DOCKET FILE COPY ORIGINAL

EX PARTE OR LATE FILED

RECEIVED

SEP 19 1996

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Sprint

1850 M Street, NW, Suite 1100
Washington, DC 20036
Telephone: (202) 828-7452
Fax: (202) 822-8999

Warren D. Hannah
Director – Federal Regulatory Relations
Local Telecommunications Division

EX PARTE

September 19, 1996

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W. Room 222
Washington, D.C. 20554

RE: In the Matter of Federal-State Joint Board on Universal Service - CC Docket No. 96-45

Dear Mr. Caton,

On September 18, 1996, representatives of Sprint Corporation met with Ms. Barb Meisenheimer of the Office of Public Counsel for the State of Missouri. Ms. Meisenheimer is an associate of Ms. Martha Hogerty who is a member of the Federal-State Joint Board in the above referenced matter. Representing Sprint Corporation were Messrs. Larry Millard and John Banks.

Sprint's proposals, filed on April 12, 1996, in the above referenced proceeding were discussed during the meeting. Also, the appropriateness of a Proxy Model, specifically the Benchmark Cost Model (BCM) filed by Sprint and US West, Inc. (joint sponsors), in September 1995 and the updated BCM 2 filed in July 1996, were discussed. The attached information was used during the meeting.

This ex parte notice is filed today since the meeting was held in Jefferson City, Missouri during the afternoon of September 18. It is requested that this information be made a part of the record in this matter. Two copies of this letter, in accordance with Section 1.1206(a)(1) of the Commission's Rules and Regulations, are provided for this purpose. Please call on the above telephone number if there are any questions.

Sincerely,

Warren D. Hannah

Warren D. Hannah

Attachment

No. of Copies rec'd 0+2
List A B C D E

Sprint Corporation

CRITIQUE OF HATFIELD PROXY MODEL 2.2.2

Sprint Corporation has reviewed the Hatfield Proxy Model (HM) 2.2.2 for the purpose of providing the Public Utility Commission of Texas with it's view of the usefulness of the HM for Project 14929, the Universal Service Fund.

Sprints findings regarding the HM are as follows:

1. It is impossible for the user of the HM to save populated copies of the various study modules for the purpose of reviewing the actual calculated data for the state being processed. The HM will produce output reports for the state being processed, however, the HM modules remain populated with Oklahoma data, which is how the modules were received. It is necessary to refer to certain of the Oklahoma CBGs to demonstrate how the model operates.
2. The HM does not correctly calculate the number of fibers required to carry Digital Loop carrier to its maximum capacity. In the HM Loop Master Module, Main Logic sheet, HM assigns 4 fibers to each CBG regardless of the number of lines served in the CBG. It does not have SLC terminals share fibers to a maximum capacity of 2016, as the Hatifeld documentation states.
3. There are a number of serious flaws that make the loop portion of the model unusable:
    a. The loop design is such that many loops will not work.
        i. The fiber/copper break point in the HM is measured against a 9000 foot test and uses copper whenever the <u>feeder</u> cable is less than 9000 feet long, ignoring the copper cable present in the distribution network. The result of this network design is that many loops exceed the working limits of an untreated copper loop. As an example, the loops in the saved Oklahoma data show copper placement of distances of 36,665 feet and 31,145 feet as well as many more in the 20,000 to 30,000 foot range.
        ii. Where fiber is placed to the CBG and a carrier terminal is used, there is no limit on the copper distribution distance within the CBG, which also results in excessive copper cable distances. This error results in copper cable being used, as an example, for distances of 56,862, 53,889, and 53,333 feet. There are several instances where copper distribution cable lengths are in excess of the 1500 ohm design maximum which will prevent the loops from working. (This analysis is based on Oklahoma data which is the only accessible data from the HM).
3. The total length of distribution cable, placed by the HM, is insufficient to reach all subscribers in a CBG. The HM assumes a square distribution area in its calculations and serves it with a number of cables that are 5/8ths of the length of the side of the square (3/4ths if rock is present within 1 foot of the surface or the soil is difficult). The HM uses 2 distribution cables for rural exchanges whose density is less than 5

Lawrence E. Millard
(913) 261-2425
09/17/96

Sprint Corporation

households per square mile. This results in very large areas being served by 2 cables that extend only 5/8ths of a side of the distribution area. One area that was reviewed contains 78 square miles and is served by cables that are 29,000 feet in length, in another area of 96 square miles cables of 32,300 feet were used. It is not possible to serve any area with two cables which extend only 5/8ths of the side of the serving area. In areas (CBGs) like these, a substantial amount of cable, structure, and placement casts are omitted by the HM which causes the costs developed to serve these areas to be grossly understated.

4. The HM applies a factor of 33% to supporting structures such as poles and conduit systems. It assumes that 66% of these structures and placement costs are assigned to non-telephone uses. While there may be instances where these facilities are used for multiple purposes, it is highly unlikely that these facilities in all, or even most, rural, and/or sparsely populated high cost areas are used for anything but basic telephone service.
5. In some instances the HM uses extremely low material prices and construction costs. Some examples are:
    a. The cost of conduit. Excluding placement costs, HM uses a material cost of $1.00 per foot for all conduit distances. In the Oklahoma CLLIOKCYOKCE with CBG #401091027001, HM places six maximum size 4200 pair feeder cables and one overflow feeder cable of from 1800 to 3600 pairs, all copper pairs, in conduit that is priced at $1.00 per foot. Construction of this size would require a nine way du0ct which would cost significantly more than $1.00 per foot.
    b. The cost of pole lines. Of the 2,690 CBGs populated from the Oklahoma data, almost all of which have aerial facilities, 747 or 28% of the CBGs that have pole lines are designed with a cost for ONE pole. The HM understate all pole lines by the cost of at least one pole.
    c. HM does not include the impact of water near the surface on the cost of cable placement. Rock presence is recognized if it is hard rock and it is within one foot of the surface. Cables are buried to depths of 24" and beyond and no additional placement costs are recognized for rock that is present between the surface and one foot down. No additional placement cost is used for any amount of soft rock at any depth.

Lawrence E. Millard
(913) 261-2425
09/17/96

BENCHMARK COST MODEL 2

WORKSHOP

SPRINT, U S WEST
July 11, 1996

BENCHMARK COST MODEL 2

PURPOSE OF THE MODEL

- Identify High Cost CBGs
- Develop Benchmark Cost Range
  - Basic Single Line Service
  - Efficient Design
  - State-of-the-Art Technology
- Allow Evaluation of Multiple Proposals for High-Cost Support Targeting
- Serve as a Basis of Critique of Studies of Unbundled Network Elements
- **Model Does Not**
  - Develop Actual or Embedded Costs
  - Develop a Hyper-Efficient, Low Cost, Unrealistic "Fantasy Network"

BENCHMARK COST MODEL 2

Public Review Process Established

- ✓ Sept. 1995 Joint Sponsors (Sprint, U S WEST, NYNEX, MCI) filed initial release
  - Filed in time for comment round in CC Docket 80-286
- ✓ Dec. 1995 filed data for 49 states
- ✓ Four Workshops held - 200 representatives from industry and government participated
- ✓ Comments provided in initial and reply comment rounds in CC Dockets 80-286 and 96-45.
- ✓ Based upon input received, Joint Sponsors proposed modifications in ex parte filings made 1/26/96 and 2/21/96.
- 4 BCM2 filed 7/5/96 by U S WEST and Sprint is a result of this public process.

Sprint.

BENCHMARK COST MODEL 2

Misuse of Original BCM

- ✓ Original BCM was not designed to develop the total cost of basic telephone service
- ✓ Primary intent was to identify high cost CBGs for which explicit support might be required.
- ✓ Little attention was devoted to identifying costs unique to urban environments
- ✓ Costs components which would be similar between high-cost and low-cost areas were omitted (e.g. drop, pedestal, etc.)
- ✓ BCM2 designed to enhance BCM - BCM2 reflects the total cost of providing service - BCM2 can serve as a critique of these other studies.

Sprint.

BENCHMARK COST MODEL 2

CENSUS BLOCK GROUPS (CBGs)

- Defined by U.S. Bureau of the Census
- 250 - 550 Housing Units
- Ideal Size of 400 Units

Sprint.

BENCHMARK COST MODEL 2

Major Changes from BCM to BCM2:

✓ **General**

- BCM2 Analysis Done for all 50 States and District of Columbia. Will be run soon for Puerto Rico, Virgin Islands and Micronesia
- Includes all Cost Elements of Basic Telephone Service
- Better Identifies Costs in Urban Environments
- Includes all Types of Loops (Including Business) by CBG
- Enhancements Provide More Flexibility and Faster Processing of the Model.

Sprint®

BENCHMARK COST MODEL 2

Major Changes from BCM to BCM2 (Con't):

✓ **Rural Area Specific BCM2 Enhancements**

- Sparsely Populated Areas Treated to Remove Areas with Little or No Population

- Loop Investments Capped to Reflect Emerging "Wireless Loop" Technology

Sprint.

BENCHMARK COST MODEL 2

Major changes from BCM to BCM2 (Con't):

✓ **Overall BCM2 Enhancements:**

- Business Lines and Lines per Household added
- Distribution plant "legs" based on number of housing lots
- Structure and placing costs based on per foot costs
- Feeder plant extends into CBG where appropriate
- Investments for Drop Wire, Network Interface Device, Pedestal, Splicing, etc. added.
- Switch Module reflects five different switch sizes including remotes
- Digital Loop Carrier costs on fixed and per line basis
- Expenses developed separately for plant related and others related to lines
- Slope variable added that impacts loop length.

Sprint.

BENCHMARK COST MODEL 2

Major changes from BCM to BCM2 (Con't):

✓ **User Interface Changes:**

- Menu Driven
- All User Adjustable inputs consolidated - formerly hard-coded items now user adjustable
- More efficient processing
- Copper/Fiber breakpoints user selectable

Sprint.

BENCHMARK COST MODEL 2

ASSUMPTIONS: LOOP TECHNOLOGY

- Distribution Plant - Analog Copper Technology
  - Fiber
- Analog Copper Feeder Where Loop Length < 9,000; 12,000; 15,000; 18,000 - User Adjustable Input
- Fiber Feeder For Digital Subscriber Line Carrier Where Loop Length >User Set Maximum
  - Remote Terminal At Feeder Plant End - May be within the CBG
- Two Types of Digital Loop Carrier Systems
  - SLC series 2000 for terminals needing capacity > 240 lines
  - AFC for terminals needing capacity < 240 lines
  - Both products utilized in drop/add configurations with SLC having total capacity of 2016 VG Channels per four fibers and AFC have total capacity of 672 VG channels per 4 fibers

Sprint®

BENCHMARK COST MODEL 2

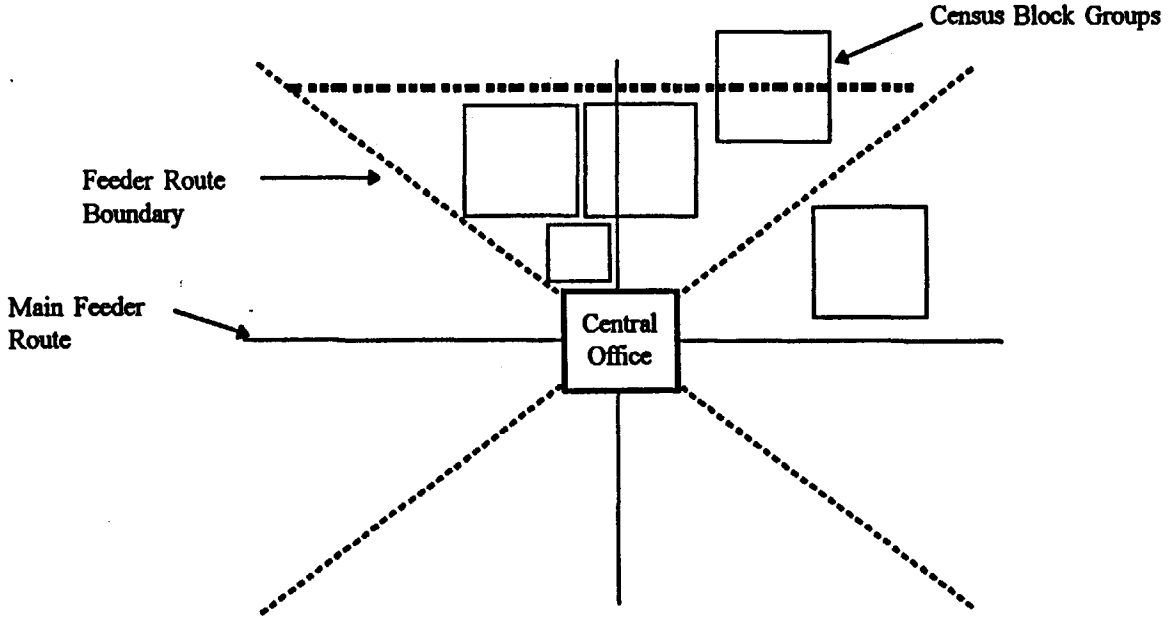
ASSUMPTIONS: FEEDER PLANT ARCHITECTURE

- Feeder Cable Begins at CO and extends to the appropriate interface point within the CBG
- 4 Main Feeder Routes Leave CO with Feeder Route Boundaries at 45° Angle From Main Route
- Cable and Fiber Feeder Systems Share Structure In Main Feeder Systems
- Main Feeder Routes are Segmented at Taper Points
- Each Feeder Segment's Cable Size Determined By Segment Capacity
- Feeder Cable Size From 25 Pair to 4200 Pair, Fiber Cable Size from 12 Strand to 144 Strand

Sprint.

BENCHMARK COST MODEL 2

FEEDER PLANT



Sprint.

BENCHMARK COST MODEL 2

Feeder Plant Changes From BCM to BCM2

- ✓ Copper/Fiber Breakpoint is User Selectable
- ✓ Fiber May Extend into CBG to Ensure Copper Distance Does Not Exceed Copper/Fiber Breakpoint
- ✓ Smaller Copper Cable Sizes Available for Feeder
- ✓ Costs of In-Line Terminals, Cross Connects, Splicing, and Engineering Included

Sprint.

BENCHMARK COST MODEL 2

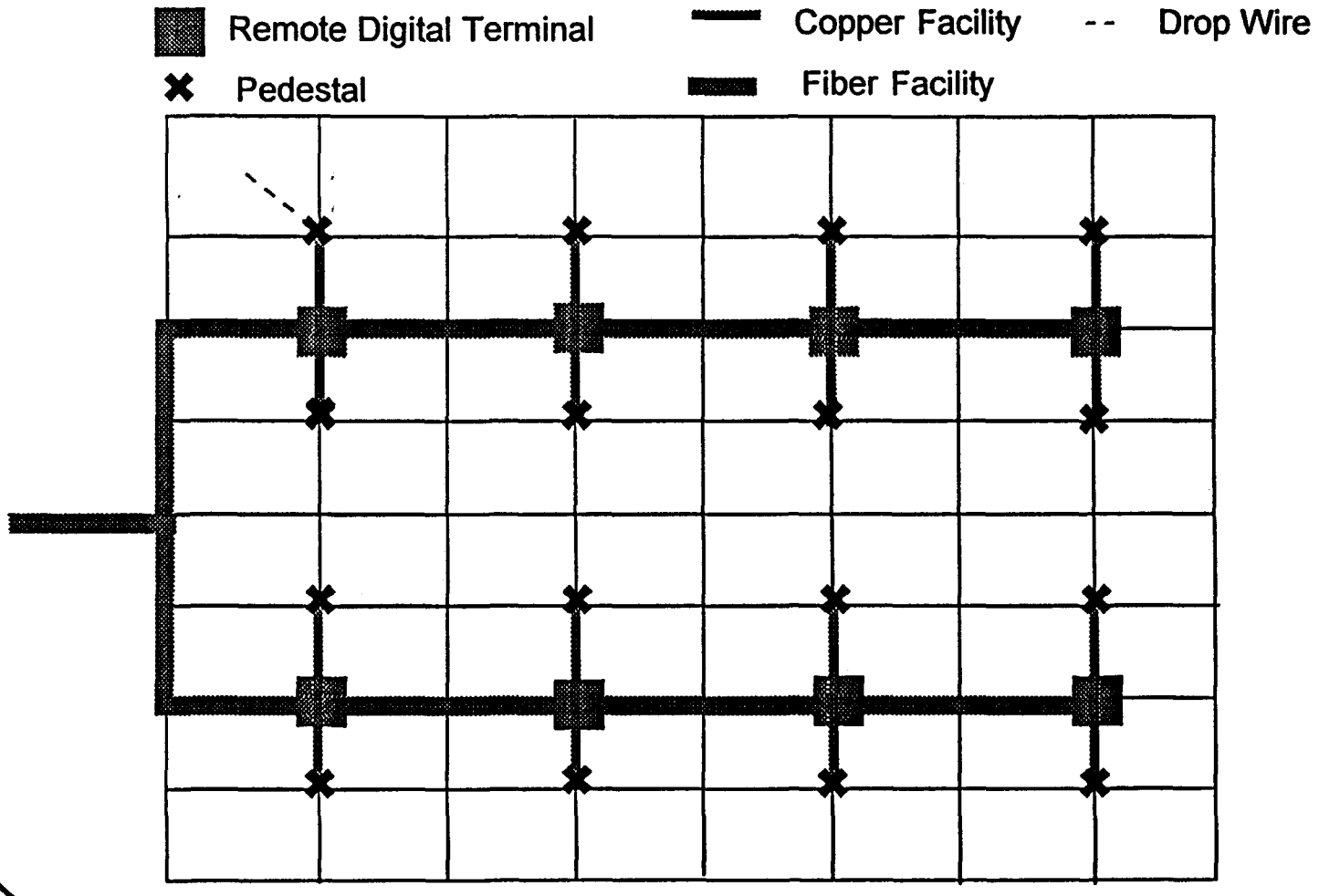
ASSUMPTIONS: DISTRIBUTION PLANT ARCHITECTURE

- Households Are Evenly Distributed in CBG
- Distribution Cable Begins at End of Feeder and Ends at Customer Premises
- Distribution Plant Designed to Reach All Households in CBG through Placing of Cables between Subdivision Lot Lines
- Copper Distribution Length Limited at User Adjustable Maximum
- Distribution Cable Size from 12 Pair to 3600 Pair
- A Percentage of Business Lines Terminated at DS1 Level Signal
- Investments Include Network Interface Device, Drop, Pedestal, In-Line Terminals, Splicing, and Engineering
- Fiber Utilized Below Distance Breakpoint in CBGs Where Line Demand Exceeds Maximum Copper Cable Size

Sprint.

BENCHMARK COST MODEL 2

Distribution Plant with Fiber

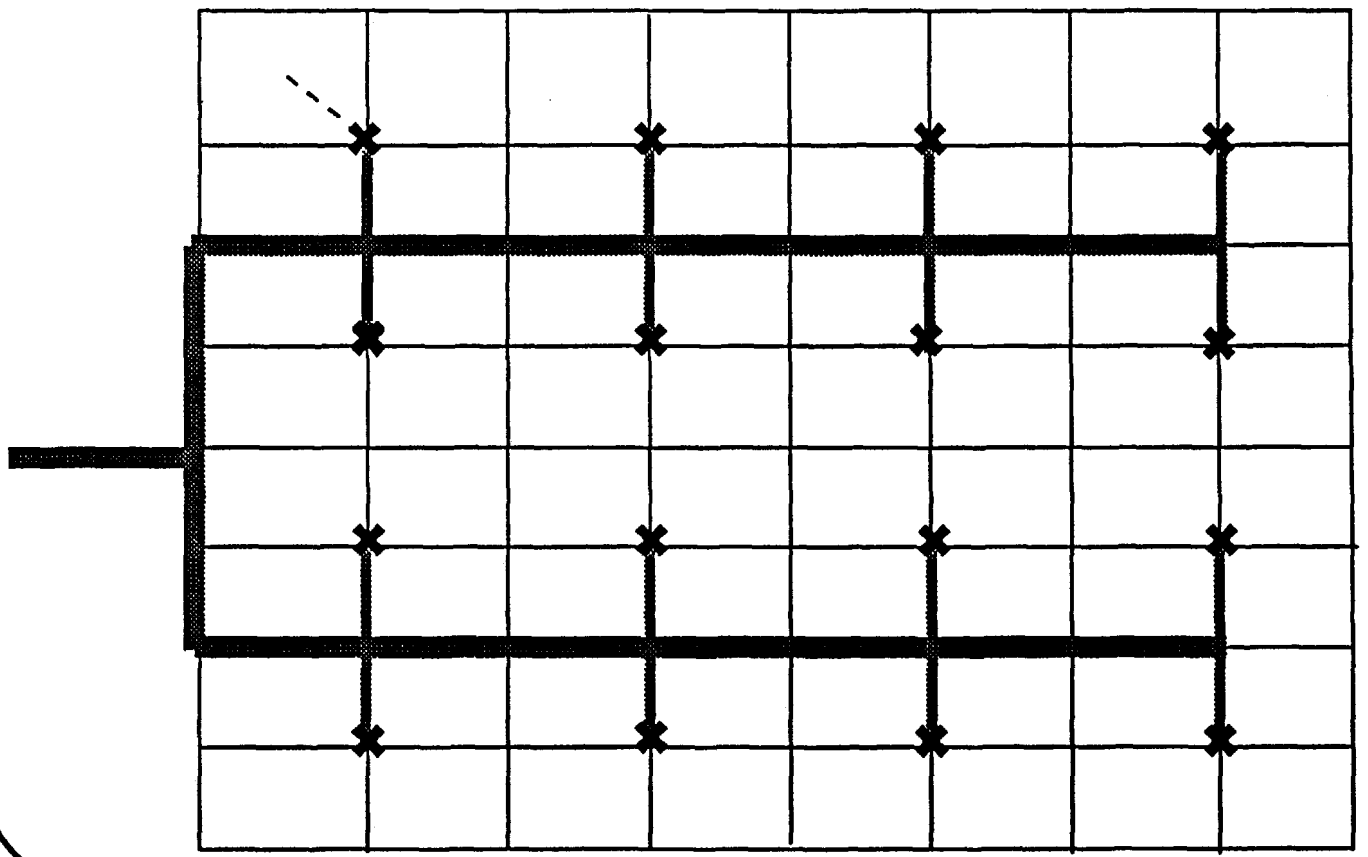


Sprint.

BENCHMARK COST MODEL 2

Distribution Plant with Copper

✖ Pedestal Copper Facility -- Drop Wire



Sprint.

BENCHMARK COST MODEL 2

ASSUMPTIONS: SWITCH TECHNOLOGY

- GENERIC DIGITAL SWITCH COSTS FOR 5 SIZE SWITCHES
  - Remote
  - Up TO 10,000 Lines
  - 10,000 < 60,000 Lines
  - 60,000 < 100,000 Lines
  - >100,000 Lines
  - Split Between Common Costs and Per Line Costs
  - Common Costs Include:
    - » Central Processor Frames
    - » Billing and Data Recording Equip and Frames
    - » Misc. Power Equip and Back Up Power
    - » Main Distribution Frame
    - » Frames For Testing
    - » Basic Software

Sprint.

BENCHMARK COST MODEL 2

ASSUMPTIONS: DENSITY

- Density determined by Households & Business Lines per Sq. Mile
- Determines Mixture of Aerial, Underground, & Buried Plant
- Determines Fill Factor - User Adjustable Input
- 6 Density Groupings
  - 0 < And <= 5
  - 5 < And <= 200
  - 200 < And <= 650
  - 650 < And <= 850
  - 850 < And <= 2550
  - 2550 +
- Density Group Determines Mix of Activities in Placing Plant and the Cost Per Foot to Place Plant - User Adjustable Input

Sprint.

BENCHMARK COST MODEL 2

ASSUMPTIONS: TERRAIN PLACEMENT COST

- Placement Depths For Copper 24"; For Fiber 36" - User Adjustable Input
- Critical Water Table Depth 36" - User Adjustable
- Terrain Indicators (Originate At U.S.D.A./S.C.S.) Include:
  - Depth to Water Table
  - Depth to Bedrock
  - Hardness of Bedrock
  - Surface Soil Texture
- If Water Table or Bedrock Within Placement Depth, Then Structure Costs Reflect Additional Construction
- Otherwise, Surface Texture Examined For Plowing Difficulty

Sprint.

BENCHMARK COST MODEL 2

ASSUMPTIONS: CABLE, FIBER, EQUIPMENT COSTS

- Prices For Cable, Fiber, Switching, & Circuit Equipment Are List Prices (Non-Volume Discount)
- Separate Discounts For Cable, Fiber, Circuit Equipment & Switching -- User Adjustable Input
- Copper Cable is 24 & 26 Gauge
- Buried Cable is Armored & Filled

Sprint.

BENCHMARK COST MODEL 2

ASSUMPTIONS: STRUCTURE COSTS

- Definition: Cost of Conduit, Innerduct, Poles etc., and Capitalized Costs of Placing Plant
- Calculated as a Cost Per Foot
- Factor Varies By Plant Type, Terrain, and Density Group
- Each Density Group and Terrain Difficulty Reflects a Different Mix of Placement Activities

Sprint.

BENCHMARK COST MODEL 2

FEEDER & DISTRIBUTION PLANT DISTANCE

- Feeder Plant Calculations Based On Airline Distance Between CBG and Closest Central Office
- Distribution Plant Calculations Based on Size of CBGs after Using Road Network to Reduce size to Populated CBG Area
- SCS Slope Measurements Trigger Distance Adjustments
- Utilizes Tree and Branch Topology
- Determination of Quadrant For Feeder Plant

Sprint.