AT&T / MCI have indicated that the eighteen year average life represents an average determined from recent FCC decisions. However, an eighteen year service life equates to a depreciation rate of 5.55%. In California, the CPUC composite depreciation rate approved for Pacific is 6.9%, nearly 25% higher than the AT&T / MCI selected rate. Neither the depreciation rate in the Hatfield Model nor that currently approved by the CPUC are appropriate for a TSLRIC proxy model. Those depreciation rates reflect the influences of a regulatory process that historically kept depreciation rates low and extended capital recovery into future years, beyond the economic lives of the equipment. Any proxy cost model intended to sustain universal service in the face of competitive entry must reflect economic lives consistent with fully competitive markets. Those lives should reflect the competitive effects on economic lives caused by PCS, cable television and CLC entry into the market. The current regulatory adopted depreciation lives do not reflect the environment a universal service provider will face. In our CPM model, we used the economic lives from our recent writedown of assets. Compared to the 18 year life assumption in the Hatfield Model, the weighted average economic life for Pacific in the CPM is 12.2 years.

III. *The Hatfield Model consistently underestimates the long run incremental investment required to provide Universal Service.*

A. *The Hatfield Model grossly understates the long run incremental switching investment required to provide Universal Service.*

16. Q. How does the Hatfield Model treat switching investment?

A. The Hatfield Model significantly understates long run incremental switching investment. In a long run incremental cost study, investments must reflect long run expected values. This the Hatfield Model fails to do.

With switching equipment, or any other technology-dependent equipment, prices vary over the life of the technology, even when adjusted to eliminate the effects of inflation. By definition, a long run incremental analysis must capture the overall effect of all life cycle price variations; something the Hatfield Model fails to do. For switch prices to a large local exchange carrier such as Pacific, the price variations have the following pattern:

1. When a new technology, such as today's digital switch, is first introduced, the price is relatively high, as the new technology provides advantages over existing technology, and the initial vendor(s) is able to charge a premium for the advanced capability.

2. As more vendors enter the market, providing competitive equipment, prices will drop, but will still reflect the premium value associated with the advanced features of the new technology.

3. At some point, the new technology will become the standard, and the older technology will have ceased to be produced. During this period, switch vendors offer to provide under contract large numbers of switches, associated with replacing a large number of existing older technology switches, at significant price discounts. These discounted prices are often limited to the replacement of the older technology, and do not extend to future growth additions to the new technology. (This is the current stage of pricing for digital switches).

4. After the replacement of the older switches has been completed, the switch replacement contracts will expire, and vendor switch prices will rise back to levels more commensurate with the relatively low volumes of purchases required to only meet growth demands (as all of the older technology switches have been replaced).

5. The last phase is late in the life of the technology, after a newer replacing technology appears, when the price of the now older technology increases rapidly as vendors exit that market.

The Hatfield Model understated current prices as the expected long run incremental investment. The Hatfield Model fails to recognize that today's

current digital switch prices, even if correctly stated, are themselves significantly lower than the long run expected values of those prices for the reasons explained above (current prices are at stage 3, the lowest in the life of the technology). By using its understatement of current digital switch prices, and by failing to recognize the long term pattern of price variations for digital switching equipment, the Hatfield Model grossly understates the average switching investment. For Pacific Bell, the Hatfield Model predicts a total digital switching investment of $2,838 million. This is obviously wrong since Pacific's actual digital switching investment was already $3,370 million in 1994, even though about 35% of Pacific's lines were still being served by older analog switches. The Hatfield Model thus starts its investment driven cost estimation process with one of its basic inputs, switching investment, at probably little over half (about 54%) of Pacific's projected long run incremental switching investment. By using as its switching investment input such a small fraction of Pacific's likely long run incremental switching investment, the Hatfield Model cannot help but grossly understate its estimates of those expenses it derives by applying embedded cost factors to that investment.

1 ***B. The Hatfield Model consistently underestimates the long run***
2 ***incremental loop investment required to provide Universal***
3 ***Service.***

4 17. Q. How does the Hatfield Model identify incremental investment for local loops?

5 A. The Hatfield Model does not independently calculate loop investments.
6 Rather, the Benchmark Cost Model (BCM) is used with the Hatfield Model to
7 calculate loop costs. The BCM has a number of problems which cause it to
8 improperly calculate incremental loop investments.

9 In his testimony for Pacific Bell, James Schaaf identifies and discusses many
10 of these problems. A summary of those problems is that the BCM does not
11 model the way loop plant is actually engineered and placed. In addition, the
12 BCM omits a lot of loop investments. The Hatfield Model attempts to rectify
13 some of the BCM problems of missing drop, terminal and SAI investments. It
14 does not, however, make any adjustments for other missing costs such as
15 engineering costs and cable splicing costs. While the BCM was a good first
16 attempt at creating a proxy cost model, it lacks the sophistication of the CPM.
17 Many of the BCM problems and shortcomings are carried over into the
18 Hatfield Model.

19 18. Q. Do you have any other concerns about the investments shown in the Hatfield
20 Model?

A. Yes. I have significant concerns about the sources and levels of many of the inputs to the Hatfield Model. At the April 3 workshops, AT&T / MCI presented revised April 1 results for their model. These revised results, which I have reflected in my testimony, increased the investments calculated by the Hatfield Model by about 30% over previous runs.

In discussing the changes, AT&T / MCI indicated that some of the inputs and logic in the model had been changed. When asked for the sources for the new inputs, AT&T / MCI said the values in the April 1 runs were only place-holders, and that AT&T / MCI were still investigating and searching for actual values to use. AT&T / MCI have yet to inform Pacific of the final values they intend to use for these place-holders , or to provide the sources for these new inputs.

19. Q. Please summarize the differences in investments as identified by the Hatfield Model and your CPM.

A. The following table (Table 2) compares the investments for Pacific Bell as determined by the two models:

TABLE 2

INVESTMENT COMPARISONS

	Unit Investment	Hatfield Model Estimates per line	CPM Per line	Total Hatfield Model Understatement
1	Feeder - Total	$ 25.79	$ 87.69	$ 569 Million
1a	Feeder	N/A	$ 65.13	-
1b	SAI	N/A	$ 22.56	-
2	Distribution - Total	$ 131.78	$ 235.54	$ 522 Million
2a	Distribution	N/A	$ 184.17	-
2b	Terminal	N/A	$ 50.99	-
3	Support Structure	$ 0	$ 90.91	$ 875 Million
4	Drop	$ 40.00	$ 50.55	$ 107 Million
5	Loop Electronics	$ 85.89	$ 139.69	$ 529 Million
6	Total Switch + IOF	$ 194.75	$ 242.11	$ 482 Million
6a	TS Switching	In Switch	$ 122.22	-
6b	NTS Switching	In Switch	$ 119.89	-
6c	Switching	$ 191.49	-	-
6d	IOF	$ 3.26	In TS Switch	-
	Total Investment	$ 478.22	$ 846.11	$ 3,604 Million

The most noticeable difference is that the Hatfield understates investments for <u>every</u> type of plant. The largest understatements are for the various categories of loop investment. The single largest difference is that the Hatfield Model assigns <u>no</u> investment for support structure to Universal Service. The Hatfield Model identifies a support structure investment, and an annual capital cost of $173 Million, but then excludes that cost from it's subsidy calculation.

20. Q. Are there any explanations of why the Hatfield Model understates loop investments for residential service?

A. Yes. AT&T / MCI have described that the Hatfield Model calculates an average loop investment for each loop in a particular studied area. It then calculates the subsidy requirement for the study area by first subtracting the investments it associates with business loops in the study area. In this calculation it assumes that both business and residence loops in the area have the same investment (the average loop investment of the area).

Pacific's OANAD TSLRIC studies indicate the distribution plant portion of residence loops tends to be significantly longer than the distribution plant portion of business loops (more than 70% longer). Additionally, the associated distribution plant costs of the buried terminals and drops of residential service loops are costs not offset by lower cost business service loop equivalents. The net effect is that the distribution plant and related costs for residential service loops are more than 70% more costly than for business service loops. This difference accounts for three fourths of the $40 annual capital cost difference between business and residence service loops. As these cost differences are relatively independent of study area differences, the effect of the Hatfield Model's averaging of the loop investments is to significantly overstate the investment for a business loop and to significantly understate the investment for a residence loop in the same study area.

Pacific's CPM does not yet have all of the business service loop data to enable it to determine the subsidy for business loops in high cost areas. We expect to

have that data and the resulting subsidy calculation by early May, if not sooner. (ALJ Ruling, February 21, 1996, Question 5).

IV. Pacific Bell's Cost Proxy Model (CPM) accurately estimates costs of providing Universal Service.

21. Q. How is Pacific Bell's Cost Proxy Model superior to the Hatfield Model?

A. Pacific Bell's Cost Proxy Model (CPM) is far superior to the Hatfield Model in accurately estimating costs of providing Universal Service for the following reasons:

- The expenses input to the Cost Proxy Model are estimated expenses per line of providing universal service that can reflect the best available data for each company, not estimates derived by applying factors from embedded cost relationships, expenses for New Hampshire in 1992, or factors from the airline industry.
- The investments input to the Cost Proxy Model reflect forward looking engineering guidelines for placing equipment, and appropriate long run equipment prices charged by equipment vendors, not estimates derived from other states or short term special price discount deals.

The inputs into the Cost Proxy Model can reflect OANAD cost studies identified following the Total Service Long Run Incremental Cost study principles adopted by the CPUC (D. 95-12-016, Appendix C), not embedded

costs and relationships from other companies in other states, or other cost studies determined using unknown principles.

22. Q. What relationship is there, if any, between the cost data used for the proxy cost model, and the cost data prepared for the OANAD? (ALJ Ruling, February 21, 1996, Question 8).

A. The cost data used for Pacific's proprietary Cost Proxy Model (CPM) is virtually identical to that prepared for Pacific's OANAD TSLRIC showing. The cash operating expenses identified in the OANAD studies are inputs to the CPM. The forward looking unit investments used as inputs to the CPM are the same as those used as inputs to Pacific's OANAD studies, as are the characteristics of the use of that investment (e.g., lengths of feeder cables, cable locations, type of plant). The only difference in the inputs to the models is that the plant utilizations used to size feeder plant for the OANAD study is the theoretical maximum, consistent with the capacity cost definitions used for OANAD, while the utilizations used to size feeder plant for the CPM are the actual expected utilizations appropriate for the Universal Service cost calculation.

The non-proprietary version of the CPM relies on data from commercial databases and other public sources. It does not use any proprietary date from Pacific's TSLRIC cost studies

1 ***V. What are the cost differences associated with providing***
2 ***customers the choice of flat or measured rate service,***
3 ***and the technical feasibility of providing that choice?***

4 23. Q. What are the cost differences associated with providing customers the choice
5 of flat or measured rate service, and the technical feasibility of providing that
6 choice? (ALJ Ruling, February 21, 1996, Question 4).

7 A. The cost differences between providing residential flat rate service and
8 residential measured rate service are the different costs of the unbilled usage
9 provided with each service. The volume sensitive TSLRIC of the average
10 unbilled usage for each of the residential services was identified in Pacific's
11 OANAD showing. Because of the wide variations in the amount of unbilled
12 local usage between customers with flat rate residential service, there is a
13 correspondingly large variation in the cost of providing that usage. Each of
14 Pacific Bell's central office switches is capable of providing either flat or
15 measured service.

16 24. Q. Does this conclude your testimony?

17 A. Yes.

Exhibit 110

[REDACTED]

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Rulemaking on the Commission's Own Motion into Universal Service and to Comply with the Mandates of Assembly Bill 3643	R.95-01-020 (Filed January 24, 1995)
Investigation on the Commission's Own Motion into Universal Service and to Comply with the Mandates of Assembly Bill 3643	I.95-01-021 (Filed January 24, 1995)

OPENING REPORT OF THE DIVISION OF RATEPAYER ADVOCATES REGARDING THE COST PROXY MODELS AND OTHER ISSUES IN THE UNIVERSAL SERVICE PROCEEDING

[Proprietary information designated as proprietary by a utility has been redacted.]

Filed: April 17, 1996

MAY 15 1996

MEMORANDUM

This report was prepared by the Division of Ratepayer Advocates (DRA) of the California Public Utilities Commission. DRA has prepared this report as part of its ongoing particpation in the Universal Service proceeding, R.95-01-020/I.95-01-021. Angela Young served as project manager for this proceeding and was responsible for the coordination of this report.

On February 21, 1996, Administrative Law Judge Wong issued a ruling listing thirteen questions as issues to be addressed in the evidentiary hearings of this proceeding. The following list identifies individual witnessess who will be sponsoring DRA's position and recommendations relating to these thirteen questions/issues.

CHAPTER 1 - Introduction and Summary of Recommendations
Witness: Angela Young

CHAPTER 2 - Commission's Expectation of a Proxy Cost Model
Witness: Hassan Mirza

CHAPTER 3 - DRA's Position and Recommendations on the Proxy Cost Model

I. [Q.1]	Witness:	Hassan Mirza
II. [Q.2]		Hassan Mirza
III. [Q.3]		Hassan Mirza
		Angela Young
IV. [Q.6]		Hassan Mirza
V. [Q.4]		Angela Young
VI. [Q.8]		Angela Young
VII. [Q.9]		Angela Young
VIII. [Q.5]		Angela Young
IX. [Q.7]		Angela Young
X. [Q.10]		Zenaida Conway

Chapter 4 - DRA's Recommendation on Other Universal Service Issues

I. [Q.1]	Witness:	Truman Burns
II. [Q.2]		Truman Burns
III. [Q.3]		Truman Burns

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APPENDIX A: QUALIFICATIONS AND PREPARED TESTIMONY

Angela Young	AYY-1
Hassan M. Mirza	MHM-1
Zenaida Conway	ZTC-1
Truman L. Burns	TXB-1

CHAPTER 1
INTRODUCTION AND SUMMARY OF RECOMMENDATIONS

I. INTRODUCTION

1 This is DRA's report in response to Administrative Law Judge (ALJ) Wong's February 21, 1996 ruling requesting parties to address in prepared testimony specific issues embodied in thirteen questions. This testimony addresses issues raised in the ALJ Ruling which includes but is not limited to the following:

- the appropriate proxy cost model to estimate the costs of universal service in high cost areas of the state;
- the subsidy requirements for the provision of universal service in California;
- the appropriate offsets to the subsidy amounts for carriers providing basic services;
- the appropriate application of implicit subsidies currently accumulated by the incumbent LECs; and
- impacts of the Telecommunications Act of 1996.

This report also includes a discussion on pricing flexibility and geographic rate deaveraging of basic service for the incumbent LECs. Even though these particular issues were not explicitly raised in the ALJ Ruling, they are included for purposes of illustrating DRA's proposed subsidy mechanism.

II. SUMMARY OF RECOMMENDATIONS

2. The Commission determined that a proxy cost study be used to develop the cost of basic service throughout the state. The Commission intends to use the outputs of the proxy cost study to determine the level of subsidy support necessary to ensure universal service in California. As of this time, there are two computer models for the proxy cost study being sponsored by

parties in this proceeding. Pacific is sponsoring the Cost Proxy Model (CPM). AT&T Communications of California (AT&T) and MCI Telecommunications Corporation (MCI) are co-sponsoring the Hatfield Proxy Model (HPM). Because the CPM and the HPM are unique and independent, only one of these models should be adopted by the Commission.

3. DRA recommends that the Commission adopt the CPM, but modified it as follow:

- Assumptions:

  a. Design utilization factor instead of actual utilization factor should be used for feeder plant and pair gain systems;

  b. Fiber cable should be used for feeder plant greater than 12,000 feet;

  c. Switch costs should reflect the higher amount of manufacturers' discount available; and

  d. Costs associated with 2 copper pairs per drop should be included.

- Input Data:

  a. Relevant cost from Pacific's and GTEC's OAND cost studies adopted by the Commission should be included;

  b. Only rearrangement costs associated with serving the entire quantity of service and not costs associated with serving new customers should be included;

  c. Non-recurring cost should be treated as a shared cost.

4. DRA envisions that subsidies would be available to all carriers of last resort, and that the subsidy amounts would vary by geographic areas of the state. DRA's subsidy mechanism proposal is summarized below:

- Subsidy Mechanism:

  a. Pacific's current rate for flat rate service ($11.25) plus the end user common line charge

($3.50) should be used to identify high cost areas;

b. Subsidies in high cost areas should be available to all carriers of last resort;

c. Applicable subsidies should be available to each residential line;

d. Basic services in high cost areas should be subsidized up to their total service long run incremental costs (TSLRICs) as estimated by the proxy cost model; and

e. Subsidies to carriers of last resort should be offset by revenues from the interstate Universal Service Fund (USF) and interstate carrier common line charge (CCLC).

- Implicit Subsidies:

  a. Revenues from Yellow Pages and other competitive and discretionary services should not be considered in the subsidy offset calculation; and

  b. Yellow Pages revenues would essentially cover the reasonable portion of the LECs' total shared and common costs not recovered through rates for the unbundled basic network functions (BNF) services the LECs sell to competing carriers.

5. Furthermore, DRA recommends that subsidies be available to schools, libraries, and rural health care providers as mandated in the Telecommunications Act of 1996.[1]

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1. Act at Sec. 254(h)(1)(A) and Sec. 254 (h)(1)(B).

CHAPTER 2
PROXY COST MODELS

I. COMMISSION'S EXPECTATIONS OF A PROXY COST MODEL

1. In D.95-12-021, the Commission determined that a proxy cost study would be used to develop the cost of basic service throughout the state. The cost of basic service would be used to determine the level of subsidy support necessary for the high cost areas. The Commission did not require a company-by-company cost analysis, or specific cost studies for each LEC. Instead, the Commission preferred a proxy cost model that would be representative of all of California, and not just for the service areas of Pacific and GTEC.[1]

2. Though the Commission did not specify a particular model, the Commission did set certain expectations. For example, the Commission envisioned that the proxy model would "accommodate different geographic and cost factors that are representative of the entire state".[2] Further, the "proxy cost model should closely reflect actual cost without having to develop all of the cost data necessary for cost studies of each individual LEC."[3] In addition, the proxy cost model should be able to account for the different kinds of service areas encountered in each LEC's territory in California. Basically, the proxy cost model should estimate the cost of providing basic service for a particular LEC area based on the characteristics of that particular area, such as "population density, distance to the nearest wire center and terrain, etc."[4] Furthermore, the Commission expects the proxy

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1. See D.95-12-021, pp. 5-7.

2. D.95-12-021, page 5.

3. Id., page 6.

4. Id., page 7.

cost model which has the advantage of being independent of a particular company's costs, to incorporate all costs including common and overhead costs.[5]

II. MODELS PROPOSED BY PARTIES

3. As of this date, only two models are being proposed by parties in this proceeding.[6] Pacific is sponsoring the CPM, while AT&T/MCI are sponsoring the HPM. Both Pacific and AT&T/MCI believe that their respective models are appropriate for the proxy cost study to estimate the costs of basic service in California.

4. Both CPM and HPM were developed by independent companies. INDETEC International (INDETEC), along with Pacific, developed the CPM for Pacific while Hatfield Associates, Inc. (Hatfield) developed the HPM for AT&T/MCI. DRA believes that both INDETEC and Hatfield have considerable financial investments in their individual models which would be enhanced if their model is adopted by the Commission.

5. Initially, HPM was the only model that was able to estimate the cost of basic service throughout the state. However, about five weeks ago, Pacific modified its CPM to estimate costs of basic service throughout the state. HPM uses

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5. Ibid.

6. DRA asked GTE California (GTEC) whether the company intended to sponsor any model different from the CPM and HPM. GTEC indicated in its March 13, 1996 data response that the company is
"... not planning to introduce a new proxy model to estimate the Universal funding requirements for California". Further, GTEC stated that "... an alternate model would not expedite the process of reaching a consensus."

the Excel Worksheet while CPM uses both Excel and SAS[7] for the various modules. Further, CPM was developed independent of any other model while HPM was developed as an extension of the Benchmark Cost Model (BCM).[8]

III. DRA'S EVALUATION PROCEDURE

6. DRA performed the following tasks in its review of the CPM and the HPM:

- o Reviewed documentation received to date for each model.
- o Examined the module structure of each model.
- o Analyzed the validity of each model as to the assumptions, objectives, and input requirements.
- o Performed a sensitivity analysis for certain assumptions and inputs on each model.

A. Documentation Review

7. During the review of the documents provided by the sponsor of each model, DRA gained some understanding of the model and its uses. Further understanding of each model was obtained through individual meetings, all party meetings, workshops, and running the individual models. At this time, DRA is expecting additional information relating to each model. Throughout the information gathering process, DRA has requested documentation

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7. SAS is Statistical Analysis Software.

8. BCM is a model developed by MCI, NYNEX, Sprint, and US West in a response to Federal Communications Commission (FCC) issuance of a docket (CC Docket No. 80-286) addressing funding for universal service. This model was suppose to provide "benchmark" costs for the provision of basic telephone service. This model is not being sponsored by any party in this Commission universal service proceeding.

relating to the individual models. Although DRA eventually received most of the information (a few responses are still outstanding), one request required considerable effort to obtain the necessary data. This request was for the proprietary information from Pacific's vendors regarding costs of the central office switches and pair gain systems.

8. Besides the difficulties of obtaining proprietary information, DRA has some concerns relating to the completeness of the information. For example, one of the inputs for the HPM model is based upon a casual conversation by Hatfield with a switch vendor, as discussed in paragraph 5 of Chapter 3 of this report. Therefore, DRA has no way of validating the basis for this input.

9. For the HPM, DRA has obtained an instruction manual, block diagrams, BCM informational package (dated December 1, 1995) submitted to the FCC in CC Docket 80-286, discussion of input assumptions, and responses to other written and verbal data requests (some data requests are incomplete). For the CPM, DRA has similarly received a User's Manual, block diagrams, design overview, information on some input assumptions, and responses to other written and verbal data requests (several of which are still outstanding). To the extent that inputs to the CPM were based upon Pacific's cost studies done for OAND, DRA has performed a limited review.

B. Module Structure

10. Both the CPM and HPM use a module structure to determine the cost of basic service. A block diagram for each model showing the different modules and a flow of data is attached to this chapter (Attachments # 2.1 & 2.2 for CPM and HPM, respectively). CPM has six input modules and one revenue module to perform the cost calculations. The output reports produced by CPM could be supplied on a statewide, or on a company-specific basis. In addition, CPM is able to produce

reports by density zones, wire centers, and census blocks, among others. HPM, on the other hand, has 2 modules which are taken directly from the BCM, and four "enhanced" modules relating exclusively to HPM. Like the CPM, the HPM can also produce output reports for the State, density zones, wire centers, and census blocks. DRA assumes that each sponsor will thoroughly discuss its model in its opening testimony to be filed on April 17, 1996.[9]

C. Validity of Model

11. In validating the CPM and HPM models, DRA examined the model input data and assumptions. For each major model assumption/input, DRA reviewed the source for most of the input data, how realistic and applicable each assumption/input is to the LEC network in California. Part of the analysis will include sensitizing some of the assumptions/inputs that are in the models. By changing one or more inputs incrementally, DRA was able to determine the effect of each change in the model result. The results on various sensitivity runs will be provided in DRA's reply testimony.

D. Sensitivity of Model

12. DRA will perform sensitivity runs on certain inputs to determine the effect on the results from the model. For example, Pacific assumed a specific utilization level for the feeder and pair gain system portions of the outside plant. DRA ran the model using the network design criteria for the utilization level for these two portions of the outside plant. This different utilization level is further discussed in paragraph 12 of Chapter 3 of this report. The sensitivity runs on utilization level and

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9. If the Commission adopts a particular model, there is a potential for the model owner(s) to market that model in other states and other countries.

other incremental input changes will be provided in DRA's reply testimony.

VI. MODEL EVALUATION CRITERIA

13. There are many different criteria that can be used to evaluate a model, from conceptual design to external validation. DRA believes that the following criteria should be used in the evaluation of the two models:

- Usefulness of the Model:

  Does the model estimate the cost of basic service throughout the state? Further, can the model adequately account for the different kinds of service areas encountered in each LEC's service area? Finally, is the model relatively easy to use?

- Conformance of the Model to Accuracy/Reality:

  Does the model accurately reflect the various network components. For example, does the model include the different components (e.g. drop, SAI, etc.) of a telecommunications network in California? Further, does the model adequately represent the outside plant and switching cost investment of the LECs in California? In addition, does the model include factors that are closely match the forward looking technology that is being modeled? Finally, are the cost inputs to the model comparable to OAND costs for similar basic services.

- Availability of Model:

  Is the model, along with inputs and assumptions constrained by proprietary or confidential concerns? Further, is the model ready and available at the Commission for the decision makers?

###

ATTACHMENTS

TO

CHAPTER 2