Distribution Cable Fill - 0	0.50	Copper Feeder Fill - 0	0.65	Cost of Debt	0.075	Trench Per Ft - 0	1.90	Plow Fraction - 0	0.6
Distribution Cable Fill - 5	0.55	Copper Feeder Fill - 5	0.75	Debt Fraction	0.480	Trench Per Ft - 5	1.90	Plow Fraction - 5	0.6
Distribution Cable Fill - 100	0.55	Copper Feeder Fill - 100	0.80	Cost of Equity	0.118	Trench Per Ft - 100	1.90	Plow Fraction - 100	0.6
Distribution Cable Fill - 200	0.60	Copper Feeder Fill - 200	0.80	Average Trunk Utilization	0.30	Trench Per Ft - 200	1.90	Plow Fraction - 200	0.5
Distribution Cable Fill - 650	0.65	Copper Feeder Fill - 650	0.80	Tax Rate	0.39	Trench Per Ft - 650	1.95	Plow Fraction - 650	0.35
Distribution Cable Fill - 850	0.70	Copper Feeder Fill - 850	0.80	Corporate Overhead Factor	0.20	Trench Per Ft - 850	2.15	Plow Fraction - 850	0.2
Distribution Cable Fill - 2550	0.75	Copper Feeder Fill - 2550	0.80	Other Taxes Factor	0.05	Trench Per Ft - 2550	2.15	Plow Fraction - 2550	0
Distribution Cable Fill - 5000	0.75	Copper Feeder Fill - 5000	0.80	Billing/Bill Inquiry per line per month	1.22	Trench Per Ft - 5000	6.00	Plow Fraction - 5000	0
Distribution Cable Fill - 10000	0.75	Copper Feeder Fill - 10000	0.80	Directory Listing per line per month	-	Trench Per Ft -10000	6.00	Plow Fraction -10000	0
Buried Fraction - 0	0.75	Fiber Feeder Strand Fill - 0	1.00	Forward-looking Network Operations Factor	0.50	Backhoe Trench Fraction - 0	0.45	Plow Per Ft - 0	0.8
Buried Fraction - 5	0.75	Fiber Feeder Strand Fill - 5	1.00	Alternative CO Switching Factor	0.03	Backhoe Trench Fraction - 5	0.45	Plow Per Ft - 5	0.8
Buried Fraction - 100	0.75	Fiber Feeder Strand Fill - 100	1.00	Alternative Circuit Equipment Factor	0.02	Backhoe Trench Fraction - 100	0.45	Plow Per Ft - 100	0.8
Buried Fraction - 200	0.70	Fiber Feeder Strand Fill - 200	1.00	EO Traffic Sensitive Fraction	0.70	Backhoe Trench Fraction - 200	0.45	Plow Per Ft - 200	0.8
Buried Fraction - 650	0.70	Fiber Feeder Strand Fill - 650	1.00	Monthly LNP cost, per line	0.25	Backhoe Trench Fraction - 650	0.45	Plow Per Ft - 650	0.8
Buried Fraction - 850	0.70	Fiber Feeder Strand Fill - 850	1.00	Carrier to Carrier Customer Service, per line per year	1.69	Backhoe Trench Fraction - 850	0.45	Plow Per Ft - 850	1.2
Buried Fraction - 2550	0.65	Fiber Feeder Strand Fill - 2550	1.00	NID Expense per line per year	1.00	Backhoe Trench Fraction - 2550	0.55	Plow Per Ft - 2550	1.2
Buried Fraction - 5000	0.35	Fiber Feeder Strand Fill - 5000	1.00	DS-0/DS-1 Terminal Factor	12.40	Backhoe Trench Fraction - 5000	0.67	Plow Per Ft - 5000	1.2
Buried Fraction - 10000	0.05	Fiber Feeder Strand Fill - 10000	1.00	DS-1/DS-3 Terminal Factor	9.90	Backhoe Trench Fraction -10000	0.72	Plow Per Ft -10000	1.2
Aerial Cable Fraction - 0	0.25	Copper Aerial Fraction - 0	0.50	Average Lines per Business Location	4.00	Backhoe Trench Per Ft - 0	3.00	Trench Per Ft - 0	1.9
Aerial Cable Fraction - 5	0.25	Copper Aerial Fraction - 5	0.50	Distribution Aerial Shring Fraction - 0	0.50	Backhoe Trench Per Ft - 5	3.00	Trench Per Ft - 5	1.9
Aerial Cable Fraction - 100	0.25	Copper Aerial Fraction - 100	0.50	Distribution Aerial Shring Fraction - 5	0.33	Backhoe Trench Per Ft - 100	3.00	Trench Per Ft - 100	1.9
Aerial Cable Fraction - 200	0.30	Copper Aerial Fraction - 200	0.40	Distribution Aerial Shring Fraction - 100	0.25	Backhoe Trench Per Ft - 200	3.00	Trench Per Ft - 200	1.9
Aerial Cable Fraction - 650	0.30	Copper Aerial Fraction - 650	0.30	Distribution Aerial Shring Fraction - 200	0.25	Backhoe Trench Per Ft - 650	3.00	Trench Per Ft - 650	1.95
Aerial Cable Fraction - 850	0.30	Copper Aerial Fraction - 850	0.20	Distribution Aerial Shring Fraction - 650	0.25	Backhoe Trench Per Ft - 850	3.00	Trench Per Ft - 850	2.15
Aerial Cable Fraction - 2550	0.30	Copper Aerial Fraction - 2550	0.15	Distribution Aerial Shring Fraction - 850	0.25	Backhoe Trench Per Ft - 2550	3.00	Trench Per Ft - 2550	2.15
Aerial Cable Fraction - 5000	0.60	Copper Aerial Fraction - 5000	0.10	Distribution Aerial Shring Fraction - 2550	0.25	Backhoe Trench Per Ft - 5000	20.00	Trench Per Ft - 5000	6
Aerial Cable Fraction - 10000	0.85	Copper Aerial Fraction - 10000	0.05	Distribution Aerial Shring Fraction - 5000	0.25	Backhoe Trench Per Ft -10000	30.00	Trench Per Ft -10000	15
Pole Spacing, feet - 0	250	Copper Buried Fraction - 0	0.45	Distribution Aerial Shring Fraction - 10000	0.25	Hand Trench Fraction - 0	0.01	Backhoe Trench Fraction - 0	0.1
Pole Spacing, feet - 5	250	Copper Buried Fraction - 5	0.45	Distribution Buried Shring Fraction - 0	0.33	Hand Trench Fraction - 5	0.01	Backhoe Trench Fraction - 5	0.1
Pole Spacing, feet - 100	200	Copper Buried Fraction - 100	0.45	Distribution Buried Shring Fraction - 5	0.33	Hand Trench Fraction - 100	0.01	Backhoe Trench Fraction - 100	0.1
Pole Spacing, feet - 200	200	Copper Buried Fraction - 200	0.40	Distribution Buried Shring Fraction - 100	0.33	Hand Trench Fraction - 200	0.03	Backhoe Trench Fraction - 200	0.1
Pole Spacing, feet - 650	175	Copper Buried Fraction - 650	0.30	Distribution Buried Shring Fraction - 200	0.33	Hand Trench Fraction - 650	0.03	Backhoe Trench Fraction - 650	0.1
Pole Spacing, feet - 850	175	Copper Buried Fraction - 850	0.20	Distribution Buried Shring Fraction - 650	0.33	Hand Trench Fraction - 850	0.05	Backhoe Trench Fraction - 850	0.1
Pole Spacing, feet - 2550	150	Copper Buried Fraction - 2550	0.10	Distribution Buried Shring Fraction - 850	0.33	Hand Trench Fraction - 2550	0.1	Backhoe Trench Fraction - 2550	0.1
Pole Spacing, feet - 5000	150	Copper Buried Fraction - 5000	0.05	Distribution Buried Shring Fraction - 2550	0.33	Hand Trench Fraction - 5000	0.1	Backhoe Trench Fraction - 5000	0.1
Pole Spacing, feet - 10000	150	Copper Buried Fraction - 10000	0.05	Distribution Buried Shring Fraction - 5000	0.33	Hand Trench Fraction -10000	0.12	Backhoe Trench Fraction -10000	0.25
Drop Distance, feet - 0	150	Copper Manhole Spacing, feet - 0	800	Distribution Buried Shring Fraction - 10000	0.33	Hand Trench Per Ft - 0	5.00	Backhoe Trench Per Ft - 0	3.00
Drop Distance, feet - 5	150	Copper Manhole Spacing, feet - 5	800	Distribution Underground Shring Fraction - 0	1.00	Hand Trench Per Ft - 5	5.00	Backhoe Trench Per Ft - 5	3.00
Drop Distance, feet - 100	100	Copper Manhole Spacing, feet - 100	800	Distribution Underground Shring Fraction - 5	0.50	Hand Trench Per Ft - 100	5.00	Backhoe Trench Per Ft - 100	3.00
Drop Distance, feet - 200	100	Copper Manhole Spacing, feet - 200	800	Distribution Underground Shring Fraction - 100	0.50	Hand Trench Per Ft - 200	5.00	Backhoe Trench Per Ft - 200	3.00
Drop Distance, feet - 650	50	Copper Manhole Spacing, feet - 650	600	Distribution Underground Shring Fraction - 200	0.50	Hand Trench Per Ft - 650	5.00	Backhoe Trench Per Ft - 650	3.00
Drop Distance, feet - 850	50	Copper Manhole Spacing, feet - 850	600	Distribution Underground Shring Fraction - 650	0.40	Hand Trench Per Ft - 850	5.00	Backhoe Trench Per Ft - 850	3.00
Drop Distance, feet - 2550	50	Copper Manhole Spacing, feet - 2550	600	Distribution Underground Shring Fraction - 850	0.33	Hand Trench Per Ft - 2550	5.00	Backhoe Trench Per Ft - 2550	3.00
Drop Distance, feet - 5000	50	Copper Manhole Spacing, feet - 5000	400	Distribution Underground Shring Fraction - 2550	0.33	Hand Trench Per Ft - 5000	10.00	Backhoe Trench Per Ft - 5000	20.00

Drop Distance, feet - 10000	50	Copper Manhole Spacing, feet - 10000	400	Distribution Underground Shring Fraction - 5000	0.33	Hand Trench Per Ft -10000	18.00	Backhoe Trench Per Ft -10000	30.00
Aerial Drop Placement (total) - 0	23.33	Fiber Aerial Fraction - 0	0.35	Distribution Underground Shring Fraction - 10000	0.33	Cut/Restore Asphalt Fraction - 0	0.55	Hand Trench Fraction - 0	0
Aerial Drop Placement (total) - 5	23.33	Fiber Aerial Fraction - 5	0.35	Feeder Aerial Shring Fraction - 0	0.50	Cut/Restore Asphalt Fraction - 5	0.55	Hand Trench Fraction - 5	0
Aerial Drop Placement (total) - 100	17.50	Fiber Aerial Fraction - 100	0.35	Feeder Aerial Shring Fraction - 5	0.33	Cut/Restore Asphalt Fraction - 100	0.55	Hand Trench Fraction - 100	0
Aerial Drop Placement (total) - 200	17.50	Fiber Aerial Fraction - 200	0.30	Feeder Aerial Shring Fraction - 100	0.25	Cut/Restore Asphalt Fraction - 200	0.65	Hand Trench Fraction - 200	0.01
Aerial Drop Placement (total) - 650	11.67	Fiber Aerial Fraction - 650	0.30	Feeder Aerial Shring Fraction - 200	0.25	Cut/Restore Asphalt Fraction - 650	0.7	Hand Trench Fraction - 650	0.02
Aerial Drop Placement (total) - 850	11.67	Fiber Aerial Fraction - 850	0.20	Feeder Aerial Shring Fraction - 650	0.25	Cut/Restore Asphalt Fraction - 850	0.75	Hand Trench Fraction - 850	0.04
Aerial Drop Placement (total) - 2550	11.67	Fiber Aerial Fraction - 2550	0.15	Feeder Aerial Shring Fraction - 850	0.25	Cut/Restore Asphalt Fraction - 2550	0.75	Hand Trench Fraction - 2550	0.05
Aerial Drop Placement (total) - 5000	11.67	Fiber Aerial Fraction - 5000	0.10	Feeder Aerial Shring Fraction - 2550	0.25	Cut/Restore Asphalt Fraction - 5000	0.8	Hand Trench Fraction - 5000	0.06
Aerial Drop Placement (total) - 10000	11.67	Fiber Aerial Fraction - 10000	0.05	Feeder Aerial Shring Fraction - 5000	0.25	Cut/Restore Asphalt Fraction -10000	0.82	Hand Trench Fraction -10000	0.1
Buried Drop Placement (total) - 0	0.60	Fiber Buried Fraction - 0	0.60	Feeder Aerial Shring Fraction - 10000	0.25	Cut/Restore Asphalt Per Ft - 0	6.00	Hand Trench Per Ft - 0	5.00
Buried Drop Placement (total) - 5	0.60	Fiber Buried Fraction - 5	0.60	Feeder Underground Shring Fraction - 0	0.50	Cut/Restore Asphalt Per Ft - 5	6.00	Hand Trench Per Ft - 5	5.00
Buried Drop Placement (total) - 100	0.60	Fiber Buried Fraction - 100	0.60	Feeder Underground Shring Fraction - 5	0.50	Cut/Restore Asphalt Per Ft - 100	6.00	Hand Trench Per Ft - 100	5.00
Buried Drop Placement (total) - 200	0.60	Fiber Buried Fraction - 200	0.60	Feeder Underground Shring Fraction - 100	0.40	Cut/Restore Asphalt Per Ft - 200	6.00	Hand Trench Per Ft - 200	5.00
Buried Drop Placement (total) - 650	0.60	Fiber Buried Fraction - 650	0.30	Feeder Underground Shring Fraction - 200	0.33	Cut/Restore Asphalt Per Ft - 650	6.00	Hand Trench Per Ft - 650	5.00
Buried Drop Placement (total) - 850	0.60	Fiber Buried Fraction - 850	0.20	Feeder Underground Shring Fraction - 650	0.33	Cut/Restore Asphalt Per Ft - 850	6.00	Hand Trench Per Ft - 850	5.00
Buried Drop Placement (total) - 2550	0.75	Fiber Buried Fraction - 2550	0.10	Feeder Underground Shring Fraction - 850	0.33	Cut/Restore Asphalt Per Ft - 2550	6.00	Hand Trench Per Ft - 2550	5.00
Buried Drop Placement (total) - 5000	1.50	Fiber Buried Fraction - 5000	0.05	Feeder Underground Shring Fraction - 2550	0.33	Cut/Restore Asphalt Per Ft - 5000	18.00	Hand Trench Per Ft - 5000	10.00
Buried Drop Placement (total) - 10000	5.00	Fiber Buried Fraction - 10000	0.05	Feeder Underground Shring Fraction - 5000	0.33	Cut/Restore Asphalt Per Ft -10000	30.00	Hand Trench Per Ft -10000	18.00
Buried Drop Sharing Fraction - 0	0.50	Fiber Pullbox Spacing, feet - 0	2,000	Feeder Underground Shring Fraction - 10000	0.33	Cut/Restore Concrete Fraction - 0	0.1	Bore Cable Fraction - 0	0
Buried Drop Sharing Fraction - 5	0.50	Fiber Pullbox Spacing, feet - 5	2,000	Feeder Buried Shring Fraction - 0	0.40	Cut/Restore Concrete Fraction - 5	0.1	Bore Cable Fraction - 5	0
Buried Drop Sharing Fraction - 100	0.50	Fiber Pullbox Spacing, feet - 100	2,000	Feeder Buried Shring Fraction - 5	0.40	Cut/Restore Concrete Fraction - 100	0.1	Bore Cable Fraction - 100	0
Buried Drop Sharing Fraction - 200	0.50	Fiber Pullbox Spacing, feet - 200	2,000	Feeder Buried Shring Fraction - 100	0.40	Cut/Restore Concrete Fraction - 200	0.1	Bore Cable Fraction - 200	0
Buried Drop Sharing Fraction - 650	0.50	Fiber Pullbox Spacing, feet - 650	2,000	Feeder Buried Shring Fraction - 200	0.40	Cut/Restore Concrete Fraction - 650	0.1	Bore Cable Fraction - 650	0
Buried Drop Sharing Fraction - 850	0.50	Fiber Pullbox Spacing, feet - 850	2,000	Feeder Buried Shring Fraction - 650	0.40	Cut/Restore Concrete Fraction - 850	0.1	Bore Cable Fraction - 850	0.03
Buried Drop Sharing Fraction - 2550	0.50	Fiber Pullbox Spacing, feet - 2550	2,000	Feeder Buried Shring Fraction - 850	0.40	Cut/Restore Concrete Fraction - 2550	0.15	Bore Cable Fraction - 2550	0.04
Buried Drop Sharing Fraction - 5000	0.50	Fiber Pullbox Spacing, feet - 5000	2,000	Feeder Buried Shring Fraction - 2550	0.40	Cut/Restore Concrete Fraction - 5000	0.15	Bore Cable Fraction - 5000	0.05
Buried Drop Sharing Fraction - 10000	0.50	Fiber Pullbox Spacing, feet - 10000	2,000	Feeder Buried Shring Fraction - 5000	0.40	Cut/Restore Concrete Fraction -10000	0.16	Bore Cable Fraction -10000	0.05
Buried Drop Fraction - 0	0.75	Fiber Feeder Investment per foot - 216	13.10	Feeder Buried Shring Fraction - 10000	0.40	Cut/Restore Concrete Per Ft - 0	9.00	Bore Cable Per Ft - 0	11.00
Buried Drop Fraction - 5	0.75	Fiber Feeder Investment per foot - 144	9.50	Motor Vehicles - Economic Life	9.50	Cut/Restore Concrete Per Ft - 5	9.00	Bore Cable Per Ft - 5	11.00
Buried Drop Fraction - 100	0.75	Fiber Feeder Investment per foot - 96	7.10	Garage Work Equipment - Economic Life	15.00	Cut/Restore Concrete Per Ft - 100	9.00	Bore Cable Per Ft - 100	11.00
Buried Drop Fraction - 200	0.70	Fiber Feeder Investment per foot - 72	5.90	Other Work Equipment - Economic Life	12.00	Cut/Restore Concrete Per Ft - 200	9.00	Bore Cable Per Ft - 200	11.00
Buried Drop Fraction - 650	0.70	Fiber Feeder Investment per foot - 60	5.30	Buildings - Economic Life	45.00	Cut/Restore Concrete Per Ft - 650	9.00	Bore Cable Per Ft - 650	11.00
Buried Drop Fraction - 850	0.70	Fiber Feeder Investment per foot - 48	4.70	Furniture - Economic Life	20.00	Cut/Restore Concrete Per Ft - 850	9.00	Bore Cable Per Ft - 850	11.00
Buried Drop Fraction - 2550	0.70	Fiber Feeder Investment per foot - 36	4.10	Office Support Equipment - Economic Life	10.00	Cut/Restore Concrete Per Ft - 2550	9.00	Bore Cable Per Ft - 2550	11.00
Buried Drop Fraction - 5000	0.40	Fiber Feeder Investment per foot - 24	3.50	Company Comm. Equipment - Economic Life	10.00	Cut/Restore Concrete Per Ft - 5000	21.00	Bore Cable Per Ft - 5000	11.00
Buried Drop Fraction - 10000	0.15	Fiber Feeder Investment per foot - 18	3.20	General Purpose Computer - Economic Life	7.00	Cut/Restore Concrete Per Ft -10000	36.00	Bore Cable Per Ft -10000	18.00
Pole Investment	201.00	Fiber Feeder Investment per foot - 12	2.90	Digital Electronic Switching - Economic Life	17.00	Cut/Restore Sod Fraction - 0	0.01	Push Pipe/Pull Cable Fraction - 0	0.02
Pole Labor	216.00	Copper Feeder Investment per foot - 4200	29.00	Operator Systems - Economic Life	6.00	Cut/Restore Sod Fraction - 5	0.01	Push Pipe/Pull Cable Fraction - 5	0.02
Buried Cable Jacketing Multiplier	1.04	Copper Feeder Investment per foot - 3600	26.00	Digital Circuit Equipment - Economic Life	13.00	Cut/Restore Sod Fraction - 100	0.01	Push Pipe/Pull Cable Fraction - 100	0.02
Conduit Investment per foot	0.60	Copper Feeder Investment per foot - 3000	23.00	Public Telephone Terminal Equipment - Economic Life	10.00	Cut/Restore Sod Fraction - 200	0.03	Push Pipe/Pull Cable Fraction - 200	0.02
Spare Tubes per route	1.00	Copper Feeder Investment per foot - 2400	20.00	Poles - Economic Life	32.00	Cut/Restore Sod Fraction - 650	0.04	Push Pipe/Pull Cable Fraction - 650	0.02
Regional Labor Adjustment Factor	1.00	Copper Feeder Investment per foot - 1800	16.00	Aerial Cable - metallic - Economic Life	28.00	Cut/Restore Sod Fraction - 850	0.06	Push Pipe/Pull Cable Fraction - 850	0.04
Residential NID case, no protector	10.00	Copper Feeder Investment per foot - 1200	12.00	Aerial Cable - non metallic - Economic Life	30.00	Cut/Restore Sod Fraction - 2550	0.04	Push Pipe/Pull Cable Fraction - 2550	0.05
Residential NID basic labor	15.00	Copper Feeder Investment per foot - 900	10.00	Underground Cable - metallic - Economic Life	28.00	Cut/Restore Sod Fraction - 5000	0.02	Push Pipe/Pull Cable Fraction - 5000	0.06
Maximum lines per NID	N/A	Copper Feeder Investment per foot - 600	7.75	Underground Cable - non metallic - Economic Life	30.00	Cut/Restore Sod Fraction -10000	0	Push Pipe/Pull Cable Fraction -10000	0.06
Residential Protection Block, per pair	4.00	Copper Feeder Investment per foot - 400	6.00	Buried - metallic - Economic Life	28.00	Cut/Restore Sod Per Ft - 0	1.00	Push Pipe/Pull Cable Per Ft - 0	6.00
Business NID case, no protector	25.00	Copper Feeder Investment per foot - 200	4.25	Buried - non metallic - Economic Life	30.00	Cut/Restore Sod Per Ft - 5	1.00	Push Pipe/Pull Cable Per Ft - 5	6.00
Business NID basic labor	15.00	Copper Feeder Investment per foot - 100	2.50	Intrabuilding Cable - metallic - Economic Life	25.00	Cut/Restore Sod Per Ft - 100	1.00	Push Pipe/Pull Cable Per Ft - 100	6.00

Business Protection Block, per pair	4.00	Buried Copper Cable Sheath Multiplier	1.04	Intrabuilding Cable - non metallic - Economic Life	25.00	Cut/Restore Sod Per Ft - 200	1.00	Push Pipe/Pull Cable Per Ft - 200	6.00
Average Lines per business location	4.00	Buried Fiber Sheath Addition per foot	0.20	Conduit Systems - Economic Life	55.00	Cut/Restore Sod Per Ft - 650	1.00	Push Pipe/Pull Cable Per Ft - 650	6.00
Terminal and Splice per line, buried	42.50	Pole Materials	201.00	Motor Vehicles - Net Salvage %	0.09	Cut/Restore Sod Per Ft - 850	1.00	Push Pipe/Pull Cable Per Ft - 850	6.00
Terminal and Splice per line, aerial	32.00	Pole Labor	216.00	Garage Work Equipment - Net Salvage %	-	Cut/Restore Sod Per Ft - 2550	1.00	Push Pipe/Pull Cable Per Ft - 2550	6.00
Drop cable investment per foot buried	0.14	Conduit Material Investment per foot	0.60	Other Work Equipment - Net Salvage %	0.05	Cut/Restore Sod Per Ft - 5000	1.00	Push Pipe/Pull Cable Per Ft - 5000	6.00
Drop cable buried pairs	3.00	Inner Duct Investment per foot	0.30	Buildings - Net Salvage %	(0.03)	Cut/Restore Sod Per Ft -10000	1.00	Push Pipe/Pull Cable Per Ft -10000	24.00
Drop cable investment per foot aerial	0.10	Spare Tubes per section	1.00	Furniture - Net Salvage %	0.04	Pavement Stabilization Per Ft - 0	5	Cut/Restore Asphalt Fraction - 0	0.03
Drop cable aerial pairs	2.00	Regional Labor Multiplier	1.00	Office Support Equipment - Net Salvage %	0.04	Pavement Stabilization Per Ft - 5	5	Cut/Restore Asphalt Fraction - 5	0.03
DS-0 fraction	1.00	Pole Spacing, feet - 0	250.00	Company Comm. Equipment - Net Salvage %	0.04	Pavement Stabilization Per Ft - 100	5	Cut/Restore Asphalt Fraction - 100	0.03
DS-1 fraction	-	Pole Spacing, feet - 5	250.00	General Purpose Computer - Net Salvage %	0.05	Pavement Stabilization Per Ft - 200	5	Cut/Restore Asphalt Fraction - 200	0.03
DS-0 pair equivalent	1.00	Pole Spacing, feet - 100	200.00	Digital Electronic Switching - Net Salvage %	-	Pavement Stabilization Per Ft - 650	5	Cut/Restore Asphalt Fraction - 650	0.03
DS-1 pair equivalent	2.00	Pole Spacing, feet - 200	200.00	Operator Systems - Net Salvage %	(0.06)	Pavement Stabilization Per Ft - 850	9	Cut/Restore Asphalt Fraction - 850	0.05
DS-3 pair equivalent	56.00	Pole Spacing, feet - 650	175.00	Digital Circuit Equipment - Net Salvage %	0.05	Pavement Stabilization Per Ft - 2550	13	Cut/Restore Asphalt Fraction - 2550	0.08
Indoor NID case	5.00	Pole Spacing, feet - 850	175.00	Public Telephone Terminal Equipment - Net Salvage %	0.05	Pavement Stabilization Per Ft - 5000	17	Cut/Restore Asphalt Fraction - 5000	0.18
Buried fraction available for shift - 0	0.75	Pole Spacing, feet - 2550	150.00	Poles - Net Salvage %	(0.55)	Pavement Stabilization Per Ft -10000	20	Cut/Restore Asphalt Fraction -10000	0.6
Buried fraction available for shift - 5	0.75	Pole Spacing, feet - 5000	150.00	Aerial Cable - metallic - Net Salvage %	(0.31)	Dirt Stabilization Per Ft - 0	1	Cut/Restore Asphalt Per Ft - 0	6.00
Buried fraction available for shift - 100	0.75	Pole Spacing, feet - 10000	150.00	Aerial Cable - non metallic - Net Salvage %	(0.31)	Dirt Stabilization Per Ft - 5	1	Cut/Restore Asphalt Per Ft - 5	6.00
Buried fraction available for shift - 200	0.75	Buried fraction available for shift - 0	0.75	Underground Cable - metallic - Net Salvage %	(0.25)	Dirt Stabilization Per Ft - 100	1	Cut/Restore Asphalt Per Ft - 100	6.00
Buried fraction available for shift - 650	0.75	Buried fraction available for shift - 5	0.75	Underground Cable - non metallic - Net Salvage %	(0.25)	Dirt Stabilization Per Ft - 200	1	Cut/Restore Asphalt Per Ft - 200	6.00
Buried fraction available for shift - 850	0.75	Buried fraction available for shift - 100	0.75	Buried - metallic - Net Salvage %	(0.10)	Dirt Stabilization Per Ft - 650	1	Cut/Restore Asphalt Per Ft - 650	6.00
Buried fraction available for shift - 2550	0.75	Buried fraction available for shift - 200	0.75	Buried - non metallic - Net Salvage %	(0.10)	Dirt Stabilization Per Ft - 850	4	Cut/Restore Asphalt Per Ft - 850	6.00
Buried fraction available for shift - 5000	-	Buried fraction available for shift - 650	0.75	Intrabuilding Cable - metallic - Net Salvage %	(0.15)	Dirt Stabilization Per Ft - 2550	11	Cut/Restore Asphalt Per Ft - 2550	6.00
Buried fraction available for shift - 10000	-	Buried fraction available for shift - 850	0.75	Intrabuilding Cable - non metallic - Net Salvage %	(0.15)	Dirt Stabilization Per Ft - 5000	12	Cut/Restore Asphalt Per Ft - 5000	18
Wireless Investment Cap Enabled	FALSE	Buried fraction available for shift - 2550	0.75	Conduit Systems - Net Salvage %	(0.15)	Dirt Stabilization Per Ft -10000	16	Cut/Restore Asphalt Per Ft -10000	30
Wireless Point to Point Inv cap - distribution, per line	7,500	Buried fraction available for shift - 5000	0.75	Furniture - Capital Costs - % assigned per line	0	Simple Backfill - 0	0.15	Cut/Restore Concrete Fraction - 0	0.01
Wireless Common inv, broadcast	112,500	Buried fraction available for shift - 10000	0.75	Furniture - Expenses - % assigned per line	0	Simple Backfill - 5	0.15	Cut/Restore Concrete Fraction - 5	0.01
Wireless per line inv, broadcast	500.00	Fiber investment/strand - foot	0.10	Office Equipment - Capital Costs - % assigned per line	0	Simple Backfill - 100	0.15	Cut/Restore Concrete Fraction - 100	0.01
Maximum broadcast lines for common inv	30.00	Copper investment/pair - foot	0.01	Office Equipment - Expenses - % assigned per line	0	Simple Backfill - 200	0.15	Cut/Restore Concrete Fraction - 200	0.01
TR-303 DLC Site and Power	3,000.00	Copper Manhole Materials - 0	1,865.00	General Purpose Computer - Capital Costs - % assigned per line	0	Simple Backfill - 650	0.15	Cut/Restore Concrete Fraction - 650	0.01
TR-303 DLC Maximum Lines/Increment	672.00	Copper Manhole Materials - 5	1,865.00	General Purpose Computer - Expenses - % assigned per line	0	Simple Backfill - 850	0.15	Cut/Restore Concrete Fraction - 850	0.03
TR-303 DLC RT Fill Factor	0.90	Copper Manhole Materials - 100	1,865.00	Motor Vehicles - Capital Costs - % assigned per line	0	Simple Backfill - 2550	0.15	Cut/Restore Concrete Fraction - 2550	0.05
TR-303 DLC Basic Common Eqpt Invest + initial lines	66,000.00	Copper Manhole Materials - 200	1,865.00	Motor Vehicles - Expenses - % assigned per line	0	Simple Backfill - 5000	0.15	Cut/Restore Concrete Fraction - 5000	0.08
TR-303 DLC POTS Channel Unit Investment	310.00	Copper Manhole Materials - 650	1,865.00	Buildings - Capital Costs - % assigned per line	0	Simple Backfill -10000	0.15	Cut/Restore Concrete Fraction -10000	0.2
TR-303 DLC POTS Lines per CU	4.00	Copper Manhole Materials - 850	1,865.00	Buildings - Expenses - % assigned per line	0			Cut/Restore Concrete Per Ft - 0	9.00
TR-303 DLC Coin Channel Unit Investment	250.00	Copper Manhole Materials - 2550	1,865.00	Garage Work Eqpt. - Capital Costs - % assigned per line	0			Cut/Restore Concrete Per Ft - 5	9.00
TR-303 DLC Coin Lines per CU	2.00	Copper Manhole Materials - 5000	1,865.00	Garage Work Eqpt. - Expenses - % assigned per line	0			Cut/Restore Concrete Per Ft - 100	9.00
TR-303 DLC 303/LD crossover, lines	480.00	Copper Manhole Materials - 10000	1,865.00	Other Work Eqpt. - Capital Costs - % assigned per line	0			Cut/Restore Concrete Per Ft - 200	9.00
TR-303 DLC Fibers per RT	4.00	Copper Manhole Frame and Cover - 0	350.00	Other Work Eqpt. - Expenses - % assigned per line	0			Cut/Restore Concrete Per Ft - 650	9.00
TR-303 DLC Optical Patch Panel	1,000.00	Copper Manhole Frame and Cover - 5	350.00	Network Operations - % assigned per line	-			Cut/Restore Concrete Per Ft - 850	9.00
TR-303 DLC Copper Feeder Max Distance, ft	9,000.00	Copper Manhole Frame and Cover - 100	350.00	Other Taxes - % assigned per line	-			Cut/Restore Concrete Per Ft - 2550	9.00
TR-303 DLC Common Eqpt Invest per additional 672 lines	18,500.00	Copper Manhole Frame and Cover - 200	350.00	Variable Overhead - % assigned per line	-			Cut/Restore Concrete Per Ft - 5000	21.00
TR-303 DLC Maximum Number of additional line modules/RT	2.00	Copper Manhole Frame and Cover - 650	350.00					Cut/Restore Concrete Per Ft -10000	36.00

Low Density DLC Site and Power	1,300.00
Low Density DLC Maximum Lines/Increment	120.00
Low Density DLC RT Fill Factor	0.90
Low Density DLC Basic Common Eqpt Invest + initial lines	16,000.00
Low Density DLC POTS Channel Unit Investment	600.00
Low Density DLC POTS Lines per CU	6.00
Low Density DLC Coin Channel Unit Investment	600.00
Low Density DLC Coin Lines per CU	6.00
Low Density DLC Fibers per RT	4.00
Low Density DLC Optical Patch Panel	1,000.00
Low Density DLC Common Eqpt Invest per additional 96 lines	9,400.00
Low Density DLC Maximum Number of additional line modules/RT	1.00
Distribution Cable Size 1	2,400.00
Distribution Cable Size 2	1,800.00
Distribution Cable Size 3	1,200.00
Distribution Cable Size 4	900.00
Distribution Cable Size 5	600.00
Distribution Cable Size 6	400.00
Distribution Cable Size 7	200.00
Distribution Cable Size 8	100.00
Distribution Cable Size 9	50.00
Distribution Cable Size 10	25.00
Distribution Cable Size 11	12.00
Distribution Cable Size 12	6.00
Distribution Cable Investment per foot 1	20.00
Distribution Cable Investment per foot 2	16.00
Distribution Cable Investment per foot 3	12.00
Distribution Cable Investment per foot 4	10.00
Distribution Cable Investment per foot 5	7.75
Distribution Cable Investment per foot 6	6.00
Distribution Cable Investment per foot 7	4.25
Distribution Cable Investment per foot 8	2.50
Distribution Cable Investment per foot 9	1.63
Distribution Cable Investment per foot 10	1.19
Distribution Cable Investment per foot 11	0.76
Distribution Cable Investment per foot 12	0.63
Distribution Riser Cable Size 1	2,400.00
Distribution Riser Cable Size 2	1,800.00
Distribution Riser Cable Size 3	1,200.00
Distribution Riser Cable Size 4	900.00
Distribution Riser Cable Size 5	600.00
Distribution Riser Cable Size 6	400.00
Distribution Riser Cable Size 7	200.00
Distribution Riser Cable Size 8	100.00
Distribution Riser Cable Size 9	50.00
Distribution Riser Cable Size 10	25.00
Distribution Riser Cable Size 11	12.00
Distribution Riser Cable Size 12	6.00

Copper Manhole Frame and Cover - 850	350.00
Copper Manhole Frame and Cover - 2550	350.00
Copper Manhole Frame and Cover - 5000	350.00
Copper Manhole Frame and Cover - 10000	350.00
Copper Manhole Site Delivery - 0	125.00
Copper Manhole Site Delivery - 5	125.00
Copper Manhole Site Delivery - 100	125.00
Copper Manhole Site Delivery - 200	125.00
Copper Manhole Site Delivery - 650	125.00
Copper Manhole Site Delivery - 850	125.00
Copper Manhole Site Delivery - 2550	125.00
Copper Manhole Site Delivery - 5000	125.00
Copper Manhole Site Delivery - 10000	125.00
Copper Manhole Excavate and Backfill - 0	2,800.00
Copper Manhole Excavate and Backfill - 5	2,800.00
Copper Manhole Excavate and Backfill - 100	2,800.00
Copper Manhole Excavate and Backfill - 200	2,800.00
Copper Manhole Excavate and Backfill - 650	3,200.00
Copper Manhole Excavate and Backfill - 850	3,500.00
Copper Manhole Excavate and Backfill - 2550	3,500.00
Copper Manhole Excavate and Backfill - 5000	5,000.00
Copper Manhole Excavate and Backfill - 10000	5,000.00
Fiber Pullbox Materials - 0	280.00
Fiber Pullbox Materials - 5	280.00
Fiber Pullbox Materials - 100	280.00
Fiber Pullbox Materials - 200	280.00
Fiber Pullbox Materials - 650	280.00
Fiber Pullbox Materials - 850	280.00
Fiber Pullbox Materials - 2550	280.00
Fiber Pullbox Materials - 5000	280.00
Fiber Pullbox Materials - 10000	280.00
Fiber Pullbox Installation - 0	220.00
Fiber Pullbox Installation - 5	220.00
Fiber Pullbox Installation - 100	220.00
Fiber Pullbox Installation - 200	220.00
Fiber Pullbox Installation - 650	220.00
Fiber Pullbox Installation - 850	220.00
Fiber Pullbox Installation - 2550	220.00
Fiber Pullbox Installation - 5000	220.00
Fiber Pullbox Installation - 10000	220.00
Dewatering factor manhole excavation (additive)	0.20
Water table depth for dewatering, ft	5.00

Note for general support facilities, network operations, customer operations and corp. operations use bcpm defaults. for all other expenses use your own default.

Cut/Restore Sod Fraction - 0	0.02
Cut/Restore Sod Fraction - 5	0.02
Cut/Restore Sod Fraction - 100	0.02
Cut/Restore Sod Fraction - 200	0.02
Cut/Restore Sod Fraction - 650	0.02
Cut/Restore Sod Fraction - 850	0.35
Cut/Restore Sod Fraction - 2550	0.35
Cut/Restore Sod Fraction - 5000	0.11
Cut/Restore Sod Fraction -10000	0.05
Cut/Restore Sod Per Ft - 0	1.00
Cut/Restore Sod Per Ft - 5	1.00
Cut/Restore Sod Per Ft - 100	1.00
Cut/Restore Sod Per Ft - 200	1.00
Cut/Restore Sod Per Ft - 650	1.00
Cut/Restore Sod Per Ft - 850	1.00
Cut/Restore Sod Per Ft - 2550	1.00
Cut/Restore Sod Per Ft - 5000	1.00
Cut/Restore Sod Per Ft -10000	1.00
Restoration Not Required - 0	0.62
Restoration Not Required - 5	0.62
Restoration Not Required - 100	0.62
Restoration Not Required - 200	0.52
Restoration Not Required - 650	0.37
Restoration Not Required - 850	0.27
Restoration Not Required - 2550	0.09
Restoration Not Required - 5000	0.11
Restoration Not Required -10000	0.11
Simple Backfill - 0	0.15
Simple Backfill - 5	0.15
Simple Backfill - 100	0.15
Simple Backfill - 200	0.15
Simple Backfill - 650	0.15
Simple Backfill - 850	0.15
Simple Backfill - 2550	0.15
Simple Backfill - 5000	0.15
Simple Backfill -10000	0.15

Distribution Riser Cable Investment per foot 1	25.00
Distribution Riser Cable Investment per foot 2	20.00
Distribution Riser Cable Investment per foot 3	15.00
Distribution Riser Cable Investment per foot 4	12.50
Distribution Riser Cable Investment per foot 5	10.00
Distribution Riser Cable Investment per foot 6	7.50
Distribution Riser Cable Investment per foot 7	5.30
Distribution Riser Cable Investment per foot 8	3.15
Distribution Riser Cable Investment per foot 9	2.05
Distribution Riser Cable Investment per foot 10	1.50
Distribution Riser Cable Investment per foot 11	0.95
Distribution Riser Cable Investment per foot 12	0.80
Distance Multiplier for difficult terrain	1.00
Rock Depth Threshold, inches	24.00
Hard Rock Placement Multiplier	3.50
Soft Rock Placement Multiplier	2.00
Sidewalk/Street Fraction	0.20
Local RT - Maximum Total Distance	18,000.00
SAI Cable Size 1	7,200.00
SAI Cable Size 2	5,400.00
SAI Cable Size 3	3,600.00
SAI Cable Size 4	2,400.00
SAI Cable Size 5	1,800.00
SAI Cable Size 6	1,200.00
SAI Cable Size 7	900.00
SAI Cable Size 8	600.00
SAI Cable Size 9	400.00
SAI Cable Size 10	200.00
SAI Cable Size 11	100.00
SAI Cable Size 12	50.00
SAI Indoor Investment 1 for bcpm numbers see bcpm worksheet	9,656.00
SAI Indoor Investment 2	7,392.00
SAI Indoor Investment 3	4,928.00
SAI Indoor Investment 4	3,352.00
SAI Indoor Investment 5	2,464.00
SAI Indoor Investment 6	1,776.00
SAI Indoor Investment 7	1,232.00
SAI Indoor Investment 8	888.00
SAI Indoor Investment 9	592.00
SAI Indoor Investment 10	296.00
SAI Indoor Investment 11	148.00
SAI Indoor Investment 12	98.00
SAI Outdoor Investment 1	10,000.00
SAI Outdoor Investment 2	8,200.00
SAI Outdoor Investment 3	6,000.00
SAI Outdoor Investment 4	4,300.00
SAI Outdoor Investment 5	3,400.00
SAI Outdoor Investment 6	2,400.00
SAI Outdoor Investment 7	1,900.00
SAI Outdoor Investment 8	1,400.00
SAI Outdoor Investment 9	1,000.00
SAI Outdoor Investment 10	600.00
SAI Outdoor Investment 11	350.00
SAI Outdoor Investment 12	250.00
Repeater Investment, installed	527.00
Integrated COT, installed	420.00

Remote Multiplexer Common Equip Inv, installed	6,200.00
Channel Unit Investment, per subscriber	125.00
COT investment per RT, installed	1,170.00
Remote Terminal fill factor	0.90
Maximum T1s per cable	8.00
T1 repeater spacing, dB	32.00
Aerial T1 attenuation, dB/kft	6.30
Buried T1 attenuation, dB/kft	5.00
Feeder steering enable	FALSE
Main feeder route/air multiplier	1.27

% of Loop Assigned to USF: 90%
% of Cost Recovered from USF: 100%
Business local loop access lines: 1,764
Monthly business peak minutes: 1,000

Sum of Business Lines Times Monthly Business Peak Minutes: 1,764,000

Sum of Business Lines Times Monthly Business Peak Minutes Times Monthly Cost per Line: $ 76,204,000

Sum of Business Lines Times Monthly Business Peak Minutes Times Monthly Cost per Line Times Percentage Assigned to USF: $ 68,583,600

Sum of Business Lines Times Monthly Business Peak Minutes Times Monthly Cost per Line Times Percentage Assigned to USF Times Percentage Recovered from USF: $ 68,583,600

Sum of Business Lines Times Monthly Business Peak Minutes Times Monthly Cost per Line Times Percentage Assigned to USF Times Percentage Recovered from USF Times Hawaiiana Co Inc Percentage: $ 68,583,600

clli	Avg monthly cost per line	@ Busines usage per line	@ Business peak per line	Monthly cost per line times business lines	Monthly cost per line times business lines times % of loop assigned to USF	Monthly cost per line times business lines times % of loop assigned to USF times % of cost recovered from USF	Monthly cost per line times business lines times % of loop assigned to USF times % of cost recovered from USF times Hawaiiana Co Inc %	Monthly cost per line times business lines times % of loop assigned to USF times % of cost recovered from USF times Hawaiiana Co Inc %	Monthly cost per line times business lines times % of loop assigned to USF times % of cost recovered from USF times Hawaiiana Co Inc %	Monthly cost per line times business lines times % of loop assigned to USF times % of cost recovered from USF times Hawaiiana Co Inc %	Monthly cost per line times business lines times % of loop assigned to USF times % of cost recovered from USF times Hawaiiana Co Inc %	Monthly cost per line times business lines times % of loop assigned to USF times % of cost recovered from USF times Hawaiiana Co Inc %	Monthly cost per line times business lines times % of loop assigned to USF times % of cost recovered from USF times Hawaiiana Co Inc %
AHMLHIQA	$ 43.68	$ 43.64	$ 44.79	$ 197,087	$ 0	$ 0	$ 0	$ 0	$ 197,087	$ 49,272	$ 147,816		
AIEAHICO	$ 12.95	$ 12.82	$ 13.22	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
ANHNHICO	$ 16.58	$ 16.49	$ 16.97	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
BRPTHICO	$ 17.96	$ 17.72	$ 18.13	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
CCAPHI49	$ 17.25	$ 17.23	$ 17.77	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
EWA HICO	$ 15.92	$ 15.81	$ 16.34	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
EWA HIXA	$ 11.57	$ 11.34	$ 11.81	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
EWABHICO	$ 16.89	$ 16.84	$ 17.36	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
HAKUHICO	$ 31.36	$ 31.27	$ 31.78	$ 5,751	$ 0	$ 0	$ 0	$ 0	$ 5,751	$ 1,438	$ 4,314		
HANAHICO	$ 120.54	$ 120.53	$ 123.32	$ 628,704	$ 0	$ 0	$ 0	$ 0	$ 628,704	$ 157,176	$ 471,528		
HILOHIMN	$ 17.53	$ 17.37	$ 17.73	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
HNAUHICO	$ 82.22	$ 82.20	$ 83.51	$ 929,983	$ 0	$ 1,215	$ 0	$ 0	$ 931,197	$ 232,799	$ 698,398		
HNKAHICO	$ 55.31	$ 55.31	$ 56.59	$ 692,633	$ 0	$ 0	$ 0	$ 0	$ 692,833	$ 173,158	$ 519,475		
HNLLHIMN	$ 9.49	$ 9.23	$ 9.65	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
HNLLHIXA	$ 8.51	$ 8.19	$ 8.58	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
HNMUHICO	$ 65.92	$ 65.92	$ 67.06	$ 399,911	$ 0	$ 0	$ 0	$ 0	$ 399,911	$ 99,978	$ 299,933		
HNPEHICO	$ 31.56	$ 31.56	$ 32.37	$ 8,759	$ 0	$ 0	$ 0	$ 0	$ 8,759	$ 2,190	$ 6,569		
KAAAHICO	$ 38.03	$ 37.92	$ 38.63	$ 103,635	$ 0	$ 0	$ 0	$ 0	$ 103,635	$ 25,909	$ 77,726		
KAILHICO	$ 13.41	$ 13.32	$ 13.72	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KAIMHICO	$ 12.59	$ 12.48	$ 12.88	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KANHHICO	$ 12.62	$ 12.52	$ 12.93	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KEAUHICO	$ 42.15	$ 42.15	$ 42.79	$ 423,519	$ 0	$ 0	$ 0	$ 0	$ 423,519	$ 105,880	$ 317,640		
KEHIHICO	$ 19.21	$ 19.19	$ 19.72	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KHAEHICO	$ 55.29	$ 55.11	$ 56.12	$ 195,738	$ 0	$ 1,881	$ 0	$ 0	$ 197,619	$ 49,405	$ 148,214		
KHLAHICO	$ 56.87	$ 56.87	$ 58.44	$ 514,297	$ 0	$ 0	$ 0	$ 0	$ 514,297	$ 128,574	$ 385,722		
KHLUHICO	$ 19.19	$ 19.13	$ 19.62	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KHOUHICO	$ 32.77	$ 32.63	$ 33.17	$ 39,716	$ 0	$ 0	$ 0	$ 0	$ 39,716	$ 9,929	$ 29,787		
KIHEHICO	$ 16.00	$ 15.89	$ 16.31	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KILAHICO	$ 42.97	$ 42.97	$ 44.22	$ 99,710	$ 0	$ 0	$ 0	$ 0	$ 99,710	$ 24,927	$ 74,782		
KKAIHIMN	$ 62.48	$ 62.48	$ 64.52	$ 420,851	$ 0	$ 0	$ 0	$ 0	$ 420,851	$ 105,213	$ 315,639		
KKHAHICO	$ 38.42	$ 38.37	$ 39.51	$ 104,808	$ 0	$ 0	$ 0	$ 0	$ 104,808	$ 26,202	$ 78,606		
KLAOHICO	$ 49.46	$ 49.33	$ 49.95	$ 435,417	$ 0	$ 0	$ 0	$ 0	$ 435,417	$ 108,854	$ 326,563		
KLHIHICO	$ 11.47	$ 11.29	$ 11.68	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KLHOHICO	$ 26.97	$ 26.91	$ 27.47	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KLKKHICO	$ 47.96	$ 47.90	$ 49.22	$ 351,064	$ 0	$ 0	$ 0	$ 0	$ 351,064	$ 87,766	$ 263,298		
KLOAHICO	$ 23.14	$ 22.99	$ 23.48	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KLPUHICO	$ 62.05	$ 62.05	$ 63.41	$ 199,364	$ 0	$ 0	$ 0	$ 0	$ 199,364	$ 49,841	$ 149,523		
KLUIHICO	$ 13.77	$ 13.58	$ 13.99	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KMLAHICO	$ 47.27	$ 47.24	$ 48.05	$ 365,468	$ 0	$ 0	$ 0	$ 0	$ 365,468	$ 91,367	$ 274,101		
KOKOHICO	$ 16.18	$ 16.11	$ 16.56	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KONAHICO	$ 19.45	$ 19.29	$ 19.75	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KPAAHICO	$ 20.94	$ 20.84	$ 21.29	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
KULAHICO	$ 53.70	$ 53.64	$ 54.34	$ 642,937	$ 0	$ 2,695	$ 0	$ 0	$ 645,632	$ 161,408	$ 484,224		
KWLNHICO	$ 20.45	$ 20.36	$ 20.83	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
LAIEHICO	$ 27.45	$ 27.34	$ 27.85	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
LAUPHICO	$ 68.68	$ 68.68	$ 71.02	$ 183,450	$ 0	$ 0	$ 0	$ 0	$ 183,450	$ 45,863	$ 137,588		
LHNAHICO	$ 13.57	$ 13.32	$ 13.73	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
LHUEHIMN	$ 15.97	$ 15.75	$ 16.18	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
LNCYHIMN	$ 44.49	$ 44.49	$ 45.85	$ 197,382	$ 0	$ 0	$ 0	$ 0	$ 197,382	$ 49,345	$ 148,036		
MILNHICO	$ 14.50	$ 14.45	$ 14.92	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
MILNHIXB	$ 31.72	$ 31.58	$ 32.10	$ 8,079	$ 0	$ 0	$ 0	$ 0	$ 8,079	$ 2,020	$ 6,059		
MKHAHICO	$ 18.66	$ 18.61	$ 19.14	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
MKLOHICO	$ 16.41	$ 16.38	$ 16.89	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
MKPUHICO	$ 18.52	$ 18.45	$ 18.97	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
MKWOHICO	$ 22.88	$ 22.78	$ 23.28	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
MLUAHICO	$ 12.09	$ 11.93	$ 12.33	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		

Line Type	Support Grand Totals
Primary residence lines	$12,210,223
Secondary residence lines	$0
Single line business lines	$7,553
Multiline business lines	$0
Public lines	$0
All switched lines	$12,217,776

Clli	Avg monthly customer line	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Line Type	Support Grand Totals
MNLOHICO	$ 181.10	$ 181.10	$ 191.63	$ 264,911	$ 0	$ 0	$ 0	$ 0	$ 264,911	$ 66,228	$ 198,683				
MNOAHICO	$ 13.37	$ 13.25	$ 13.71	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
MTVWHICO	$ 64.51	$ 64.51	$ 65.39	$ 778,009	$ 0	$ 0	$ 0	$ 0	$ 778,009	$ 194,502	$ 583,507				
NANAHICO	$ 22.22	$ 22.14	$ 22.63	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
NLHUHICO	$ 103.11	$ 103.11	$ 104.81	$ 1,125,827	$ 0	$ 0	$ 0	$ 0	$ 1,125,827	$ 281,457	$ 844,370				
NPLIHICO	$ 18.26	$ 18.10	$ 18.62	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
PAAUHICO	$ 91.84	$ 91.84	$ 93.67	$ 329,286	$ 0	$ 0	$ 0	$ 0	$ 329,286	$ 82,321	$ 246,964				
PAIAHICO	$ 28.15	$ 27.93	$ 28.51	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
PHLAHICO	$ 66.04	$ 66.04	$ 67.94	$ 316,965	$ 0	$ 0	$ 0	$ 0	$ 316,965	$ 79,241	$ 237,724				
PHOAHICO	$ 55.93	$ 55.92	$ 56.62	$ 879,088	$ 0	$ 1,455	$ 0	$ 0	$ 880,543	$ 220,136	$ 660,407				
PKAPHIXA	$ 25.61	$ 25.42	$ 26.09	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
PLOAHICO	$ 15.17	$ 15.07	$ 15.49	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
PNHOHICO	$ 9.76	$ 9.58	$ 9.99	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
PNUIHICO	$ 14.08	$ 13.92	$ 14.38	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
PPKUHICO	$ 52.35	$ 52.35	$ 53.29	$ 167,501	$ 0	$ 23	$ 0	$ 0	$ 167,524	$ 41,881	$ 125,643				
PRCVHICO	$ 55.47	$ 55.47	$ 56.71	$ 370,130	$ 0	$ 0	$ 0	$ 0	$ 370,130	$ 92,532	$ 277,597				
PRLCHICO	$ 12.96	$ 12.87	$ 13.29	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
SSBHHICO	$ 24.64	$ 24.53	$ 25.15	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
ULPEHICO	$ 106.57	$ 106.57	$ 110.71	$ 241,777	$ 0	$ 0	$ 0	$ 0	$ 241,777	$ 60,444	$ 181,333				
VOLCHICO	$ 77.06	$ 77.06	$ 78.85	$ 452,093	$ 0	$ 285	$ 0	$ 0	$ 452,378	$ 113,094	$ 339,283				
WAHWHIMN	$ 13.59	$ 13.47	$ 13.91	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
WKKIHICO	$ 8.84	$ 8.61	$ 8.99	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
WLKUHIMN	$ 16.72	$ 16.57	$ 16.98	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
WLUAHICO	$ 23.38	$ 23.27	$ 23.80	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
WMEAHICO	$ 43.68	$ 43.68	$ 44.56	$ 136,374	$ 0	$ 0	$ 0	$ 0	$ 136,374	$ 34,094	$ 102,281				
WMLOHICO	$ 25.28	$ 25.11	$ 25.91	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
WNAEHICO	$ 15.86	$ 15.75	$ 16.21	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
WPHUHICO	$ 14.06	$ 14.00	$ 14.41	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				
WPHUHIXB	$ 17.25	$ 17.21	$ 17.75	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0				

DECLARATION OF A. DANIEL KELLEY

I have prepared this Declaration at the request of Association of Competitive Telecommunications Providers of Puerto Rico ("ACTP"). The purpose of the Declaration is to respond to the Public Notice issued by the Commission on June 4, 1998 asking for comments on the "cost study" filed by the Government of Puerto Rico Telecommunications Regulatory Board ("PRTRB"). The PRTRB modifies the BCPM model by increasing the values of many of the default BCPM inputs. The result is a $190,972,908.00 subsidy for Puerto Rico.

I conclude that there are several fundamental flaws with the PRTRB study. The study does not meet the requirements for forward-looking cost determinations established by the Commission in CC Docket No. 96-45.[1] The PRTRB has used embedded rather than forward-looking expenses. The "unique service characteristics" of Puerto Rico do not justify the use of either the BCPM defaults or the full embedded costs used by the PRTRB.

QUALIFICATIONS

My professional experience began in 1972 at the Antitrust Division of the U.S. Department of Justice where I analyzed mergers, acquisitions and business practices in a number of industries, including telecommunications. While at the Department of Justice, I was a member of the U.S. v. AT&T economics staff. In 1979, I moved to the Federal Communications Commission ("FCC") where I held positions as Senior Economist in the Common Carrier Bureau and the Office of Plans and Policy, and also served as Special Assistant to the Chairman. After leaving the FCC, I was a Project Manager and Senior Economist at ICF, Incorporated, a public policy consulting firm. From September 1984 through July of 1990, I was employed by MCI

[1] See May 8, 1998 Report and Order.

Communications Corporation as its Director of Regulatory Policy. My current position is Senior Vice President of HAI Consulting, Inc. (formerly Hatfield Associates, Inc.). I conduct economic and policy studies on a wide variety of telecommunications issues, including local exchange competition, dominant firm regulation, and the cost of local service. I have advised foreign government officials on telecommunications policy matters and have taught seminars in regulatory economics in a number of countries.

I received a Bachelor of Arts degree in Economics from the University of Colorado in 1969, a Master of Arts degree in Economics from the University of Oregon in 1971 and a Ph.D. in Economics from the University of Oregon in 1976.

I have testified on telecommunications issues before this Commission, the California, Colorado, Connecticut, Florida, Georgia, Hawaii, Maryland, Massachusetts, Michigan, New York, Oregon, Pennsylvania and Utah Commissions, as well as the Federal-State Joint Board investigating universal service reform. Much of my testimony in recent years has dealt with cost modeling issues and universal service reform. A copy of my resume is attached.

PRTRB STUDY

The PRTRB has adopted the BCPM as its platform for measuring economic costs. However, rather than using the default values for expenses used by the BCPM developers, the PRTRB uses its own input values for expenses. According to the PRTRB, these input values are used " . . . to model specifically Puerto Rico's unique service characteristics."[2] The PRTRB fails to adequately explain exactly how it derived its input factors. However, the values for most accounts appear to be based on PRTC's embedded costs. Table 1 compares the PRTRB's

[2] PRTRB letter, p. 1.

investment related expense ratios with 1997 PRTC embedded costs and the BCPM defaults.[3] The Table shows that the majority of the PRTRB factors are larger than the default BCPM levels, but all of the factors are close to PRTC embedded cost levels.

Table 1
Investment Factors

Account	Category	BCPM Default	PRTRB Value	PRTC Embedded
6112	Motor Vehicle	0.739%	1.251%	1.191%
6114	Special Purpose Vehicle	0.001%	0.000%	0.000%
6115	Garage	0.032%	0.004%	0.003%
6116	Other Work Equipment	0.627%	0.798%	0.770%
6122	Furniture	0.233%	0.572%	0.586%
6123	Office Support	0.701%	0.652%	0.633%
6124	Computers	2.965%	2.510%	2.644%

Table 2 compares PRTRB monthly per line operating expenses with the embedded PRTC expenses and the default BCPM levels.[4] The key point in understanding the results is that the embedded expenses are for the company as a whole, even though basic universal service represents only a portion of the company's activities. Nevertheless, several accounts show per line expenses higher than embedded. The PRTRB amounts for Services and Marketing accounts are smaller than embedded, but still substantial when considering the fact that Marketing is generally not required for basic universal service and the Services account includes the cost of establishing accounts. Network operations expenses and General and Administrative expenses are reduced relative to total company embedded costs, but are still quite high in relation to the BCPM defaults. The PRTRB Network Operations factor exceeds the BCPM default by 180

[3] Embedded factors are computed from the 1997 Statisitcs of Common Carriers ("SOCC").
[4] Account 6310 is excluded because the embedded amount reported in the SOCC appears to be anomalous.

percent while the General and Administrative expense factor exceeds the BCPM default by 103 percent.

Table 2
Per Line Expenses

		1	2	3	4	5
Account	Category	PRTRB Value	PRTC Embedded	% Difference 2-1	BCPM Default	% Difference 1-4
6110	Network Support Expenses	0.15	0.13	16%	0.15	0%
6120	General Support	4.68	4.32	8%	1.20	290%
6210	COE Switching	1.79	1.76	2%	0.34	426%
6230	COE Transmission	1.31	1.47	-12%	0.23	470%
6411	Poles	0.13	0.11	13%	2.76	-95%
6421	Aerial Cable	3.41	3.30	3%	-	n/a
6422	UG Cable	0.60	0.66	-11%	-	n/a
6423	Buried Cable	1.09	1.04	5%	-	n/a
6510	Other Property Plant	0.12	0.15	-28%	0.03	300%
6530	Network Operations	3.73	5.28	-42%	1.33	180%
6610	Marketing	0.75	2.87	-283%	0.35	114%
6620	Services	3.39	7.83	-131%	2.42	40%
6710	Exec. And Planning	0.35	0.38	-8%	0.14	150%
6720	General and Admin	4.37	6.74	-54%	2.15	103%
6790	Uncollectibles	-	-	0%	0.17	-100%

THE PRTRB MODEL FAILS TO SATISFY COMMISSION REQUIREMENTS

The Commission established criteria for universal service cost studies in a Report and Order released in CC Docket No. 96-45 on May 8, 1997. The PRTRB fails to comply with

several of these requirements. While I believe that the BCPM Model used by PRTRB fails to estimate efficient local network investments, I will concentrate on the issues surrounding the input assumptions used by the PRTRB.[5]

The Commission requires that "only long-run forward-looking cost may be included." The Commission specifically rules out the use of embedded costs. As noted above, the PRTRB has effectively used embedded costs. The only explanation given is that there are "unique service characteristics in Puerto Rico."

There are many reasons why embedded costs of telephone companies are generally higher than economic costs. Foremost among these is that incumbent local telephone companies have not been, and are not today, subject to the cost-reducing discipline of competition. This problem is exacerbated for firms that are not privately held. PRTC's embedded costs are significantly higher than those of other telephone operating companies.[6]

As Table 3 shows, there are only 163 lines per employee for PRTC compared to 445 lines for the average U.S. telephone company. Compensation per employee for PRTC is higher than compensation per employee for the average U.S. telephone company, but in-line with some potential benchmark companies, such as Sprint Florida and GTE Florida, which are approximately PRTC's size. However, as discussed further below, average wages in Puerto Rico are substantially lower than those in the U.S.

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[5] See December 23, 1997 ex parte letter from Richard N. Clarke, AT&T, to Ms. Magalie Roman Salas, in CC Docket No. 96-45 for an discussion of how the BCPM fails to accurately locate customers.
ex parte for a description of the basic underlying problems with the BCPM Model.

Table 3
Efficiency Measures

	PRTC	All LECs	Non-RBOCs	GTE Florida	Sprint Florida
Access Lines	1,282,756	193,614,850	34,243,933	2,624,110	2,177,987
Employees	7,863	434,771	96,594	7,473	5,714
Compensation ($000)	417,408	22,196,451	4,774,778	307,769	333,257
Lines/Employee	163	445	355	351	381
Compensation /Employee	53,085	51,053	49,431	41,184	58,323

The PRTRB does not explain the "unique service characteristics of Puerto Rico." An analysis of general economic statistics for the Commonwealth of Puerto Rico shows that, if anything, the "unique characteristics" should lead to lower, not higher, costs. First, operating costs in Puerto Rico should not be higher than operating costs in the lower 48 states. Labor costs explain a high percentage of operating expenses. Salaries, wages, and benefits account for 36 percent of plant specific operations expenses for non-RBOCs.[7] The average hourly wage in Puerto Rico is only 60 percent of the hourly wage in the U.S.[8] Consequently, forward-looking operating expenses for PRTC should be substantially lower than those in the mainland U.S.

Second, PRTC is not a small telephone company. With 1.3 million lines, it is the 12th largest U.S. telephone company. Therefore, PRTC is in a position to obtain reasonable discounts on the purchase of equipment. It might be argued that shipping costs for equipment are higher due to the need to ship over water. However, the market for telecommunications equipment is

[6] PRTC's lines per employee figure approximate those of government monopolies in other countries. This is not surprising given that PRTC is a government-owned monopoly. But the evidence shows that costs in these government-owned monopolies far exceed efficient levels.
[7] See SOCC, p. 36.

international in scope. Mainland U.S. telephone companies have been known to purchase telephone poles from Finland.

Hawaii provides another example of an insular economy. The Hawaii Commission has notified this Commission that it intends to use a modified version of the HAI Model to estimate universal service costs.[9] My understanding is that the Hawaii Commission did not modify equipment prices, but did modify labor rates to reflect the fact that costs are higher in Hawaii.

Third, population density, a key driver of forward-looking telephone costs, is high in Puerto Rico, suggesting that costs per line should be lower for PRTC than for the average telephone company. Population per square mile is 1,028 in Puerto Rico compared to 70 for the United States as a whole.[10] Although telephone penetration is lower in Puerto Rico than in the lower 48 states, this should not offset the effects of density on costs in Puerto Rico because density in Puerto Rico is so high.

Finally, geographic features do not explain PRTC's excessive costs. Both the BCPM and the HM 5.0a have built-in adjustments for factors such as terrain. As noted earlier, the fact that Puerto Rico is insular does not explain the large discrepancy between costs. GTE-Hawaii, has total embedded plant-specific operating expenses per line substantially less than those of PRTC, even though GTE Hawaii has substantially higher labor rates. GTE Hawaii's embedded plant specific operating expense per line was $169 per year in 1997 compared with a PRTC figure of $238.[11]

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[9] See http://www.pr-eda.com/workforc.html, page 3 of 3.
[9] See http://www.fcc.gov/e-file/cost_studies.
[10] Statistical Abstract of the United States, 1997, Table No. 1311. Population density is higher in Puerto Rico than in the Virgin Islands, Guam, American Samoa and the Northern Mariana Islands. Id.
[11] Computed from SOCC.

The fourth Commission requirement is that "the rate of return must be either the authorized federal rate of return on interstate services, currently 11.25 percent, or the state's prescribed rate of return for intrastate services." This is a case where the unique characteristics of Puerto Rico call for a much smaller rate of return. The PRTC is a government owned utility. Therefore, its cost of capital is that of the government. Puerto Rico development bonds are currently yielding 5.12 percent.[12]. Therefore, the 11.25 percent BCPM default is too large by a factor of at least two. Moreover, because of exemptions granted to companies operating in Puerto Rico, PRTC is not subject to federal income tax.

Commission requirement number 8 is that the model outputs should be plausible. This is not the case for the PRTRB study. The $190,000,000 plus subsidy for the commonwealth of Puerto Rico represents over $150 per year for every switched access line on the island. If this number were to be extrapolated for all local exchange telephone companies, the resulting nationwide universal service subsidy would be almost $25 billion. Moreover, it is simply implausible that a forward-looking study could result in a subsidy requirement that is higher than the current requirement, which has always been based on embedded costs.

Commission requirement number 9 is that "the cost study must include the capability to examine and modify the critical assumptions and engineering principles." The PRTRB letter does not attempt to explain or justify the input assumptions that were adopted.

I believe that the results of the HM 5.0a, adjusted for the proper rate of return and income tax level, provide a more reasonable estimate of universal service costs for Puerto Rico. The default subsidy generated by HM 5.0a for Puerto Rico is approximately $5 million. When the

[12] See The Wall Street Journal, June 23, 1998, p. C24.

HM 5.0 is run with the appropriate rate of return and tax inputs, the subsidy falls to $326,000. The default BCPM subsidy falls to $3.2 million when the appropriate tax and return assumptions are used. When the BCPM is run with the PRTRB inputs, but with the lower rate of return and lower tax rate, the subsidy falls to approximately $92,000,000.

CONCLUSIONS

The PRTRB study fails to estimate valid forward-looking costs. Embedded instead of forward-looking economic costs are used as the basis for expense assumptions. The PRTRB's use of embedded costs is especially troublesome because PRTC's embedded costs are unusually high compared to most U.S. telephone companies. The PRTRB also failed to adjust inputs to reflect the lower taxes and cost of capital it enjoys. These factors, taken together with the fact that the BCPM generates excessive investments, result in a model that produces unreasonable results.

I declare, under penalty of perjury, that the foregoing is true and correct. Executed on June 24, 1998.

J. Daniel Kelley

Daniel Kelley

PROFESSIONAL EXPERIENCE:

Senior Vice President, HAI Consulting, Inc., Boulder Colorado (current position).

Conducting economic and applied policy analysis of domestic and international telecommunications public policy and business issues. Recent projects have included advising Central and Eastern European Governments on privatization and competition matters, assisting a private client with entry into the long distance market in Mexico, analyzing competitive conditions in cellular radio markets, analyzing the economics of cable television regulation, analyzing the prospects for local competition and measuring the economic cost of local service.

Director of Regulatory Policy, MCI Communications Corporation, 1984-1990.

Responsible for developing and implementing MCI's public policy positions on issues such as dominant carrier regulation, Open Network Architecture, accounting separations and Bell Operating Company line of business restrictions. Also managed an interdisciplinary group of economists, engineers and lawyers engaged in analyzing AT&T and local telephone company tariffs.

Senior Economist and Project Manager, ICF Incorporated, 1982-1984.

Telecommunications and antitrust projects included: forecasting long distance telephone rates; analysis of the competitive effects of AT&T's long distance rate structures; a study of optimal firm size for cellular radio markets; analysis of the FCC's Financial Interest and Syndication Rules, and competitive analysis of mergers and acquisitions in a variety of industries.

Senior Economist, Federal Communications Commission, 1979-1982.

Served as Special Assistant to the Chairman during 1980-1981. Advised the Chairman on proposed regulatory changes in the broadcasting, cable television and telephone industries; analyzed legislation and drafted Congressional testimony. Coordinated Bureau and Office efforts on major common carrier matters such as the Second Computer Inquiry and the Competitive Carrier Rulemaking. Also held Senior Economist positions in the Office of Plans and Policy and the Common Carrier Bureau.

Staff Economist, U.S. Department of Justice, 1972-1979.

Analyzed proposals for restructuring the Bell System as a member of the economic staff of U.S. v. AT&T; investigated the competitive effects of mergers and business practices in a wide variety of industries.

EDUCATION:

1976	Ph.D. in Economics	University of Oregon
1971	M.A. in Economics	University of Oregon
1969	B.A. in Economics	University of Colorado

PUBLICATIONS AND COMPLETED RESEARCH:

"Cable and Wireless Alternatives to Residential Local Exchange Service," Berkeley Conference on Convergence and Digital Technology (1997), with Alan J. Boyer and David M. Nugent.

"A General Approach to Local Exchange Carrier Pricing and Interconnection Issues," Telecommunications Policy Research Conference, (1992), with Robert A. Mercer.

"Gigabit Networks: Is Access a Problem?" IEEE Gigabit Networking Workshop (1992).

"Advances in Network Technology" in Barry Cole, ed., After the Break-Up: Assessing the New Post-AT&T Divestiture Era (1991).

"Alternatives to Rate of Return Regulation: Deregulation or Reform?" in Alternatives to Rate Base Regulation in the Telecommunications Industry, NARUC (1988).

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TESTIMONY:

Federal Communications Commission, Application of Cellular Communications of Cincinnati, July 25, 1983 (with Robert J. Reynolds): Optimum firm size in the cellular radio market

Maryland Public Service Commission, Case No. 0450-Phase II, May 31, 1983: Access charge implementation issues

New York Public Service Commission, Case No. 28425, June 1983: Access charge implementation issues

Florida Public Service Commission, Docket No. 820537-TP, June 30, 1983, November 4, 1983, April 9, 1984, June 4, 1984, September 7, 1984, October 25, 1984 and August 15, 1985: Access charge implementation issues

Pennsylvania Public Utility Commission, Docket No. R-832, August 5, 1983: Pennsylvania Bell Rate Case

New Jersey Board of Public Utilities, Docket No. 83-11, February 20, 1984: Access charge implementation issues

New York Public Service Commission, Case 88-C-102, March 2, 1990: Alternative Operator Service Issues

California Public Service Commission, A.90-07-015, July 10, 1990: AT&T Deregulation

New York Public Service Commission, Case 28425, October 8, 1990: IntraLATA Dial 1 Competition

Massachusetts Department of Public Utilities, DPU 90-133, October 17, 1990: AT&T Deregulation

Georgia Public Service Commission, 3905-U, November 16, 1990: Incentive Regulation

California Public Service Commission, I-87-11-033, September 23, 1991: IntraLATA Competition

Georgia Public Service Commission, Docket No. 3987-U, January 31, 1992: Cross-Subsidy

Colorado Public Utilities Commission, Docket No. 92R-050T, August 24, 1992: Collocation

Connecticut Department of Public Utility Control, Docket No. 9106-10-06, September 25, 1992: Infrastructure

Maryland Public Service Commission, Case No. 8584, Phase II, July 21, 1995: Local Competition.

Connecticut Department of Public Utility Control, Docket No. 95-06-17, September 8, 1995: Local Competition.

Federal-State Joint Board on Universal Service, CC Docket No. 96-45, June 5, 1996: Cost Modeling.

Colorado Public Utilities Commission, Docket No. 96A-287T, September 6, 1996: Arbitration.

Oregon Public Service Commission, Dockets ARB 3 & 6, October 14, 1996: Arbitration.

Hawaii Public Utilities Commission, October 17, 1996: Arbitration.

Michigan Public Service Commission, October 24, 1996: Arbitration.

New York Public Service Commission, Case No. 28425, May 9, 1997: Access charges.

Colorado Public Utilities Commission, Docket No. 97F-175T, July 18, 1997: Access Charges.

Utah Public Service Commission, Docket No. 97-049-08, October 2, 1997: Access charges.

Connecticut Department of Public Utility Control, Docket No. 96-04-07, February 10, 1998: Access Charges.