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E THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE PETITIONS OF:	)	
	)	
AMERICAN COMMUNICATIONS SERVICES, INC. AND AMERICAN COMMUNICATIONS SERVICES OF PIMA COUNTY, INC.;	)	**DOCKET NO. U-3021-96-448**
	)	**DOCKET NO. U-3245-96-448**
	)	**DOCKET NO. E-1051-96-448**
	)	
AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC.;	)	**DOCKET NO. U-2428-96-417**
	)	**DOCKET NO. E-1051-96-417**
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MFS COMMUNICATIONS COMPANY, INC.;	)	**DOCKET NO. U-2572-96-362**
	)	**DOCKET NO. E-1051-96-362**
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TCG PHOENIX;	)	**DOCKET NO. U-3016-96-402**
	)	**DOCKET NO. E-1051-96-402**
	)	
MCIMETRO ACCESS TRANSMISSION SERVICES, INC.;	)	**DOCKET NO. U-3175-96-479**
	)	**DOCKET NO. E-1051-96-479**
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BROOKS FIBER COMMUNICATIONS OF TUCSON, INC.;	)	**DOCKET NO. U-3009-96-478**
	)	**DOCKET NO. E-1051-96-478**
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SPRINT COMMUNICATIONS COMPANY, L.P.; and	)	**DOCKET NO. U-2432-96-505**
	)	**DOCKET NO. E-1051-96-505**
	)	
GST TUCSON LIGHTWAVE, INC.	)	**DOCKET NO. U-3155-96-527**
	)	**DOCKET NO. E-1051-96-527**
FOR ARBITRATION OF THE RATES, TERMS, AND CONDITIONS OF INTERCONNECTION WITH U S WEST COMMUNICATIONS, INC. PURSUANT TO § 252(b) OF THE TELECOMMUNICATIONS ACT OF 1996.	)	(Consolidated)

REBUTTAL TO TESTIMONY OF U S WEST WITNESS MARILYN A. FIGUEROA

BY

JOHN C. DONOVAN

ON BEHALF OF

AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC. AND MCIMETRO ACCESS TRANSMISSION SERVICES, INC.

DECEMBER 4, 1996

A. INTRODUCTION

Q. PLEASE STATE YOUR NAME, JOB TITLE, AND BUSINESS ADDRESS.

A. My name is John C. Donovan. I am President of Telecom Visions, Inc. My business address is 11 Osborne Road, Garden City, New York.

Q. ARE YOU THE SAME JOHN DONOVAN WHO PROVIDED DIRECT AND REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. Yes, I am.

B. PURPOSE

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to rebut the statements of Ms. Marilyn A. Figueroa, Director of Construction - Arizona, for U S WEST Communications, Inc. ("U S WEST"). Specifically, I will be addressing her comments regarding 1) fill factors, 2) sharing of structures, 3) distance between manholes, 4) the use of aerial cable larger than 900 pairs, 5) the use of 'C' rural wire in lieu of cable, 6) the Hatfield Model default assumption of 50% aerial cable, 7) developers' construction of drop wire conduit systems in housing developments, 8) the cost and extent of boring, 9) the use of 3 pairs per living unit, 10) the cost of installing drops, and 11) the installed cost of a Network Interface Device ("NID").

C. REBUTTAL COMMENTS

1. FILL FACTORS

Q. DO YOU TAKE ISSUE WITH MS. FIGUEROA'S STATEMENTS ABOUT FILL FACTORS?

A. As I described in my initial testimony, fill factors are critical in each individual cross section of feeder cable. Measuring fill factors at the Main Distributing Frame ("MDF") is easy to do, but essentially meaningless. Ms. Santos-Rach clearly stated that she defines copper feeder cable fill factors at the MDF. Ms Figueroa stated during her cross examination that she would also measure fill at the MDF (Tr. p. 1599, lines 7-8). She also stated that feeder fill could be above 85% or below 40% (Tr. p. 1599, lines 19-20). Although I would agree that it would be possible, and desirable, to achieve such extremes in feeder cable sections, I would be amazed to find such extremes at a MDF. In a cross section of feeder cable, fills above 85% occur in large cross sections experiencing slow growth. Also, in a cross section where a new relief cable has recently been placed, it would not be unusual to have an initial cross section fill of below 40% until growth utilized significant quantities of the newly placed cable. Since MDFs terminate the entire universe of copper cables in a central office building, it would not be typical to observe higher than 85% nor lower than 40% fills at an MDF. It would appear that Ms. Figueroa confuses the practical cross section fill with the easy to report MDF fill.

I had a special run of the Hatfield Model done to compute the MDF fill factor, keeping all other things equal. The results indicate an overall MDF fill of 71.5%, a

result not far off U S WEST's claims. Because comparable U S WEST MDF and Hatfield Model MDF fills show no significant difference, the Hatfield Model values for copper feeder cable fill are reasonable and should be accepted.

Ms. Figueroa also states that she would expect to see distribution fills of 65% to 70%. Using the same logic, the fill she refers to must be the fill at the Serving Area Interface ("SAI"), also called the Feeder Distribution Interface ("FDI"). The same run of the Hatfield Model reveals that it uses distribution fills at the SAI of 39% to 54%, depending on the density range. This means that Ms. Figueroa's estimate of 65% to 70% at the SAI is significantly higher than the more conservative figures used by the Hatfield Model. One might argue that the default values for distribution cable in the Hatfield Model should be increased to yield results in the 65% to 70% range. The effect of such a change, however, would be to lower the monthly local loop charge that is currently produced by the Hatfield Model.

2. SHARING STRUCTURES

Q. DO YOU ACCEPT MS. FIGUEROA'S STATEMENTS THAT IT IS VIRTUALLY IMPOSSIBLE TO SHARE STRUCTURES.

A. No. Ms. Figueroa stated that, "The only time I get to share facilities is when I am in a new development..." (Tr. p. 1576, lines 23-25). She does not provide data to support her contention and could not report what percentage of the U S WEST trenches in the state are shared with another utility. (Tr. p. 1592, lines 7-9).

3. DISTANCE BETWEEN MANHOLES:

Q. WHAT IS THE AVERAGE DISTANCE BETWEEN MANHOLES FOR COPPER CABLE IN THE HATFIELD MODEL?

A. The average distance between manholes for copper cable in the Hatfield Model varies from 400 feet to 800 feet, depending on the density zone. This distance is significantly lower than U S WEST's average of 800-1,000 feet between manholes for copper according to Ms. Figueroa. (Tr. p. 1604, line 14).

Q. WHAT IS THE AVERAGE DISTANCE BETWEEN MANHOLES FOR FIBER CABLE IN THE HATFIELD MODEL?

A. The average distance between manholes for fiber cable in the Hatfield Model is 2,000 feet. Ms. Figueroa stated that the average restoration fiber reel is 10,080 feet, and so that would probably be about what her average manhole distance would be for fiber cable.

Q. WHAT CAN YOU CONCLUDE ABOUT U S WEST'S DISTANCES BETWEEN MANHOLES?

A. U S WEST's distances are much more aggressive than the values in the Hatfield Model. If the Hatfield Model were to use the U S WEST numbers, the loop cost per month would decrease.

4. USE OF AERIAL CABLE LARGER THAN 900 PAIRS:

Q. DO YOU AGREE THAT THERE ARE TECHNICAL DIFFICULTIES IN PLACING AERIAL CABLES LARGER THAN 900 PAIRS?

A. No. Ms. Figueroa admitted during cross examination that she is not an Engineer. Perhaps that explains her lack of knowledge in basic pole line design. She stated,

> we have a very difficult time getting the legal height clearances with cable that is 900. in excess of 900 pair because of the size of the cable, because of the weight of the cable. And it is almost physically impossible unless you have extremely short spans to safely and legally place more than 900 pair. (Tr. p. 1579, lines 21-25).

Using the extreme case of placing a 4200 pair cable on a pole line with span lengths of 150 feet, I found that it could be readily done using common 40 foot, Class 4, Southern Pine poles. Supporting information for this design includes the following:

Arizona is in the "Medium Storm Loading Area"
Radial Thickness of Ice Coating = ¼ inch
Transverse Wind Pressure = 4 lb/ft of projected area
Minimum Temperature = 15 degrees F
4200 Pair Cable Weight = 8.14 lb/ft
4200 Pair Cable Diameter = 3.35"
16M Strand = 18,000 lb breaking strength
16M Strand = .390 lb/ft
16M Strand Diameter = .44"
Total Diameter of Cable & Strand = 3.79"
Storm Load = 1.4 lb/ft x 150 ft span = 210 lb x 2 sections = 420 lbs

Maximum allowable transverse storm load for a Class 5 pole is 475 lbs
Wind Load of a 40 ft Class 4 pole is 55 lbs
Total Load = 420 lbs + 55 lbs = 475 lbs, exactly matching the Class 5 pole limit. Therefore, use a Class 4 pole (Class 4 is larger diameter than a Class 5 pole, and therefore provides an additional measure of safety).

40 ft Class 4 pole set depth of 6 ft leaves 34 ft height.
Top 2 ft of pole not used, Power Company uses 1 ft of pole,

40 inch clearance needed between power and telecommunications.
1 ft of Telco use
Leaves 26-1/2 ft to point of connection on the pole for Telco.

150 ft span with 16M Strand supporting 8.53 lb/ft (8.14lb + .39lb)
causes less than 3 ft sag at center of span.

Therefore center of span is at 23-1/2 feet, far exceeding the national standard minimum cable height requirement of 18 feet at roadside.

U S WEST's policy to not use more than 900 pair cables on aerial structures because of the weight and sag of the cables violates basic outside plant engineering principles.

5. USE OF 'C' RURAL WIRE

Q. DO YOU HAVE ANY COMMENTS REGARDING U S WEST'S USE OF 'C' RURAL WIRE?

A. I believe that Ms. Figueroa's cross examination reveals that she would agree that U S WEST's use of 'C' Rural Wire on poles, versus the Hatfield Model's use of the smallest cable size of 25 pair, causes the Hatfield Model to derive a higher cost for loop investment than if the Hatfield Model allowed the use of 'C' Rural Wire. (Tr. p. 1577, lines 14, 15, 22; and p. 1592, line 2).

6. THE HATFIELD DEFAULT ASSUMPTION OF 50% AERIAL CABLE

Q. DO YOU AGREE THAT THE HATFIELD MODEL ERRONEOUSLY USES 50% AERIAL CABLE TO DRIVE THE COST PER MONTH DOWN IN THE U S WEST TERRITORY IN ARIZONA?

A. No. Because U S WEST utilizes 'C' Rural Wire in lieu of cable, the sheath miles of aerial wire should be included in both the numerator and denominator of ARMIS data in calculating the percent aerial sheath miles to total sheath miles of outside plant. Using a calculation method that includes aerial wire, the percent aerial in U S WEST - Arizona is 34%, not 18% as claimed by Ms. Figueroa.

As a sensitivity test, I had the Hatfield Model run, changing the structure breakdown in the greater than 2550 lines per square mile density zone. When set at 45% aerial, 5% buried, and 50% underground, the loop priced out at $14.41 per month. When set at 9% aerial, 72% buried, and 19% underground, the loop priced out at $$14.01 per month. So, when adjusted to significantly change the structure breakdown in the highest density zone, which contains 52% of the lines in Arizona, ***the price actually goes down by 40 cents***.

Q. DO YOU AGREE THAT HEAT AND HUMIDITY LIMIT THE USE OF AERIAL CABLE?

A. No, not at all. Ms. Figueroa stated, "Because of the heat, because of the humidity, the life of our facilities is limited if we place it in an aerial environment." (Tr. p. 1578, lines 13-16).

Cables manufactured for outside plant undergo extensive testing at the manufacturers' locations, and must pass stringent tests at Bellcore. U S WEST has always been a part of this process. I do not believe its engineers would agree with Ms. Figueroa.

From my own personal experience in engineering cables next to the ocean on Long Island, and near the steam tunnels of New York City, I cannot agree with Ms. Figueroa's statements that heat and humidity have a bearing on the life of aerial facilities.

7. DEVELOPERS' CONSTRUCTION OF DROP WIRE CONDUIT SYSTEMS IN HOUSING DEVELOPMENTS

Q. WHAT HAVE YOU LEARNED ABOUT CONSTRUCTION TECHNIQUES IN THE STATE OF ARIZONA?

A. While in Phoenix, I asked a local architectural firm, High-Point Rendel, to perform a survey of local builders in the area.

They attempted to contact over a dozen sources, and assembled information from 4 builders, and 3 city planning departments. The key pieces of information High-Point Rendel provided are as follows:

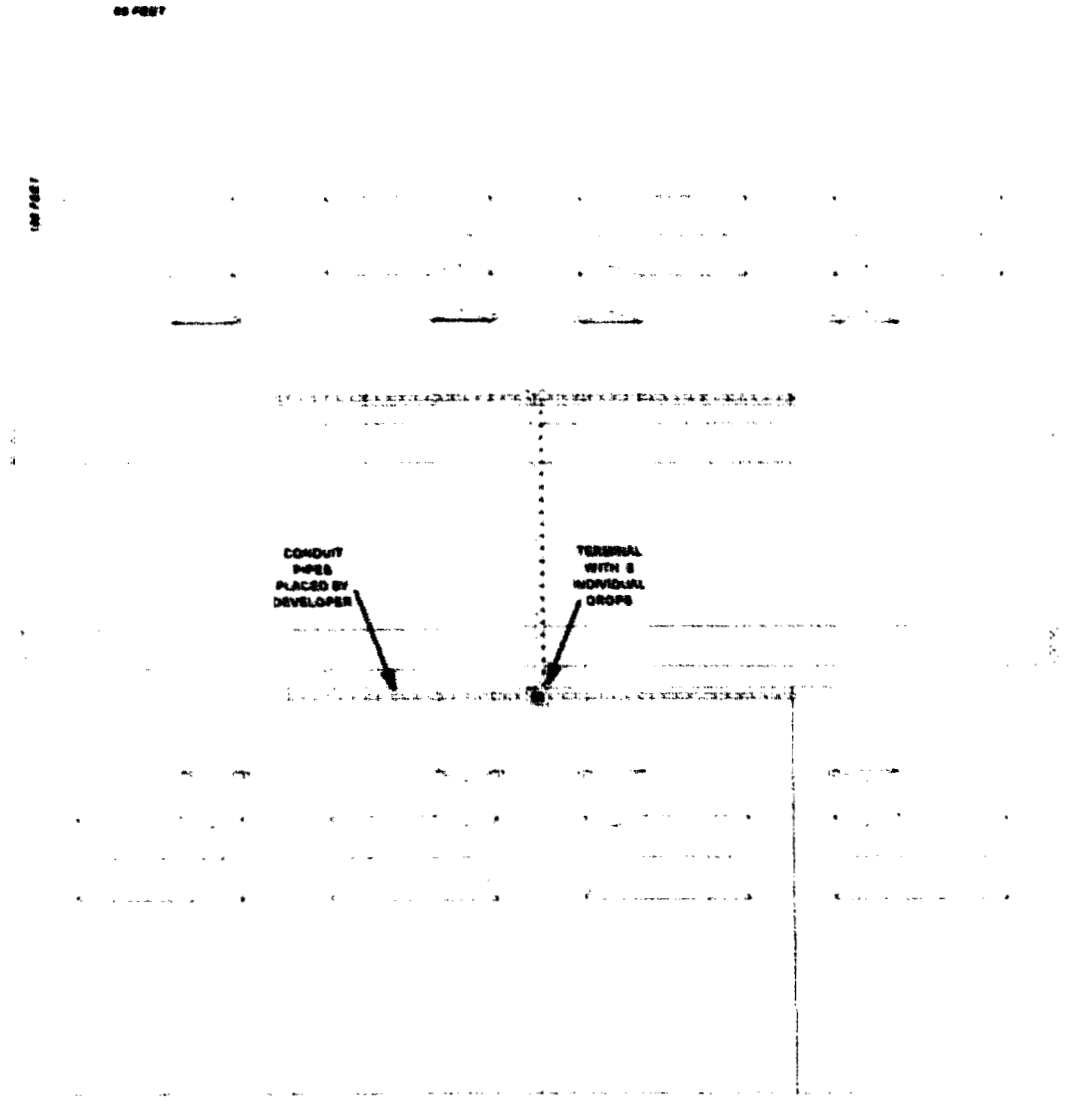
- Typical plot size is 60ft x 100ft

  (Ms. Figueroa agreed that the average frontage is 60 ft to 80 ft. Tr. p.1584, line 15).
- Typical setback is 20 ft
- Builders dig trenches and place conduit at their own expense, not at U S WEST's expense.
- Builders place a conduit from the pedestal terminal, under the street to the other side of the street before completing paving operations.

- Builders place small conduit across the front of every property line. There is also a conduit placed under every driveway.
- Average drop lengths are 78 feet.

  (Ms. Figueroa stated that the average length in Phoenix is 100 ft. Tr. p. 1584, line 12, although the U S WEST model uses 170 ft. average drop lengths.)
- The trenching cost for a 4 inch wide by 24 inch deep trench in soft caliche soil conditions (typical of Arizona) is $3.00 per foot. There is an additional cost of $1.00 per foot if paving is necessary.
- The trenching cost for a much wider 12 inch wide by 36 inch deep trench in soft caliche soil conditions is $7.25 per foot. There is an additional cost of $1.50 per foot if paving is necessary.
- Plowing a cable typically costs $1.00 per foot in soft caliche soil in Arizona.

The way properties over the last 5 years or so have been provisioned to allow flexibility in the local loop is somewhat atypical. The following diagram shows the infrastructure that has existed for the past several years in Arizona, and the infrastructure that will continue on a going-forward basis, at no cost to U S WEST.



The Hatfield Model builds a network on a "forward-looking" basis. Costs associated with digging up epoxy encapsulated drop splices are not relevant to a network based on forward looking costs. Competitive entrants should not be encumbered by historic mistakes in engineering design, including the lack of "home-run" drop wires run in

small conduits to reach a pedestal terminal that can serve 8 homes in Arizona housing developments.

Q. DOES U S WEST HAVE TO PAY FOR TRENCHES IN NEW DEVELOPMENTS?

A. No. As Ms. Figueroa testified, "[p]reconstruction is the trenching and putting the conduit into the trench, and the developer pays for that." (Tr. p. 1583, lines 21-25 and p. 1584, line 3).

Ms. Figueroa also agreed that the Hatfield Model overprices trenching costs by more than double in the highest density area, which accounts for 52% of the access lines in Arizona. (Tr. p. 1588, line 1).

8. <u>COST AND EXTENT OF BORING:</u>

Q. DO YOU TAKE ISSUE WITH THE AMOUNT OF BORING USED BY U S WEST IN ITS COSTING MODEL?

A. Yes. First of all, U S WEST has made so many variations in its claims of how often boring is used, that I have no idea what is in its model. What I do know is that use of its high tech "Mole" is far too expensive for getting under driveways and sidewalks. Other, simpler methods exist such as using simple water tunneling for small diameter cables and drop wires. In addition, as has been pointed out earlier, new developments are being built with conduits in place to cross streets, sidewalks, and driveways. The extent of new development construction over the past five years is obvious by Ms.

Figueroa's statement that, "...the municipalities now have moratoriums on cutting streets ... for instance, Tucson is less than five years old, we cannot get approval to cut the street. In the Phoenix area it's anywhere from 2-1/2 to 3 years before they will allow us to do cuts." Tr. p. 1580. Developers in Phoenix have been doing this (known as "bonding the road") for 5 years. The statements by Ms. Figueroa are consistent with the methods developers are now using to place small conduits that preclude boring.

9. USE OF 3 PAIR PER LIVING UNIT

Q. SHOULD U S WEST BE USING A DESIGN CRITERIA OF 3 PAIRS PER LIVING UNIT FOR DISTRIBUTION CABLE?

A. It is not completely clear what guidelines are being used. It was pointed out during cross examination of Ms. Figueroa that another U S WEST witness stated in proceeding E-1051-93-183 on May 16, 1994, that 2 pairs per living unit is the standard design. As I stated in my rebuttal testimony, I believe it is not necessary to design all plant, including distribution and feeder, for 3 pairs when there is an actual utilization of 1.1 access lines per living unit.

Q. DO YOU HAVE A PROBLEM WITH THE USE OF 3 PAIR BURIED DROPS AS A STANDARD?

A. I do not disagree with Ms. Figueroa's use of 3 pair filled buried drop wire (filled with a water blocking compound). I disagree with dedicating 3 pairs all the way from the NID at the house, through the drop, the terminal, and the distribution cable to the SAI.

Furthermore, U S WEST's purported costs are too high. I have obtained material prices of 9.5 cents per foot for 2 pair aerial drop wire, and 11 cents per foot for 3 pair filled buried drop wire. These prices are more than 30 percent less than the prices U S WEST allegedly pays. I would suggest they obtain a less expensive supplier.

If the use of 3 pair buried drop is combined with home-run placing (meaning the drop is run from the NID at the home to the pedestal terminal without using encapsulated plant), then 2 of the 3 pairs can be pre-provisioned, with the third pair having access to several spare distribution pairs in the cable sheath at the pedestal terminal.

10. COST OF INSTALLING DROPS

Q. DO YOU AGREE WITH U S WEST'S CLAIMED DROP WIRE INSTALLATION COSTS?

A. No. The costs are much too high. Drop wires can be placed in a very productive fashion in a buried development as follows:

- The builder places small conduits across each property line, leading back to the pedestal terminal.
- The drop is attached to the NID at the side of the house and laid on the ground to the front property line. The drop is later plowed into the ground by a contractor using a vibrating plow, doing several homes at a time (average Arizona price @ $1/ft x 23 ft from property line to 20 ft. setback of house per High-Point Rendel study)

- The drop is fed seamlessly back to the pedestal terminal through prewired small conduits.
- The drop wire is terminated on lug nuts (binding posts) on the terminal inside the pedestal.
- No below ground splicing is required.
- Each house can access three distribution lines within the pairs in the entire distribution cable, if necessary.
- Since one terminal serves 8 houses, a 25 pair termination provides considerable flexibility.

Using these methods, there is no reason why productivity should be as low as 1.6 hours per drop.

II. INSTALLED COST OF A NID

Q. DO YOU AGREE WITH U S WEST'S NID INSTALLATION COSTS?

A. No. Ms. Figueroa stated that the material cost of a NID is $15.51 [Rebuttal Testimony p. 6, line 6]. I do not take major issue with that number, but I believe it could be purchased for no more than $15.

However, I have a significant difference of opinion with Ms. Figueroa regarding the labor cost involved. Ms. Figueroa claimed, "The technicians average approximately 5 NIDs a day." (Tr. p. 1605, lines 10-11]. She divides an average day by five to arrive at a per NID time allotment of 1.6 hours. Id. She claims each NID requires a separate service call. Since this number is the same as the cost to place the drop, and since she

claims that the 1.6 hours includes placing the NID and terminating the drop, I wonder if she is double counting the labor required for the NID and the drop. If not, then Ms Figueroa is claiming that it takes 3.2 hours to install the NID, lay out the drop, skin the wires, and wrap 6 wires around binding posts at each end. This time estimate is too long for the work required.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

BEFORE THE ARIZONA CORPORATION COMMISSION

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FOR ARBITRATION OF THE RATES, TERMS, AND CONDITIONS OF INTERCONNECTION WITH U S WEST COMMUNICATIONS, INC. PURSUANT TO § 252(b) OF THE TELECOMMUNICATIONS ACT OF 1996.	)	(Consolidated)

MAILING CERTIFICATE

REBUTTAL TO TESTIMONY OF
U S WEST WITNESS MARILYN A. FIGUEROA
BY
JOHN C. DONOVAN
ON BEHALF OF
AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC.
AND MCIMETRO ACCESS TRANSMISSION SERVICES, INC.
DECEMBER 4, 1996

The undersigned certifies that the ORIGINAL and FOUR COPIES of the REBUTTAL TO TESTIMONY OF U S WEST WITNESS MARILYN A. FIGUEROA BY JOHN C. DONOVAN ON BEHALF OF AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC. AND MCIMETRO ACCESS TRANSMISSION SERVICES, INC. in the above-referenced docket were filed this 4th day of December, 1996, with:

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DATED this 4th day of December, 1996.

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