DMD1
COSA: TOTL
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Demand Inputs

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	ACCESS LINES (4308) :								
100	Total Switched Access Lines	4308, Table II, r.910, c.cj	116,367,890	120,968,239	123,850,902	128,073,888	130,575,917	134,674,007	138,532,479
	MINUTES OF USE (4301) :								
	Common Line:								
110	Originating Premium	4301, Table II, r.2010	99,325,328,600	111,757,545,000	125,155,347,000	131,138,509,000	140,064,893,830	148,066,549,743	156,681,449,000
120	Terminating Premium	4301, Table II, r.2020	120,665,947,333	140,105,222,000	154,611,484,000	166,603,685,000	179,958,114,400	195,057,856,096	212,437,359,000
130	Originating NonPremium	4301, Table II, r.2030	1,945,303,667	1,562,340,000	1,175,215,000	763,839,000	442,129,000	268,011,000	169,649,000
140	Terminating NonPremium	4301, Table II, r.2040	6,298,918,467	4,978,912,000	3,211,781,000	2,228,644,000	1,535,714,000	997,995,000	761,136,000
150	Sw Traffic Sensitive (Prem&NonPrem)	4301, Table II, (r.2050+r.2060)	248,179,024,000	275,176,417,000	294,359,067,000	308,939,142,000	328,659,997,000	346,621,156,250	376,393,931,000

EXP1
COSA: TOTL
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Expense and Labor Inputs

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	EXPENSE DATA (4302) :								
100	Total Operating Expenses	4302, Table I-1-4,r.720,c.ab	57,111,554,000	59,473,475,000	60,558,389,000	62,141,854,000	62,025,453,000	64,847,301,000	68,311,956,000
110	Depreciation & Amortization	4302, Table I-1-3,r.6560,c.ab	16,581,948,000	16,833,893,000	16,990,192,000	16,581,181,000	16,987,080,000	17,509,939,000	18,418,540,000
120	Wages & Salaries	4302, Table I-1-4,r.720,c.ac	18,214,136,000	18,215,072,000	18,462,119,000	18,325,683,000	18,303,688,000	18,497,395,000	18,249,299,000
130	Fringe Benefits	4302, Table I-1-4,r.720,c.ad	4,297,157,000	4,387,998,000	4,468,608,000	5,228,091,000	5,468,267,000	6,839,533,000	7,378,506,000
	OPERATING TAXES (4302) :								
200	ITC-Net	4302, Table I-1-5, r.7210, c.bb	901,851,326	837,210,000	753,845,000	692,001,000	628,967,000	575,949,000	505,138,000
210	FIT	4302, Table I-1-5, r.7220, c.bb	4,645,625,000	4,006,070,000	4,522,431,000	4,917,550,000	5,137,906,000	5,783,218,000	5,823,528,000
220	State and Local	4302, Table I-1-5, r.7230, c.bb	785,380,000	651,584,000	700,868,000	795,543,000	723,444,000	824,087,000	909,859,000
230	Property	4302, Table I-4, r.940, c.c	2,367,591,280	2,503,465,183	2,581,675,183	2,572,201,207	2,491,384,000	2,506,729,000	2,504,554,000
240	Gross Receipts	4302, Table I-4, r.940, c.d	1,427,152,594	1,303,982,445	1,265,089,843	1,392,927,386	1,406,799,000	1,445,125,000	1,449,586,000
250	Capital Stock	4302, Table I-4, r.940, c.e	103,165,366	126,173,280	134,439,705	148,856,692	162,651,000	166,125,000	155,336,000
260	Other	4302, Table I-4, r.940, c.g	135,297,634	140,633,576	153,176,359	155,671,325	150,667,000	197,351,000	194,513,000
	LABOR DATA (4302) :								
300	End of Year Employee Counts	4302, Table I-1-6, r.830,c.bb	597,389	592,155	560,941	537,336	511,370	492,446	456,729

INV1
COSA: TOTL
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Gross Additions Inputs

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	(a) General Support Facilities								
100	2112 Motor Vehicles	4302, Table B-1-2, r.2112, c.ac	280,587,000	306,302,000	295,390,000	286,241,000	224,867,000	212,146,000	199,643,000
110	2115 Garage Work Equip	4302, Table B-1-2, r.2115, c.ac	11,389,000	10,917,000	14,670,000	13,481,000	12,283,000	10,463,000	6,596,000
120	2116 Other Work Equip	4302, Table B-1-2, r.2116, c.ac	182,715,000	169,152,000	187,264,000	185,597,000	200,325,000	178,791,000	182,260,000
130	2121 Buildings	4302, Table B-1-2, r.2121, c.ac	708,296,000	747,142,000	887,276,000	858,622,000	978,858,000	823,969,000	815,765,000
140	2122 Furniture	4302, Table B-1-2, r.2122, c.ac	141,533,000	57,819,000	56,877,000	51,515,000	22,015,000	27,440,000	27,814,000
150	2123 Office Equipment	4302, Table B-1-2, r.2123, c.ac	442,933,000	318,569,000	374,544,000	252,536,000	244,961,999	220,464,000	228,909,000
160	2124 Genl Purpose Computers	4302, Table B-1-2, r.2124, c.ac	1,110,021,000	1,264,161,000	1,228,031,000	1,268,957,000	1,403,136,000	1,357,526,000	1,490,211,000
170	(b) Central Office	4302, Table B-1-2, r.2210, c.ac	4,973,681,000	4,341,004,000	4,572,734,000	4,323,207,000	4,643,269,000	4,504,608,000	4,559,264,000
180	(c) Operator Systems	4302, Table B-1-2, r.2220, c.ac	151,107,000	94,684,000	173,401,000	169,759,000	122,725,000	144,651,000	91,514,000
190	(d) Transmission	4302, Table B-1-2, r.2230, c.ac	3,797,270,000	3,407,508,000	3,601,038,000	3,866,435,000	4,011,502,000	4,363,443,000	4,651,247,000
200	(e) Information Orig/Term	4302, Table B-1-2, r.2310, c.ac	420,216,000	433,639,000	449,091,000	444,753,000	478,359,000	523,248,000	392,887,000
210	(f) Cable and Wire	4302, Table B-1-2, r.2410, c.ac	5,244,616,000	5,293,100,000	6,194,042,000	6,029,114,000	5,970,277,000	5,903,305,000	5,513,409,000

REV1
COSA: TOTL
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Revenue Inputs

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	BOOKED REVENUES (4302) :								
100	Basic Local Service	4302, Table I-1-1, r.520, c.b	33,815,096,000	34,663,999,000	35,810,228,000	37,420,078,000	39,003,982,000	40,697,565,000	42,081,853,000
110	LD Network Service	4302, Table I-1-1, r.525, c.b	13,447,717,000	13,620,071,000	13,550,232,000	12,985,462,000	12,532,277,000	12,627,066,000	12,309,693,000
120	Network Access	4302, Table I-1-1, r.5080, c.b	25,184,736,000	25,271,602,000	25,138,391,000	25,315,371,000	25,826,373,000	26,613,054,000	27,696,034,000
130	End User	4302, Table I-1-1, r.5081, c.b	4,260,916,000	5,234,789,000	5,568,965,000	5,759,898,000	5,919,313,000	6,263,956,000	6,641,589,000
140	Switched Access	4302, Table I-1-1, r.5082, c.b	12,090,404,000	11,415,189,000	10,843,689,000	10,772,567,000	10,946,149,000	11,200,613,000	11,636,002,000
150	Special Access	4302, Table I-1-1, r.5083, c.b	2,829,746,000	2,537,732,000	2,507,064,000	2,417,913,000	2,468,341,000	2,408,596,000	2,532,469,000
160	State Access	4302, Table I-1-1, r.5084, c.b	6,003,665,000	6,083,891,000	6,218,675,000	6,364,990,000	6,492,571,000	6,739,888,000	6,885,974,000
170	Miscellaneous	4302, Table I-1-1, r.5200, c.b	7,961,596,000	8,449,620,000	8,591,238,000	8,975,543,000	8,494,943,000	8,934,023,000	9,198,820,000
	BOOKED REVENUES (4301) :								
200	Common Line	4301, Table I, r.1020, c.m	8,834,763,533	8,718,170,000	8,579,912,000	8,446,488,000	8,492,271,000	9,238,686,000	10,069,332,000
210	Switched Traffic Sensitive	4301, Table I, r.1020, c.r	7,505,365,200	7,947,394,000	7,678,383,000	7,762,722,000	8,084,789,000	8,061,347,000	8,032,144,000

1994 Total Factor Productivity Review Plan
Other Inputs

	Item	Source	1987
	STARTING TOTAL PLANT IN SERVICE		(End of Year)
100	Motor Vehicles (acct. 2112)	ARMIS 4302, Table B-1-2, col. (ab	2,193,729,000
110	Garage Work Eqpt. (2115)	ARMIS 4302, Table B-1-2, col. (ab	87,017,000
120	Other Work Eqpt. (2116)	ARMIS 4302, Table B-1-2, col. (ab	1,263,257,000
130	Buildings (2121)	ARMIS 4302, Table B-1-2, col. (ab	15,494,010,000
140	Furniture (2122)	ARMIS 4302, Table B-1-2, col. (ab	1,201,015,000
150	Office Eqpt. (2123)	ARMIS 4302, Table B-1-2, col. (ab	2,862,699,000
160	Geal Purpose Computers (2124)	ARMIS 4302, Table B-1-2, col. (ab	5,757,010,000
170	Central Office Switches (2210)	ARMIS 4302, Table B-1-2, col. (ab	42,016,583,000
180	Operator Systems (2220)	ARMIS 4302, Table B-1-2, col. (ab	683,598,000
190	Transmission Eqpt. (2230)	ARMIS 4302, Table B-1-2, col. (ab	31,880,822,000
200	IOT Eqpt. (2310)	ARMIS 4302, Table B-1-2, col. (ab	18,532,626,000
210	Cable & Wire (2410)	ARMIS 4302, Table B-1-2, col. (ab	82,204,618,000
220	END OF YEAR EMPLOYEES	Form M Totals	610,881

	RATE CHANGE DATA		1988	1989	1990	1991	1992	1993	1994
	Local								
300	Credit	Form M Totals	(58,714,000)	(103,148,360)	(97,449,700)	(56,996,874)	(64,425,378)	(49,054,610)	(100,000)
310	Annualized Revenue Change	Form M Totals	(632,511,294)	(860,781,645)	(850,649,631)	238,676,538	(150,198,750)	108,707,752	(538,895,835)
320	Effective Rate Change	Form M Totals	(340,068,376)	(766,149,283)	(819,971,392)	253,819,268	(65,683,094)	64,178,875	(402,174,777)
	Intrastate								
330	Credit	Form M Totals	0	0	(14,860,000)	(1,950,000)	(3,053,622)	(1,430,000)	(4,200,000)
340	Annualized Revenue Change	Form M Totals	(149,695,234)	(40,774,370)	(294,335,445)	(56,244,640)	(137,050,818)	(294,444,655)	(310,358,704)
350	Effective Rate Change	Form M Totals	(128,635,581)	(215,358)	(66,924,763)	(26,816,105)	(70,924,079)	(117,672,023)	(136,741,899)
	Toll								
360	Credit	Form M Totals	(587,472)	0	19,797,000	0	0	(1,500,000)	1,000,000
370	Annualized Revenue Change	Form M Totals	(143,394,579)	(174,659,929)	(523,904,945)	(61,416,848)	(210,937,296)	(171,239,732)	(32,881,069)
380	Effective Rate Change	Form M Totals	(78,815,767)	(109,747,232)	(158,827,078)	(35,349,393)	(146,935,103)	(82,577,797)	(58,885,257)

1994 Total Factor Productivity Review Plan
Miscellaneous Inputs

	Item	Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	BEA PRICE INDEXES											
100	Motor Vehicles	SCB Table 7.8 Line 18	93.80	98.40	100.00	103.40	107.00	108.20	111.70	116.70	121.90	125.80
110	Garage & Other Work Eqpt	SCB Table 7.8 Line 2	97.50	99.00	100.00	101.90	103.90	106.20	108.30	109.70	110.70	112.50
120	Furniture and Office Equipment	SCB Table 7.8 Line 24	93.70	97.00	100.00	105.60	109.40	113.30	115.40	116.20	118.20	123.00
130	Gen Purpose Computers	SCB Table 7.8 Line 4	131.90	113.70	100.00	95.30	90.00	82.40	73.70	66.40	59.30	55.20
140	Communications Equipment	SCB Table 7.8 Line 7	95.50	97.50	100.00	99.60	100.90	102.10	103.70	105.10	106.80	108.00
150	Telecommunications Structures	SCB Table 7.7 Line 11	101.00	100.00	100.00	101.00	110.00	113.00	114.00	114.00	115.00	118.60
	OTHER INDEXES AND DATA BY YEAR											
200	GDPPI	BEA, National Income&Product Accts	N/A	N/A	100.025	103.950	108.625	113.550	118.125	121.875	125.500	128.925
210	Special Access Growth Rate	Industry analysis (see note 1 below)	N/A	N/A	N/A	N/A	-0.0794	-0.0106	0.0257	N/A	N/A	N/A
220	Special Access API as of 1/1	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	N/A	98.3753	98.9917	97.1108	88.0858
230	as of 4/1	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	N/A	98.1593	98.8726	96.8618	87.9792
240	as of 7/1	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	N/A	98.3881	98.0450	89.4779	85.7953
250	as of 10/1	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	N/A	98.3837	97.4509	88.2985	85.7071
	GROSS ADDITIONS											
300	Motor Vehicles	used 1988 values as surrogate	280,587,000	280,587,000	280,587,000							
310	Garage & Other Work Eqpt	used 1988 values as surrogate	194,104,000	194,104,000	194,104,000							
320	Furniture & Office Eqpt	used 1988 values as surrogate	584,466,000	584,466,000	584,466,000							
330	General Purpose Computers	used 1988 values as surrogate	1,110,021,000	1,110,021,000	1,110,021,000							
340	Total	Sum of 300 thru 330	2,169,178,000	2,169,178,000	2,169,178,000							
	COST OF CAPITAL	Lines 400 thru 460 shown in Millions of $										
400	Gross Domestic Product	SCB Table 1.1 Line 1		4,268.6	4,539.9	4,900.4	5,250.8	5,546.1	5,724.8	6,020.2	6,343.3	6,738.4
410	Labor Compensation	SCB Table 6.2 Line 2		2,524.0	2,698.8	2,921.5	3,100.4	3,297.8	3,405.0	3,591.3	3,780.6	4,004.8
420	Depreciation	SCB Table 1.9 Line 5		478.6	502.2	534.0	580.4	602.7	626.5	658.5	669.1	715.3
430	Indirect Business Taxes	SCB Table 1.9 Line 9		345.5	365.0	385.3	414.7	444.2	478.3	504.4	525.3	554.0
440	Corporate FIT Liability	SCB Table 6.18 Line 2		106.5	127.1	137.0	141.3	138.7	131.1	139.7	173.2	202.5
450	Current Cost of Net CapitalStock	SCB & BEA (see note 2 below)	7,751.8	8,224.3	8,729.1	9,108.3	9,650.3	10,116.5	10,384.8	10,751.2	11,290.9	11,917.2
460	Constant Cost of Net CapitalStock	SCB & BEA (see note 3 below)	8,112.4	8,346	8,558	8,774	8,980	9,158	9,262	9,374	9,563	9,825
470	U.S. Capital Stock Price Index	1.450/1.460	0.9555	0.9854	1.0200	1.0381	1.0746	1.1047	1.1213	1.1469	1.1807	1.2129
480	%Chg in U.S.Cap.Stk.Price Index	(1.470(t)-1.470(t-1)/1.470(t-1)		3.13%	3.51%	1.78%	3.51%	2.80%	1.50%	2.29%	2.95%	2.73%
490	Cost of Capital	(1.400-Sum(1.410 to 1.440) + (1.450(t-1)*1.480))/1.450(t-1)		13.63%	13.81%	12.35%	14.65%	13.81%	12.22%	13.13%	14.06%	13.90%

1994 Total Factor Productivity Review Plan
Miscellaneous Inputs

	Item	Source	
	ECONOMIC STOCK BOOK VALUE ADJUSTMENT FACTORS		
500	Gen Support Equipment	USTA comments (see note 4 below)	0.585915
510	Communication Equipment	USTA comments (see note 4 below)	0.667352
520	Structures	USTA comments (see note 4 below)	1.210756
	DEPRECIATION RATES		
600	NonCommunications(Other) Eqpt	USTA comments (see note 4 below)	0.1546
610	Communications Equipment	Dale M. Jorgenson [see note 5 below]	0.1100
620	Structures	Dale M. Jorgenson [see note 5 below]	0.0225
	OTHER MISCELLANEOUS INPUTS		
700	GSE Declining Balance Rate	Internal Revenue Code, MACRS	2.0
710	GSE Asset Life	Internal Revenue Code, MACRS	7.0
720	CommEqpt DecliningBalanceRate	Internal Revenue Code, MACRS	2.0
730	Communications Eqpt. Asset Life	Internal Revenue Code, MACRS	7.0
740	Cable & Wire Asset Life	Internal Revenue Code, MACRS	31.5
	STARTING INDEXES		as of 12/31/87
800	Local Price Index	Initialized to 1.0000 on 12/31/87	1.0000
810	Intrastate Access Price Index	Initialized to 1.0000 on 12/31/87	1.0000
820	Toll Price Index	Initialized to 1.0000 on 12/31/87	1.0000
830	End User Price Index	Initialized to 1.0000 on 12/31/87	1.0000
840	Switched Access Price Index	Initialized to 1.0000 on 12/31/87	1.0000
850	Special Access Price Index	Initialized to 1.0000 on 12/31/87	1.0000
860	Miscellaneous Price Index	Initialized to 1.0000 on 12/31/87	1.0000

Note1: Special Access growth rate is based on a study of LEC special access revenues and quantities commissioned by USTA.

Note2: Survey of Current Business (SCB), August 1994, p.55, Table 2, line 1, and BEA Wealth Diskettes released April 16, 1995 (described in January 1995 SCB).

Note3: SCB, August 1994, p.56, Table 4, line 1, and BEA Wealth Diskettes released April 16, 1995 (described in January 1995 SCB).

Note4: Comments of the United States Telephone Association, FCC Dkt 94-1, May 9, 1994: Attachment 6 - Productivity of the Local Telephone Operating Companies, Laurits R. Christensen, Philip E. Schoech and Mark E. Meitzen, pp.5-9

Note5: Dale M. Jorgenson, "Productivity and Economic Growth" (Chapter 3) in 'Fifty Years of Economic Measurement', ed. E.R.Brendt and J.E.Triplett, University of Chicago Press, 1990, Table 3-6, p.45.

ASTPRC1
Total Industry Rollup
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Asset Price Development

	Item	Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	BEA PRICE INDEXES											
100	Motor Vehicles	MISC1,I.100	93.80	98.40	100.00	103.40	107.00	108.20	111.70	116.70	121.90	125.80
110	Garage & Other Work Eqpt	MISC1,I.110	97.50	99.00	100.00	101.90	103.90	106.20	108.30	109.70	110.70	112.50
120	Furniture & Office Eqpt	MISC1,I.120	93.70	97.00	100.00	105.60	109.40	113.30	115.40	116.20	118.20	123.00
130	General Purpose Computers	MISC1,I.130	131.90	113.70	100.00	95.30	90.00	82.40	73.70	66.40	59.30	55.20
	% CHANGE IN BEA PRICE INDEXES											
140	Motor Vehicles	@ln(I.100(t)/I.100(t-1))	N/A	4.79%	1.61%	3.34%	3.42%	1.12%	3.18%	4.38%	4.36%	3.15%
150	Garage & Other Work Eqpt	@ln(I.110(t)/I.110(t-1))	N/A	1.53%	1.01%	1.88%	1.94%	2.19%	1.96%	1.28%	0.91%	1.61%
160	Furniture & Office Eqpt	@ln(I.120(t)/I.120(t-1))	N/A	3.46%	3.05%	5.45%	3.54%	3.50%	1.84%	0.69%	1.71%	3.98%
170	General Purpose Computers	@ln(I.130(t)/I.130(t-1))	N/A	-14.85%	-12.84%	-4.81%	-5.72%	-8.82%	-11.16%	-10.43%	-11.31%	-7.16%
	GROSS ADDITIONS											
200	Motor Vehicles	INV1,I.100; 85-87:MISC1,I.300	280,587,000	280,587,000	280,587,000	280,587,000	306,302,000	295,390,000	286,241,000	224,867,000	212,146,000	199,643,000
210	Garage & Other Work Eqpt	INV1,I.110+I.120; 85-87:MISC1,I.310	194,104,000	194,104,000	194,104,000	194,104,000	180,069,000	201,934,000	199,078,000	212,608,000	189,254,000	188,856,000
220	Furniture & Office Eqpt	INV1,I.140+I.150; 85-87:MISC1,I.320	584,466,000	584,466,000	584,466,000	584,466,000	376,388,000	431,421,000	304,051,000	266,976,999	247,904,000	256,723,000
230	General Purpose Computers	INV1,I.160; 85-87:MISC1,I.330	1,110,021,000	1,110,021,000	1,110,021,000	1,110,021,000	1,264,161,000	1,228,031,000	1,268,957,000	1,403,136,000	1,357,526,000	1,490,211,000
240	Total	Sum of 200 thru 230	2,169,178,000	2,169,178,000	2,169,178,000	2,169,178,000	2,126,920,000	2,156,776,000	2,058,327,000	2,107,587,999	2,006,830,000	2,135,433,000
	GROSS ADDITIONS: AVERAGE OF SHARES											
250	Motor Vehicles	(I.200(t-1)/I.240(t-1)+I.200(t)/I.240(t))/2	N/A	12.94%	12.94%	12.94%	13.67%	14.05%	13.80%	12.29%	10.62%	9.96%
260	Garage & Other Work Eqpt	(I.210(t-1)/I.240(t-1)+I.210(t)/I.240(t))/2	N/A	8.95%	8.95%	8.95%	8.71%	8.91%	9.52%	9.88%	9.76%	9.14%
270	Furniture & Office Eqpt	(I.220(t-1)/I.240(t-1)+I.220(t)/I.240(t))/2	N/A	26.94%	26.94%	26.94%	22.32%	18.85%	17.39%	13.72%	12.51%	12.19%
280	General Purpose Computers	(I.230(t-1)/I.240(t-1)+I.230(t)/I.240(t))/2	N/A	51.17%	51.17%	51.17%	55.30%	58.19%	59.29%	64.11%	67.11%	68.72%
300	% Change: GSE Price Index	140*250+150*260+160*270+170*280	N/A	-5.91%	-5.45%	-0.39%	-1.74%	-4.12%	-5.67%	-5.93%	-6.82%	-3.98%
310	General Support Index	I.310(t-1)*@exp(I.300(t))	1.1247	1.0602	1.0040	1.0000	0.9828	0.9431	0.8911	0.8398	0.7844	0.7538
320	Communications Equipment	MISC1,I.140	95.50	97.50	100.00	99.60	100.90	102.10	103.70	105.10	106.80	108.00
330	% Change: Comm. Eqpt. Index	@ln(I.320(t)/I.320(t-1))	N/A	2.07%	2.53%	-0.40%	1.30%	1.18%	1.55%	1.34%	1.60%	1.12%
340	Communication Equipment Index	I.340(t-1)*@exp(I.330(t))	0.9588	0.9789	1.0040	1.0000	1.0131	1.0251	1.0412	1.0552	1.0723	1.0843
350	Telecommunications Structures	MISC1,I.150	101.00	100.00	100.00	101.00	110.00	113.00	114.00	114.00	115.00	118.60
360	% Chg: TelecomStructures Index	@ln(I.350(t)/I.350(t-1))	N/A	-1.00%	0.00%	1.00%	8.54%	2.69%	0.88%	0.00%	0.87%	3.08%
370	Telecom Structures Index	I.370(t-1)*@exp(I.360(t))	1.0000	0.9901	0.9901	1.0000	1.0891	1.1188	1.1287	1.1287	1.1386	1.1743

CAPSTK1
Total Industry Rollup
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Capital Stock Beginning Value

	Item	Source	1987
	GROSS BOOK VALUES		
100	Gen Support Equipment	OTH1:1.100 to 1.120 + 1.140 to 1.160	13,364,727,000
110	Communication Equipment	OTH1:1.170 to 1.200	93,113,629,000
120	Structures	OTH1:1.130+1.210	97,698,628,000
	STARTING CAPITAL STOCK VALUES		
200	Gen Support Equipment	1.100*MISC1,1.500	7,830,594,020
210	Communication Equipment	1.110*MISC1,1.510	62,139,566,540
220	Structures	1.120*MISC1,1.520	118,289,200,043
230	Total		188,259,360,603
	STARTING CAPITAL STOCK QUANTITIES		
300	Gen Support Equipment	1.200/ASTPRICE1,1.310	7,799,769,698
310	Communication Equipment	1.210/ASTPRICE1,1.340	61,891,008,274
320	Structures	1.220/ASTPRICE1,1.370	119,472,092,043

1994 Total Factor Productivity Review Plan
Development of Capital Index, Part 1: Capital Stock Calculations

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	GROSS ADDITIONS								
100	Gen Support Equipment	INV1, Sum of 1.100 thru 1.160 - 1.130	2,169,178,000	2,126,920,000	2,156,776,000	2,058,327,000	2,107,587,999	2,006,830,000	2,135,433,000
110	Communication Equipment	INV1, Sum of 1.170 thru 1.200	9,342,274,000	8,276,835,000	8,796,264,000	8,804,154,000	9,255,855,000	9,535,950,000	9,694,912,000
120	Structures	INV1, Sum of 1.130 + 1.210	5,952,912,000	6,040,242,000	7,081,318,000	6,887,736,000	6,949,135,000	6,727,274,000	6,329,174,000
130	Total	Sum of 100 thru 120	17,464,364,000	16,443,997,000	18,034,358,000	17,750,217,000	18,312,577,999	18,270,054,000	18,159,519,000
	ASSET PRICE INDEXES								
200	Gen Support Equipment	ASTPRC1, 1.310	1.0000	0.9828	0.9431	0.8911	0.8398	0.7844	0.7538
210	Communication Equipment	ASTPRC1, 1.340	1.0000	1.0131	1.0251	1.0412	1.0552	1.0723	1.0843
220	Structures	ASTPRC1, 1.370	1.0000	1.0891	1.1188	1.1287	1.1287	1.1386	1.1743
	CONSTANT DOLLAR INVESTMENT								
300	Gen Support Equipment	1.100/1.200	2,169,178,000	2,164,218,141	2,286,935,384	2,309,897,399	2,509,614,855	2,558,406,854	2,832,806,296
310	Communication Equipment	1.110/1.210	9,342,274,000	8,170,195,897	8,580,880,454	8,456,063,051	8,771,485,804	8,893,076,966	8,940,863,289
320	Structures	1.120/1.220	5,952,912,000	5,546,040,382	6,329,319,628	6,102,292,421	6,156,689,781	5,908,301,513	5,389,937,386
	CAPITAL STOCK QUANTITY								
400	Gen Support Equipment	1.400(t-1)*(1-MISC1,1.600)+1.300	8,763,103,303	9,572,545,674	10,379,565,496	11,084,782,070	11,880,689,616	12,602,341,856	13,486,826,101
410	Communication Equipment	1.410(t-1)*(1-MISC1,1.610)+1.310	64,425,271,364	65,508,687,411	66,883,612,250	67,982,477,954	69,275,891,183	70,548,620,119	71,729,135,195
420	Structures	1.420(t-1)*(1-MISC1,1.620)+1.320	122,736,881,972	125,521,342,510	129,026,431,932	132,225,629,634	135,407,242,748	138,268,881,299	140,547,768,856
	CAPITAL STOCK VALUE								
500	Gen Support Equipment	1.200*1.400	8,763,103,303	9,407,572,395	9,788,819,533	9,877,540,981	9,977,466,785	9,885,354,109	10,166,672,378
510	Communication Equipment	1.210*1.410	64,425,271,364	66,363,720,480	68,562,417,779	70,780,953,452	73,101,367,102	75,648,520,369	77,778,580,332
520	Structures	1.220*1.420	122,736,881,972	136,706,412,634	144,356,305,032	149,244,770,082	152,835,897,755	157,434,864,846	165,039,261,251
530	Total	Sum of 500 thru 520	195,925,256,639	212,477,705,509	222,707,542,344	229,903,264,515	235,914,731,641	242,968,739,324	252,984,513,961
	LAGGED CAPITAL STOCK VALUE								
600	Gen Support Equipment	1.200(t)*1.400(t-1)	7,799,769,698	8,612,079,957	9,027,730,699	9,249,129,384	9,309,059,363	9,319,285,674	9,499,928,292
610	Communication Equipment	1.210(t)*1.410(t-1)	61,891,008,274	65,266,163,460	67,152,981,774	69,636,853,317	71,736,530,451	74,283,786,931	76,498,503,744
620	Structures	1.220(t)*1.420(t-1)	119,472,092,043	133,673,831,851	140,434,769,342	145,633,794,457	149,244,770,082	154,176,563,525	162,363,260,615
630	Total	Sum of 600 thru 620	189,162,870,016	207,552,075,268	216,615,481,815	224,519,777,158	230,290,359,896	237,779,636,131	248,361,692,650

1994 Total Factor Productivity Review Plan
Development of Capital Index, Part 2: Capital Cost Development

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	VALUE OF REPLACEMENT								
700	Gen Support Equipment	MISC1,l.600*CAP1,l.600	1,205,844,395	1,331,427,561	1,395,687,166	1,429,915,403	1,439,180,578	1,440,761,565	1,468,688,914
710	Communication Equipment	MISC1,l.610*CAP1,l.610	6,808,010,910	7,179,277,981	7,386,827,995	7,660,053,865	7,891,018,350	8,171,216,562	8,414,835,412
720	Structures	MISC1,l.620*CAP1,l.620	2,688,122,071	3,007,661,217	3,159,782,310	3,276,760,375	3,358,007,327	3,468,972,679	3,653,173,364
730	Total	Sum of 700 thru 720	10,701,977,377	11,518,366,759	11,942,297,471	12,366,729,643	12,688,206,254	13,080,950,807	13,536,697,690
	THREE YEAR MOVING AVERAGE FOR CAPITAL GAINS								
800	Gen Support Equipment	ASTPRC1,[l.310(t)-l.310(t-3)]/3	-0.041579	-0.025810	-0.020289	-0.036303	-0.047654	-0.052893	-0.045756
810	Communication Equipment	ASTPRC1,[l.340(t)-l.340(t-3)]/3	0.013722	0.011379	0.007028	0.013722	0.014056	0.015730	0.014391
820	Structures	ASTPRC1,[l.370(t)-l.370(t-3)]/3	0.000000	0.033003	0.042904	0.042904	0.013201	0.006601	0.015182
	CAPITAL GAINS								
900	Gen Support Equipment	l.400(t-1)*l.800(t)	(324,307,275)	(226,174,552)	(194,215,075)	(376,812,037)	(528,229,181)	(628,407,504)	(576,631,795)
910	Communication Equipment	l.410(t-1)*l.810(t)	849,240,743	733,085,417	460,402,422	917,747,022	955,576,999	1,089,681,019	1,015,257,920
920	Structures	l.420(t-1)*l.820(t)	0	4,050,722,177	5,385,404,134	5,535,787,509	1,745,552,866	893,777,180	2,099,131,531
930	Total	Sum of 900 thru 920	524,933,467	4,557,633,042	5,651,591,481	6,076,722,493	2,172,900,685	1,355,050,695	2,537,757,656
	TAXES								
1000	Direct Income Taxes	EXP1,[l.210+l.220]	5,431,005,000	4,657,654,000	5,223,299,000	5,713,093,000	5,861,350,000	6,607,305,000	6,733,387,000
1010	Property & Capital Stock Taxes	EXP1,[l.230+l.250]	2,470,756,646	2,629,638,463	2,716,114,888	2,721,057,899	2,654,035,000	2,672,854,000	2,659,890,000
1020	Net Investment Tax Credits	EXP1,l.200	901,851,326	837,210,000	753,845,000	692,001,000	628,967,000	575,949,000	505,138,000
1100	Investment Tax Credit Rate	l.1020/l.130	0.0516	0.0509	0.0418	0.0390	0.0343	0.0315	0.0278
1110	Property/Capital Stock Taxation Rate	l.1010(t)/l.530(t-1)	0.0131	0.0134	0.0128	0.0122	0.0115	0.0113	0.0109
1120	Cost of Capital	MISC1,l.490	0.1235	0.1465	0.1381	0.1222	0.1313	0.1406	0.1390
1130	Three Year Moving Average	MISC1:(l.490(t-2)+l.490(t-1)+l.490(t))/3	0.1326	0.1360	0.1360	0.1356	0.1305	0.1314	0.1370
	PRESENT VALUE OF DEPRECIATION								
1140	GSE:Decl.Balance Rate/Asset Life	MISC1,(l.700/l.710) (for all Years)	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857
1150	CommEqpt:Decl.Bal.Rate/Asset Life	MISC1,(l.720/l.730) (for all Years)	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857
1160	Gen Support Equipment	(l.1140)*(1/(l.1130+(l.1140)))*(1-((1-(l.1140))/(1+l.1130))^3)+((1-(l.1140))/(1+l.1130))^3*(1/(l.1130*4))*(1-(1/(1+l.1130))^4)	0.6972	0.6917	0.6916	0.6923	0.7006	0.6992	0.6901
1170	Central Office	(l.1150)*(1/(l.1130+(l.1150)))*(1-((1-(l.1150))/(1+l.1130))^3)+((1-(l.1150))/(1+l.1130))^3*(1/(l.1130*4))*(1-(1/(1+l.1130))^4)	0.6972	0.6917	0.6916	0.6923	0.7006	0.6992	0.6901
1180	Cable & Wire	(1-(1/(1+l.1130))^MISC1,l.740)/(l.1130*MISC1,l.740)	0.2347	0.2292	0.2292	0.2299	0.2381	0.2367	0.2277
1190	Capital Cost	l.1130*CAPSTK1,l.230+l.1000+l.1010+l.730-l.930	43,041,036,285	40,893,132,333	43,129,828,736	44,919,636,862	49,042,001,677	51,999,676,231	53,677,635,141

1994 Total Factor Productivity Review Plan
Development of Capital Index, Part 3: Capital Input Index

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	PROPERTY/CAPITAL STOCK TAXES								
1200	Gen Support Equipment	1.1110(t)*1.500(t-1)	102,770,413	117,615,227	120,257,546	119,600,551	114,027,696	113,042,165	108,219,496
1210	Communication Equipment	1.1110(t)*1.510(t-1)	815,533,137	864,692,865	848,331,305	837,700,899	817,105,091	828,219,925	828,158,978
1220	Structures	1.1110(t)*1.520(t-1)	1,552,453,096	1,647,330,371	1,747,526,037	1,763,756,449	1,722,902,214	1,731,591,910	1,723,511,526
	IMPUTED TAX DEPRECIATION								
1300	Gen Support Equipment	1.1160*(1.1130*1.500(t-1)+1.700-1.900)	1,790,774,457	1,901,633,625	1,984,626,741	2,169,732,201	2,281,780,497	2,363,378,448	2,345,872,340
1310	Communication Equipment	1.1170*(1.1130*1.510(t-1)+1.710-1.910)	9,899,245,319	10,518,714,615	11,033,547,047	11,103,849,819	11,332,565,242	11,666,883,056	12,257,398,382
1320	Structures	1.1180*(1.1130*1.520(t-1)+1.720-1.920)	4,311,712,825	3,587,117,632	3,751,623,834	3,979,934,071	5,022,510,740	5,362,084,611	5,264,163,855
1330	Total	Sum of 1300 thru 1320	16,001,732,602	16,007,465,872	16,769,797,622	17,253,516,091	18,636,856,479	19,392,346,114	19,867,434,577
1350	Effective Income Tax Rate	(1.1100*(1.1130*1.530(t-1)+1.730-1.930)+ 1.1000)/(1.1190-1.1010-1.1330)	0.2949	0.2862	0.2831	0.2860	0.2614	0.2657	0.2557
	SERVICE FLOWS								
1400	Gen Support Equipment	((1-1.1100-1.1350*1.1160)/(1-1.1350))* (1.1130*1.500(t-1)+1.700-1.900)+1.1200	2,808,382,969	3,010,694,364	3,171,857,307	3,468,712,997	3,564,420,624	3,715,777,821	3,742,723,383
1410	Communication Equipment	((1-1.1100-1.1350*1.1170)/(1-1.1350))* (1.1130*1.510(t-1)+1.710-1.910)+1.1210	15,771,923,831	16,867,498,770	17,813,722,748	17,977,162,449	17,953,636,418	18,613,224,107	19,818,775,518
1420	Structures	((1-1.1100-1.1350*1.1180)/(1-1.1350))* (1.1130*1.520(t-1)+1.720-1.920)+1.1220	24,460,729,485	21,014,939,199	22,144,248,681	23,473,761,416	27,523,944,635	29,670,674,303	30,116,136,240
	CAPITAL INPUT QUANTITIES								
1500	Gen Support Equipment	1.400(t-1)/CAPSTK1,1.300	1.0000	1.1235	1.2273	1.3308	1.4212	1.5232	1.6157
1510	Communication Equipment	1.410(t-1)/CAPSTK1,1.310	1.0000	1.0409	1.0585	1.0807	1.0984	1.1193	1.1399
1520	Structures	1.420(t-1)/CAPSTK1,1.320	1.0000	1.0273	1.0506	1.0800	1.1067	1.1334	1.1573
	CAPITAL INPUT SHARES								
1600	Gen Support Equipment	1.1400/1.1190	0.0652	0.0736	0.0735	0.0772	0.0727	0.0715	0.0697
1610	Communication Equipment	1.1410/1.1190	0.3664	0.4125	0.4130	0.4002	0.3661	0.3579	0.3692
1620	Structures	1.1420/1.1190	0.5683	0.5139	0.5134	0.5226	0.5612	0.5706	0.5611
	AVERAGE OF CAPITAL INPUT SHARES								
1700	Gen Support Equipment	(1.1600(t-1)+1.1600(t))/2	N/A	0.0694	0.0736	0.0754	0.0750	0.0721	0.0706
1710	Communication Equipment	(1.1610(t-1)+1.1610(t))/2	N/A	0.3895	0.4128	0.4066	0.3831	0.3620	0.3636
1720	Structures	(1.1620(t-1)+1.1620(t))/2	N/A	0.5411	0.5137	0.5180	0.5419	0.5659	0.5658
	CAPITAL INPUT GROWTH RATES								
1800	Gen Support Equipment	@ln(1.1500(t)/1.1500(t-1))	N/A	11.65%	8.83%	8.09%	6.57%	6.93%	5.90%
1810	Communication Equipment	@ln(1.1510(t)/1.1510(t-1))	N/A	4.01%	1.67%	2.08%	1.63%	1.88%	1.82%
1820	Structures	@ln(1.1520(t)/1.1520(t-1))	N/A	2.70%	2.24%	2.75%	2.45%	2.38%	2.09%
1850	AGGREGATE CAPITAL INPUT GROWTH RATE	1700*1800+1710*1810+1720*1820	N/A	3.83%	2.49%	2.88%	2.44%	2.53%	2.26%

LABMRS1
Total Industry Rollup
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Labor and MR&S Input Index Development

Item	Source	1988	1989	1990	1991	1992	1993	1994
LABOR INPUT INDEX DEVELOPMENT								
100 Wages and Salaries	EXP1,1.120	18,214,136,000	18,215,072,000	18,462,119,000	18,325,683,000	18,303,688,000	18,497,395,000	18,249,299,000
110 Fringe Benefits	EXP1,1.130	4,297,157,000	4,387,998,000	4,468,608,000	5,228,091,000	5,468,267,000	6,839,533,000	7,378,506,000
120 Labor Input Cost	Sum of 100 + 110	22,511,293,000	22,603,070,000	22,930,727,000	23,553,774,000	23,771,955,000	25,336,928,000	25,627,805,000
200 End of Year Work Force	EXP1,1.300	597,389	592,155	560,941	537,336	511,370	492,446	456,729
210 Average Work Force	[1.200(t-1)+1.200(t)]/2	604,135	594,772	576,548	549,139	524,353	501,908	474,588
220 % Change in Labor Input	@ln[1.210(t)/1.210(t-1)]	N/A	-1.56%	-3.11%	-4.87%	-4.62%	-4.37%	-5.60%
MR&S INPUT INDEX DEVELOPMENT								
300 Total Operating Expenses	EXP1,1.100	57,111,554,000	59,473,475,000	60,558,389,000	62,141,854,000	62,025,453,000	64,847,301,000	68,311,956,000
310 Depreciation & Amortization	EXP1,1.110	16,581,948,000	16,833,893,000	16,990,192,000	16,581,181,000	16,987,080,000	17,509,939,000	18,418,540,000
320 Wages and Salaries	EXP1,1.120	18,214,136,000	18,215,072,000	18,462,119,000	18,325,683,000	18,303,688,000	18,497,395,000	18,249,299,000
330 Fringe Benefits	EXP1,1.130	4,297,157,000	4,387,998,000	4,468,608,000	5,228,091,000	5,468,267,000	6,839,533,000	7,378,506,000
340 MR&S Input Cost	1.300-1.310-1.320-1.330	18,018,313,000	20,036,512,000	20,637,470,000	22,006,899,000	21,266,418,000	22,000,434,000	24,265,611,000
350 % Change in MR&S Cost	@ln[1.340(t)/1.340(t-1)]	N/A	10.62%	2.96%	6.42%	-3.42%	3.39%	9.80%
370 GDPPI	MISC1,1.200	103.9500	108.6250	113.5500	118.1250	121.8750	125.5000	128.9250
380 % Change in GDPPI	@ln[1.370(t)/1.370(t-1))	N/A	4.40%	4.43%	3.95%	3.13%	2.93%	2.69%
390 % Change in MR&S Quantity	1.350-1.380	N/A	6.22%	-1.48%	2.47%	-6.55%	0.46%	7.11%

INPIDX1
Total Industry Rollup
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Index of Total Input

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	INPUT COSTS								
100	Capital	CAP1,1.1190	43,041,036,285	40,893,132,333	43,129,828,736	44,919,636,862	49,042,001,677	51,999,676,231	53,677,635,141
110	Labor	LABMRS1,1.120	22,511,293,000	22,603,070,000	22,930,727,000	23,553,774,000	23,771,955,000	25,336,928,000	25,627,805,000
120	MR&S	LABMRS1,1.340	18,018,313,000	20,036,512,000	20,637,470,000	22,006,899,000	21,266,418,000	22,000,434,000	24,265,611,000
130	Total Input Cost	Sum of 100 thru 120	83,570,642,285	83,532,714,333	86,698,025,736	90,480,309,862	94,080,374,677	99,337,038,231	103,571,051,141
	AVERAGE OF SHARES								
200	Capital	[1.100(t-1)/1.130(t-1)+1.100(t)/1.130(t)]/2	N/A	50.23%	49.35%	49.70%	50.89%	52.24%	52.09%
210	Labor	[1.110(t-1)/1.130(t-1)+1.110(t)/1.130(t)]/2	N/A	27.00%	26.75%	26.24%	25.65%	25.39%	25.13%
220	MR&S	[1.120(t-1)/1.130(t-1)+1.120(t)/1.130(t)]/2	N/A	22.77%	23.90%	24.06%	23.46%	22.38%	22.79%
	INPUT QUANTITY GROWTH								
300	Capital	CAP1,1.1850	N/A	3.83%	2.49%	2.88%	2.44%	2.53%	2.26%
310	Labor	LABMRS1,1.220	N/A	-1.56%	-3.11%	-4.87%	-4.62%	-4.37%	-5.60%
320	MR&S	LABMRS1,1.390	N/A	6.22%	-1.48%	2.47%	-6.55%	0.46%	7.11%
350	TOTAL INPUT GROWTH	1.200*1.300+1.210*1.310+1.220*1.320	N/A	2.92%	0.04%	0.75%	-1.48%	0.31%	1.39%

OUTIDX1
Total Industry Rollup
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Revenues Inputs and Percent Shares

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	BOOKED REVENUES								
100	Local	REV1,1.100	33,815,096,000	34,663,999,000	35,810,228,000	37,420,078,000	39,003,982,000	40,697,565,000	42,081,853,000
110	Intrastate Access	REV1,1.160	6,003,665,000	6,083,891,000	6,218,675,000	6,364,990,000	6,492,571,000	6,739,888,000	6,885,974,000
120	Toll	REV1,1.110	13,447,717,000	13,620,071,000	13,550,232,000	12,985,462,000	12,532,277,000	12,627,066,000	12,309,693,000
130	Interstate End User	REV1,1.130	4,260,916,000	5,234,789,000	5,568,965,000	5,759,898,000	5,919,313,000	6,263,956,000	6,641,589,000
140	Interstate Switched	REV1,1.140	12,090,404,000	11,415,189,000	10,843,689,000	10,772,567,000	10,946,149,000	11,200,613,000	11,636,002,000
150	Interstate Special	REV1,1.150	2,829,746,000	2,537,732,000	2,507,064,000	2,417,913,000	2,468,341,000	2,408,596,000	2,532,469,000
160	Miscellaneous	REV1,1.170	7,961,596,000	8,449,620,000	8,591,238,000	8,975,543,000	8,494,943,000	8,934,023,000	9,198,820,000
170	Total	Sum of 1.100 thru 1.160	80,409,140,000	82,005,291,000	83,090,091,000	84,696,451,000	85,857,576,000	88,871,707,000	91,286,400,000
	AVERAGE OF REVENUE SHARES								
200	Local	[1.100(t-1)/1.170(t-1)+1.100(t)/1.170(t)]/2	N/A	0.422	0.427	0.436	0.448	0.456	0.459
210	Intrastate Access	[1.110(t-1)/1.170(t-1)+1.110(t)/1.170(t)]/2	N/A	0.074	0.075	0.075	0.075	0.076	0.076
220	Toll	[1.120(t-1)/1.170(t-1)+1.120(t)/1.170(t)]/2	N/A	0.167	0.165	0.158	0.150	0.144	0.138
230	Interstate End User	[1.130(t-1)/1.170(t-1)+1.130(t)/1.170(t)]/2	N/A	0.058	0.065	0.068	0.068	0.070	0.072
240	Interstate Switched	[1.140(t-1)/1.170(t-1)+1.140(t)/1.170(t)]/2	N/A	0.145	0.135	0.129	0.127	0.127	0.127
250	Interstate Special	[1.150(t-1)/1.170(t-1)+1.150(t)/1.170(t)]/2	N/A	0.033	0.031	0.029	0.029	0.028	0.027
260	Miscellaneous	[1.160(t-1)/1.170(t-1)+1.160(t)/1.170(t)]/2	N/A	0.101	0.103	0.105	0.102	0.100	0.101
270	Total	Sum of 200 thru 260	N/A	1.000	1.000	1.000	1.000	1.000	1.000

1994 Total Factor Productivity Review Plan
Price Index Development

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	LOCAL PRICE INDEX								
100	Booked Revenue	OUTIDX1,l.100	33,815,096,000	34,663,999,000	35,810,228,000	37,420,078,000	39,003,982,000	40,697,565,000	42,081,853,000
110	Credit Amount	OTH1,l.300	(58,714,000)	(103,148,360)	(97,449,700)	(56,996,874)	(64,425,378)	(49,054,610)	(100,000)
120	Annualized Revenue Change	OTH1,l.310	(632,511,294)	(860,781,645)	(850,649,631)	238,676,538	(150,198,750)	108,707,752	(538,895,835)
130	Effective Revenue Change	OTH1,l.320	(340,068,376)	(766,149,283)	(819,971,392)	253,819,268	(65,683,094)	64,178,875	(402,174,777)
140	Year over Year Change	(100/(100+110))/(100/(100+110)(t-1)) *(100/(100-130-((120-130)(t-1)))* (100/100(t-1))))-1	N/A	-0.0286	-0.0252	0.0048	-0.0020	-0.0010	-0.0096
150	Local Price Index	l.150(t-1)*[1+l.140(t)]	1.0000	0.9714	0.9469	0.9514	0.9495	0.9485	0.9394
	INTRASTATE ACCESS PRICE INDEX								
200	Booked Revenue	OUTIDX1,l.110	6,003,665,000	6,083,891,000	6,218,675,000	6,364,990,000	6,492,571,000	6,739,888,000	6,885,974,000
210	Credit Amount	OTH1,l.330	0	0	(14,860,000)	(1,950,000)	(3,053,622)	(1,430,000)	(4,200,000)
220	Annualized Revenue Change	OTH1,l.340	(149,695,234)	(40,774,370)	(294,335,445)	(56,244,640)	(137,050,818)	(294,444,655)	(310,358,704)
230	Effective Revenue Change	OTH1,l.350	(128,635,581)	(215,358)	(66,924,763)	(26,816,105)	(70,924,079)	(117,672,023)	(136,741,899)
240	Year over Year Change	(200/(200+210))/(200/(200+210)(t-1)) *(200/(200-230-((220-230)(t-1)))* (200/200(t-1))))-1	N/A	-0.0035	-0.0148	-0.0412	-0.0151	-0.0272	-0.0437
250	Intrastate Access Price Index	l.250(t-1)*[1+l.240(t)]	1.0000	0.9965	0.9817	0.9413	0.9271	0.9019	0.8625
	TOLL PRICE INDEX								
300	Booked Revenue	OUTIDX1,l.120	13,447,717,000	13,620,071,000	13,550,232,000	12,985,462,000	12,532,277,000	12,627,066,000	12,309,693,000
310	Credit Amount	OTH1,l.360	(587,472)	0	19,797,000	0	0	(1,500,000)	1,000,000
320	Annualized Revenue Change	OTH1,l.370	(143,394,579)	(174,659,929)	(523,904,945)	(61,416,848)	(210,937,296)	(171,239,732)	(32,881,069)
330	Effective Revenue Change	OTH1,l.380	(78,815,767)	(109,747,232)	(158,827,078)	(35,349,393)	(146,935,103)	(82,577,797)	(58,885,257)
340	Year over Year Change	(300/(300+310))/(300/(300+310)(t-1)) *(300/(300-330-((320-330)(t-1)))* (300/300(t-1))))-1	N/A	-0.0127	-0.0177	-0.0274	-0.0135	-0.0114	-0.0119
350	Toll Price Index	l.350(t-1)*[1+l.340(t)]	1.0000	0.9873	0.9698	0.9433	0.9305	0.9199	0.9090
	END USER PRICE INDEX								
400	Booked Revenue	OUTIDX1,l.130	4,260,916,000	5,234,789,000	5,568,965,000	5,759,898,000	5,919,313,000	6,263,956,000	6,641,589,000
410	% Change in End User Revenue	@ln[l.400(t)/l.400(t-1)]	N/A	20.58%	6.19%	3.37%	2.73%	5.66%	5.85%
420	Access Lines	DMD1,l.100	116,367,890	120,968,239	123,850,902	128,073,888	130,575,917	134,674,007	138,532,479
430	% Chg in End User Quantity Index	@ln[l.420(t)/l.420(t-1)]	N/A	3.88%	2.36%	3.35%	1.93%	3.09%	2.82%
440	% Change in End User Price Index	l.410-l.430	N/A	16.71%	3.83%	0.02%	0.80%	2.57%	3.03%
450	End User Price Index	l.450(t-1)*@exp(l.440(t)]	1.0000	1.1818	1.2280	1.2282	1.2381	1.2703	1.3093

1994 Total Factor Productivity Review Plan
Price Index Development

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	SWITCHED PRICE INDEX								
500	Booked Revenue	OUTIDX1,1.140	12,090,404,000	11,415,189,000	10,843,689,000	10,772,567,000	10,946,149,000	11,200,613,000	11,636,002,000
510	% Change in Switched Revenue	@ln[1.500(t)/1.500(t-1)]	N/A	-5.75%	-5.14%	-0.66%	1.60%	2.30%	3.81%
520	Carrier Common Line Revenue	REV1,1.200-REV1,1.130	4,573,847,533	3,483,381,000	3,010,947,000	2,686,590,000	2,572,958,000	2,974,730,000	3,427,743,000
530	Traffic Sensitive Revenue	REV1,1.210	7,505,365,200	7,947,394,000	7,678,383,000	7,762,722,000	8,084,789,000	8,061,347,000	8,032,144,000
540	Total Revenue	1.520+1.530	12,079,212,733	11,430,775,000	10,689,330,000	10,449,312,000	10,657,747,000	11,036,077,000	11,459,887,000
550	Avg.Cxr.Cmn Line Revenue Share	[1.520(t-1)/1.540(t-1)+1.520(t)/1.540(t)]/2	N/A	0.3417	0.2932	0.2694	0.2493	0.2555	0.2843
560	Avg.TrafficSensitive Revenue Share	[1.530(t-1)/1.540(t-1)+1.530(t)/1.540(t)]/2	N/A	0.6583	0.7068	0.7306	0.7507	0.7445	0.7157
570	Common Line MOU	DMD1,Sum of 1.110 thru 1.140	228,235,498,067	258,404,019,000	284,153,827,000	300,734,677,000	322,000,851,230	344,390,411,839	370,049,593,000
580	% Change in Common Line MOU	@ln[1.570(t)/1.570(t-1)]	N/A	12.41%	9.50%	5.67%	6.83%	6.72%	7.19%
590	Traffic Sensitive MOU	DMD1,1.150	248,179,024,000	275,176,417,000	294,359,067,000	308,939,142,000	328,659,997,000	346,621,156,250	376,393,931,000
600	% Change in Traffic Sensitive MOU	@ln[1.590(t)/1.590(t-1)]	N/A	10.33%	6.74%	4.83%	6.19%	5.32%	8.24%
610	% Chg in Switched Quantity Index	1.550*1.580+1.560*1.600	N/A	11.04%	7.55%	5.06%	6.35%	5.68%	7.94%
620	% Change in Switched Price Index	1.510-1.610	N/A	-16.79%	-12.68%	-5.72%	-4.75%	-3.38%	-4.13%
630	Switched Price Index	1.630(t-1)*@exp[1.620(t)]	1.0000	0.8455	0.7447	0.7034	0.6707	0.6484	0.6222
	SPECIAL PRICE INDEX								
700	Agg.Special Access/Trunking API	MISC1:(Sum 220to250(t)+220(t+1))/5	N/A	N/A	N/A	98.4596	98.0942	91.9670	86.8919
710	% Change in Special Price Index	@ln[1.700(t)/1.700(t-1)]	N/A	-7.94%	-1.06%	2.57%	-0.37%	-6.45%	-5.68%
720	Special Price Index	1.720(t-1)*@exp[1.710(t)]	1.0000	0.9237	0.9139	0.9377	0.9342	0.8759	0.8276
	MISCELLANEOUS PRICE INDEX								
800	GDPPI	LABMRS1,1.370	103.9500	108.6250	113.5500	118.1250	121.8750	125.5000	128.9250
810	% Change in GDPPI	@ln[1.800(t)/1.800(t-1)]	N/A	4.40%	4.43%	3.95%	3.13%	2.93%	2.69%
820	Miscellaneous Price Index	1.820(t-1)*@exp[1.810(t)]	1.0000	1.0450	1.0924	1.1364	1.1724	1.2073	1.2403

OUTIDX3
Total Industry Rollup
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Output Growth Index Development

	Item	Source	1988	1989	1990	1991	1992	1993	1994
	DEFLATED REVENUES/QUANTITY INDEX								
100	Local	OUTIDX1,1.100/OUTIDX2,1.150	33,815,096,000	35,685,574,304	37,820,009,786	39,333,199,453	41,078,421,726	42,906,539,222	44,795,312,132
110	Intrastate Access	OUTIDX1,1.110/OUTIDX2,1.250	6,003,665,000	6,105,447,428	6,334,302,786	6,761,832,837	7,003,455,406	7,473,141,376	7,983,814,014
120	Toll	OUTIDX1,1.120/OUTIDX2,1.350	13,447,717,000	13,795,827,404	13,971,760,080	13,766,502,198	13,468,503,087	13,726,793,009	13,542,462,716
130	Interstate End User	OUTIDX1,1.130/OUTIDX2,1.450	4,260,916,000	4,429,361,958	4,534,913,282	4,689,541,750	4,781,155,815	4,931,211,103	5,072,492,560
140	Interstate Switched	OUTIDX1,1.140/OUTIDX2,1.630	12,090,404,000	13,501,627,120	14,560,198,583	15,315,878,690	16,319,756,033	17,273,354,783	18,700,895,378
150	Interstate Special	OUTIDX1,1.150/OUTIDX2,1.720	2,829,746,000	2,747,443,296	2,743,164,956	2,578,492,102	2,642,074,855	2,749,890,624	3,060,189,950
160	Miscellaneous	OUTIDX1,1.160/OUTIDX2,1.820	7,961,596,000	8,085,965,468	7,864,898,196	7,898,477,840	7,245,532,922	7,399,933,792	7,416,849,634
	REAL GROWTH								
200	Local	@ln[1.100(t)/1.100(t-1)]	N/A	5.38%	5.81%	3.92%	4.34%	4.35%	4.31%
210	Intrastate Access	@ln[1.110(t)/1.110(t-1)]	N/A	1.68%	3.68%	6.53%	3.51%	6.49%	6.61%
220	Toll	@ln[1.120(t)/1.120(t-1)]	N/A	2.56%	1.27%	-1.48%	-2.19%	1.90%	-1.35%
230	Interstate End User	@ln[1.130(t)/1.130(t-1)]	N/A	3.88%	2.36%	3.35%	1.93%	3.09%	2.82%
240	Interstate Switched	@ln[1.140(t)/1.140(t-1)]	N/A	11.04%	7.55%	5.06%	6.35%	5.68%	7.94%
250	Interstate Special	@ln[1.150(t)/1.150(t-1)]	N/A	-2.95%	-0.16%	-6.19%	2.44%	4.00%	10.69%
260	Miscellaneous	@ln[1.160(t)/1.160(t-1)]	N/A	1.55%	-2.77%	0.43%	-8.63%	2.11%	0.23%
300	TOTAL OUTPUT GROWTH	OUTIDX1,1.200*1.200+ OUTIDX1,1.210*1.210+ OUTIDX1,1.220*1.220+ OUTIDX1,1.230*1.230+ OUTIDX1,1.240*1.240+ OUTIDX1,1.250*1.250+ OUTIDX1,1.260*1.260	N/A	4.70%	3.84%	2.71%	2.01%	4.01%	3.82%

TFP1
Total Industry Rollup
DATE: 12/13/95

1994 Total Factor Productivity Review Plan
Total Factor Productivity Development

	Item	Source	1988	1989	1990	1991	1992	1993	1994
100	Total Output Growth	OUTIDX3,1.300	N/A	4.70%	3.84%	2.71%	2.01%	4.01%	3.82%
110	Total Input Growth	INPIDX1,1.350	N/A	2.92%	0.04%	0.75%	-1.48%	0.31%	1.39%
120	LEC Total Factor Productivity	1.100-1.110	N/A	1.79%	3.80%	1.96%	3.49%	3.70%	2.43%
130	U.S. TFP	U.S.Dept.of Labor(see Note1 below)	N/A	-0.26%	-0.21%	-1.04%	1.49%	0.62%	0.60%
140	TFP Differential	1.120-1.130	N/A	2.05%	4.01%	3.00%	2.00%	3.08%	1.83%
150	5 Year Rolling Avg LEC TFP	[Sum of 1.120(t-4) thru 1.120(t)]/5	N/A	N/A	N/A	N/A	N/A	2.95%	3.07%
160	5 Year Rolling Avg US TFP	[Sum of 1.130(t-4) thru 1.130(t)]/5	N/A	N/A	N/A	N/A	N/A	0.12%	0.29%
170	5 Year Rolling Avg TFP Differential	[Sum of 1.140(t-4) thru 1.140(t)]/5	N/A	N/A	N/A	N/A	N/A	2.83%	2.78%

Note1: U.S. Department of Labor, Bureau of Labor Statistics, "Multifactor Productivity-Private Business Sector", February 15,1995
Note that 1994 U.S. TFP value is an estimate. The new BLS number for 1994 is expected to be published late in December 1995.

ATTACHMENT C

"Economic Evaluation of Selected Issues from the Fourth Further Notice of Proposed Rulemaking in the LEC Price Cap Performance Review"

William E. Taylor and Charles Zarkadas

National Economic Research Associates, Inc.

ECONOMIC EVALUATION OF SELECTED ISSUES FROM THE FOURTH FURTHER NOTICE OF PROPOSED RULEMAKING IN THE LEC PRICE CAP PERFORMANCE REVIEW

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ECONOMIC EVALUATION OF SELECTED ISSUES FROM THE FOURTH FURTHER NOTICE OF PROPOSED RULEMAKING IN THE LEC PRICE CAP PERFORMANCE REVIEW

I. BACKGROUND AND SUMMARY

The *Fourth Further Notice of Proposed Rulemaking (FFN)* solicited comments regarding methods to establish a long-term price cap plan for the local exchange company (LEC) industry. This paper addresses four issues: (i) trends in LEC input prices and the direct measurement of LEC's unit costs (¶57 and ¶61); (ii) the measurement of separate productivity growths for interstate, intrastate, regulated and nonregulated services, (¶64, ¶65 and ¶70); (iii) AT&T's Historical Revenue (¶80-83 and ¶88-89) and (iv) the consumer productivity dividend (¶ 94-95).

In general, we find that post-divestiture point estimates of the difference between LEC and U.S. industry input price growth rates are unreliable. Measures of LEC productivity growth relative to the U.S. as a whole provide reliable targets for the annual price cap adjustment formula, and attempts to fine-tune such a formula using short-term changes in the input price differential will not lead to greater accuracy or larger welfare gains. Productivity measures must be calculated—as nearly as possible—at the level of aggregation of the entire firm. Because the production processes for interstate and intrastate (or regulated and unregulated) services are not separable, attempts to calculate service-specific productivity growth rates or to adjust total-firm TFP estimates for relative growth rates of particular inputs are futile. Finally, though the historical price and TFP methods of appraising past industry performance are based on the same basic economic theory and similar assumptions, (i) the TFP-based calculation is less sensitive to violations of those assumptions, (ii) the historical revenue approach does not have the theoretical support that the TFP and historical price methods possess, and (iii) the historical revenue approach requires many additional unrealistic conditions which do not hold in the telecommunications industry.

II. LEC INPUT PRICES GROW AT THE SAME RATE AS U.S. INPUT PRICES

The *X* in a price cap plan should be chosen so that ***GDP-PI*** - ***X*** is a reasonable target for the future change in cost per unit of output for the regulated firm. Measurement of LEC and U.S. input price changes is thus necessary in order to translate changes in relative growth of total factor productivity (TFP)—which relate growth rates of output and input *quantities*—to relative changes in unit *costs*, which requires reliable information about input prices. Put simply, changes in cost per unit of output are given by the difference between the change in cost and the change in output quantity. Since the change in cost is simply the sum of the change in input price and input quantity, the change in cost per unit of output can be written as the difference between the growth of input prices and the growth of TFP.

The *FFN* seeks comments on three items related to the measurement of LEC and U.S. input prices and their role in the selection of an appropriate target value for *X*:

- Is the long-term difference between U.S. and LEC input price growth rates (the "input price differential") zero?
- Has the trend in LEC input prices or the input price differential changed since divestiture?
- Is it more desirable to measure LEC unit cost growth directly, rather than by comparing LEC TFP and input price growth to U.S. TFP and input price growth?

Our analysis once again confirms that the long-term trend of the LEC and U.S. input price differential is zero and that the trend has not changed since divestiture. We continue to believe that capital service prices are difficult to determine and, while adequate for their intended use in a TFP study, will result in historical input price growth differences that

cannot be calculated with sufficient accuracy to support forecasts of future input price growth differences.

A. The Long-Term Trend of The Input Price Differential is Zero

There is no genuine dispute in this proceeding that the long-term rate of growth of LEC input prices is the same as U.S. input price growth. As discussed in the attachment to the United States Telephone Association filing prepared by Christensen Associates, the input price series that is most methodologically consistent over time was filed in an affidavit by Dr. Laurits Christensen on February 1, 1995.[1] It combines (i) the Christensen Bell System study[2] for the 1949-1979 period, (ii) the USTA LEC study[3] for the 1984-1992 period, (iii) the Bellcore Report[4] for the 1980-1982 period and (iv) the North Dakota study[5] for the 1983-1984 period. In this data set (which we will call "Christensen 1" for convenience), the long run input price differential averages 0.1 percent and is not statistically significantly different from zero at conventional confidence levels.

In Appendix F to the *First Report and Order*, FCC Staff members C. Anthony Bush and Mark Uretsky (henceforth "Bush-Uretsky") cite a NERA analysis of a different set of Christensen data spanning the 1960-1992 period, which combines input price data from the Christensen LEC study for 1984-1992 and the Christensen North Dakota study for 1960-1984.[6] For convenience, we will label this data set "Christensen 2." Bush-Uretsky observe

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[1] L.R. Christensen, "An Input Price Adjustment would be an Inappropriate Addition to the LEC Price Cap Formula," Affidavit filed in CC Docket No. 94-1, February 1, 1995, Exhibit A (Christensen Affidavit).

[2] L.R. Christensen, D.C. Christensen, and P.E. Schoech, "Total Factor Productivity in the Bell System, 1947-1979," Christensen Associates, September 1981.

[3] L.R. Christensen, P.E. Schoech, and M.E. Meitzen, "Productivity of the Local Operating Telephone Companies Subject to Price Cap Regulation, 1993 Update," Christensen Associates, January 1995.

[4] Bell Communications Research Inc., *Econometric Estimation of the Marginal Operating Cost of Interstate Access*, Special Report SR-FAD-0900552, May, 1987.

[5] L.R. Christensen, "Total Factor Productivity Growth in the U.S. Telecommunications Industry and the U.S. Economy, 1951-1987," Schedule 3 to Direct Testimony, Case No. PU-2320-90-149, North Dakota Public Service Commission, 1990; U.S. Bureau of Labor Statistics, "Multifactor Productivity for the Private Business Sector."

[6] C.A. Bush and M. Uretsky, "Input Prices and Total Factor Productivity," *In the Matter of Price Cap Performance Review for Local Exchange Carriers, First Report and Order*, CC Docket 94-1, FCC 95-132 (March 30, 1995), Appendix F (henceforth "Appendix F").