as T1, ensure that the quality of the signal at the specified bit rate can be maintained over the entire extension of the facility.

The HAI Model appropriately extends T1 signals over distances longer than the analog copper maximum to reach customers located in outlier clusters; analog signals then travel over copper distribution cable only the remaining distance from the point where the T1 facility ends to the customers' premises. As in the case of main clusters, this remaining distance is limited to whatever the user has set as the Maximum Analog Copper Distance in the HAI Model input. By using digital technology in this fashion, HAI ensures that appropriate-quality digital signals are maintained between the Central Office and the customers' premises.

Q. IS A MAXIMUM COPPER LOOP LENGTH OF 12,000 FEET REQUIRED IN ORDER TO ENABLE THE PROVISION OF ADSL?

R. Not necessarily. This limitation appears to be based on the assumption that a relatively high digital signal rate will be delivered to all customers. ADSL technology can operate at a variety of bit rates, from a few hundred kilobits per second (kbps) to as much as eight megabits per second (Mbps).[18] Although the maximum achievable rate is dependent on the loop length involved, the ADSL Forum states that standard systems

[18] The bit rate of the downstream signal. In addition, ADSL supports one or more bi-directional signals at bit rates up to 640 kbps.

should be able to deliver a T1 (1.5 Mbps) downstream signal, even at 18,000 feet.[19] To our knowledge, neither the FCC nor any other regulatory body has asserted what it believes to be the signal rate that must be assumed for all customers. In fact, ADSL does not appear to be included in the definition of universal service – the ADSL issue arises only as a consideration of what advanced services the network would be capable of supporting, above and beyond universal service.

It is important to recognize that (1) ADSL is an embryonic technology, (2) it can be provided to only a fraction (typically cited as 35-40%) of customers in a given area, and (3) currently supports signal rates well below 1 Mbps at affordable prices. Under these circumstances, calculating the level of universal service support on the basis of a loop plant design capable of delivering a signal in excess of a T1 to every customer is a dramatic extension of any reasonable requirement that would be imposed today, or in the near future. Furthermore, if ISDN were used as the standard, rather than ADSL, one ISDN vendor -- Adtran -- can deliver 144 kbps Basic Rate Interface (BRI) service over a single twisted pair up to 30,500 feet from the CO without repeaters.[20]

For these reasons, we believe that the 18,000 foot limit set as the default

[19] http://www.adsl.com/general_tutorial.html, p. 6.
[20] http://ww.adtran.com/telco/isdn/rep.products.html, p. 1.

1 Maximum Analog Copper Distance in the HAI Model is a more appropriate
2 value to use -- it is sufficient to allow a 1.5 Mbps signal to be delivered to
3 every customer. Again, however, we wish to emphasize that whatever
4 distance limit is set, BCPM's practice of allowing analog copper distances
5 in excess of this limit is inappropriate, and effectively impossible for the
6 user to correct.
7
8 **Q. TURNING NOW TO MR. MURPHY'S STATEMENT, IS HE CORRECT**
9 **THAT THE DIGITAL COPPER EXTENSIONS OF THE HAI MODEL DO**
10 **NOT HAVE SUFFICIENT CAPACITY TO SUPPORT ADSL?**
11 R. His statement is correct in certain respects, but his statement is also
12 misleading. It is true that a 1.5 Mbps T1 signal cannot carry an 8 Mbps
13 ADSL signal. To carry a signal of that rate, if that were the ADSL capacity
14 that a cost proxy model were required to meet, one would need to
15 combine multiple T1 signals, which would consume multiple wire pairs.
16 Even a 1.5 Mbps criterion would require two wire pairs per customer (in
17 addition to the pairs carrying the digitized voice signals, since
18 conventional T1 systems use two pairs, one for each direction of
19 transmission). The HAI Model has not sized cables to support the
20 consumption of such additional pairs. As Dr. Mercer stated during the
21 hearings, however, we do not believe that it should, because ADSL is not
22 part of the definition of Universal Service.

Mr. Murphy's statement is highly misleading, however, if it is read to imply that the network modeled by the BCPM *does* have sufficient capacity for ADSL. In place of T1 facilities, the BCPM uses Digital Loop Carrier (DLC) systems to reach distant customers.[21] DLC systems are designed with sufficient capacity for voice service, along with some small additional capacity for growth. In Mr. Murphy's example of 8 Mbps ADSL to each customer, however, each customer would consume the equivalent of at least 192 (8 times 24) voice circuits to receive the ADSL,[22] and more if the bi-directional signals of ADSL also were taken into account. Therefore, to provide ADSL service over the system assumed by the BCPM, far greater capacity than is modeled by the BCPM would be required in the DLC system for a given number of customers.[23]

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

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[21] As we have noted, however, it does not adequately ensure that these systems extend to within the maximum allowed copper distance of each customer.

[22] One might argue that there could be a system that puts more downstream signals on the wire pair that would normally carry the upstream signal, thereby halving the requirement, but we are not aware of any such system in existence at this point.

[23] This is a problem that is already impacting the deployment of ADSL by ILECs today, *i.e.*, they have not deployed DLC systems with the capacity to support such an enormous increase in bandwidth. Similar problems would be encountered if one tried to deploy ADSL with the system modeled by the BCPM.

Comparison of All Distribution Cable (Customer Side of the FDI)
HAI Model and the BCPM with Staff Inputs

Order Number	Wire Center	Branch, Backbone and Connecting Cable			
		HAI	BCPM	Difference	% Difference
Order 16	BARDTXXA	130.81	136.86	-6.05	-4.42%
Order 16	BLANTXXA	154.63	222.77	-68.14	-30.59%
Order 16	BRBOTXXA	252.38	206.28	46.10	22.35%
Order 16	BRCLTXXA	77.44	104.96	-27.52	-26.22%
Order 16	BTVLTXBV	177.81	148.15	29.66	20.02%
Order 16	CFTNTXXA	151.44	210.35	-58.91	-28.01%
Order 16	CHRCTXXA	92.91	128.19	-35.28	-27.52%
Order 16	CLMNTXXA	115.38	191.78	-76.40	-39.84%
Order 16	CMRCTXXA	166.93	185.50	-18.57	-10.01%
Order 16	COPRTXXA	148.29	128.06	20.23	15.80%
Order 16	CRTNTXXD	67.92	60.97	6.95	11.40%
Order 16	DLLSTXME	87.49	132.31	-44.82	-33.88%
Order 16	DLLSTXRI	54.63	78.30	-23.67	-30.23%
Order 16	DLRITXXB	171.21	159.77	11.43	7.16%
Order 16	EGLKTXEG	176.26	193.69	-17.43	-9.00%
Order 16	ELPSTXHC	78.59	103.19	-24.60	-23.84%
Order 16	FLDDTXFL	182.29	331.77	-149.47	-45.05%
Order 16	FLRNTXXA	163.08	189.95	-26.87	-14.15%
Order 16	FRCYTXXA	115.31	32.64	82.67	253.23%
Order 16	FRFDTXXB	295.55	363.13	-67.58	-18.61%
Order 16	FRTNTXXA	204.56	226.44	-21.88	-9.66%
Order 16	FTHDTXXM	80.82	118.41	-37.59	-31.75%
Order 16	FTWOTXEC	157.00	144.06	12.94	8.98%
Order 16	GLLTTXXA	66.51	101.42	-34.91	-34.43%
Order 16	GRSBTXXA	182.22	235.94	-53.72	-22.77%
Order 16	HSTNTXCA	84.33	162.69	-78.36	-48.16%
Order 16	KNKRTXXA	36.63	50.89	-14.26	-28.02%
Order 16	KRCYTXFC	67.21	117.76	-50.55	-42.93%
Order 16	LOLDTXXA	140.86	190.32	-49.46	-25.99%
Order 16	MDKFTXMK	100.19	118.56	-18.37	-15.50%
Order 16	MMPHTXXA	114.01	98.73	15.28	15.48%
Order 16	MNRDTXXA	270.25	452.74	-182.49	-40.31%
Order 16	NBRNTXNB	529.27	468.76	60.51	12.91%
Order 16	NRMNTXXA	109.27	137.61	-28.34	-20.60%
Order 16	NVSTTXXA	234.98	262.04	-27.06	-10.33%
Order 16	OVTNTXXA	93.74	89.47	4.28	4.78%
Order 16	PECSTXXB	146.97	141.44	5.53	3.91%
Order 16	PSBGTXUN	281.36	272.90	8.46	3.10%
Order 16	PYSPTXXA	90.18	115.89	-25.71	-22.18%
Order 16	PYTNTXXA	262.28	432.03	-169.75	-39.29%
Order 16	REFGTXRF	144.78	163.04	-18.26	-11.20%
Order 16	RKWLTXPA	260.36	223.27	37.09	16.61%
Order 16	RONKTXWO	201.19	142.68	58.52	41.01%
Order 16	SBPSTXSB	36.92	12.06	24.86	206.02%
Order 16	SNFRTXXA	1.14	2.79	-1.66	-59.31%
Order 16	SNRATXXA	345.76	448.20	-102.44	-22.86%
Order 16	SRTGTXXA	143.23	177.03	-33.80	-19.09%
Order 16	STFRTXXA	325.71	113.59	212.12	186.75%
Order 16	STVLTXXB	413.89	505.11	-91.21	-18.06%
Order 16	THRKTXXA	83.94	69.40	14.53	20.94%
Order 16	TUNSTXXG	262.06	292.57	-30.51	-10.43%
Order 16	VLNTTXXA	171.37	30.16	141.20	468.15%
Order 16	WCFLTXNI	324.89	371.18	-46.29	-12.47%
Order 16	WCLMTXXA	224.10	209.51	14.60	6.97%
Order 16	WMBRTXXA	223.34	249.06	-25.72	-10.33%
Order 16 Total		**9,275.66**	**10,256.37**	**-980.71**	**-9.56%**

Comparison of All Distribution Cable (Customer Side of the FDI) HAI Model and the BCPM with Staff Inputs

Order Number	Wire Center	Branch, Backbone and Connecting Cable			
		HAI	BCPM	Difference	% Difference
Order 17	AUSTTXPF	250.22	212.35	37.87	17.84%
Order 17	CHRLTXXA	135.20	228.59	-93.39	-40.86%
Order 17	CLEVTXCL	613.39	597.61	15.78	2.64%
Order 17	COPRTXXA	148.29	128.06	20.23	15.80%
Order 17	DLLSTXDA	212.64	223.92	-11.28	-5.04%
Order 17	DLLSTXFE	253.96	258.75	-4.79	-1.85%
Order 17	DLLSTXNM	227.41	214.60	12.81	5.97%
Order 17	EDENTXXA	144.61	160.83	-16.22	-10.09%
Order 17	FLTOTXFL	112.22	168.89	-56.67	-33.55%
Order 17	FRPTTXFR	161.65	180.59	-18.94	-10.49%
Order 17	FTWOTXAT	185.11	206.22	-21.11	-10.24%
Order 17	FTWOTXCE	154.94	135.51	19.43	14.34%
Order 17	GLRSTXXA	181.22	192.34	-11.12	-5.78%
Order 17	GLTNTXSH	85.01	84.47	0.54	0.64%
Order 17	GLTNTXSO	81.07	124.84	-43.77	-35.06%
Order 17	GRLDTXXA	334.86	181.23	153.63	84.77%
Order 17	GVTNTXXA	133.02	146.66	-13.64	-9.30%
Order 17	HRLNTXHG	461.31	459.80	1.51	0.33%
Order 17	HSTNTXAL	351.12	317.29	33.84	10.66%
Order 17	HSTNTXAP	174.61	115.34	59.27	51.38%
Order 17	HSTNTXBW	180.69	150.65	30.04	19.94%
Order 17	HSTNTXHO	279.37	307.71	-28.34	-9.21%
Order 17	HSTNTXMI	214.36	254.26	-39.90	-15.69%
Order 17	HSTNTXNE	191.84	212.59	-20.76	-9.76%
Order 17	KNRDTXXA	127.58	158.37	-30.79	-19.44%
Order 17	LCKNTXLO	95.41	162.46	-67.05	-41.27%
Order 17	LNDLTXTU	309.72	249.24	60.48	24.27%
Order 17	MIAMTXXA	107.73	65.60	42.13	64.22%
Order 17	NCGDTXNC	866.59	816.83	49.76	6.09%
Order 17	PLPNTXXA	89.06	197.02	-107.95	-54.79%
Order 17	PTTVTXXA	66.37	124.70	-58.32	-46.77%
Order 17	SNANTXLE	170.09	171.32	-1.23	-0.72%
Order 17	SNANTXSL	174.98	103.50	71.48	69.06%
Order 17	SNTOTXXA	93.82	130.42	-36.60	-28.07%
Order 17	TBLLTXKL	351.78	278.43	73.35	26.35%
Order 17	TRUPTXXA	224.90	219.16	5.74	2.62%
Order 17	TXRKTXXA	468.56	502.59	-34.03	-6.77%
Order 17	VERNTXLI	210.86	271.53	-60.66	-22.34%
Order 17	WACOTX01	268.31	192.84	75.47	39.14%
Order 17	WCFLTXTF	145.59	111.05	34.55	31.11%
Order 17 Total		**9,039.48**	**9,018.15**	**21.33**	**0.24%**
Total For Both Orders *		**18,166.85**	**19,146.46**	**-979.60**	**-5.12%**

* "COPRTXXA" is included in both Order 16 and Order 17. This total does not double-count this wire center.

Comparison of Cable Actually Serving Customers (Branch and Backbone)
HAI Model and the BCPM with Staff Inputs

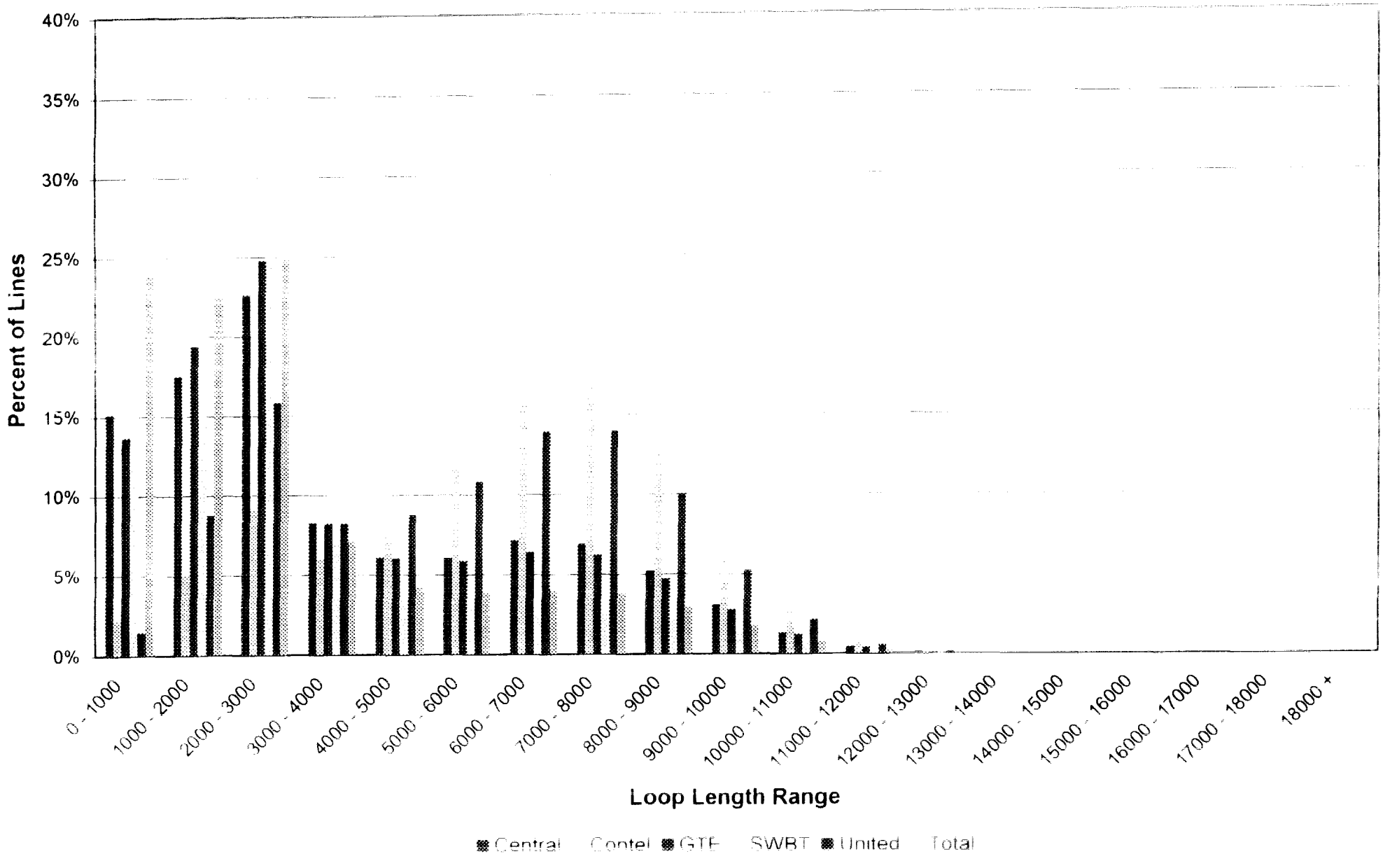
Order Number	Wire Center	Branch and Backbone Cable			
		HAI	BCPM	Difference	% Difference
Order 16	BARDTXXA	47.16	29.40	17.76	60.40%
Order 16	BLANTXXA	149.08	117.10	31.98	27.31%
Order 16	BRBOTXXA	238.70	153.21	85.49	55.80%
Order 16	BRCLTXXA	24.70	8.47	16.23	191.70%
Order 16	BTVLTXBV	26.49	25.78	0.70	2.73%
Order 16	CFTNTXXA	133.44	70.91	62.53	88.17%
Order 16	CHRCTXXA	72.74	22.96	49.78	216.77%
Order 16	CLMNTXXA	96.57	77.80	18.77	24.13%
Order 16	CMRCTXXA	153.92	109.94	43.98	40.01%
Order 16	COPRTXXA	143.92	62.76	81.16	129.33%
Order 16	CRTNTXXD	67.92	60.97	6.95	11.40%
Order 16	DLLSTXME	87.45	131.45	-44.00	-33.47%
Order 16	DLLSTXRI	54.63	78.30	-23.67	-30.23%
Order 16	DLRITXXB	39.87	50.70	-10.82	-21.35%
Order 16	EGLKTXEG	153.84	88.73	65.12	73.39%
Order 16	ELPSTXHC	65.06	78.24	-13.18	-16.84%
Order 16	FLDDTXFL	101.32	43.98	57.34	130.38%
Order 16	FLRNTXXA	143.96	86.59	57.37	66.26%
Order 16	FRCYTXXA	0.00	0.00	0.00	N/A
Order 16	FRFDTXXB	246.34	186.74	59.60	31.91%
Order 16	FRTNTXXA	204.56	134.65	69.91	51.92%
Order 16	FTHDTXXM	13.79	5.94	7.85	132.11%
Order 16	FTWOTXEC	157.00	143.04	13.96	9.76%
Order 16	GLLTTXXA	39.96	6.49	33.46	515.32%
Order 16	GRSBTXXA	160.46	116.93	43.53	37.23%
Order 16	HSTNTXCA	84.02	162.69	-78.67	-48.35%
Order 16	KNKRTXXA	36.63	28.13	8.50	30.22%
Order 16	KRCYTXFC	60.02	23.45	36.57	155.92%
Order 16	LOLDTXXA	128.51	55.54	72.97	131.38%
Order 16	MDKFTXMK	15.82	4.31	11.51	267.10%
Order 16	MMPHTXXA	49.41	30.13	19.28	64.01%
Order 16	MNRDTXXA	61.97	47.39	14.58	30.77%
Order 16	NBRNTXNB	529.27	425.67	103.59	24.34%
Order 16	NRMNTXXA	103.70	59.52	44.18	74.22%
Order 16	NVSTTXXA	224.59	167.33	57.27	34.22%
Order 16	OVTNTXXA	93.74	68.95	24.79	35.96%
Order 16	PECSTXXB	48.70	38.36	10.34	26.96%
Order 16	PSBGTXUN	273.39	211.90	61.50	29.02%
Order 16	PYSPTXXA	90.18	111.37	-21.19	-19.02%
Order 16	PYTNTXXA	100.49	76.57	23.92	31.24%
Order 16	REFGTXRF	86.24	51.58	34.66	67.18%
Order 16	RKWLTXPA	260.36	211.39	48.97	23.17%
Order 16	RONKTXWO	201.19	132.06	69.13	52.35%
Order 16	SBPSTXSB	11.57	3.58	7.99	223.08%
Order 16	SNFRTXXA	1.14	2.79	-1.66	-59.31%
Order 16	SNRATXXA	66.80	46.31	20.49	44.24%
Order 16	SRTGTXXA	124.04	64.58	59.46	92.07%
Order 16	STFRTXXA	325.71	113.59	212.12	186.75%
Order 16	STVLTXXB	384.89	270.74	114.15	42.16%
Order 16	THRKTXXA	34.69	21.46	13.23	61.65%
Order 16	TUNSTXXG	247.83	136.68	111.15	81.32%
Order 16	VLNTTXXA	3.58	4.81	-1.23	-25.61%
Order 16	WCFLTXNI	322.77	314.27	8.50	2.71%
Order 16	WCLMTXXA	208.43	150.53	57.90	38.47%
Order 16	WMBRTXXA	223.34	212.71	10.63	5.00%
Order 16 Total		**7,025.90**	**5,139.46**	**1,886.44**	**36.71%**

Comparison of Cable Actually Serving Customers (Branch and Backbone)
HAI Model and the BCPM with Staff Inputs

Order Number	Wire Center	Branch and Backbone Cable			
		HAI	BCPM	Difference	% Difference
Order 17	AUSTTXPF	250.22	181.92	68.30	37.54%
Order 17	CHRLTXXA	65.34	29.86	35.47	118.78%
Order 17	CLEVTXCL	606.52	477.45	129.08	27.03%
Order 17	COPRTXXA	143.92	62.76	81.16	129.33%
Order 17	DLLSTXDA	212.64	223.92	-11.28	-5.04%
Order 17	DLLSTXFE	253.96	256.40	-2.45	-0.95%
Order 17	DLLSTXNM	227.41	214.60	12.81	5.97%
Order 17	EDENTXXA	41.36	21.21	20.16	95.04%
Order 17	FLTOTXFL	105.12	65.08	40.04	61.53%
Order 17	FRPTTXFR	151.19	170.87	-19.67	-11.51%
Order 17	FTWOTXAT	183.84	206.22	-22.39	-10.86%
Order 17	FTWOTXCE	154.94	121.88	33.06	27.13%
Order 17	GLRSTXXA	174.18	120.36	53.82	44.71%
Order 17	GLTNTXSH	85.01	82.73	2.27	2.75%
Order 17	GLTNTXSO	81.07	124.05	-42.97	-34.64%
Order 17	GRLDTXXA	334.86	181.23	153.63	84.77%
Order 17	GVTNTXXA	105.50	58.77	46.73	79.52%
Order 17	HRLNTXHG	451.48	424.80	26.68	6.28%
Order 17	HSTNTXAL	351.12	317.29	33.84	10.66%
Order 17	HSTNTXAP	174.61	114.83	59.78	52.06%
Order 17	HSTNTXBW	180.69	144.69	36.00	24.88%
Order 17	HSTNTXHO	279.37	307.71	-28.34	-9.21%
Order 17	HSTNTXMI	214.36	254.26	-39.90	-15.69%
Order 17	HSTNTXNE	191.01	212.00	-20.99	-9.90%
Order 17	KNRDTXXA	100.96	49.00	51.95	106.02%
Order 17	LCKNTXLO	91.58	33.62	57.97	172.43%
Order 17	LNDLTXTU	302.83	229.65	73.18	31.87%
Order 17	MIAMTXXA	19.37	11.67	7.70	66.03%
Order 17	NCGDTXNC	853.31	598.59	254.72	42.55%
Order 17	PLPNTXXA	66.63	43.16	23.47	54.39%
Order 17	PTTVTXXA	59.29	15.63	43.67	279.42%
Order 17	SNANTXLE	170.09	171.32	-1.23	-0.72%
Order 17	SNANTXSL	174.98	101.41	73.56	72.54%
Order 17	SNTOTXXA	89.05	51.68	37.37	72.32%
Order 17	TBLLTXKL	351.78	275.77	76.01	27.56%
Order 17	TRUPTXXA	224.90	133.87	91.04	68.01%
Order 17	TXRKTXXA	464.72	466.70	-1.98	-0.42%
Order 17	VERNTXLI	172.27	128.45	43.82	34.11%
Order 17	WACOTX01	268.31	192.84	75.47	39.14%
Order 17	WCFLTXTF	143.68	95.73	47.95	50.09%
Order 17 Total		**8,573.48**	**6,973.95**	**1,599.53**	**22.94%**
Total For Both Orders *		**15,455.46**	**12,050.65**	**3,404.80**	**28.25%**

* "COPRTXXA" is included in both Order 16 and Order 17. This total does not double-count this wire center.

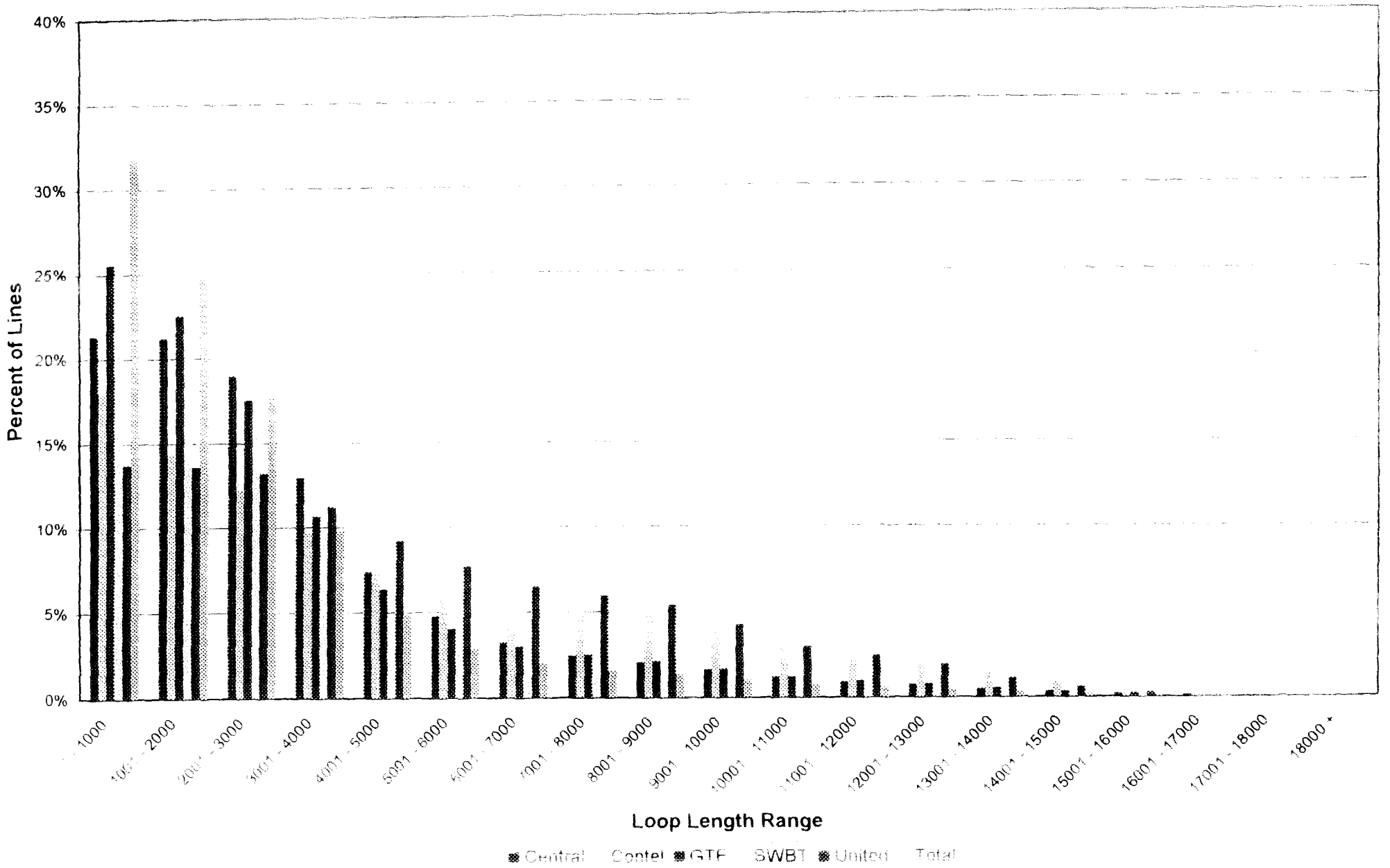
LOOP LENGTHS IN BCPM FOR 5 COMPANIES
With No Limit on Maximum Analog Copper Loop Length, No Road Adjustment



DATA FOR COMPANY GRAPH

Loop Length	Central	Contel	GTE	SWBT	United	Total
0 - 1000	15.12%	2.22%	13.69%	27.06%	1.45%	24.00%
1000 - 2000	17.50%	5.00%	19.42%	23.93%	8.79%	22.51%
2000 - 3000	22.64%	9.07%	24.78%	25.48%	15.83%	24.80%
3000 - 4000	8.31%	5.96%	8.25%	6.87%	8.24%	7.09%
4000 - 5000	6.09%	7.97%	6.03%	3.58%	8.74%	4.15%
5000 - 6000	6.06%	12.25%	5.87%	3.06%	10.82%	3.84%
6000 - 7000	7.13%	17.03%	6.39%	2.91%	13.94%	3.97%
7000 - 8000	6.91%	16.92%	6.25%	2.73%	13.98%	3.80%
8000 - 9000	5.21%	12.81%	4.73%	2.13%	10.06%	2.92%
9000 - 10000	3.09%	6.99%	2.78%	1.32%	5.25%	1.75%
10000 - 11000	1.34%	2.72%	1.22%	0.62%	2.15%	0.79%
11000 - 12000	0.45%	0.80%	0.42%	0.21%	0.58%	0.27%
12000 - 13000	0.11%	0.21%	0.11%	0.06%	0.13%	0.07%
13000 - 14000	0.03%	0.04%	0.04%	0.02%	0.02%	0.02%
14000 - 15000	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
15000 - 16000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16000 - 17000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17000 - 18000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18000 +	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

LOOP LENGTHS IN HAI MODEL 5.0a FOR 5 COMPANIES
With Maximum Analog Copper Loop Length of 18,000 Feet



DATA FOR COMPANY GRAPH

Loop Length	Central	Contel	GTE	SWBT	United	Total
1 - 1000	21.32%	17.93%	25.53%	33.57%	13.72%	31.76%
1001 - 2000	21.20%	14.34%	22.54%	25.55%	13.58%	24.72%
2001 - 3000	18.99%	12.19%	17.54%	17.85%	13.19%	17.67%
3001 - 4000	12.90%	9.72%	10.66%	9.57%	11.22%	9.79%
4001 - 5000	7.37%	7.28%	6.32%	4.43%	9.20%	4.85%
5001 - 6000	4.79%	6.50%	4.02%	2.48%	7.66%	2.86%
6001 - 7000	3.23%	5.91%	3.00%	1.66%	6.52%	2.00%
7001 - 8000	2.45%	5.47%	2.50%	1.26%	5.93%	1.58%
8001 - 9000	2.06%	5.04%	2.10%	1.03%	5.38%	1.32%
9001 - 10000	1.63%	4.43%	1.68%	0.77%	4.24%	1.02%
0001 - 1100	1.22%	3.24%	1.21%	0.54%	2.97%	0.72%
1001 - 1200	0.91%	2.68%	0.96%	0.43%	2.40%	0.58%
2001 - 1300	0.74%	2.08%	0.78%	0.35%	1.91%	0.46%
3001 - 1400	0.50%	1.43%	0.53%	0.24%	1.14%	0.31%
4001 - 1500	0.33%	0.92%	0.32%	0.14%	0.59%	0.19%
5001 - 1600	0.22%	0.61%	0.21%	0.09%	0.28%	0.12%
6001 - 1700	0.13%	0.20%	0.09%	0.04%	0.07%	0.05%
7001 - 1800	0.01%	0.02%	0.01%	0.00%	0.01%	0.01%
18000 +	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

CERTIFICATE OF SERVICE

I, Scott M. Bohannon, do hereby certify that on this 9th day of July, 1998, I caused a copy of the foregoing Reply Comments of AT&T Corp. on State Universal Service Cost Studies to be served upon each of the parties listed on the attached Service List by U.S. First Class mail, postage prepaid.

/s/ Scott M. Bohannon
Scott M. Bohannon

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