996 Act's competition and deregulation policies, while simultaneously ensuring the achievement of Congress's no-less-imperative universal service and infrastructure advancement mandates.

Respectfully submitted,

TDS TELECOMMUNICATIONS
CORPORATION, INC.

By: Margot Smiley Humphrey
Margot Smiley Humphrey

Koteen & Naftalin, L.L.P.
1150 Connecticut Avenue, N.W.
Suite 1000
Washington, DC 20036

Its Attorneys

September 2, 1997

CERTIFICATE OF SERVICE

I, Sheila V. Hickman, a secretary in the office of Koteen & Naftalin, L.L.P. hereby certify that true copies of the foregoing Comments of TDS Telecommunications Corporation, Inc. have been served on the parties on the attached service list, via first class mail, postage prepaid, on the 2nd day of September, 1997.

By: Sheila V. Hickman
Sheila V. Hickman

SERVICE LIST

* The Honorable Reed E. Hundt, Chairman
Federal Communications Commission
1919 M Street, NW
Room 814
Washington, DC 20554

* The Honorable Rachelle B. Chong, Commissioner
Federal Communications Commission
1919 M Street, NW
Room 844
Washington, DC 20554

* The Honorable Susan Ness, Commissioner
Federal Communications Commission
1919 M Street, NW
Room 832
Washington, DC 20554

* The Honorable James H. Quello, Commissioner
Federal Communications Commission
1919 M Street, NW
Room 802
Washington, DC 20554

The Honorable Julia Johnson, State Chair, Chairman
Florida Public Service Commission
2540 Shumard Oak Blvd.
Gerald Gunter Building
Tallahassee, FL 32399-0850

The Honorable David Baker, Commissioner
Georgia Public Service Commission
244 Washington Street, SW
Atlanta, GA 30334-5701

* James Casserly
Federal Communications Commission
Commissioner Ness's Office
1919 M Street, NW
Room 832
Washington, DC 20554

The Honorable Sharon L. Nelson, Chairman
Washington Utilities and Transportation Commission
1300 South Evergreen park Dr. SW
P.O. Box 47250
Olympia, WA 98504-7250

The Honorable Laska Schoenfelder, Commissioner
South Dakota Public Utilites Commission
State Capitol, 500 East Capitol Street
Pierre, SD 57501-5070

Martha S. Hogerty
Missouri Office of Public Council
301 West High Street, Suite 250
P.O. Box 7800
Jefferson City, MO 65102

* Tom Boasberg
Federal Communications Commission
Office of the Chairman
1919 M Street, NW
Room 814
Washington, DC 20554

Charles Bolle
South Dakota Public Utilities Commission
State Capitol, 500 East Capitol Street
Pierre, SD 57501-5070

Deonne Bruning
Nebraska Public Service Commission
300 The Atrium, 1200 N Street,
P.O. Box 94927
Lincoln, NE 68509-4927

Debra M. Kriete
Pennsylvania Public Utilities Commission
North Office Building, Room 110
P. O. Box 3265
Commonwealth and North Avenues
Harrisburg, PA 17105-3265

Rowland Curry
Texas Public Utility Commission
1701 North Congress Avenue
P.O. Box 13326
Austin, TX 78701

Bridget Duff, State Staff Chair
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0866

* Kathleen Franco
Federal Communications Commission
Commissioner Chong's Office
1919 M Street, NW
Room 844
Washington, DC 20554

* Paul Gallant
Commissioner Quello's Office
Federal Communications Commission
1919 M Street, NW
Room 802
Washington, DC 20554

* Emily Hoffnar, Federal Staff Chair
Federal Communications Commission
Accounting and Audits Division
Universal Service Branch
2100 M Street, NW
Room 8617
Washington, DC 20554

Lori Kenyon
Alaska Public Utilities Commission
1016 West Sixth Avenue, Suite 400
Anchorage, AK 99501

Kevin Schwenzfeir
NYS Dept. of Public Service
3 Empire State Plaza
Albany, NY 12223

* Sheryl Todd
Federal Communications Commission
Accounting and Audits Division
Universal Service Branch
2100 M Street, NW
Room 8611
Washington, DC 20554

Sandra Makeeff
Iowa Utilities Board
Lucas State Office Building
Des Moines, IA 50319

Philip F. McClelland
Pennsylvania Office of Consumer Advocate
1425 Strawberry Square
Harrisburg, PA 17120

Thor Nelson
Colorado Office of Consumer Counsel
1580 Logan Street, Suite 610
Denver, CO 80203

Barry Payne
Indiana Office of the Consumer Counsel
100 North Senate Avenue, Room N501
Indianapolis, IN 46204-2208

*Timothy Peterson, Deputy Division Chief
Federal Communications Commission
Accounting and Audits Division
2100 M Street, NW, Room 8613
Washington, DC 20554

James B. Ramsay
National Association of Regulatory Utility
Commissioners
1100 Pennsylvania Avenue, NW
P.O. Box 684
Washington, DC 20044-0684

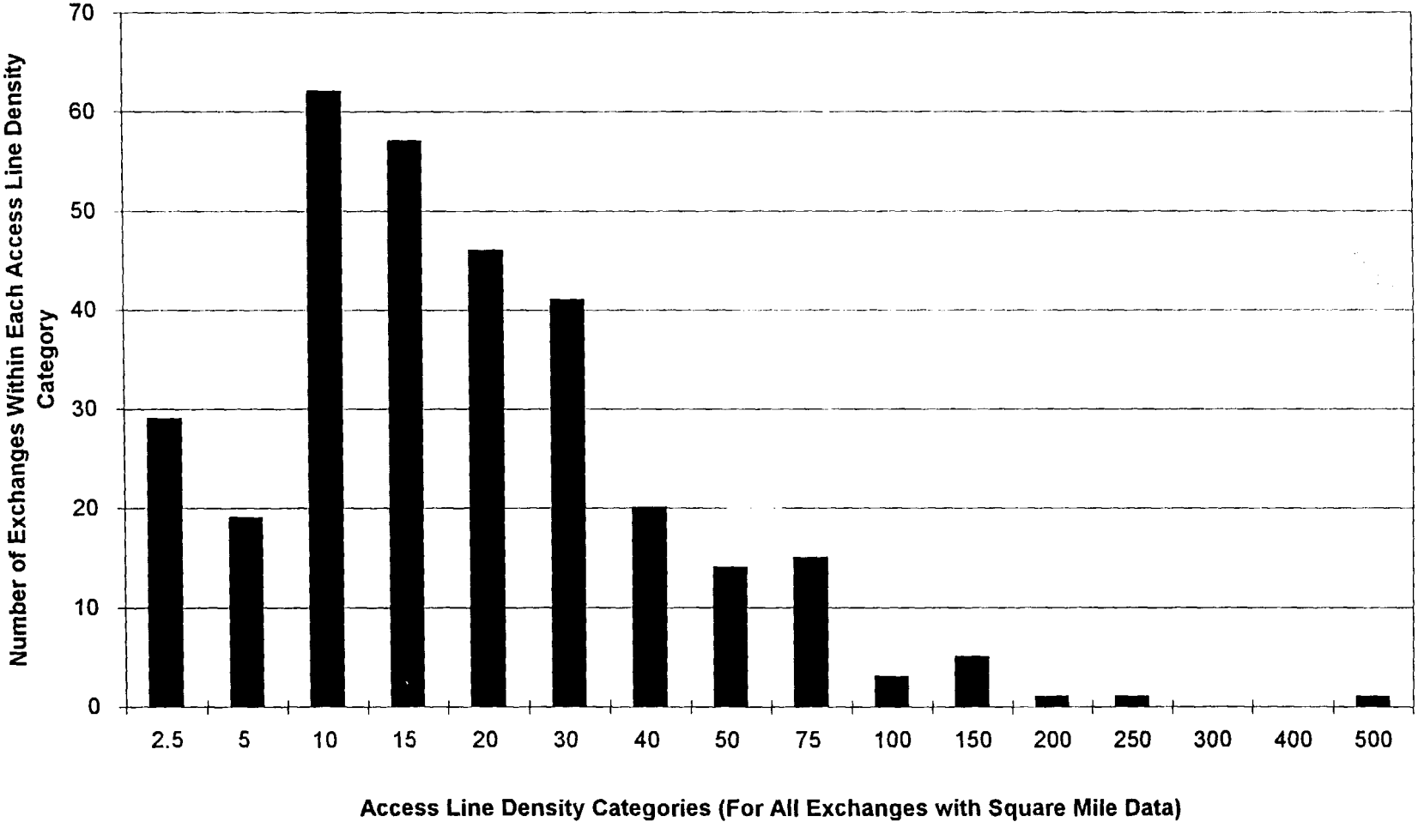
Brian Roberts
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102

Tiane Sommer
Georgia Public Service Commission
244 Washington Street, SW
Atlanta, GA 30334-5701

* International Transcription Service
2100 M Street, NW
Suite 140
Washington, DC 20037

* via Hand Delivery

ATTACHMENT A

TDS TELECOM

Histogram of Year Ending 1996 Access Line Density Per Exchange