38. How should a proxy model evolve to account for changes in the definition of core services or in the technical capabilities of various types of facilities?

As stated in Section 254(c)(1) of the 1996 Act, "universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information services." Coincident with its evaluation and determination of the definition of core universal services, the Commission should undertake periodic evaluations of any cost proxy model adopted for universal service funding requirements to assess (1) whether the forward-looking costs of deploying basic telecommunications services to residential households has significantly changed and (2) to assess the feasibility of modifying the cost proxy model to reflect any FCC-mandated changes in the definition of the basic service being modeled.

The FCC should establish timetables in this proceeding for conducting periodic evaluations of any cost proxy model it adopts, and it should also identify the major attributes that should be re-evaluated, e.g., the cost of money, the cost of switches, CBG-based data (such as numbers of households), significant changes in state-of-the-art technology (such as technological break-throughs in wireless services), etc. so that the FCC need not necessarily re-investigate each and every aspect of the cost proxy model in its periodic investigations. The goal of administrative simplicity needs to be balanced with that of accuracy. It would simply not be feasible to update the model on a daily, monthly, or arguably even annual basis, and thus the FCC should consider carefully the frequency with which it is appropriate to revise the model to reflect significant changes that have occurred in the telecommunications industry.

39. Should a proxy model account for the cost of access to advanced telecommunications and information services, as referenced in section 254(b) of the Act? If so, how should this occur?

NCTA recommends that the FCC focus its efforts first on the challenge of adopting and implementing a cost proxy model for the purpose of ensuring the availability of affordable single-line residential service. Only after such time should the FCC consider the feasibility and desirability of developing a proxy model to account for the cost of access to advanced telecommunications and information services.

40. If a proxy model is used, what, if any, measures are necessary to assure that urban rates and rates in rural, insular, and high-cost areas are reasonably comparable, as required in Section 254(b)(3) of the 1996 Act.

The purpose of the cost proxy model -- to provide an objective measure of the economic, forward-looking cost of providing single-line basic residential service - is critical in order to assess which areas of the country may require high cost support. The model can then be used by federal and state policy makers to distribute high cost support with the goal of establishing rates that are comparable between urban and rural, insular and high cost

areas. A cost proxy model such as the BCM can inform, but does not specifically address, the important question as to how to set interstate and intrastate rates for individual telecommunications services.

41. How should support be calculated for those areas (e.g., insular areas and Alaska) that are not included under the proxy model?

It is NCTA's understanding that BCM2 does include Alaska. In any event, the same principles that are guiding the design of cost proxy models should guide any assessment of need for insular areas, i.e., objective cost characteristics should be identified, the least-cost technology (that satisfies quality of service requirements) should be assumed, and those incumbent carriers with experience serving such areas should provide comprehensive information as to the cost characteristics of deploying telecommunications in these regions. Furthermore, it may be appropriate to establish different criteria for those islands that are privately owned from those that are public and/or to establish different criteria for those residences that are second homes rather than primary homes.

42. Will support calculated using a proxy model provide sufficient incentive to support infrastructure development and maintain quality service?

Although the 1996 Act sets forth a blueprint for making a transition to a competitive telecommunications market, ubiquitous local competition is many years off. High cost support, even if structured (as it should be) in a competitively neutral fashion, will not in and of itself make any given geographic market competitive. Therefore, until such time as effective local competition has been established, regulatory oversight is likely to be needed to ensure that the levels of infrastructure development and quality that policy makers seek are achieved. Competitively neutral sources of high cost support are critical to ensure that competition can develop (yielding infrastructure development, low costs, and quality service), but the mere availability of high cost support will not in and of itself cause competition to flourish. Certainly if high cost funds are designed in a competitively neutral fashion, there is a much greater possibility of competition developing sooner rather than later in remote and high cost areas

43. Should there be recourse for companies whose book costs are substantially above the costs projected for them under a proxy model? If so, under what conditions (for example, at what cost levels above the proxy amount) should carriers be granted a waiver allowing alternative treatment? What standards should be used when considering such requests?

As discussed in response to questions 34 and 59, should any incumbent LECs be aware of particular, unique areas (e.g., islands) that face extraordinary and atypical cost characteristics that the BCM fails to reflect, it may be appropriate for the FCC to permit such ILECs to identify and describe such instances so that the BCM can be adjusted to reflect the fact that a more costly type of technology is needed in order to provide these remote areas with the same quality of service as is provided elsewhere. The preferred solution is to modify the BCM to reflect the objective characteristics that cause the extenuating circumstance. Should that not be feasible, the burden should rest with the

LEC to request and justify a waiver. Furthermore such a waiver process should simply entail a right to seek an exemption but by no means entail a guarantee of such a waiver.

44. How can a proxy model be modified to accommodate technological neutrality?

There are several potential modifications to existing proxy models that might more adequately address the need to accommodate technological neutrality in the design of an optimal network based on forward-looking costs. Accommodation of alternative technologies for certain geographic areas is important because, for instance, the investment costs of wireless equipment generally do not vary with the customer's distance from the serving area interfaces (SAI), such that for areas requiring long loops and/or having unusually expensive loop construction characteristics (e.g., mountainous terrain and/or extremely low population density), wireless technologies may well represent an economically viable alternative to wireline loops. While the BCM2 model addresses this issue at least in part, other models fail to incorporate a cap on wireline investment levels for implementation of wireless and/or other technological solutions in situations where they represent the least cost alternative

The approach to the issue of technological neutrality varies significantly from model to model. The original BCM computed the cost of constructing a *wireline* telephone network to all households, regardless of the distance from the wire center or the relative density of the area being modeled. BCM2 represents an improvement from the original BCM, addressing the issue of technological neutrality by recognizing the possibility that some customers may be more reasonably served by emerging "wireless loop" technologies. BCM2 assumes that an alternative wireless loop technology is utilized for loops requiring wireline investment levels in excess of the cost of an alternative wireless technology; BCM2 therefore assumes a value of $10,000 per loop as the cutover point for wireless, a figure purported to be based upon ongoing trials. (See also response to Question 57 for additional detail concerning BCM2's actual calculations regarding the wireline investment cap.)

From a more generic standpoint, changes to the benchmark models that seek to address the issue of technological neutrality should take into account only those technologies whose cost and performance characteristics are substantially proven. Furthermore, to the extent that costs related to newer technologies are declining as they gain acceptance in the marketplace, such reductions should be incorporated into any model that is adopted and implemented for universal service funding purposes.

45. Is it appropriate for a proxy model adopted by the Commission in this proceeding to be subject to proprietary restriction, or must such a model be a public document?

The Commission should adopt a public model so that the model can be subject to open, complete, comprehensive, and rigorous examination by all interested parties. Reliance on databases such as the Local Exchange Routing Guide, which must be purchased from a third party, is acceptable so long as the purchase price is not set at an unreasonable level. Similarly a requirement to use models under a licensing agreement is acceptable.

Otherwise, the model should be public and accessible to complete scrutiny by affected and interested parties.

46. Should a proxy model be adopted if it is based on proprietary data that may not be available for public review?

No. A proxy model that is being adopted for public policy decisions should be available for complete public review. Incumbent LECs will be the initial primary beneficiaries of any universal service funding that is established by the FCC in this docket and therefore it is entirely inexcusable for them to cloak their efforts to shield critical information from scrutiny in assertions that such data is proprietary. There is absolutely no reason that the FCC should accept the implied trade-off between quality (i.e., accurate) data and public data. The FCC should insist upon *public, accurate* data. Ultimately, it is the regulator, not a local exchange carrier, that must make judgment calls about critical input assumptions and network engineering characteristics. Public, accurate data is essential and the FCC should require incumbent local exchange carriers to be forthcoming and comprehensive in their submission of relevant data.

47. If it is determined that proprietary data should not be employed in the proxy model, are there adequate data publicly available on current book costs to develop a proxy model? If so, identify the source(s) of such data.

No. As stated in response to question 35, NCTA recommends that the FCC direct incumbent LECs to provide documented, detailed up-to-date cost data on items such as equipment costs so that the FCC can make fully informed decisions as to the appropriate input values to select when the FCC runs a cost proxy model in order to compute the level and geographic distribution of high cost funds. Ultimately, regulators, not local exchange carriers, will need to run and refine any cost proxy model that is adopted for universal service funding requirements, and therefore it is essential that regulators be provided with the best available data on the forward-looking costs of key model components such as switches and digital loop carrier equipment. Proprietary claims made by LECs about critical data should be questioned and investigated by the FCC.

48. Should the materiality and potential importance of proprietary information be considered in evaluating the various models?

As stated in response to question 46, the FCC should explicitly reject the "either-or" approach to information that incumbent local exchange carriers seem to be presenting to regulators (i.e., regulators can have access *either* to unreliable public information *or* to accurate proprietary information). Well in advance of the legislated time frame for rendering a decision in this proceeding, the Commission should direct incumbent local exchange carriers (those which advocate a proxy model as well as those which do not) to submit public, accurate data on the critical attributes of a cost proxy model (e.g., switch costs and digital loop carrier equipment costs).

Competitive Bidding

49. How would high-cost payments be determined under a system of competitive bidding in areas with no competition?

As stated in NCTA's initial comments, where there is no existing competition, competitive bidding will likely be infeasible. If however a competitive bid process is adopted in an effort to encourage competition, in no event should the subsidy amount exceed the subsidy amount distributed today for serving a particular area. Rather, assuming a national benchmark rate has been adopted, as recommended by NCTA in the context of a proxy model, high cost payments should be determined based on the difference between the benchmark rate and the lowest bid. If no bids are received, the incumbent should receive the difference between the benchmark rate and the benchmark cost flowing from the proxy model.

50. How should a bidding system be structured in order to provide incentives for carriers to compete to submit the low bid for universal service support?

The bidding system should not be structured in a manner which would allow an increase in the funding level over that of today. Carriers should have a sufficient incentive to offer lower bids because the total level of funding will be reduced for all parties, not just the low bidder.

51. What, if any, safeguards should be adopted to ensure that large companies do not bid excessively low to drive out competition?

The lowest possible bid would of course be for a zero subsidy level. It is unlikely that such a low bid will drive out competition since most new entrants will not base their business plans on whether or not a subsidy (which can be further reduced through competitive bidding, and may be transitory at best) is available. In any case, low bids are preferable since they will minimize the total universal service funding requirement. Even so, if there is a basis for concern that an incumbent LEC has engaged in predatory pricing in a particular case, then the Commission, the state PUCs and the courts should be available to address such concerns.

52. What safeguards should be adopted to ensure adequate quality of service under a system of competitive bidding?

Most states have adequate quality of service standards in place today. Those same standards should be applied under a system of competitive bidding.

53. How is collusion avoided when using a competitive bid?

The Commission has experience in preventing collusive activity in the context of spectrum lotteries and auctions. Similar restrictions should be adopted in the context of a universal

service competitive bid process.

54. Should the structure of the auction differ if there are few bidders? If so, how?

No. NCTA would expect that for otherwise unserved areas, the general case would be that there are few (less than 4 or 5) bidders.

55. How should the Commission determine the size of the areas within which eligible carriers bid for universal service support? What is the optimal basis for determining the size of those areas, in order to avoid unfair advantage for either the incumbent local exchange carriers or competitive carriers?

Because the recommended proxy model approach would use wire center boundaries to determine the level of support, competitive bidding should also take place at the wire center level. This should not be interpreted to mean, however, that any carrier should be required to serve an entire wire center area, or that any geographic restrictions on service boundaries are appropriate.

Benchmark Cost Model (BCM)

56. How do the book costs of incumbent local exchange carriers compare with the calculated proxy costs of the Benchmark Cost Model (BCM) for the same areas?

NCTA and other proponents of cost proxy models have repeatedly stated that in the context of universal service, the proper goal of cost proxy models is to estimate the forward-looking cost of providing basic, single line, residential telecommunications service using today's technology. As such, it should not be expected that the cost estimates of a properly designed cost proxy model would match the book cost of incumbent local exchange carriers. Such a comparison is fundamentally flawed by the fact that what is being modeled is *intended to represent different costs* from what is reported. The book costs of an individual carrier necessarily reflect that carrier's *actual* network design and therefore engineering goals associated with services other than basic residential local exchange service. Book costs not only reflect past LEC investment decisions and operating inefficiencies, but they are also rooted in rate of return regulation -- a regulatory paradigm that LECs have sought to discredit and that the FCC and many state commissions have since replaced with price caps or other forms of "incentive" regulation. Basing the distribution of universal service support on a company's reported costs would be entirely inconsistent with the competition goals of the 1996 Act and would ignore the need for a properly designed, forward-looking cost proxy model.

57. Should the BCM be modified to include non-wireline services? If wireless technology proves less costly than wireline facilities, should projected costs be capped at the level predicted for use of wireless technology?

Yes. To the extent that non-wireline services demonstrate an economic advantage over the use of more traditional wireline technologies, any reasonable forward-looking cost model

should include algorithms that cap wireline costs. This is precisely the approach adopted in the BCM2, where a maximum investment per wireline loop has been established.

BCM2 assumes that an alternative wireless loop technology is utilized for loops requiring investment levels in excess of the cost of an alternative wireless technology; in BCM2, this value is set at $10,000 per loop as the cutover point for wireless, a figure purportedly based upon ongoing trials.

58. What are the advantages and disadvantages of using a wire center instead of a Census Block Group as the appropriate geographic area in projecting costs?

The Census Block Group is a construct of the U.S. Census Bureau and has nothing whatever to do with the manner in which the telecommunications network would be designed, either in the past or in the future. Consequently, there is no basis whatsoever to expect that, on a forward-looking basis, any network would be constructed around the geographic properties of a CBG. The public switched network is, however, structured around the wire center as the basic network unit. Within the area served by a wire center there are extensive scale and scope economies arising from the ability of subscribers in all parts of the wire center serving area to share certain resources in common. Assessment of costs at a level below the wire center (e.g., at the CBG) necessarily requires an arbitrary assignment of such shared switching and distribution network costs as among the various CBGs and should therefore be rejected

In contrast, wire center locations and their associated feeder and distribution networks have been optimized to cover most efficiently the entire area that each serves. Furthermore, determining cost proxies and cost support requirements at the wire center level does not preclude one from utilizing *data* that is disaggregated at the CBG level, as does the BCM. Wire center costs can be determined by simply aggregating the per-CBG costs that are derived by the BCM for all of the CBGs within each wire center. ETI has demonstrated that the BCM can be readily used to develop such wire center level cost proxy estimates. Thus, the issue at hand is not constrained by the available proxy modeling tools, but is simply one of determining which approach better achieves an economically efficient and competitively fair result.

59. The Maine PUC and several other State commissions proposed inclusion in the BCM of the costs of connecting exchanges to the public switched network through the use of microwave, trunk or satellite technologies. Those commenters also proposed the use [of] an additional extra-high-cost variable for remote areas not accessible by road. What is the feasibility and the advisability of incorporating these changes into the BCM?

Should any incumbent LECs be aware of particular, unique areas (e.g., islands) that face extraordinary and atypical cost characteristics that the BCM fails to reflect, it may be appropriate for the FCC to permit such ILECs to identify and describe such instances so that the BCM can be adjusted to reflect the fact that a different type of technology is needed in order to provide these remote areas with the same quality of service as is provided elsewhere. The feasibility of such changes depends largely on the ability of the

ILECs to specify which CBGs cannot be served by a landline network and what forward-looking, available technology would be used to serve such CBGs.

60. The National Cable Television Association proposed a number of modifications to the BCM related to switching cost, fill factors, digital loop carrier subscribers equipment, penetration assumptions, deployment of fiber versus copper technology assumptions, and service area interface costs. Which, if any, of these changes would be feasible and advisable to incorporate into the BCM?

NCTA has focused its efforts on identifying feasible ways in which the BCM can be revised in order to more accurately reflect the forward-looking economic costs of providing single-line basic local exchange service. The two Joint Sponsors of BCM2 have adopted or partially adopted several of the recommendations that ETI put forward in its April 1996 report which was submitted with NCTA's initial comments.[4] Other important recommendations, however, still need to be addressed.

ETI recommended that the fill factors for feeder and distribution be increased to 95 percent for all density zones to account for the relative stability inherent in the provision of primary residential access lines. While the Joint Sponsors have raised the fill factors slightly,[5] they are still far below the levels needed to properly model the potential universal service requirement, and thus, if adopted, would burden universal service funding with the recovery of costs associated with LECs' excess spare capacity -- spare capacity that exists for strategic reasons and not for the purpose of providing single-line basic residence service.

The recommendation that the copper/fiber crossover point should be a user specified input has been partially addressed; the BCM2 allows for the user to choose from among four crossover points at 9,000, 12,000, 15,000 and 18,000 feet, respectively. There is no evidence, however, that the Sponsors have attempted to identify which of these crossovers represents the most economic option. Furthermore, unlike other user-specified variables which allow any figure to be used, the BCM2 limits the selection of the cross-over point to four options.

NCTA intends to address these and other issues more comprehensively in its comments on the BCM2 that will submitted on August 9.

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4 Baldwin, Susan M. and Selwyn, Lee L., The Cost of Universal Service: A Critical Assessment of the Benchmark Cost Model, April 1996.

5 Feeder fill in BCM-1 ranged from 65 percent for the least dense areas to 80 percent in urban density zones versus 75-85 percent in BCM-2. Similarly, for Distribution fill, while BCM-1 ranged from 25-75 percent, BCM-2 modifies the range to be from 40-80 percent.

61. Should the support calculated using the Benchmark Cost Model also reflect subscriber income levels, as suggested by the Puerto Rico Telephone Company in its comments?

No. The purpose of the BCM should continue to be to model the forward-looking cost of providing single-line basic residential service and, based upon the results of the model, to then compute the high cost/universal service funding requirement that is necessary to support a given price threshold. The important question as to the appropriate level of support that should be provided to ensure that service is affordable for all households, regardless of income, should continue to be addressed through distinct programs such as Lifeline and Link Up. Although there is merit to the concept that some relatively high-cost areas may include households with high incomes (and thus the households may be able to pay higher monthly rates, eliminating the need for high-cost support) or alternatively some areas with costs that are just below the qualifying price support level may include low-income households (and thus need support where other areas of average income would not), it would be unwieldy to modify the BCM to overlay the dual goals of targeting assistance based upon (1) income and (2) the cost characteristics of serving given areas. Issues of universal service support needed in order to target assistance to low-income households should continue to be addressed separately. After a cost proxy model has been successfully adopted and implemented, it could be appropriate in a future and separate proceeding for the FCC to seek to enhance the cost proxy model so that high cost support is considered in tandem with current income levels.

62. The BCM appears to compare unseparated costs, calculated using a proxy methodology, with a nationwide local benchmark rate. Does use of the BCM suggest that the costs calculated by the model would be recovered only through services included in the benchmark rate? Does the BCM require changes to existing separations and access charge rules? Is the model designed to change as those rules are changed? Does the comparison of model costs with a local rate affordability benchmark create an opportunity for over-recovery from universal service support mechanisms?

Question 62 raises many related issues, among them that of rate rebalancing. The BCM yields an unseparated cost for basic local exchange service and compares that theoretical cost to a desired price support. Without a comprehensive evaluation of the existing sources of support for universal service support (e.g., high cost and income-based assistance) and for basic local exchange service, there is certainly a possibility for over-recovery by incumbent local exchange carriers. For a comprehensive discussion of this and related issues, refer to Chapter 7 of the ETI report submitted with NCTA's initial comments in this proceeding.[6]

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[6] See The Cost of Universal Service: A Critical Assessment of the Benchmark Cost Model, Baldwin, Susan M. and Selwyn, Lee L., April 1996 at 123-138

63. Is it feasible and/or advisable to integrate the grid cell structure used in the Cost Proxy Model (CPM) proposed by Pacific Telesis into the BCM for identifying terrain and population in areas where population density is low?

Based on our understanding of the CPM and its grid cell structure, we do not recommend attempting to add a similar degree-based grid structure to the BCM (or BCM2). As explained below, the CPM's grid does not in itself improve the accuracy with which customer locations and terrain variables are known, and may in fact create spurious precision in terrain and location data and the resulting estimates of local loop costs.

For all the cost proxy models under study, the accuracy of their loop cost estimates will reflect, among other things, the accuracy of the *source data* on customer locations. The original version of the CPM -- which Pacific Bell submitted in the California Public Utility Commission's (CPUC's) universal service proceeding -- had an advantage in this particular respect, since it used actual customer addresses drawn from Pacific Bell's billing databases. However, a serious drawback to this approach is that Pacific Bell and other LECs consider such address data confidential and proprietary, thereby limiting the ability to review related portions of the model. INDETEC and Pacific Bell have now modified the CPM so that it can accept commercially-available census data on households and daytime population, mapped to the CPM's grid cells.[7] While this approach mitigates the latter problem, it also means that the CPM now has the same dependency upon census-based data as do the BCM/BCM2 and the Hatfield Model, with no better prospects for accurately determining customer locations. To date, Pacific Telesis has supplied scant public information to the parties in this proceeding concerning the design of the CPM, including details on how census data has been mapped to grid cells. Unless the mapping process *begins* with location data below the CBG level (e.g., specific customer addresses), mapping customers to grid cells rather than CBGs produces a spurious "precision" and will not improve the actual precision with which customer locations are modeled.

The same issue applies when modeling terrain factors at a grid cell level. However, even if terrain data could be accurately disaggregated to the grid cell level, it would be insufficient to simply evaluate terrain conditions at the customer location. Terrain conditions impact the cost of installing loop facilities at all points along the facilities route, not just at the customer locations. Developing grid cell-level terrain data would do little to improve loop cost estimates unless the loop costing algorithms were modified to separately apply the terrain factors for each grid cell traversed by a loop facility segment to that segment. For example, simply assuming that a customer assigned to a grid cell identified as having sandy soil (low cost) terrain will have a relatively low loop cost may be incorrect if the route to that customer's serving central office must traverse other grid cells identified as having bedrock or subsurface water (high cost) terrain. Refining the model further in this

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[7] CC Docket 96-98, Reply Comments of Pacific Telesis Group, May 30, 1996, Appendix C ("Declaration of Richard D. Emmerson") at 17.

direction would appear to be a complex and costly exercise, which is not warranted at this time.

Cost Proxy Model Proposed by Pacific Telesis

64. Can the grid cell structure used in the CPM reasonably identify population distribution in sparsely-populated areas?

Please see the response to Question 63.

65. Can the CPM be modified to identify terrain and soil type by grid cell?

Please see the response to Question 63.

66. Can the CPM be used on a nationwide basis to estimate the cost of providing basic residential service?

The CPM is generally not a suitable model for estimating the costs of basic residential service outside of Pacific Bell's service territory, for which it was originally designed. In contrast to the BCM/BCM2 and the Hatfield Model, the CPM is not strictly a bottoms-up engineering/planning model, that builds up a simulated network from underlying components as required to meet the total specified demand level. Instead, the CPM costs out individual customer loops using pre-determined *unit* cost data stored in numerous tables in the CPM, which have been drawn from Pacific Bell company-proprietary databases and therefore strongly reflect the particular characteristics of Pacific Bell's embedded network. These individual loop costs are then simply summed together to estimate the total outside plant investment costs for the network, without any explicit sizing and costing of many of the network components that would actually be required to serve those customers.

In essence, the CPM's overall approach to costing outside plant is to: (1) analyze the LEC's existing, embedded local distribution network into a series of tables of unitized costs and network parameters,[8] and (2) reconstitute the network by applying those values to individual customer loops. This basic structure creates a dilemma for those who would apply the CPM beyond Pacific Bell's service territory: one must either assume that all of the characteristics of Pacific Bell's network that are enshrined in the CPM are correct, from a forward-looking perspective, for the LEC under study, or develop a full set of replacement values based on a forward-looking analysis of that particular LEC's network. Either choice is clearly problematic.

The drawbacks presented by the CPM's basic structure have also been recognized by

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8 Examples of the network parameters that must be specified in the CPM are: average cable sizes for feeder and distribution, mix of SAI vs. cross-connects by density zone, percentages of copper feeder that is underground, buried, and aerial, and ratio of route miles to airline miles, and ratio of feeder to distribution lengths.