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May 7, 1998

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie R. Salas
Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, DC 20554

Ex Parte: **Federal-State Joint Board on Universal Service,**
CC Docket Nos. 96-45 and 97-160 - Proxy Cost Models

Dear Ms. Salas,

In accordance with Commission Rules, please be advised that on Wednesday, May 6, 1998, Whitney Hatch, Alan Ciamporcero, Dennis Weller and the undersigned of GTE and Frank Murphy of Network Engineering Consulting, Inc. met with Kevin Martin of Commissioner Furchgott-Roth's office, Kyle Dixon of Commissioner Powell's office, Jim Casserly of Commissioner Ness's office and Paul Gallant of Commissioner Tristant's office to discuss the development and use of proxy cost models and the design of the federal universal service mechanism. The following material was used in the discussion (copies are attached):

"Cost Model Platforms and the Design of the Federal USF Mechanism" - review of specific cost model components and policy considerations for designing the federal universal service plan.

"GTE Texas Geocoding Match Rates" – copy of map depicting low geocoding match rates in rural areas originally submitted by GTE onApril 27, 1998 in response to the Common Carrier Bureau's data request.

"The Hatfield (HAI) Model 5.0a and the Underbuilding of Distribution Plant" – an analysis of PNR data developed by Sprint.

"BCPM Customer Location and Outside Plant Distribution Design Methodology" – developed by BCPM sponsors.

If you have any questions regarding this filing, please call me at (202) 463-5293.

Sincerely,

W. Scott Randolph
Director - Regulatory Matters

Attachment

cc: Jim Casserly
Kyle Dixon
Paul Gallant
Kevin Martin

No. of Copies rec'd 0+2
List ABCDE

Cost Model Platforms and the Design of the Federal USF Mechanism

GTE

6 May 1998

Dennis Weller, GTE

Francis Murphy, NECI

Cost Model Platform and the Design of the Federal USF Mechanism

- None of the cost models is accurate
- Of the platforms available to the Commission, BCPM is the only reasonable choice
- The Federal plan must be designed to achieve reasonable results even if the model is not perfect
  - Reasonableness checks for result of plan
  - Auctions as corrective mechanism

None of the Proxy Models Is Accurate

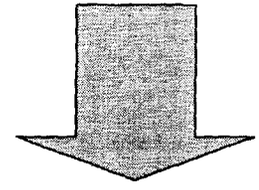
- **Results are erratic**
  - Wide variations in total, by state, by wire center, by biz/res
- **No reason to expect accuracy**
  - Incorrect cost concept
  - Limited information
  - Crude heuristics
- How can the Commission be confident that **either** of these estimates is correct?

Results All Over the Map

- Models produce wildly different results
  - **Nationwide**
    - Hai estimates 40% less support than BCPM for 20/25/40 plan
  - **By state**
    - BCPM provides 51% **less** support than HAI in Arkansas;
    - 271% **more** support in Puerto Rico
  - **By wire center**
    - The two models don't even support the same wire centers
  - **Between business and residence**
    - Percent of support between $31 and $51 that goes to business: 14% for BCPM, 4% for HAI

THE NETWORK MODELED IN HAI 5.0A CANNOT FUNCTION

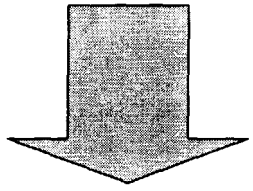
- Basic Engineering Principles are Ignored
- Technology Assumptions are Not Forward-Looking
- Customers are Not in the Correct Locations
- Rural Customers Cannot Receive Advanced Services or Take Advantage of Today's Modem Speeds
- Output Does Not Compare Realistically to Reported Data
- Distribution Cable Does Not Reach Customers
- The Model Cannot Accommodate Growth or Seasonality
- Switching Assumptions are Unrealistic



THESE FLAWS ARE NOT INHERENT IN THE BCPM MODEL

THE NETWORK MODELED IN BCPM CAN FUNCTION

- BCPM Adheres to Basic Engineering Principles
- Technology Assumptions Are Forward-Looking
- Customers Are More Realistically Located
- Rural Customers Can Receive Advanced Services and Take Advantage of Today's Modem Speeds
- Compares More Reasonably to Reported Data
- Distribution Cable is Sufficient
- The Model Can Accommodate Growth and Seasonality
- Switching Assumptions are Realistic



BCPM SHOULD BE ADOPTED BY THE COMMISSION FOR USF PURPOSES

The Cost Mechanism Chosen Should Include:

- Access to the model
  - HAI contains preprocessing steps that are closed to the user
  - The limited access provided to the PNR database is problematic
- Model chosen by the Commission should be taken in-house by the staff
  - Out of sponsor's hands
  - All processes open to examination

THE COST MECHANISM CHOSEN SHOULD INCLUDE:

- **Customer Location Algorithms That Reasonably Locate Customers**
  - HAI artificially clusters customers and consequently understates distribution plant
  - Geo-coding is seriously incomplete in HAI
  - Geo-coded data that is available is discarded
  - The HAI cluster design methodology does not adhere to standard engineering designs
  - Non geo-coded customers should be evenly distributed throughout all roads in the CB not just the periphery
- **BCPM More Reasonably Locates Customers Than the HAI Model**
  - BCPM places customers on appropriate roads

THE COST MECHANISM CHOSEN SHOULD INCLUDE:

- **Sufficient Distribution Cable to Reach Customers**
  - Cursory review of PNR data indicates distribution plant is insufficient in the lowest density zones where USF funding will most likely be required
- **Preliminary Analysis Performed by Sprint for GTE Contel in Nevada**
  - HAI under builds a minimum 27 of 46 clusters in the 0-5 density zone
  - HAI under builds a minimum 14 of 49 clusters in the 6-100 density zone
  - A sample of the Nevada Contel clusters depicts a minimum shortfall of 193,751 feet of a total of 492,344

THE COST MECHANISM CHOSEN SHOULD INCLUDE:

- **Output That Compares Realistically To Reported Data**

Telephone Plant In Service

(% Modeled to ARMIS Actuals)

	Oregon	Texas
HAI	61%	75%
BCPM	92%	87%

Total Operating Expenses

(% Modeled to ARMIS Actuals)

	Oregon	Texas
HAI	47%	52%
BCPM	86%	79%

Note: Data is based on default runs

THE COST MECHANISM CHOSEN SHOULD INCLUDE:

- **A Forward-looking Network That Supports Required Services**
  - Copper-based T1 DLC modeled by HAI is not forward-looking
  - Compliance with CSA standards is a must for costs to be accurate
    - 18,000 foot copper loops modeled by HAI will prohibit the offering of advanced services
    - HAI's preprocessing steps do not conform to CSA standards
- **BCPM Adheres to Network Design Standards and Models a Forward-looking Network That Can Provide Advanced Services**
- **HAI Fails to Model a Forward-looking Network That Can Provide Advanced Services and Consequently Understates Costs**

THE COST MECHANISM CHOSEN SHOULD INCLUDE:

- **A Network Built To All Customer Locations In Order To Meet Service Delivery Standards**
  - HAI builds plant to only "in-service" locations which is unrealistic
  - HAI does not provide sufficient pairs per living unit
  - The mechanism must be capable of taking into account "warm dial-tone" requirements
  - The network must be built to adequate engineering standards in order support current service intervals and levels of service quality
    - < 1% blocking during the busiest hours of the 10 busiest days
    - New service requests and change orders must be processed promptly
    - Repair service provided in timely manner
- **BCPM's Network Is Able to Comply With Current Standards, HAI's Network Cannot and As a Result Understates USF Costs**

THE COST MECHANISM CHOSEN SHOULD INCLUDE SUFFICIENT STRUCTURE:

- **HAI Does Not Provide Structure Costs for Aerial Cable in the Two Highest Density Zones Causing It to Understate Costs**
- **Structure Costs in the Two Highest Density Zones**
  - A review of 3 communities whose CBGs are predominantly in the two highest density zones was conducted
  - HAI does not provide any aerial distribution structure costs for the top two density zones in these three communities because it effectively assumes all high rise dwellings
  - These communities have high percentages of single and small multi-family dwellings (67% - 86%)
  - These communities are served by aerial cable and drops in the distribution plant
- **BCPM Correctly Provides Structure Costs for Aerial Cable in the Highest Density Zones**

THE COST MECHANISM CHOSEN SHOULD INCLUDE:

- **Sufficient Trunks for the Network to Operate**
  - HAI consistently models significantly less trunks than found in GTE's network
    - In most states only 25-30% of GTE's trunks are modeled by HAI
  - The HAI Model ignores basic trunk engineering principles
    - Seasonality, modularity, assumed usage per trunk
- **Conformance To Standard Engineering Practices**
  - Model must recognize the indivisibility of certain network components
    - Line and Trunk Modules (e.g. line module = 640 lines)
    - GR-303 Interface Groups
  - Switch engineering standards must be followed

THE COST MECHANISM CHOSEN SHOULD INCLUDE:

- **The Ability to Unbundle Fiber Loops From Integrated Digital Loop Carrier (IDLC)**

- **BCPM Includes Necessary Investment to Unbundle Loops From IDLC**

- **HAI Does Not Include the Investment to Unbundle Loops from IDLC**

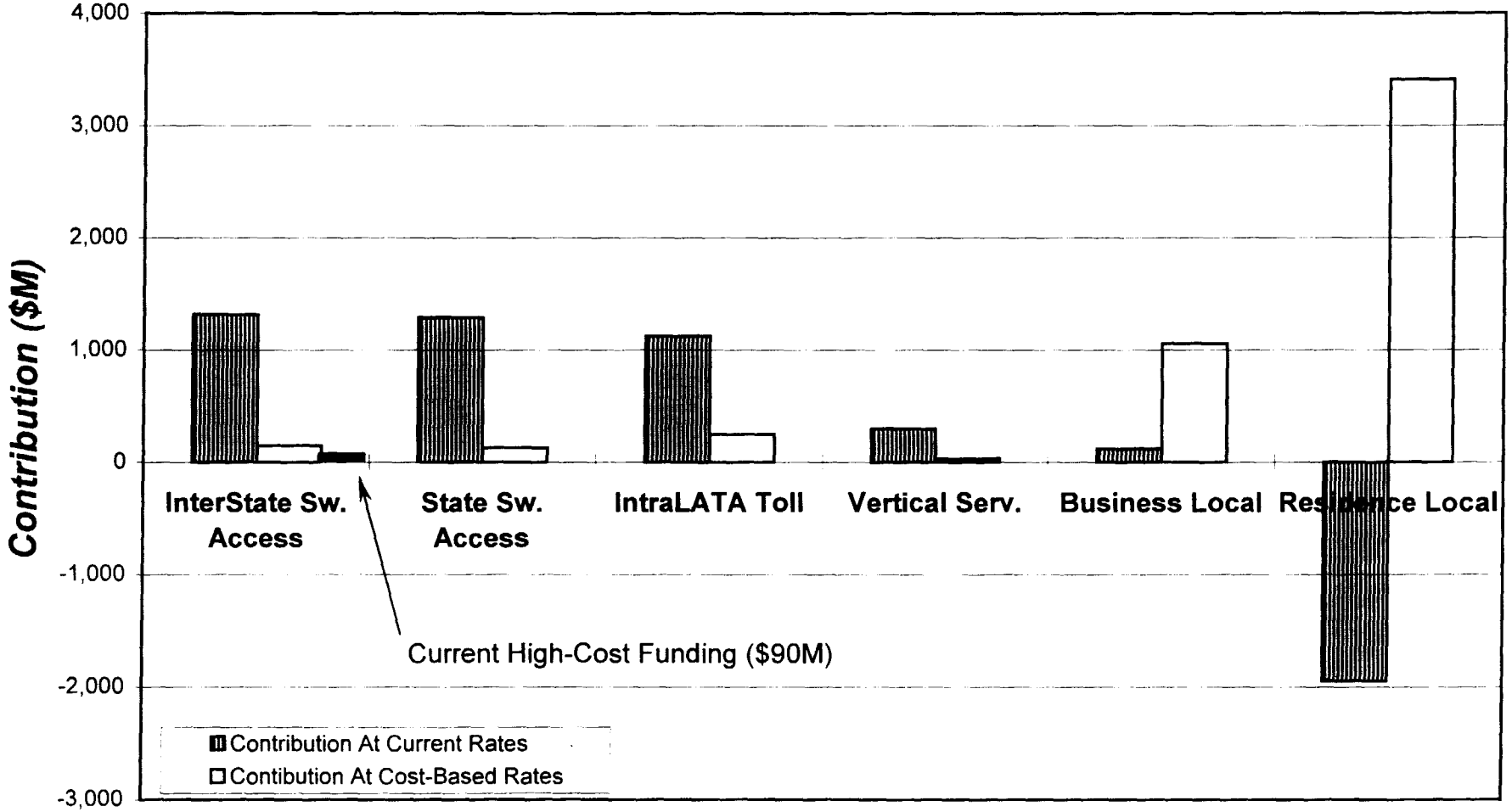
Plan Results Should be Reasonable

- Cost model will be wrong
- Plan should be designed with this in mind
- Results should make sense, even if the model doesn't
  - Commission should ensure that plan meets reasonable objectives
  - Model should not be vehicle for changing the basis of regulation

Methods for ensuring plan results are reasonable

- Checks for reasonableness of results:
  - **Is support sufficient to replace existing implicit support**?
    - $6.3 Billion in interstate rates alone
    - Is plan sending reasonable amount to states?
  - **What would revenue be if ILEC output were all sold at estimated cost level?**
    - Does model implicitly set new revenue level?
- **What would an efficient firm bid?**
    - Auctions would serve as corrective mechanism for support

GTE Contribution ($M) By Service At Cost-Based Rates



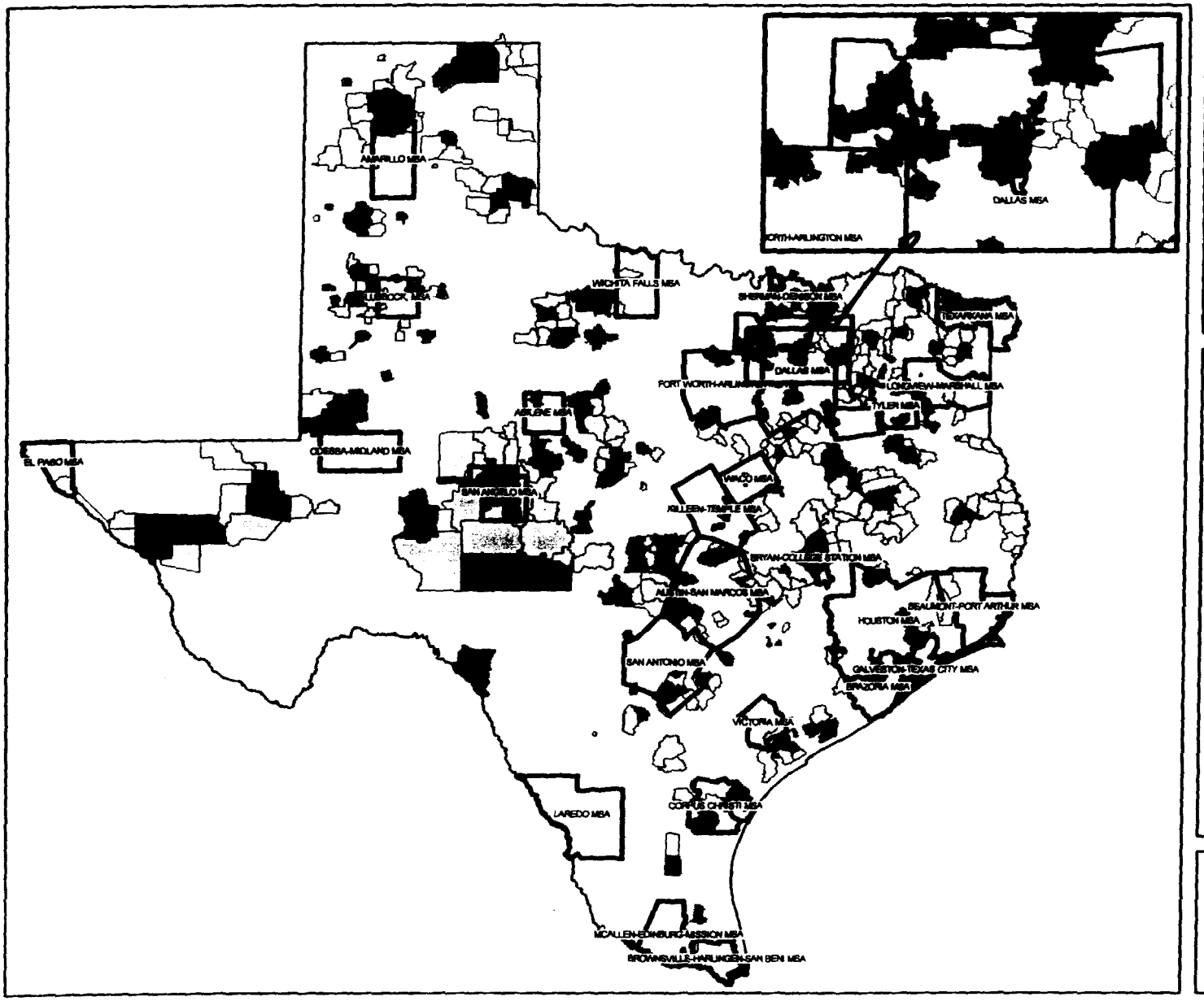
Issues To Be Addressed By Federal Fund

- Replace implicit support from interstate access -- $ 6.3 B
- Provide support for states with high costs, limited revenue --- $? B
- Maintain current level of Federal high cost funding --- $212 M

ATTACHMENT V

TEXAS GEOCODING MATCH RATES

COLOR CODED BY MATCH RATE PERCENTAGE



Layers

- TXWIRE:gte_total
- TXSTATE:States
- TX_MSA:MSAs

ADDR_GEO_

.00 to	.10
.10 to	.50
.50 to	.80
.80 to	1.00

MATCH RATE PERCENTAGE

Miles

0 100 200

The Hatfield (HAI) Model 5.0a and the Underbuilding of Distribution Plant

Sprint has previously filed documents with this Commission in which we provided evidence demonstrating how customer locations are distorted in the Hatfield Model and how the resulting distribution plant built by the Model falls far short of that which would be required to construct a functioning telephone network.

That information was created after an initial (and incomplete) examination of a portion of the HAI's underlying data, which is the property of PNR & Associates.

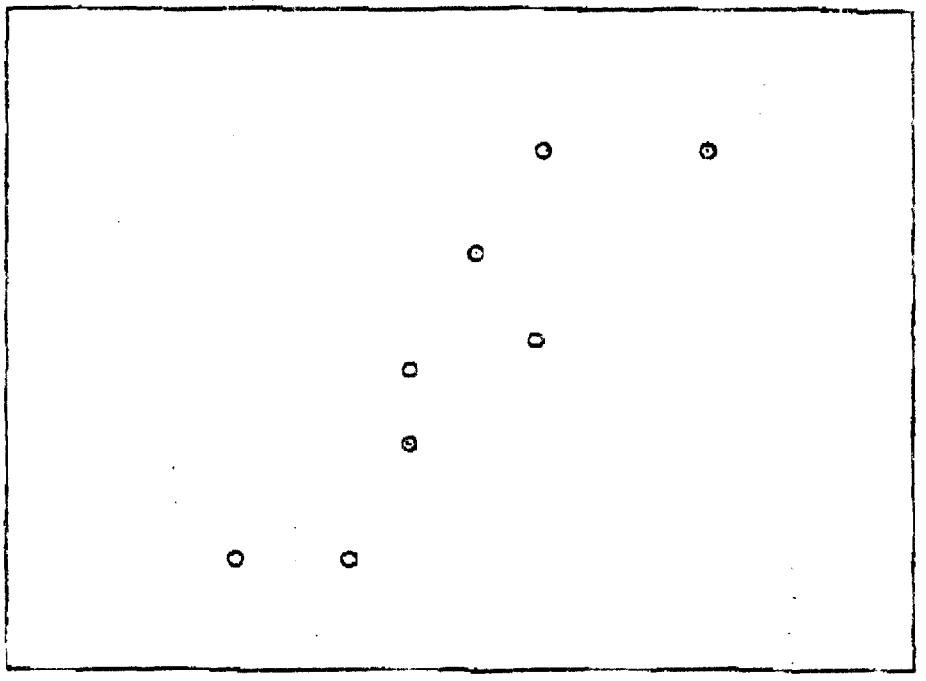
To date, Sprint has been denied further access to that data by the HAI Sponsors. As a result, we have not been able to provide a more extensive set of evidence revealing the magnitude of this flaw.

Now, however, Sprint has conducted an analysis using only data taken directly from the HAI Model itself. This analysis provides a sense of the magnitude and frequency with which HAI under-builds the local telephone network, particularly with regard to rural areas (which are of highest concern for universal service issues).

On the following pages, we list several facts and diagrams regarding the HAI's Preprocessing, Clustering and Loop Construction. Following this, we provide sample tables showing such results as...

For a cluster in...	The required distribution cable (in feet) is...	And the Hatfield Model builds a total of...
Nevada Bell region	More than 15,323	Less than 1,000
GTE/Contel region	More than 15,402	Less than 2,100
Citizens Tel. region	More than 30,863	Less than 1,700
Sprint region	More than 27,534	Less than 10,100

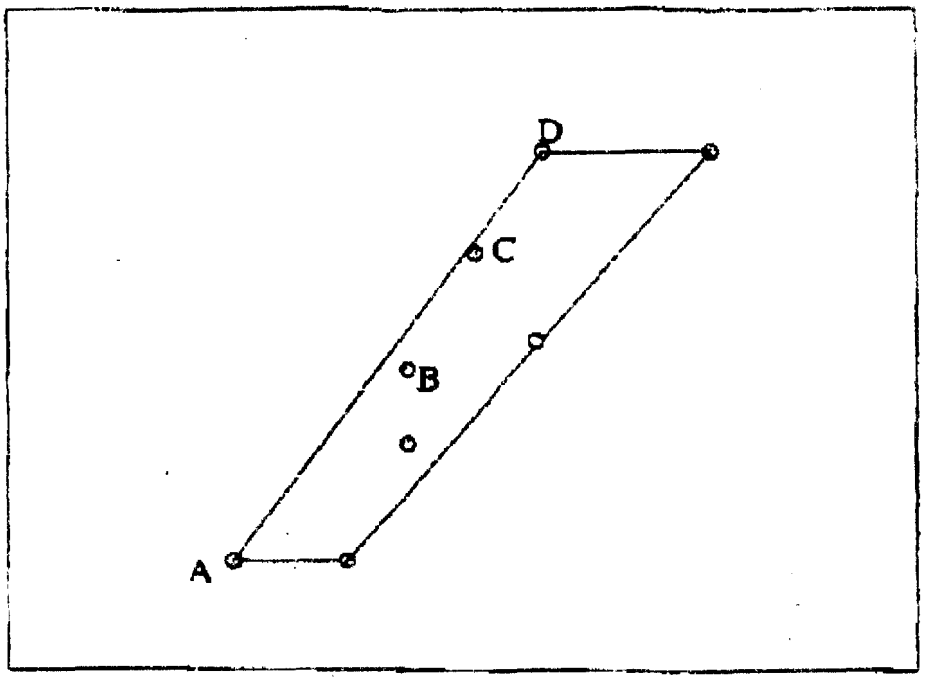
As the following pages show, this flaw permeates the HAI Model results for customers in rural locations, and seriously impacts the cost estimates produced by the model.



Facts Regarding the Hatfield Model's Preprocessing, Clustering and Loop Construction.

#1. Sets of customer locations are grouped together to form clusters. The points above represent such a set. These locations may be all actual locations (obtained from geocoding), or all surrogate locations (placed on a CB perimeter), or some combination of both.

These points are grouped together according to the criteria listed in the HAI Model Methodology.

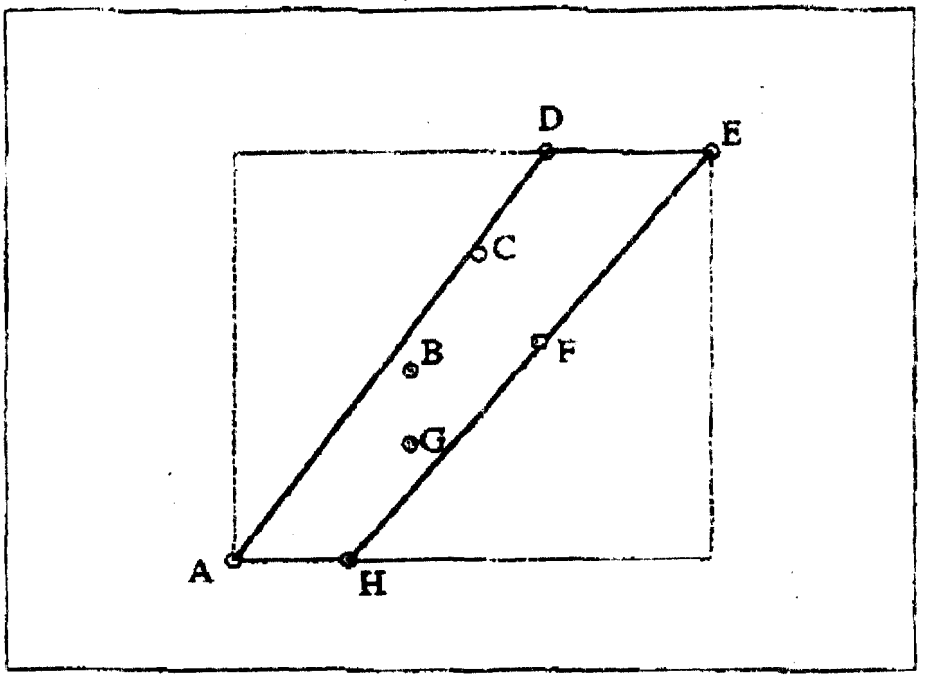


Facts Regarding the Hatfield Model's Preprocessing, Clustering and Loop Construction.

#2. The original points in cluster are surrounded by what is called the cluster's "convex hull". It is the dotted line above.

[All interior angles in a convex hull must be less than 180°, which is why the dotted line from A to D doesn't "angle in" to pick up point B. Doing so would result in an interior angle greater than 180°.]

The area within this convex hull is measured, and retained. In this example, the area of the convex hull is 1.9 square miles. (setting 1 inch = 1 mile.)



Facts Regarding the Hatfield Model's Preprocessing, Clustering and Loop Construction.

#3. The HAI Model next takes what is called the **minimum bounding rectangle** of the polygon. That is the rectangle (or square) which contains the furthest points N,S,E, and W. In this example, points D & E are northernmost, points A & H are southernmost, point A is farthest west and point E is farthest east.

The height of this rectangle over the width is the **aspect ratio**. In this example, the aspect ratio is approx. 0.9.

The HAI clustering uses this aspect ratio to convert the original polygon to a rectangle. This new rectangle will maintain the **area** of the original polygon (1.9 square miles) but will have the **shape** of the minimum bounding rectangle.