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September 2, 1998

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OF COUNSEL

Ms. Blanca S. Bayó Director, Records and Reporting Florida Public Service Commission 2540 Shumard Oak Boulevard Tallahassee, FL 32399-0850

Re: Determination of Cost of Local Service -Docket No. 980696-TP

Dear Ms. Bay6:

AMES S. ALVES

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Enclosed for filing on behalf of MCI Telecommunications Corporation and MCImetro Access Transmission Services, Inc. (collectively, "MCI") are the original and fifteen redacted copies of the rebuttal testimony and exhibits of J.W. Wells.

Also enclosed in an envelope marked "CONFIDENTIAL" is one unredacted copy of Mr. Wells' testimony and exhibits on which potentially confidential information has been highlighted in yellow.

This potentially confidential information belongs to BellSouth, GTE Florida and Sprint, respectively. MCI hereby requests that this information be accorded confidential status pending any required justification by the owners of the information and an ultimate ruling, if one is required.

By copy of this letter, the redacted version of these documents are being furnished to the parties on the attached service list.

Very truly yours,

Richard D. Melson

RDM/mee Enclosures

cc: Parties of Record

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BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY OF

JAMES W. WELLS, JR.

ON BEHALF OF

ACK AFA	MCI TELECOMMUNICATIONS CORPORATION
CMU Kang	Docket No. 980696-TP
LEG 2 LIN 51%	September 2, 1998
SEC	

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EPSC-RECORDS/REPORTING

-	1000	
2	Q.	PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.
3	A.	My name is James W. Wells, Jr., and my office address is 5280 Laithbank Lane,
4	100	Alpharettu, GA 30022
5		
6	Q.	BY WHOM AND IN WHAT CAPACITY ARE YOU EMPLOYED?
7	A.	I am the President of J. W. Wells, Inc. In this proceeding, I am providing
8		consulting expertice in telecommunications Outside Plant ("OSP") infrastructure
9		planning, design and construction, including costing aspects of the local loop.
10		
11	Q.	ON WHOSE BEHALF ARE YOU TESTIFYING?
12	A	I am testifying on behalf of MCI Telecommunications Corporation.
13		
14	IL.	PURPOSE
15	Q.	WHAT ARE THE PURPOSES OF YOUR TESTIMONY?
16	A.	The purposes of my testimony are to:
17		analyze the OSP input values of the Incumbent Local Exchange Carriers
18		("ILECs") in comparison to those of AT&T/MCI,
19		· examine the OSP modeling methodology and assumptions of the
20		Benchmark Cost Proxy Model Release 3.1 ("BCPM 3.1") in comparison
21		to those of the HAI Model Release 5.0a ("HM 5.0a"), formerly known as
22		the Hatfield Model, and
23		rebut specific OSP portions of the direct testimonies of the ILEC

	NO 201	
2	Q.	HAVE YOU PROVIDED OTHER TESTIMONY IN THIS
3		PROCEEDING?
4	A.	Yes. I filed direct testimony in this proceeding.
5		
6	ш	OUALIFICATIONS AND EXPERIENCE
7	Q.	PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND OSP
8		WORK EXPERIENCE.
9	A.	I have Bachelor of Engineering (Electrical Engineering) and Master of Business
0		Administration degrees and certification as a Project Management Professional. I
1		have gained OSP experience in the following assignments with:
2		South Central Bell Telephone Company (now BellSouth) in Birmingham,
3		AL: OSP Construction Foreman - 1 year, OSP Facilities Engineer - 4
4		years, OSP Planning Engineer - 2 years,
5		Western Flectric and AT&T Network Systems (now Lucent
6		Technologies): Technical Representative for OSP Products - 5 years and
7		District Manager - OSP Engineering and Construction - 5 years,
8		AT&T Local Infrastructure and Access Management: District Manager
9		OSP Engineering and Construction - 1 year,
20	77.40	AT&T Local Services Division: District Manager Outside Plant Cost
21		Engineering - 1 year, and
12		J. W. Wells, Inc.: OSP Consultant – 2 months.
23		
FEL:	COTTON S	

- Q. HOW DOES YOUR TESTIMONY FIT INTO THE OVERALL CASE?
- A. My area of expertise is the OSP portion of the local loop, which is the network
 infrastructure from the main distributing frame in the wire center to the network
 interfree device at the customer's premise. My testimony is complemented by the
 - Mr. Don Wood, which addresses the HM 5.0a methodology, design and several of the inputs, and
 - Mr. Brian Pitkin, which addresser the overall BCPM 3.1.

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testimonies of:

10 Q. WOULD YOU PLEASE PROVIDE AN OVERVIEW OF YOUR 11 CONCERNS REGARDING THE BCPM 3.1?

- I have reviewed the GSP portions of the prefiled direct testimonies of the ILEC witnesses in this proceeding and the BCPM 3.1 Model Methodology (April 30, 1998 Edition). I have also participated in workshops where ILECs have presented the BCPM. In Release 3.1, the BCPM modelers have taken steps to evolve their model by incorporating several of the concepts of earlier releases of the Hatfield Model plus some additional ideas to improve the accuracy and cost efficiency of their local loop model. However, upon thorough investigation, I have found that in the actual implementation of these ideas the BCPM 3.1 still falls well short of being the least-cost, most-efficient, forward-looking and reasonable local loop cost model based on currently available technology in the following ten areas:
 - The input values filed by BellSouth, GTE and Sprint vary widely, and in numerous instances the ILECs have utilized unreasonable OSP input

	values. The OSP input values filed by AT&T/MCI for the HM 5.0a in
	this proceeding will be shown to be reasonable by comparison.
	The ILEC witnesses make misleading claims of superior transmission
	quality based on adhering to the constraints of the Carrier Serving Area
	("CSA") Concept. However, BCPM 3.1 very clearly does not adhere to
	those constraints. Both models appropriately design distribution to a
	maximum length of 18,000 feet from the Digital Loop Carrier Remote
	Terminal ("DLC RT") by employing range extension cards as required.
	BCPM 3.1 now models customer locations to the much smaller Census
	Block ("CB") level instead of the Census Block Group ("CBG") level.

- BCPM 3.1 now models customer locations to the much smaller Census Block ("CB") level instead of the Census Block Group ("CBG") level. However, the HM 5.0a employs a superior customer location methodology to BCPM 3.1 in that it models most customer locations (70% for Florida) far more precisely by latitude and longitude geocoding of their addresses. The remaining customers are located by HM 5.0a at the CB level of precision, which is the maximum level of precision that BCPM 3.1 attains for any customer. More precise customer location produces a more accurate and cost efficient network design.
- BCPM 3.1 arbitrarily segments natural clusters of customers (i.e., customers located in the same neighborhood or town) based on a fixed grid overlay. However, HM 5.0a clusters customers based on their proximity to each other and transmission design rules, which is what an OSP Engineer would realistically do in designing a least-cost local loop network.
- The BCPM 3.1 overstates costs because it models an excessive number of
 DLC RTs in locations serving geographical areas and numbers of

46.5	customers that are far too small for a least-cost model. DLC RT
	locations are costly, and thus it is more cost effective to fully utilize the
	capacity and transmission capabilities of currently available DLC systems,
	which is exactly what HM 5.0a does.

- exceeds 18,000 feet in length from the DLC RT. This is important because when a loop exceeds 18,000 feet, the quality of voice grade becomes substandard. In Florida and other states, the BCPM 3.1 has indeed modeled customer locations that are more than 18,000 feet from the DLC RT. By way of comparison, 1 M 5.0a performs a quality test to assure that none of the loops it models exceed this limit.
- BCPM 3.1 uses a fixed copper/fiber breakpoint and also automatically deploys fiber feeder and LLC for gric s where customer demand exceeds the capacity of a single copper cable. However, fiber with DLC is clearly not the economical alternative to copper feeder cables for short loops. HM 5.0a methodology is far superior in its use of dynamic selection of copper versus fiber feeder based upon comparative life cycle economics of these two alternatives.
- BCPM 3.1 still overstates distribution cable length and cost by modeling square lots even though it is clearly more economical and realistic for cities and subdivisions to be modeled based on rectangular lots. The HAI Model has always been more real world and cost efficient in its modeling of 1 wide by 2 deep rectangular lots.
- The BCPM 3.1 modeling methodology oversizes distribution cables by:

2000	######################################
1	first sizing for the <u>ultimate</u> demand by providing up to two copper
2	cable pairs to all houses, including empty houses;
3	2. then increasing the ultimate number of pairs required by a cable
4	sizing factor; and
5	3. finally rounding up this double inflated pair requirement to the
6	next largest discrete ceble size.
7	The BCPM 3.1 has three significant, but rather arbitrary, OSP network
8	design assumptions which cannot be readily subjected to sensitivity
9	analysis because they are only user adjustable via the cumbersome and
10	time consuming preprocessing application. These assumptions are:
u	1. The maximum threshold of 999 lines for determining Carrier
12	Serving Area size.
13	2. The distance of 10,000 feet from the wire center in every feeder
14	route in the state of Florida as being the appropriate distance
15	where it is economical and feasible to split a feeder route. Also,
16	this is the arbitrary distance from every wire center where the
17	spacing of lateral subfeeder routes suddenly goes from
18	approximately every 1,600 feet to approximately every 13,000
19	foot.
20	3. The sizing of the road reduced area in the distribution quadrant
21	based on a 500-foot buffer along each side of the roads within that
100	

•		As will be defined all a make greater detail in the remainder of this reduction
2	age .	testimony, the HM 5.0a is clearly the most appropriate model for determining the
3		cost of the local loop network in Florida based on the relevant criteria of being:
4	7/85 14/1/0	• reasonable,
5		• least-cost,
6		• most-efficient, and
7		based on currently available technology.
8		
9	v.	CONCERNS REGARDING THE OSP PORTION OF BCPM 3.1
10	Q.	WHAT CONCERNS DO YOU PAVE REGARDING THE OSP INPUT
11		VALUES FILED BY THE ILECA!
12	A	My analysis of the OSP input values filed by BellScuth, GTE, Sprint and
13		AT&T/MCI in this proceeding contradicts the following three representations
14		generally promoted by the ILBCs:
15		1. The ILECs somehow possess the only true knowledge of local loop
16		network costs in Florida and have also figured out how to appropriately
17		apply their cost data to a bottoms-up model.
18		2. Because an input value reflects the ILEC's actual experience in its service
19		territory, it is therefore indisputably the least-cost, most-efficient input
20		value.
21		3. HM 5.0a is populated with unrealistic and low input values because the
22		HAI OSP Engineering Team developed these input values on a national
13	的人 (a) 的 (7) 理	

AT&T/MCI to HM 5.0a and the input values of the ILECs to BCPM 3.1		· Ch
. There are several major differences between the input values of	N.	
BCPM 3.1 because they reflect real world OSP Engineering judgment.		- 5
significantly more costly than the same input value for the ILECs to	India	2
 In several instances, the input values of AT&T/MCI to HM 5.0a are 	Lings of the second	2
values of the ILECs and AT&T/MCL		6
 In many areas there is a great deal of consistency between the input 		9
items rather than determine their Florida-specific input values.		80
 ILECs have adopted the BCPM national default input values for several 		5
the three ILECs for the same item.		6
 There are a number of significant differences among the input values of 		ᅜ
show that:		I
frame from three independent ILECs. The following analysis will once again		5
comparison of input values for the same model in the same state in the same time		12
Yes. This docket has created yet another opportunity for a side-by-side	>	=
HEC: FOR BCPM 3.1 WITH THOSE OF HM 5.0a?		10
HAVE YOU COMPARED THE INPUT VALUES PROTOSED BY THE	Q.	9
		00
under a "scorched node" assumption.		7
efficient model for a local loop network based on currently available technology		٥
grappling with how to utilize a bottoms-up, forward-looking, least-cost, most-	MAUS TO TO	u
under rate base regulation. However, BellSouth, GTE and Sprint are clearly		•
of the embedded costs in their local loop networks which have been deployed		w
great deal of data and experience with studies that perform top-down allocations		ы
ILECs have been building local loop networks for decades and do indeed have a		-

1	in those areas where there are significantly differing modeling							
2	assumptions.							
3	There are numerous examples of ILEC incorrect and illogical input values							
4	having been derived by top-down accounting methods absent direction, or							
5	at least a reasonableness check, by OSP Engineers.							
6	There appears to be no consistent patterns in these differences.							
7								
8	Thus, there is no substantiation to representations that ILEC input values are							
9	always the correct values and HM 5.0a input values always drive unreasonably							
10	low costs. My conclusions are based on a side-by-side comparison of the							
11	national default input values for the BCPM 2.1, with the BCPM 3.1 input values							
12	filed by BellSouth, Sprint and GTE on August 3, 1998, and the AT&T/MCI							
13	input values to the HM 5.0a in this proceeding. This comparison is detailed in							
14	the attached Exhibit(JWW-4). The following are examples of some of the							
15	analysis of these input values by category:							
16								
17	Pose Costs: The input value comparison for the per unit installed cost of a pole							
18	with anchors and guys in density zone 650 - 850 is:							
19								
20 21	BCPM 3.1 Default BellSouth Sprint GTE HM 5.0a							
22								
23	\$775.20 20000000 20000000 \$417.00							
24	There is no replaced as a second committee to the own the own black or the							
25	There is no explanation as to why GTE's input value is 96.9% higher than							
	BellSouth's for Florids-specific installed pole cost. GTE used a mix of 30-foot							

non-shared poles and 40-foot shared poles. However, Sprint appears to have used only 45- foot poles, which are too tall and much too costly, especially for approximately half of the poles that Sprint does not share. There are obviously major inconsistencies among the ILECs on how to properly model and cost poles using BCPM 3.1. 5 6 The relevant question is "What is a reasonable input value in Florida for pole 7 costs?" For a benchmark, the Federal Communications Commission ("FCC") has gathered pole cost data from the ILECs regarding material and labor costs for 9 40-foot class 4 poles, which is summarized in Exhibit (JWW-2) of my Direct 10 Testimony in this proceeding. Even though it adds costs, HM 5.0a utilizes only 11 40-foot class 4 poles in order to accommodate sharing on any pole. However, 12 there is very little supporting documentation to ascertain the size and class of the 13 pole(s) being modeled by the ILECs or any underlying data regarding how pole 14 costs were derived or may have been validated. 15 16 The total pole costs submitted to the FCC for Florida were BellSouth - \$xxxxxx, 17 Sprint - \$xxxxxx and GTE - \$xxxxxx. Note that the input values filed by Sprint 18 19 and GTE in this proceeding are considerably higher. 20 The unweighted arithmetical mean of the FCC pole cost data is \$500.75 21 nationwide and \$373.49 for the three Florida ILECs. The nationwide median 22

cost is \$422.14. Therefore, my conclusion is that the input value for pole costs

for HM 5.0a of \$417.00 (even though it is indeed a national default value) is

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actually quite reasonable for Florida based on the ILEC data collected by the FCC and the Florida-specific costs filed by BellSouth.

Buried Distribution Structure: The input value comparisons for normal buried distribution structure cost in density zone 0 - 5, which is the most rural and therefore most critical in this Universal Service Fund (USF) case, and the most urban density zone of 10,000 + are:

Density Zone	BCPM 3.1 Default	BellSouth	Sprint	GTE	HM 5.0a
0-5	\$ 1,47	\$ xxxx	\$ 10000	\$ xxxx	\$ 1.77
10000+	\$ 8.84	\$ xxxx	\$ xxxx	\$ 10000	\$45.00

GTE has utilized BCPM national default values rather than its Florida-specific costs for burying cable, even though it is local contractors that typically bury cables. BellSouth's buried distribution structure cost in the lowest density zone (0 - 5), where USF funding is most applicable, is overstated by at least xx%.

BellSouth has not figured out how to, or for other reasons has chosen not to, differentiate buried cable structure costs by type for input into the BCPM 3.1 bottom-up model. Specifically, BellSouth has filed the same cost of \$xxxx per for for plow, rocky plow, trench and backfill, rocky trench, backhoe trench and hand dig for each density zone. This is simply wrong. It cost much less per foot to plow cable than it does to trench and backfill.

Sprint has also made this same errone	ous simplification i	in Florida	though it was
able to provide costs specific to each t	ype of buried cable	e trench iz	another state.
However, it should be possible to der	ive these differing	costs by	type of buried
structure from the ILEC's contracts.			
		3/ 1/	

The consequences of this inability, or refusal, of the ILECs to differentiate their buried structure costs are profound in the most rural density zone where the USF Fund would be applied. The reason in that the predominant method of burying cable in rural areas is plowing (e.g., xx% in BullSouth's filing, Bates Stamp 000196), and plowing is by far the least costly of the BCPM 3.1 buried structure types. Thus, ILEC buried cable structure costs are substantially overstated in rural areas because the average cost for buried cable structures of all types of placing methods has been used as the input value.

Note that the HM 5.0a input value in this comparison is inside the range of the ILECs in the lowest density zone. However, in the most urban density zone, the HM 5.0a input value is far more costly than the three ILECs. This is because the HAI Model OSP Engineering Team has more reasonably determined that there are much higher costs for burying cable when the density is more than 10,000 lines per square mile. This is just one clear demonstration that the HM 5.0a input values are more realistic and have not been derived to produce unreasonably low creats for the local loop network.

Further analysis of the ILEC input values for below ground structure shows that BellSouth's buried and underground structure costs in density zone 10,000+ are illogically lower than the same costs in density zones 2,550 - 5,000 and 5,000 - 10,000. It certainly appears that BellSouth has made input value entry errors which overstate structure costs in density zones 2,550 - 5,000 and 5,000 - 10,000. Also, Sprint's underground structure costs are approximately 10% less than its buried structure costs in each density zone. This is illogical because a conduit trench is wider than a buried cable trench, and the trench depth should be comparable.

These few examples clearly demonstrate that the ILECs are using accountants to unrealistically spread ILEC top-down cost data for input into the bottom-up BCPM 3.1 without applying the judgment of OSP Engineers. Furthermore, it is apparent that even with access to the same pool of OSP Contractors in Florida that Sprint models buried cable structure at less than half the cost of BellSouth.

<u>Underground Feeder Structure</u>: The input value comparisons for underground feeder structure cost in density zone 0 - 5 and the two most urban density zones are:

18 19	Density Zone	Default	BellSouth	Sprint	GTE	HM 5.0a
20	0-5	\$ 2.76	\$ 10000	\$ xxxx	\$ 10000	\$10.29
21	5000 -10000	\$ 8.22	SHOODOC	\$ 20000	\$ 10000	\$50.10
22	10000+	\$ 8.84	\$xxxxxx	\$ xxxx	\$ 10000	\$75.00

Since the ILECs have access to the same pool of contractors in Florida who place underground structure, why would BellSouth's costs for placing

1	underground structure in the most rural density zone be more than four times that
2	of Sprint? In going from the 5,000 - 10,000 density zone to the 10,000+ density
3	zone, the HM 5.0a input value increases by 49.7%, GTE's input value (i.e., the
4	BCPM national default value) increase by 7.5%, Sprint's input value remains
5	constant, but the BellSouth input value inexplicably drops by 9.9%.
6	Unfortunately, there is no supporting ILEC documentation (e.g., the HM 5.0a
7	Inputs Portfolio) that would help to explain such huge discrepancies.
8	
9	The HM 5.0a input values in the urban race are far more costly compared to
10	those of the three ILECs. This is because the HAI Model OSP Engineering
u	Team has more reasonably determined that there are extra costs for placing
12	conduit when the density is more than 5,000 lines per square mile. This clearly
13	shows again that the HM 5.0a inputs have been derived from realistic OSP
14	Engineering judgment and certainly do not produce unreasonably low costs.
15	
16	Note also that GTE's input values for both buried cable and for underground
17	conduit structure in the three highest density zones are identical to each other
18	(Exhibit (JWW-4), Pg. 1). However, the cost for underground conduit
19	structure should definitely be higher than for buried structure because it takes a
20	wider trench for conduit placement, plus several other cost in general.
21	
22	Conduit: The input value comparison for the material cost of 4-inch conduit is:
23	

HM 5.0a

BellSouth

Sprint

The HM 5.0a Inputs Portfolio shows validation data ranging from \$0.52 to \$0.65, which supports the HM 5.0a input value of \$0.60. However, BellSouth's input value of \$xxxx per foot for 4-inch conduit purchased in large quantities is at least xxxx too high. Once again, however, there is no ILEC supporting documentation to explain why Sprint can obtain 4-inch conduit at a much more reasonable cost than BellSouth or GTE in Florida.

Structure Sharing (% Paid by Telco) - Arrial: The input value comparisons for the sharing of aerial structure (after weighting for poles, anchors and guys) in the most rural and most urban density zones are:

Density Zone	BCPM 3.1 Default	BellSouth	Sprint	GTE	HM 5.0a Model
0-5	56.45%	xxxxxx%	1000001%	xxxxxx%	50.00%
10000+	60.53%	xxxxxx/%	xxxxxx/%	1000000%	25.00%

There is consistency among all input values in the most rural density zone. However, HM 5.0s shows considerably more structure sharing (i.e., a lower percentage paid by the telephone company) in the urban area than in the rural area. This is because there are, and certainly will be in the future, more utilities to share with in the urban area than in the rural area. The ILECs, on the other hand, have modeled little difference in the sharing in the urban area than the rural

1	area. There is no supporting documentation to explain the ILEC's modeling
2	logic, which appears lacking in sound OSP Engineering judgment.
3	
4	Structure Sharing (% Paid by Telco) - Buried Distribution Cable and
5	Underground Feeder Conduit: The input value comparisons for the percentage
6	paid by the telephone company for underground feeder structure in the most
7	urban density zones are* .
8	
9 0	Type of Density BCPM 3.1 Structure Zone Default BellSouth Sprint GTE HM 5.0a
1	Buried Dist 10000+ 80.0% xxxx% xxxxx% xxxxx% 33.00%
2	UG Feeder 10000+ 85.0% xxxxx% xxxxx% xxxxx% 33.00%
3	
4	These input values represent a most significant difference of OSP Subject Matter
5	Expert opinion regarding least-cost, most-efficient, forward-looking modeling of
6	the local loop network. In the most urban areas for below ground structures, the
7	forward-looking view of the HAI Model OSP Engineering Team is that the
8	telephone company will be able to share underground costs with two other
9	utilities on the average (HM 5.0a IP, App. B).
0	
1	In sharp contrast, BellSouth, GTE and Sprint foresee virtually zero amounts of
2	sharing. However, the Lucent (formerly AT&T) OSP Engineering Handbook
3	that "reflects standard engineering guidelines" supposedly modeled by BCPM 3.1

(Bowman Direct, Pg. 7) states that "[i]n areas where both power and telephone

This demonstrates an appalling lack of OSP Engineering oversight. This also results in GTE's cost for aerial plant in rural areas to be overstated because too many poles are modeled per aerial cable route distance.

Copper Cable: BellSouth, GTE and Sprint all have input values for 3000, 3600 and 4200 pair 24 gauge cables. However, 24 gauge cables are simply not manufactured in sizes larger than 2400 pairs. Therefore, it is rather obvious that the ILECs are not using the actual existing prices that they pay for specific size cables, since they could not possibly have purchased these particular cables for which they have provided input values. Again, it is obvious that accountants are determining the BCPM 3.1 input values for the ILECs without the input or oversight of competent OSP Engineers.

The comparisons of the total cost input values for the smaller sizes of 24 gauge buried cables, which would be used extensively in rural areas, are:

17 18	Cable Size	Default	BellSouth	Sprint	GTE	HM 5.0a
19	200 pair	\$4,45	\$xxxx	\$10000	Sxxxxx	\$4.42
20	50 pair	\$2,50	\$xxxx	Sxxxx	Sxxxx	\$1.70
21	25 pair	\$2.08	\$xxxx	Sxxxx	Sxxxx	\$1.24
22	12 pair	\$2,05	Sxxx	\$xxxxx	Sxxxx	\$0.79
23	6 pair	\$1.97	\$10000	\$xtox	\$xxxx	\$0.66

requirements because they represent currently available technology alternatives operating practices do not allow these small cables in their inventories that have lower installed cost and are more efficient in terms of cable utilization 12 pair cable sizes. The rationale is that current (i.e., BellSouth's embedded) than 25 pair cables. BellSouth has defaulted to the 25 pair cable costs for 6 and HM 5.0a models 6 and 12 pair 24 gauge cables when they satisfy cable size

BCPM 3.1 for the purpose of determining appropriate local loop costs for USF The relevant criteria for determining USF support are least-cost and mostsupport, which is what Sprint and GTE have done provide appropriate input values for 6 and 12 pair 24 gauge copper cables in prevalent and where the USF support will be most required. BellSouth should cable costing will be in the most rural areas where the smallest cables are more these relevant criteria. Furthermore, the greatest manifestation of this excessive BellSouth in the BCPM 3.1 for 6 and 12 pair 24 gauge cable does not satisfy efficient based on currently available technology. The latest input values filed by

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prime example of misapplying top-down costing principles in a bottom-up feeder cable costs obviously include a loading factor for terminals. 000157). Feeder cables simply do not have cable terminals, yet BellSouth's loading factor (BellSouth's Model Inputs and Assumptions, Bates Stamp applications. However, BellSouth's cable prices include cable terminals via a BellSouth utilizes the same copper cable prices for feeder and distribution cable costing model without OSP Engineering judgment direction or overnight

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26 gauge aerial cable costs are higher than its 24 gauge buried cable cost for each gauge cables in the same pair size for the same application. higher than for the same cables in 24 gauge. pair size. Also, BellSouth's cost for 25 pair 26 gauge aerial and buried cables are conductors are smaller than 24 gauge, 26 gauge cables are less costly than 24 Another seemingly illogical phenomenon of BellSouth's cable costing is that its Because 26 gauge copper

For some unexplained reaso, Sprint's underground gable costs (i.e., demonstrated by the comparable input values for HM 5.0a and the other ILECs structure) are significantly higher than its aerial and buried cable cost for the same pair size and gauge of cables. This contradicts the appropriate relationship without

Fiber Cable: The input value comparisons for serial fiber cable total costs are

		7	6
z,	8	Ē	Fiber Strands
83.04	\$5.27	\$9.85	Default
Stook	Sxxxx	Stock	BellSouth
Stoock	Sxxx	Spoox	Sprint
Spoox	Soook	Sxxx	E E
\$2.90	\$4.70	\$9.50	HM 5.0a

BCPM 3.1 and the three ILECs. Thus, HM 5.0s will incur even higher fiber 5.0a has a maximum size fiber cable of 216 strands versus 288 strands for the cable costs than BCPM 3.1 when the fiber strand requirements exceed 216 Thus, the HM 5.0s fiber cable costs are shown to be very reasonable. Also, HM

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1	because HM 5.0a will place an additional fiber cable with supporting structure at
2	multiples of 216 required strands instead of at multiples of 288 required strands
3	
4	Serving Area Interface ("SAI", also known as Feeder Distribution Interface):
5	The input value comparison for the installed (i.e., material and installation) cost
6	of a 3600 pair indoor SAI is:
7	
8 9	BCPM 3.1 Default BellSouth Sprint GTE HM 5.0a
10	\$19,605 \$xxxxxxx \$xxxxxxx \$xxxxxx \$4,928
11	
12	There are obviously incredible differences. The HM 5.0a input value is described
13	in Section 2.9 of the HM 5.0a Inputs Portfolio. There is no similar
14	documentation to explain the ILEC's costs. The material components consist of
15	a plywood backboard, modular protector units, connecting blocks and jumper
16	wire. BellSouth's cost level could cover several weeks of engineering and labor
17	plus \$100000 in supply costs, all of which are exorbitant. Note that GTE has
18	defaulted to the BCPM national input value rather than ascertain its Florida-
19	specific costs.
20	
21	Only BellSouth furnished detailed SAI costs (Exhibit (JWW-4), Pg. 15 -
22	18). Note how the "engineering" costs have been applied linearly based on the
23	pair count of the SAL. For example, BellSouth has costed \$200000 to engineer a
24	100 pair indoor SAI and \$xxxxxxxxxx to engineer a 4200 pair indoor SAI (i.e.,

42 times more). However, real world engineering costs for an indoor SAI vary

little by pair size. This is an example of the top-down accounting application of

ILEC cost data without OSP Engineering judgment.

<u>Drop Wire Placement - Aerial and Buried</u>: The comparisons of ILEC input values for the aerial and buried total drop wire costs are:

		BCrM 3.1 Default	Be South	Sprint	GTE	HM 5.0a
Acrial	0-5	\$ 0.77	\$ xxxx	\$ xxxx	\$10000	\$0,26
Acrial	10000+	\$ 0.77	\$ xxxx	\$ 10000	\$2000	\$0.33
Buried	0-5	\$ 0.77	\$ 2000	\$ 2000	\$10000	\$0.74
Buried	10000+	\$ 0.77	\$ xxxxx	\$ 20000	\$xxxx	\$5,14

HM 5.0a appropriately reflects the real world by modeling higher drop costs for the urban versus rural area., 27% higher for aerial drops and 595% higher for buried drops. The ILECs model the same cost per foot in all density areas by drop type. This shows a lack of OSP Engineering judgment and also results in higher drop costs in rural areas because the average drop cost is being applied.

Drop costs have a major impact on total loop costs because they represent a significant amount of investment that occurs at virtually each customer location.

The impact of inappropriate drop costing on a per foot basis is even more profound in rural areas because of generally longer drops lengths.

Buried drops simply cost more than aerial drops. Note that BellSouth more than doubles its installed cost for buried drops versus aerial drops, while HM 5.0a increases range from 184% to 1458%. In contrast, Sprint's costing of aerial drops higher than buried drops is astonishingly illogical.

Note that GTE's buried and aerial drop input values (i.e., the BCPM 3.1 national default values) are the same, and they are at the much higher buried drop cost level. This is because CTE is modeling 100% buried drop costs, which cost more than aerial drops. This is a clear violation of the FCC Criteria No. 1 that the model be "reasonable" and "least-cost" based on currently available technology.

The drop wire input values of the HM 5.0a are clearly realistic and reasonable compared to those of the ILECs. Furthermore, in urban density zones, the HM 5.0a drops costs are significantly higher. This reflects sound OSP Engineering judgment of real world higher costs that has been consistently incorporated into the HM 5.0a input values as appropriate.

Network Interface Device ("NID"), Protector and Interface: The input value comparison for the total costs of NID, Protector and Interfaces is:

21 22	NID Type	BCPM 3.1 Default	BellSouth	Sprint	GTE	HM 5.0a
23	Residential	\$30.73	\$200000	\$1000000	\$100000	\$29.00
24	Business	\$30.73	Sxxxxx	\$10000X	\$100000	\$44.00

BellSouth and GTE utilize the same cost for residential and business NIDs, whereas Sprint and HM 5.0a appropriately reflect lower cost for residential NIDs. Why are Sprint's business NID costs so much higher? HM 5.0a costs are within the range of the ILEC costs.

Digital Loop Carrier: The comparisons of ILEC input values for digital loop carrier costs are:

Cost Type	Line Size	Default	BellSouth	Sprint	GTE	HM 5.0a
Fixed	25	\$19,204	\$ 10000000	\$ 200000	\$ 1000000	\$18,300
Fixed	673	\$96,859	\$ xxxxxxx	\$20000000	\$ xxxxxx	\$88,500
Per Line	0 - 192	\$94.00	\$1000000	\$200000	\$200000	\$100.00
Per Line 1	92 - 2016	\$89.11	Sxxxxx	Sxxxxx	\$xxxxx	\$ 77.50

Why does GTE input the same cost for low density and high density line cards? The ILEC's fixed costs for DLC RT locations are extremely high considering that these locations would be generally much smaller than 999 lines, the BCPM 3.1 threshold. In other words, the smaller size DLC RTs modeled by BCPM 3.1 should be housed predominantly in cabinets and not require more expensive huts or controlled environment vaults ("CEVs"). It appears that ILEC accountants have loaded DLC RT site input values reflecting the embedded network investment including huts and CEVs. There is no supporting documentation that would reflect appropriate OSP Engineering judgment.

Why are high density DLC system costs per line significantly less for Sprint and GTE than for BellSouth? The conclusion of the Staff of the Louisiana Public Service Commission was that the BCPM inappropriately modeled the expensive REUVG range extension line card for high density DLC systems (Louisiana Staff's Final Recommendation, Docket No. U-20833, March 27, 1998, Pg. 14). BellSouth has adopted the BCPM national default value that still includes the exorbitant REUVG range extension line cards; whereas, Sprint and GTE appear to have made the appropriate adjustment to the lower cost RUVG2 range extension line card.

HM 5.0a models sufficient costs for range extension line cards as required. For the CSAs requiring low density DLC Systems, HM 5.0a models the Advanced Fiber Systems UMC 1000. HM 5.0a has costed these systems with 100% utilization of UMC Remote Terminal Range Extension RST POTS Channel Units (R-EPOTS or simply EPOTS), even though the less expensive standard RPOTS card is sufficient for loops up to 12,000 feet from the DLC RT. Note that this is reflected in the HM 5.0a low density per line costs, which are higher than those of the ILECs.

For high density CSAs, HM 5.0a models the DSC Litespan 2000 DLC System. HM 5.0a incorporates costs for the DSC Litespan 2000 RPOTS channel unit for customers served by large DLC RT units to a distance of 17,600 feet. DSC recommends the use of the RUVG2 card for those customers exceeding 17,600 feet in distribution length. Since the maximum distribution length in limited to 18,000 feet in HM 5.0s, the number of customers requiring this card from a high density DLC system is de minimis.

To add some further perspective to the debate over range extension requirements and appropriate costs, BCPM 3.1 recommends range extension only for loops exceeding 13,600 feet from the DLC RT (BCPM 3.1 Description, Pg. 55). According to Mr. Brian Pitkin, an AT&T/MCI Witness in this proceeding, the HM 5.0a network designed fo. Florida has less than 0.05% of its loops exceeding 13,600 feet in distribution length from the DLC RT. Furthermore, most of these loops will be served by low density DLC systems, which have 100% range extension line cards in HM 5.0a. My conclusion is that HM 5.0a models more than sufficient costs for the required range extension line cards.

<u>Fiber/Copper Breakpoint</u>: The input value comparison for the fiber/copper breakpoint is:

Default	BellSouth	Sprint	GTE	HM 5.0a
12,000	12,000	12,000	12,000	9,000

The explanation for the 3,000 foot difference between BCPM 3.1 modeled by the ILECs and HM 5.0a is that BCPM 3.1 is measuring the longest total loop length in a CSA whereas HM 5.0a is measuring the feeder distance from the wire center to the Feeder Distribution Interface ("FDI"). The overall impact of this difference in modeling methodologies is not that significant. However, the latest dynamic copper versus fiber feeder selection methodology employed by the HM

5.0a (HM 5.0a Methodology, Sec. 4.5) is the one that replicates the process utilized by a real world OSP Engineer. 2 3

Plant Mix - Distribution: The input value comparisons for the percentage of distribution plant are:

Type of Plan	AND STATE OF THE PARTY OF THE P	Default	BellSouth	Sprint	GTE I	IM 5.0a
Underground	10000+	90.00%	x0000x%	xxxxxx/%	10000%	10.00%
Buried	0-5	60.00%	200000%	x0000x%	хооох%	75.00%
Aerial	10000+	0.00%	200000%	100000%	xxxxx/%	5,00%

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BellSouth has adopted the BCPM 3.1 national default input values for all of its plant mix inputs because it cannot ascertain from its own Florida-specific data the appropriate mix of plant in Florida. There are huge differences among the ILEC input values.

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The BCPM 3.1 national default input, which BellSouth has adopted, is 90% underground distribution plant in the 10000+ density zone. However, in this most urban, high density zone, most feeder cables go into buildings, and most of the distribution cables are either inside of or attached to buildings or placed in ducts provided by property owners. Thus, when BellSouth models 90% of the distribution plant as underground, it is adding substantial costs for underground conduit and manholes that are simply not required.

In sharp contrast, HM 5.0a has a more reasoned input value of 10% as a in the HAI Model Release 5.0a Inputs Portfolio Section 2.5. Also, 3 Sprint and GTE have even smaller input values of less than xx underground distribution plant in urban areas. Another example of flawed modeling logic is the fact that BellSouth, ag the BCPM national default inpa value, 'hows 0.00% for aerial plant in urban density zone. Moreover, Sprint has modeled xxxx% of its discables in the highest density zone as buried plant, which would prohibitive, if not impossible, to place in a congested urban area. Not these ILEC input values reflects sound OSP Engineering judgment. Plant Mix — Fiber Feeder: The input value comparisons for the percentage of the probability of the probability of the probability of the percentage of the percentag	
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prohibitive, if not impossible, to place in a congested urt an area. No these ILEC input values reflects sound OSP Engineering judgment. Plant Mix - Fiber Feeder: The input value comparisons for the percential fiber feeder plant are: Density BCPM 3.1 Type of Plant Zone Default BellS with Sprint GTE II Underground 0-5 10.00% xxx % xxxx% xxxx% 19	distribution
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Plant Mix - Fiber Feeder: The input value comparisons for the percent fiber feeder plant are: Density BCPM 3.1 Type of Plant Zone Default Bells with Sprint GTE 1 Underground 0-5 10.00% xxx % xxxx% xxxxx%	
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18 Underground 0 - 5 10,00% xxx % xxxx% xxxx% xxxx% 19	
19	HM 5.0a
	5,00%
20 GTE's high input value of xxxxxx for unde ground fiber feeder percentage.	100
	centage in

GTE's high input value of xxxxx% for unde ground fiber feeder percentage in the rural areas is simply ridiculous. Feeder routes in rural areas consist of only one fiber cable that will never need to be reinferced. Such situations clearly call for less costly buried or serial plant. No cost-er icient telephone company would incur the exorbitant cost of building a conduit and manhole system for xxxxx% of its fiber feeder in rural areas. This is an even more profound issue given that the

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1	BCPM 3.1 also models excessive fiber feeder to far too many DLC RT locations
2	(detailed elsewhere in this testimony). The impact of this egregious error in plant
3	mix is to greatly inflate GTE's rural costs, which results in an artificially high
4	Universal Service Fund.
5	
6	Investment Loop Cap: BCPM 3.1 employs an investment loop cap to allow for a
7	maximum individual loop investment based on either potential regulatory policy
8	or a wireless technology alternative (BCPM Methodology, Pg. 56). The default
,	value is \$10,000, which has been commonly accepted in numerous proceedings
,	by all parties. In this proceeding however, BellSouth has filed an Investment
ı	Loop Cap of only \$200000, without any explanation or supporting documentation.
1	
	BellSouth's In-Plant Loading Factors: BellSouth's engineering and labor costs
	are derived from BellSouth's in-plant loading factors that convert the material
	prices to an installed investment. Having analyzed BellSouth's in-plant loading
	factors in UNE Cost Dockets in eight states, including Florida, I believe that
	BellSouth's OSP loadings are not forward-looking and, instead, are utilized to
V	recover the costs of BellSouth's embedded methods of operation. I have several
	concerns with BellSouth's cost modeling methodology base on its use of top-
)	down loading factors.
	BellSouth applies a material loading factor to the inflated (Caldwell Direct, Pg. 9)
	direct material cost for copper and fiber cables in its OSP Field Reporting Codes.
	These material loading factors are modeled primarily to recover

telecommunications engineering and labor, vendor engineering and installation,

exempt (i.e., minor) material, and sales tax (Caldwell Direct, Pg. 11). BellSouth's methodology is to calculate a ratio of these associated expenses to its non-exempt (i.e., major) material investments for the year 1995, and then multiply this ratio by the inflated direct cable material cost.

I do not believe that BellSouth's ratio of material loading expenses to cable investment in 1995 should be considered least-cost, most-efficient, or forward-looking based on currently evailable technology. Mr. William Zarakas, BellSouth's Cost Modeling Witness in the UNE Cost Dockets, stated in his deposition in Louisiana that, "our assumption there would be that the cost of installing a pole in the future would basically be the same as it was in the past, because we see no change in the technology. And we did that for each individual factor or loading" (Zarakas Deposition, LA Docket U-22022/U-22093, 8/19/97, Pg. 110, with italics added for emphasis). However, the BCPM proponents contradict this statement by saying that "the Model does not rely upon embedded costs for facilities, functions or elements" (BCPM Methodology, Pg. 12).

Going beyond the fundamental methodology question and looking into the data provided on the material loading factors raises additional questions. These material loading factors for cable are huge contributors to the total loop investment. The following examples of these in-plant loadings will demonstrate how they are used to drive enormous underlying costs that make up BellSouth's input values to the BCPM 3.1:

- A prime example of the impact of these loadings can be found in the BellSouth's application of in-plant loading factors to SAIs. In BellSouth's costing of a 4200 pair indoor SAI, \$xxxxxx worth of material becomes \$xxxxx in installed costs. Thus, the in-plant loading factors account for 84% of the total costs.
- size or material costs. For example, BellSouth's placing input values for 24 gauge underground cable are \$xxxx for 100 pair and \$xxxxx for 2400 pair. Likewise, BellSouth's engineering input values for these same cables are \$xxxx and \$xxxx. It simply does not cost 22 times as mu⁻¹ to engineer or place a 2400 pair underground cable than a 100 pair underground cable. In reality, there is very little difference in the costs to engineer and place an underground copper cable based on its pair size.
- BeliSouth has double counted placing costs for buried copper and fiber cables because it zeroed out the splicing column instead of the placing column in its buried cable tables. Buried cable placement costs are appropriately included in the buried structure costs and should not be included in the cost of the buried cables themselves. Furthermore, based on a comparison of these additional buried placement costs to the splicing cost for aerial and underground cables, this double-counting does not seem to have been a simple matter of BellSouth putting its splicing costs in the placing costs column. Thus, BellSouth's installed buried cable costs are overstated.

1	There are a significantly higher supply costs for serial versus buried and								
2	underground copper cables of the same gauge and pair count as shown in								
3		the following table:							
4 5	float Float		Be	llSouth's	Copper Cabl	e Supply Costs			
6 7		Size/ Type 24 Gauge Cables				26 Gauge Cables			
9		Pairs	4200	900	25	4200	900	25	
10	AS	Aerial	\$200000	2000K	\$xxxx	\$200000	Sicocock	\$20000	
n .		Buried	\$100000	\$10000	\$xxxx	\$2000000	\$100000	\$xxxx	
12		UG	Sxxxxx	Sxxxx	\$xxxx	\$xxxx	Sxxxxx	\$10000	
13					all a				
14		The explanation cannot be that BellSouth includes terminal costs as a							
15		cable loading factor because there are no comparable supply costs for							
16	11.0	buried cables that also have terminals. Furthermore, comparable supply							
17		costs have been applied to the larger size cables, which rarely have							
18		terminals. Also, the explanation cannot be due to strand and pole line							
19		hardwar	re costs b	ecause tl	here are no c	omparable supp	ly costs	for aerial	
20		fiber cal	oles?						
21	BellSouth's costs for splicing aerial cables are unrealistically higher than								
22		splicing costs for underground cables of the same pair size and gauge.							
23		BellSouth's filing also shows that it is more costly to place 26 gauge							
24	I Berling and St.	underground cables than larger and heavier 24 gauge cables of the same							
25	0.00	pair size	L.						
26	•	BellSouth's engineering costs vary considerably between 24 and 26 gauge							

cables of the same pair size and type of plant.

 Furthermore, since fiber cable sheaths are the virtually the same regardless of fiber count, there is no rationale for BellSouth to model a much higher cost to place a fiber cable of higher fiber count. This discrepancy causes BellSouth's fiber cable placement costs for larger fiber cables to be overstated.

These are but a few examples where BellSouth has taken an illogical, top-down accounting approach to deriving input values that simply contradict real world OSP Engineering. BellSouth's filing shows a lack of OSP Engineering judgment in the determination or review its cable input values. Noteworthy is the observation that GTE and Sprint simply did not file the underlying costing details for their cable input values for analysis.

Drop Wires: Responses to Data Requests in this proceeding show that ILECs serve fewer than xxxx lines per residence. Yet, BCPM 3.1 assumes five-pair buried drops for both residences and businesses. While ILECs can certainly choose to invest in five-pair buried drops to every residence to preclude ever having to reinforce any of them, it does not seem reasonable that the Universal Service Fund should fully support the excessive spare capacity. Furthermore, the availability of two-channel DSL Systems provides a viable alternative for up to four subscriber lines on a two-pair buried drop for those residential customers who may someday require more than two lines. My recommendation, for the purpose of USF costing, is that all residence buried drops should be two pair.

Lack of Real World Variation in Input Values: The ILECs have filed in BCPM

3.1 input values in a manner that totally disregards clearly understood differences
by density zone. There is no appropriate variation in many of the ILEC input
values by density zone for such input values as pole structure sharing, aerial and
buried drop costs, or distribution fill factors. The following examples will further
illustrate the lack of OSP Engineering judgment in deriving ILEC input values:

- BellSouth utilizer the same costs per foot for conduit installation and cost per foot for buried cable !astallation for each trenching method: Trench and Backfill, Rocky Trench, Backhoe Trench and Hand Dig Trench. Sprint does likewise. Furthermore, BellSouth does not vary its buried cable trenching costs for differing terrain conditions of normal, soft rock and hard rock.
 - Sprint even uses the same base cost per foot installed for both conduit and cable placement for all methods, all soil types, and all density zones. Sprint's explanation is that "the contract does not differentiate among these activities" (Sprint's Response to AT&T's First Set of Interrogatories, Att. 24). As an OSP Engineer, I find that statement rather amazing. As an example of the impact of these simplified input values, For Hard Rock Feeder Conduit Trench and Backfill, BellSouth has filed a base cost per foot installed of \$xxxxx compared to Sprint's filing of \$xxxx, a difference of 3,209%. This contradicts real world OSP costing, because trench costs vary considerably by method, density zone and type of soil condition.

BCPM 3.1 contains extensive input value tables that have been developed to appropriately differentiate pole, buried cable and underground conduit placement costs by type of method, by density zone, and by soil conditions. The ILECs may rationalize that by populating these input tables with average values that "it all averages out." However, the abject failure of the ILECs to populate the cells of these input value tables with realistic costs raises considerable doubt regarding the validity of BCPM 3.1 output in any particular density zone.

Contractor costs) for placing conduit, trenching/plowing buried cable, and placing poles are based on an average of the ten existing BellSouth contracts with outside plant contractors in Florida" (Caldwell Direct, Pg. 9). ILECs use such "Master Contracts" to award day-to-day small-scale routine work and smaller-scale projects. However, in accordance with the "least-cost, most-efficient" assumptions of FCC Criterion 1, the appropriate contractor costs for these models should be lower than these averages to reflect only large-scale projects that are put out for competitive bids. This would produce more appropriate contractor costs consistent with the underlying "scorched node" assumption of these models.

The supposedly proper application of the "scorched node" assumption by BCPM 3.1 has been testified to by Dr. Staihr when he stated that, "the BCPM 3.1 model assumes that the entire network is built at a single point in time. This allows the service provider to realize certain 'efficiencies' and 'economies of scale' that could not have been realized historically' (Staihr Direct, Pg. 7 with halics added

1	for emphasis). The averaging of Master Contract costs by the ILECs to
2	determine input values to BCPM 3.1 does not conform with this very key
3	assumption.
4	
5	Summary Regarding Input Value Comparisons: These input value comparisons
6	are rather clear examples of the ILECs having the data but not seeming to know
7	how to identify and/or correctly apply their data as input values into a bottom-up,
8	least-cost model. It is also apparent that the ILEC OSP input values for many
9	items have been derived via accounting methods that have not been subjected to
0	a reasonableness check by OSP Engineers.
1	
2	Some BCPM witnesses have frankly admitted this. One stated that, "GTE does
3	not necessarily maintain data that can be easily translated into all of the input
4	values for the BCPM or HAI models" (Robinson Direct, NC Docket P-100, SUB
5	133b, 12/10/97, Pg. 5). Another ILEC witness has testified that "it is difficult
6	and time consuming to make all model default inputs company-specific.
7	Therefore, in producing costs using a cost proxy model, GTE must rely on many
8	default inputs" (Collins Direct, TX Docket 18515, 2/17/98, Pg. 4).
9	
0	It is indeed difficult for the ILECs to properly define and properly apply OSP
1	input values, even though they have volumes of state-specific cost data. On the
2	other hand, HM 5.0a employs national default input values developed by the HAI
3	OSP Engineering Team that work within the HM 5.0a to produce Florida-

specific outputs because:

	NULLED A STREET	PAYOR CONTROL OF THE PAYOR OF T
1		The labor content of OSP costs are reduced from national levels by a
2		Florida-specific factor of 68% (HM 5.0a IP, Sec 7.)
3		Placing costs are increased appropriately for difficult terrain, surface
4		texture, rock depth, rock hardness and water depth statistics that are
5		Florida-specific at the CBG level.
6		Customer and wire center locations are Florida-specific at the individual
7		location level.
8		Material costs for a least-cost model representing large ILECs should not
9		very significantly from nationwide material costs.
10		
11	Q.	HAS THE BCPM 3.1 ACHIEVED THE MOST REALISTICALLY
12		ATTAINABLE LEVEL OF ACCURACY FOR IDENTIFYING
13		CUSTOMER LOCATIONS?
14	A.	No. One of the primary goals of a superior local loop model is precise customer
15		location because this is the basis for accurate and cost-efficient network design.
16		The BCPM 1.0 and the Hatfield Model up through Release 4.0 located or
17	No. of	assigned customers at the CBG level. The BCPM 2.0 and now BCPM 3.1 use
18	15.3	housing and business line data at the CB level to better locate customers. On
19		average, there are about 30 CBs per CBG (BCPM 3.1 Description, Pg. 6).
20		However, the HM 5.0a is much more precise in locating customers through
21	W.,	latitude and longitude geocoding to six decimal places of the customer's
22		addresses (HM 5.0a Description, Sec. 5.4.3).
23		
24		The overall geocoding success rate for HM 5.0a, as calculated by Mr. Pitkin, was
25	48	70% of the Florida customers in this proceeding. It is higher in the urban areas

because	customer	locations	have	more	geographically	definite	addresses	and
lower in	rural areas	for the op	posite	e reaso	n.			

BCPM 3.1 does not actually locate any customers. In essence, it locates roads and then assumes that customers in the CB are uniformly distributed along those roads (Duffy-Deno Direct, Pg. 3). The testimonies of Messrs. Pitkin and Wood critique the BCPM 3.1 grid based cust other location methodology in detail.

Q. HOW WELL DOES THE BCPM 3.1 GROUP CUSTOMERS AS AN OSP ENGINEER WOULD IN DESIGNING A LOCAL LOOP NETWORK?

Not nearly as well as HM 5.0a. The BCPM 3.1 translates the CB level customer information into a microgrid that has its boundaries based on fixed latitude and longitude lines. As these microgrids are subsequently combined into ultimate grids, or CSAs, for the purpose of modeling the OSP network, their boundaries are still arbitrarily fixed. The BCPM 3.1 CSAs are then divided into four Distribution Area ("DA") quadrants.

One unintended consequence of this BCPM 3.1 modeling methodology is that some natural clusters of customers (e.g., a small town or subdivision) will be arbitrarily segmented into different DAs, CSAs or feeder routes in contradiction to the way that they would in reality be engineered. As an OSP Engineer, I thus take exception to the assertion that "BCPM designs a network the way actual telephone companies design networks" (Bowman Direct, Pg. 6). Furthermore, the current PCC Public Notice states that, "we consider a model platform that groups customers using a clustering approach because it appears to have

	advantages over gridding approaches (PCC Fubic Notice DA 98-1387, 8/1/98
2	Pg. 4).
3	
4	The BCPM 3.1 road-reduced DA (BCPM 3.1 Methodology, Pg. 49) is based or
5	two questionable assumptions:
6	1. That simply designating "a 500 foot buffer along each side of the roads
7	within the distribution quadrant" in all density zones will model the
8	correct size DA for distribution cable design. Because the arbitrariness of
9	this assumption can result in oversizing the DA, the BCPM 3.1 has had to
10	add a check to constrain the area of the DA so that it does not exceed the
11	actual area of the microgrid itself (BCPM 3.1 Methodology, Pg. 49,
12	Footnote 36).
13	2. The center of each quadrant's DA should be placed at the road centroid
14	of the quadrant because customers are uniformly distributed along the
15	roads. While this is an improvement over locating them at the centroid of
16	a CBG, in reality the road centroid could be in the middle of a lake, or
17	top of a mountain, or in any number of inaccessible places.
18	
19	On the other hand, HM 5.0a clusters its more precisely located customers like an
20	OSP Engineer would do in designing a local loop network (HM 5.0a Description,
21	Sec 5.5) based on:
22	 assuring a reasonable proximity of the customer locations to each other
13	(i.e., two miles),

1		• maximizing the copper distribution length up to 18,0 0 feet from the
2		DLC RT based on fully utilizing the capabilities of currently available
3		technology,
4		maximizing the customer line size of the DLC RT up to 1,800 lines based
5		on 90% utilization of a 2,016 line DLC system,
6		designing the shortest distance between customer clusters (however,
7		based on right angle routing to assure sufficient cable length), and
8		efficiently linking "outlier clusters" to main clusters.
9		
10		"One of the major challenges of building a proxy model is caustering customers in
11		a fashion that integrates engineering practices based on this CSA approach"
12		(BCPM 3.1 Methodology, Pg. 24). I certainly agree, and conclude that the HM
13		5.0a methodology of grouping customer locations into clusters based on OSP
14		Engineering principles is clearly superior to the BCPM 3.1 methodology of
15		assembling and dividing grids with fixed boundaries at various latitude and
16		longitude lines.
17		
18	Q.	DOES EITHER BCPM 3.1 OR HM 5.0a ACTUALLY DESIGN
19		DISTRIBUTION CABLES TO EACH AND EVERY CUSTOMER
20		LOCATION?
21	A.	No. Each model sizes and centers its DAs using different methodologies. Each
22		model then effectively lays out a grid of backbone and branch distribution cables
23		to serve the defined DAs areas from the defined DA centers. However, "[t]he
24		[BCPM 3.1] road-reduced area is not used to locate customers, but as a
25		modeling tool to determine likely cable distances required to serve c. stomers in

the distribution quadrant" (BCPM 3.1 Methodology, Pg. 20, with italics added for emphasis). Dr. Duffy-Deno helps to further clarify the BCPM 3.1 distribution cable modeling methodology by stating:

It is important to make clear that BCPM does not locate customers within the road-reduced areas. Estimated customer locations reside in the microgrids and are not "moved" to the road-reduced areas. Eather, the road-reduced area is used as a tool to estimate the amount of cable needed to serve the estimated customer locations that reside within the microgrids in populated distribution quads (Duffy-Deno Direct, Pg. 20, with italics added for emphasis).

Claims that either model "moves customers" at "comes up short" of reaching a particular customer location must be evaluated with the above understanding of what these two models do, and do not do, in regards to distribution cable modeling. For example, the BCPM 3.1 Model Methodology makes the following false and very misleading statement when it states that, "BCPM places cable to the actual customer locations, rather than moving the customers to some hypothetical distribution cable network" (BCPM 3.1 Methodology, Pg. 34, with italics added for emphasis). The truth is that neither model designs a distribution cable to each and every precise customer location, and neither model physically "moves customers."

The relevant issue then is to determine which model has the most accurate, most reasonable, least-cost, most-efficient methodology based on currently available technology for modeling sufficient distribution cable and structure investment to serve all of the customers located in the CSA/DA. The relevant evaluation criteria are:

· precisely locating customers,

1		 clustering customers into CSA/DAs in a manner consistent with that of an
2		OPS Engineer,
3		cost-effectively sizing the CSA/DAs,
4		realistically shaping the CSA/DAs,
5		determining the center of the CSA/DAs relative to the customer
6		locations,
7		determining the number of FDIs needed,
8		laying out the distribution cable grid in realistic and cost-efficient
9		configuration (e.g., rectangular lots),
10		sufficiently sizing the distribution cables to serve existing customers only
11		with appropriate administrative and maintenance spare capacity, and
12		 conforming to transmission requirements for loop resistance and loss.
13	V in	
14		The CSA/DA modeling methodology, assumptions and input values of HM 5.0a
15		are superior to those of BCPM 3.1 in regards to each of the above criterion.
16		
17	Q.	DOES THE BCPM 3.1 METHODOLOGY FOR MODELING CSAs
18		PRODUCE THE LEAST-COST, MOST-EFFICIENT, FORWARD-
19		LOOKING AND REASONABLE LOCAL LOOP MODEL BASED ON
20		CURRENTLY AVAILABLE TECHNOLOGY?
21	A.	Absolutely not. There are two major shortcomings in the BCPM 3.1
22		methodology for modeling CSAs that result in an overestimate of network costs
23	S	with an everying number of DLC PT locations. The BCDM 3.1 CSAs are:

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1	 too small geographically because they are designed far beneath the
2 5	maximum distribution cable distance reachable with currently available
3	technology, and
4	too small in terms of the number of customers served because the
5	maximum line threshold for an ultimate grid CSA is well below the
6	capacity of the DLC RT to serve customers in a CSA.
7	
8	There is a major difference between HM 5.0n and BCPM 3.1 regarding the
9	design of distribution cable lengths from the DLC RT. The ILEC proponents
10	incorrectly emphasize that BCPM 3.1 designs an outside plant network that
11	maximizes loop lengths for copper at 12,000 feet. For example, the BCPM 3.1
12	proponents make the following partially true statements (with italics added for
13	emphasis):
14	The engineering protocols most central to the design of this model
15	include a maximum loop length for each CSA that is less than 12,000
16	feet. To ensure attainment of this standard, the maximum ultimate grid
17	size is typically constrained to 1/25th of a degree of latitude and
18	longitude (BCPM 3.1 Description, Pg. 42).
19	
20	BCPM 3.1 constrains the size of the ultimate grids to be no larger than
21	approximately 12,000 feet by 14,000 feet. The rationale for this
22	constraint on the ultimate grid size is to limit copper loop lengths from
23	the DLC to the farthest customer to approximately 12,000 feet (Bowman
24	Direct, Pg. 4).
25	
26	By utilizing the DSC architecture and the maximum 12 Kft copper loop,
27	BCPM3 assures that the requirements for advanced telecommunications
28	service access for remote rural customers is reasonably comparable to the
29	enjoyed by urban customers, as mandated by the 1996 Act (Bowman
30	Direct, Exhibit RMB 3, Pg. 9).
31	The whole truth in regards to this matter is that BCPM 3.1 routinely designs
	The state of the s
33	copper loops in excess of 12,000 feet in length from the DLC RT because it adds
34	partial grids to the 12,000 x 14,000 foot ultimate grids. This is quite evident

1		from the following statements from the BCPM 3.1 Model Methodology itself
2		(with italics added for emphasis):
3		BCPM 3.1 - Tends to limit average copper loop lengths from the DLC to
4		the customer by generally limiting the maximum ultimate grid size to
5		12,000 feet by 14,000 feet, latitude and longitude. If copper cable
6		lengths from the DLC to the customer exceed 12,000 feet, the cable
7		gauge is reduced to 24 gauge cable and extended range plug-ins are
8		installed on loops extending beyond 13,600 feet. The ultimate grids are
9		designed such that copper loop lengths from the DLC to the customer are
10		unlikely to exceed 18,000 feet. (BCPM Description, Pg. 125).
11		
12		The design of the ultimate grids ensures that the maximum copper loop
13		length from the DLC site to the customer for any individual customer
14		should not exceed 18,000 feet. (BCPM 3.1 Description, Pg. 42)
15		
16		Thus, BCPM 3.1 clearly allows for copper loops of up to 18,000 feet, and
17		occasionally even further, from the DLC RT in its distribution network. It is an
18		indisputable fact that currently available DLC technology will support
19		distribution cable lengths up to 18,000 feet from the DLC RT. And, both HM
20		5.0a and BCPM 3.1 design loops to this limit.
21		
22		The telling difference is that HM 5.0a designs up to 18,000 foot copper loops
23		purposefully because it conforms to network transmission design standards and
24		produces a least-cost network design. On the other hand, BCPM 3.1 designs up
25		to 18,000 foot copper loops on an exception basis due to the arbitrarily fixed
26		dimensions of its grid structure.
27		
28	Q.	DOES BCPM 3.1 "ENSURE" SUPERIOR TRANSMISSION QUALITY
29		AND "ASSUREADVANCED TELECOMMUNICATIONS SERVICES"
	Este	

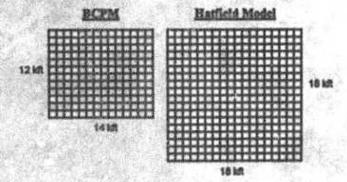
A. No. Not only has this been incorrectly stated by the ILEC proponents, but it
begs a question regarding the quality of service the proponents of BCPM 3.1
believe they would be providing to those customers who are actually modeled by
BCPM 3.1 to be more than 12,000 feet from the DLC RT.

BCPM 3.1 states as an objective the minimization of the distribution portion of the plant (BCPM 3.1 Methodology, Pg. 24), which is contrary to a least-cost, most-efficient network design. On the other hand, HM 5.0a seeks to maximize the distribution portion of the plant in order to minimize the number of costly DLC RT locations and the additional subfeeder cable and structure required to reach them. Sensitivity runs of HM 5.0s with the maximum distribution cable length constrained to 12,000 feet have actually produced higher loop costs. This is because the expected reductions in distribution cable investment are more than offset by increased investments in feeder cable and structure and additional DLC RT sites.

It is commonly understood in the local loop telecommunications industry that the ultimate minimization of distribution cable length is achieved by putting fiber feeder further into the network and closer to the customer in what is known as Fiber-to-the Curb ("FTTC") architecture. However, ILECs have not deployed FTTC on a wide scale basis for the simple reason that it is a very costly network architecture. This is even more true for the basic types of narrowband services to be supported by these networks, especially in rural areas.

OSP Engineering design guidelines typically state limits that assure quality transmission performance of the network. Both BCPM 3.1 and FM 5.0a agree that the maximum limit for copper distribution cable is 18,000 feet from the DLC RT. HM 5.0a very purposefully designs non-loaded copper distribution loops out to 18,000 feet from the DLC RT and models subsidiary remote terminals on T1 extensions to "outlier clusters" on copper cable far beyond 18,000 feet (HM 5.0a Description, Sec. 6.2 and HM 5.0a, IP, Sec. 2.8) because this is the least-cost, most-efficient network design utilizing currently available technology.

The following diagrams compare the reographical coverage of just the copper distribution cables for these two differing modeling assumptions:



Furthermore, the effective geographical area covered from a single DLC RT by the HM 5.0a is actually even more than 93% greater than the 12 Kft x 14 Kft CSA of the BCPM 3.1 (as illustrated above) when the road cables on the T1 extensions to "outlier clusters" are taken into consideration.

The conclusion from these diagrams is that the BCPM 3.1 must model many more CSAs to cover the same geographical area. The consequences of this aspect of the BCPM 3.1 modeling methodology are excessive fixed investments and recurring operations and maintenance cost for many more DLC RTs. These costly consequences are even more profound in the extensive rural geographical areas, which are the primary areas for support from the Universal Service Fund.

9 MAXIMUM NUMBER OF LINES SERVED IN EACH CSA TO 999
10 RESULT IN EXCESSIVE COSTS?

A. The second costly flaw in the CSA modeling methodology of BCPM 3.1 is that the maximum number of lines modeled for each CSA is simply too few based on the most economic application of currently available technology. The BCPM 3.1 preprocessing program limits ultimate grids (i.e., CSAs) to a maximum of 999 lines (BCPM 3.1 Description, Pg. 119).

A BCPM 3.1 witness states that "a Carrier Serving Area typically contains no more than 1,000 living units, while a Distribution Area typically contains 200 to 600 living units" (Bowman Direct, Pg. 6 with italics added for emphasis). This statement clearly shows that the BCPM 3.1 modeling methodology for sizing CSAs and DAs is based on the backward-looking inefficiencies of the embedded network in violation of the long-run, least-cost principles in the FCC guidelines for these models. This preprocessing assumption drives excessive costs into the BCPM 3.1 network because it models many more CSAs and with excessive fixed

1	investments and recurring operations and maintenance cost for many more DLC
2	RTs than does HM 5.0a.
3	
4	A "least-cost, most-efficient" network design based on "currently available
5	technology" would seek to maximize the utilization of the 1,800 line capability
6	(i.e., 90% of 2,016 line capacity) of the DLC RT serving a CSA without
7	exceeding the limitation of 18,000 feet of copper distribution cable. The BCPM
8	3.1 modelers do support a DLC RT site capable of 2,016 lines and do agree that
9	2,016 line DLC systems optimize the utilization of fiber feeder cables (BCPM 3.1
0	Description, Pg. 49). However, BCPM 3.1 has a maximum threshold of 999
1	lines per CSA, which is far below the "most-efficient" 2,016-line capacity of a
2	DLC RT site. Thus, the BCPM 3.1 modeling assumption of a 999 line maximum
3	CSA results in a network design that is certainly not "least-cost, most-efficient."
4	
5	All of the unnecessary additional DLC RT sites modeled by the BCPM 3.1 drive
6	excessive costs, because each one has incremental investment associated with:
7	site acquisition and preparation,
8	cabinetry (or perhaps huts and CEVs),
9	common equipment,
0	standard and emergency power source,
1	additional strands in the main fiber feeder cables,
2	subfeeder fiber cables with associated structure

and optical patch panel.

	있으로 가장하다 보고 있습니다. 그 사용한 중소를 보고 있는데 네트를 보고 TO SEE HEAD (1997년 1일 전략 1997년 1일 대표 HEAD HEAD HEAD HEAD HEAD HEAD HEAD HEAD
	According to Mr. Pitkin, the BCPM 3.1 networks modeled by the ILECs for
1	Florida in this proceeding include 223 CSAs that have only one customer
	location. Thus, BCPM 3.1 models each of these customer locations with the
	excerbitant costs of its own dedicated feeder fibers and its own dedicated DLC
	RT. The cost-effective HM 5.0a alternative for narrowband services is to model
	isolated individual and tiny groups of customers as "outlier clusters" on T1 road
	cables from a "main cluster" CSA. BCPM 3.1 is definitely not the "least-cost,
1	most-efficient" network model fc: isolated customer locations based on
	"currently available technology," and thus it inflates the loop cost basis for the
)	Universal Service Fund.
	Furthermore, there are greater operational expenses resulting from having a
	larger number of DLC RT sites (e.g., maintaining service during a power failure).
	Thus, the BCPM 3.1 does not use the forward-looking, least-cost, most-efficient
	engineering design for determining the number of CSAs and DAs, particularly
,	when compared to HM 5.0a.
	CSAs and DAs in a forward-looking model should be modeled based on:
1	clustering customer locations that are within reasonable proximity to one
,	another,
/	keeping natural clusters of customers together,
	utilizing the transmission design capabilities of currently available

- utilizing the transmission design capabilities of currently available technology, and
- allowing the cost-efficient utilization of the maximum size of IDLC system (2,016 lines) and FDI (7,200 pairs).

1		TO THE ACTION OF THE PROPERTY
2		The CSA/DA modeling methodology, assumptions and input values of HM 5.0a
3		are superior to those of BCPM 3.1 in regards to the above criteria.
4		
5	Q.	WHAT IS THE CARRIER SERVING AREA CONCEPT?
6	A	The CSA Concept is an OSP Engineering guideline that was formulated around
7		1980 and has been documented as a part of the record for this proceeding
8		(Bowman Direct, Exhibit RMB 3, Pg. 6). The source document for the CSA
9		design criteria used by the BCPM modelers is the Lucent Technologies (formerly
10		AT&T) Outside Plant Engineering Randbook (BCPM 3.1 Description, Pg. 18).
11		Incidentally, I was a member of the AT&T OSP organization that did the 1994
2		update of the handbook. The relevant parts of the CSA Concept for this
13	No.	proceeding are (with italics added for emphasis):
14		No loop can exceed 900 ohms of resistance, which generally equates to:
15		- 9,000 feet of 26 gauge copper cable or
16		- 12,000 feet of 24 gauge copper cable. [Note: cables with 26 gauge
17		copper conductors are smaller, less costly and have greater resistance
18		and loss than 24 gauge cables.]
19		Extended range line cards are available which extend the range of the
20		DLC remote terminal beyond 12,000 feet.
21	7	
22	Q.	DOES BCPM 3.1 CONFORM TO THE CSA CONCEPT?
23	A	No. The ILEC proponents have incorrectly implied that BCPM 3.1 is designed
24	0.0	around and conforms to the CSA Concept as evidenced by the following
25		statements (with italics added for emphasis):

CSA engineering guidelines do not recommend copper loop lengths greater than 12,000 feet ... The 26/24 gauging used in the distribution takes into account the industry standard 900 ohm Carrier Scring Area 3 (CSA) design criteria of no more than 12,000 feet of copper regardless of gauge. (BCPM Description, Pg. 18) 6 These engineering constraint conform to the specifications of a 7 forward-looking, efficient network design. That efficient network is based on the designation of a 'arrier Serving Area, A Carrier Serving 9 Area is a standard telephone design concept that consists of a geographic 10 area that can be served by a single digital loop carrier (DLC) site. 11 (Bowman Direct, Pg. 4) 12 13 The Carrier Serving Area (CSA) concept was specifically designed to 14 allow for access to advance 1 lecommunications services within the 15 context of an efficient local exchange distribution network. (Bowman 16 Direct, Exhibit RMB 3, Pg. 7) 17 18 Yet, the truth is that the BCPM 3.1 goes not conform to the "constraints" of the 19 CSA Concept as evidenced by the following enlightening statements from the 20 ILEC testimonies (with italics added for emphasis): 21 BCPM 3.1 uses 24 gauge cable only when the copper loop from the DLC 22 to the furthest customer exceeds 1 ,100 feet. This distance is based on 23 complying with engineering standards for the maximum dB loss 24 permissible to maintain adequate se vice quality. An extended range line 25 card is included for loops that extend beyond 13,600 feet from the DLC 26 to the customer. This also is an engineering standard, but is a user 27 adjustable input in the model. (Bowman Direct, Pg. 5) 28 29 BCPM 3.1 uses 26/24 gauge cable in distribution. 12,000 ft of 26 gauge 30 copper has resistance value of 999.6 ohms (83.3.0hms per thousand feet 31 @ 68deg.), well within the 1500 ohm supervisory limit of today's digital 32 switches. The 26/24 gauging used in the distribution takes into account 33 the industry standard 900 ohm Carrier Serving Area (CSA) design criteria 34 of no more than 12,000 feet of copper regardless of gauge. In the few 35 cases where BCPM 3.1 finds grid Quadrants with copper loops greater 36 than 12,000 and up to 18,000 feet in the distribution network, it uses the 37 Extended CSA (ECSA) design with 24 gauge cable throughout that 38 quadrant. Extended range line cards are used to serve all customers in 39 the distribution area (Grid quadrant) for distribution distances over 40 13,600 feet. (BCPM 3.1 Methodology, Pg. 18 - 19) 41 42 Within a grid, if the length of copper from the DLC to the last lot in a 43 quadrant is less than 11,100 feet, 26 gauge cable is used to serve all 44 customers. In those circumstances where the distance from the DLC to 45

the last lot is greater than 11,100 feet, 24 gauge wire is used in oll cables

Where distances exceed 13,600 feet, to and within the guadrant. extended range plug-ins are installed on lines that exceed 13,600 feet. (BCPM 3.1 Methodology, Pg. 54 - 55) Thus, BCPM 3.1 clearly violates the CSA Concept in the following four ways: BCPM 3.1 models 26 gauge cable out to 11,100 feet from the DLC RT, which clearly exceeds the 9,000 foot limit on 26 gauge cable of the CSA Concept. The 9,000 foot CSA Concept limit on 26 gauge cable is based on cable loss, not 900 ohms of resistance. Therefore, BCPM 3.1 would appear to be modeling customers that are located 9,000 to 11,100 feet from the DLC RT with excessive loss and thus poor quality service. There is no BCPM 3.1 supporting documentation (like the HAI 5.0a Inputs Portfolio) that explains how or why the BCPM developers changed the CSA Concept maximum loop distance for 26 gauge distribution cable from the DLC RT from 9,000 feet to 11,100 feet. BCPM 3.1 models loops between 12,000 and 13,600 feet from the DLC RT without range extension line cards in violation of the CSA Concept requirement that all loops in excess of 12,000 feet should have range extension line cards. Do these particular BCPM 3.1 customers have substandard quality service and/or impeded access to advanced services on a reasonably comparable basis? Again, there is no BCPM 3.1 supporting documentation for this deviation from the CSA Concept. BCPM 3.1 actually models the Extended (or Expanded) CSA Concept,

- which supports the design of loops out to 18,000 feet from the DLC RT.
 - BCPM 3.1 allows the distance at which the extended range line cards are applied to be a user adjustable input, instead of conforming to the CSA

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Concept requirement of 12,000 feet or any particular standard. The statement is made that the 13,600 foot distance to begin employing range extension cards "also is an engineering standard," but there is no supporting documentation for this deviation from the CSA Concept.

6 Q. DOES BCPM 3.1 MODEL DISTRIBUTION CABLE REALISTICALLY 7 AND COST-EFFECTIVELY?

No. When a single lot in a DA exceeds 11,100 feet distance from the DLC RT, BCPM 3.1 then designs all of the distribution cables to and within the DA from 26 gauge to more costly 24 gauge conductor cables. This is a grossly oversimplified and needlessly costly modeling assumption. In the real world, OSP Engineers do not simply increase the gauge of every single cable in a DA to satisfy the transmission requirements of the longest loop when only a few customers exceed the limit for 26 gauge cables. In the real world of OSP Engineering, the larger distribution cables closer to the DLC RT would remain 26 gauge, and the smaller cables closer to the customer would be 24 gauge such that the combined 26/24 gauge loop resistance and loss would be within transmission limits.

In comparison, HM 5.0a models 24 gauge copper conductors for cables less than 400 pairs and 26 gauge conductors for cables 400 pairs and larger (HM 5.0a IP, 2.3.2). Since distribution cable loops more than 9,000 feet from a DLC RT of no greater than 1,800 line capacity will invariably be less than 400 pairs, HM 5.0a does ratisfy the CSA Concept constraint on 26 gauge cable distance.

1		Furthermore, HM 5.0a does this in a "least-cost" manner that is consistent with
2	2.8	real world OSP Engineering practice.
3		
4	Q.	WHAT CSA DESIGN STANDARD DOES HM 5.0a EMPLOY?
5	A.	The more cost-efficient design employed by HM 5.0a conforms to OSP
6		transmission requirements for acceptable loop loss of 8.5 dB from the DLC RT
7		based on currently available technology. OSP Engineering guidelines are always
8		subject to "engineering judgment", and currently available technology continually
9		drives the evolution of such guidelines. For example, when the CSA design
10		concept was originally formulated around 1980, ISDN was then limited to less
11		than 12,000 feet on copper. Such service is now routinely guaranteed to any
12	79	subscriber served on copper cable within 18,000 feet of their serving wire center.
13		
14	100	The realistic and cost-effective gauging of the copper distribution cables by HM
15		5.0a has been described above. For its Integrated DLC systems, HM 5.0a uses
16		two types:
17		Low density DLC system applications are based on the Advanced Fiber
18		Communications UMC 1000A.
19		. High density DLC system applications are based on the DSC
20		Communications Litespan-2000.
21		
22		The line cards costed for each of these DLC systems allows for the utilization of
23		extended range line cards as required to support distribution cable lengths out to
24	Endo	18,000 feet from the DLC RT. The low density DLC system, which is more
		The state of the s

likely to be deployed in rural areas, actually uses the cost for UMC Remote

1	Terminal Extended Range RST POTS Channel Units (R-EPOTS) for all channel
2	units. The high density DLC system uses its "regular" R-POTS channel unit to
3	meet transmission requirements for loops up to 17,600 feet from the DLC RT
4	(Exhibit (JWW-5)). Should there be any instances of customers between
5	17,600 to 18,000 feet from a high density DLC system, the Litespan 2000
6	RUVG2 card is utilized.
7	
8	In the USF Hearings in Louisiana (Docket 13-20883), the Staff's Final
9	Recommendation dated April 3, 1998, resorted on page 15 (with italics added
0	for emphasis) that, "Dr. Bowman did conce to that Hatfield's [i.e., HAI 5.0a's]
1	use of 18,000 feet for copper cable beyond the DLC remote terminal would
2	provide quality telecommunications services, as long as the proper electronics
3	were installed in those instances." HM 5.0a does indeed use the proper
4	electronics, which are the range extension line cards described above.
5	
6	Moreover, the Louisiana Staff also found (pages 17 - 18) that "the BCPM
7	overstates cost because the input for extended line range cards are for the more
8	expensive REUVG card." For comparison, the RUVG2 card, used by HM 5.0a
9	for any customers located between 17,600 and 18,000 feet from a high density
0	DLC RT, is approximately 25% more than the standard RPOTS card. However,
1	the REUVG card used by BCPM 3.1 for customers between 13,600 and 18,000
2	feet is twice as expensive as the standard RPOTS card.
3	
4 Q.	WHAT IS THE COST COMPARISON BETWEEN MODEL RUNS
5	BASED ON 12,000-FOOT GRIDS VERSUS 18,000-FOOT GRIDS?

1	A.	The ILEC proponents claim that "the 12,000-foot grids result in lower per-line
2		loop cost than the 18,000-foot grids." (Bowman Direct, Pg. 5) This claim is not
3		surprising, nor particularly persuasive, given that:
4		BCPM 3.1 defaults to all 24 gauge cable when any customer in a DA is
5		beyond 11,100 feet from the DLC RT.
6		BCPM 3.1 greatly exaggerates the cost of range extension line cards by
7		utilizing the very expensive REUVG card beyond 13,600 feet when the
8	lo.t.	RPOTS card, at half the cost, is good out to 17,600 feet. At the very
9		least, BCPM 3.1 should be costing the RUVG2 card, which is only 25%
10		more expensive than the standard RPOTS card.
11		
12		Sensitivity runs of HM 5.0a with the maximum distribution cable length
13		constrained to 12,000 feet have actually produced higher loop costs. This is
14		because the expected reductions in distribution cable investment are more than
15		offset by increased investments in feeder cable and structure and additional DLC
16		RT sites.
17		
18	Q.	DO YOU HAVE OTHER TRANSMISSION CONCERNS REGARDING
19		THE BCPM 3.17
20	A.	Yes. There is no explicit test in BCPM 3.1 to ensure that customers do not
21		exceed 18,000 feet in loop length from the DLC RT. The BCPM 3.1 Model
22	100	Methodology states that "ultimate grids are designed such that loop lengths from
23		the DLC to the customer are unlikely to exceed 18,000 feet" (BCPM 3.1
24		Description, Pg. 125, with italics added for emphasis). However, BCPM 3.1

does indeed model customers more than 18,000 feet from the DLC RT, and Mr.

Pitkin has determined that BellSouth, GTE and Sprint have all modeled loops
exceeding 18,000 feet from the DLC RT in this proceeding. By comparison, the
HM 5.0a explicitly tests to ensure that no copper loops exceed the 18,000 feet
limit from the DLC RT.

The reason that this is important is that copper loops in excess of 18,000 feet require load coils to meet transmission requirements for quality voice grade service. However, load coils are unacceptable in these models because they would inhibit the provisioning of advanced services per FCC Criterion No. 1. On the other hand, non-loaded copper loops longer than 18,000 feet from the DLC RT would violate network design standards and result in poor quality service to those customers.

Q. DO YOU HAVE A CONCERN WITH THE BCPM 3.1 MODELING METHODOLOGY THAT PLACES FIBER FEEDER CABLE TO LARGE CAPACITY GRIDS BY DEFAULT?

Yes. The BCPM 3.1 deploys DLC systems for voice grade services rather than analog copper facilities when demand within a particular grid "exceeds the user designated capacity of the largest copper distribution cable" (BCPM 3.1 Methodology, Pg. 19). I have serious engineering and economic concerns regarding this modeling assumption because no consideration is given to the distance of the particular grid from the wire center. Consequently, BCPM 3.1 will une conomically deploy fiber and DLC to a large apartment/office building directly across the street from the wire center.

This is not an acceptable assumption for a "least-cost" local loop network. The reason is that there are insufficient savings realized in the substitution of fiber feeder cable for copper feeder cable to offset the additional cost of the DLC electronics for loops generally less than 12,000 feet in total length from the wire center, which is the BCPM 3.1 copper to fiber breakpoint. So, this particular BCPM 3.1 modeling assumption is an unreasonable cost adder to the network and thus unreasonably increases the cost of an average loop.

The justification offered by the BCPM proponents is that this modeling assumption "avoids the typical duct congestion in urban rights of way where utilities and urban services vie for below ground space" (BCPM 3.1 Methodology, Pg. 19). That is a backward-looking justification based on the ILEC's embedded network and is inconsistent with the "long-run, forward-looking cost" economic assumptions applicable to these models per FCC Criterion 3. In other words, in accordance with the "scorched node" assumption, a conduit system would need to be installed anyway with sufficient 4-inch ducts to handle whatever copper and fiber feeder cables might be required. So, BCPM3.1's uneconomic substitution of one fiber cable with substantial DLC system costs instead of placing two, more economical copper cables, saves only the minimal cost of one duct and certainly avoids no congestion.

HM 5.0a, on the other hand, performs a life cycle cost analysis of fiber versus copper feeder on the route to determine if fiber with DLC is the more economical alternative (HM 5.0a Description, Sec. 6.3.5). Thus, the HM 5.0a model

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1		methodology again more realistically represents the decision process of an OSP
2		Engineer in designing a feeder route.
3		
5	Q.	DOES BCPM 3.1 SYSTEMATICALLY OVERSTATE THE AMOUNT OF
6		DISTRIBUTION CABLE REQUIRED BECAUSE IT MODELS SQUARE
7		LOTS7
8	A.	Yes: The BCPM 3.1 developers continue to assert the assumption that customer
9		locations should be modeled as square lots. This is not only unrealistic; it results
0		in the modeling of excessive distribution cable and associated structure
1		investment. HM 5.0a makes a much more realistic assumption that lots are
2		rectangular based on observations of a number of zoning maps and field
3		experience.
4		
5		Furthermore, as will be detailed below, city and subdivision planners know that
6	San,	any given geographical area can be served with fewer streets, sidewalks, sewers,
7		streetlights, etc. if the lots are rectangular rather than square. Since utilities
8		typically follow the streets or rear lot lines, it follows that rectangular lot layouts
9		are also more efficient and less costly for the power, water, cable and
0		telecommunications utilities to serve their customers as illustrated by the
		diagrams in Exhibit (JWW-6).
2		
3		The square lot assumption that has been perpetuated in BCPM 3.1 results in
•		more distribution cable than would be necessary with rectangular lots. Let's
5	7	consider two generic examples. Assume there are 256 households within a DA.

The square DA in the BCPM 3.1 will have 256 square lots, or 16 by 16 as can be seen below.

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1	*	1	-)	4)	*	7	4	>	+	>	-)	4	

Each square lot represents a customer location with a drop going to it (dotted line). The thicker lines represent the distribution cable needed to reach each customer location. For simplicity sake let's assume the area of each lot is one. This means each side of a lot has a length and a width of one. Thus, from the diagram one can see that the amount of distribution cable needed by the BCPM 3.1 in this example is enough to run past 126 lots.

Now consider the next diagram, which roughly represents the way rectangular customer locations could be distributed within the same DA. The total DA remains the same; however, in order to fit this into a square serving area that is somewhat similar, I have taken the liberty of using 288 lots to avoid rounding

problems. Again, to be conservative, we will assume that the HAI Model will design the distribution cable to reach all 288 lots in this DA, and that none are empty. Refer to the following figure to see how the HAI Model designs the distribution plant.

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Pecall the BCPM 3.1 DA was 256 lots. The area of each lot in BCPM 3.1 was

1. The area of each lot in the HAI Model is the distribution area divided by the
number of lots, 256/288 = 8/9. Since the length of a lot is twice its width in HM

5.0a, the width must be 2/3. You can see that this is correct by multiplying the
width times twice the width, 2/3*(2*2/3) = 8/9. Now all we need to do is to add
up the cable used by the HAI Model, which equals 101.33 to serve 288
rectangular lots. Now, compare this number to the BCPM 3.1 design, which
needed cable for a distance of 126 to serve only 256 square lots.

The amount of distribution cable needed for the same distribution area as modeled by the HM 5.0a is 19.58% less than that modeled by the BCPM 3.1 — a significant difference that also reflects the reality of city and subdivision planning. BCPM 3.1 consistently models excessive distribution cable length to serve a modeled area of customers occupying lots of identical area.

Q. DOES BCPM 3.1 HAVE TO LIMIT THE AMOUNT OF CABLE THAT CAN BE MODELED WITHIN A DISTRIBUTION QUADRANT?

Yes. As an indication of just how seriously BCPM 3.1 overstates total distribution cable length, there is a check that had to be built into the BCPM 3.1 that "constrains the total length of cables (including the backbone, branch, vertical and horizontal connecting cables) within a distribution quadrant to not exceed the length of the road network in that distribution quadrant (BCPM 3.1 Methodology, Pg. 54). According to Mr. Pitkin, over half of the distribution quadrant's have to invoke this constraint in order to limit the amount of excessive distribution cable otherwise modeled by BCPM 3.1 based on the square lot assumption.

This difference in modeling assumptions between the HAI Model and the BCPM is farther accentuated when the distance from the center of the street to the front of the lot is taken into consideration. The 1 x 2 rectangular lots of the HAI Model and the 1 x 1 square lots of the BCPM include the entire are: being modeled and thus go to the center of the street or road. When the distance from the center of the road to the actual front of the lot, which is typically 25 - 30 feet,

is subtracted, the HAI Model still has a rectangular lot where the depth is greater than its width. However, the BCPM is now left with a rectangular lot where the width is greater than the depth with the distribution cables having to traverse the longer width. This further elucidates just how unrealistic it is for BCPM 3.1 to model square lots.

Q. DOES BCPM 3.1 OVERSIZE DISTRIBUTION CABLES?

- 8 A. Yes. In regards to distribution cable sizing, the BCPM 3.1 Model Methodology
 9 states the following:
 - "Branch cables are sized to the number of pairs for housing units and business locations. This calculation takes the number of housing units times pairs per housing unit and the greater of actual business pairs per location or business locations times pairs per location." (BCPM 3.1 Methodology, Pg. 55)
 - "The Model default inputs assume two pairs for a resident unit and six pairs for a business unit." (BCPM 3.1 Methodology, Pg. 56)

These "default minimums" in BCPM 3.1 are based on a guideline from the outdated practice on Detailed Distribution Area Planning (DDAP) for a minimum of two pairs per ultimate living unit and five pairs per small business, which may be modified based on the judgment of the engineer (BSP 901-350-250, Pg. 20-21). However, technological advances have superseded these "minimum" values. For example, two-channel DSL Systems have become a viable means of rapidly providing additional lines for loops up to 18,000 feet. A primary advantage of incorporating these systems into local loop distribution planning for additional lines is that the investment in two-channel DSL Systems is only needed if, when, and for as long as the additional customer demand is there.

There is excessive cost in oversizing copper distribution cables based on historically low utilization rates that can no longer be justified. The ILECs like to raise a big scare over the time, expense and disruption of digging up streets and yards to place a second distribution cable or drop to serve additional customer demand. With the widespread use of two-channel DSL Systems, the addition of a second cable is no longer the primary alternative. Thus, the ILECs can no longer justify exorbitant levels of spare cable pairs by using their historically low average distribution cables utilization, typically in the 40% range (Dickerson Direct, Pg. 11). Indee 4, GTE's deployment practice prescribes distribution cable fills in excess of xxxx% based on the planned selective utilization of two-channel DSL Systems. ILEC cable utilization rates should be rising from their historical levels.

In regards to these historically embedded distribution cable fills, BellSouth testifies that, "These [distribution cable sizing] factors are designed to produce a fill representative of BellSouth's projection of actual fill, based on experience over time, for Florida' (Caldwell Direct, Pg. 12 with italics added for emphasis). However, in response to AT&T's First Set of Interrogatories, Item No. 26, which tried to ascertain the historical utilization of distribution cables, BellSouth responded that, "No record is kept of distribution cable status on statewide basis." Thus, BellSouth could not produce any distribution cable "actual fill, based on experience over time, for Florida", and BellSouth's interrogatory response appears to contradict Ms. Caldwell's testimony.

(cable pairs in service) divided by total pairs available as tracked in the Custom

From other proceedings that I have participated in, I know that BellSouth has proceeding. However, I recommend that the BCPM 3.1 input value for BellSouth, reduced its distribution cable sizing guidelines for pairs per house, or living unit. distribution pairs per residential housing unit for the ILECs should be reduced to GTE and Sprint have filed xxx pairs per housing unit in this

per business location should be reduced from x to 3 Therefore, I recommend that the input value for the minimum number of pairs too high given that the actual mamber of lines are modeled for large businesses Sprint all have filed input values of xxx pairs per business location. This is much BCPM 3.1 takes the greater of actual business pairs per location or business business location is definitely less than 3.0. However, BellSouth, GTE and locations times the input value for business pairs per location. Based on data from several other dockets, I know that the number of business lines per small

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	700

BCPM 3.1 utilizes distribution cable sizing factors to increase the demand numbers that are already based on the <u>ultimate</u> pair requirements. In addition, there is one more step of rounding up to the next discrete cable size, which is necessary, but in the case of the BCPM 3.1 is based on already overinflated pair requirements as detailed above. Interestingly, the ILECs have begun to realize the excess that has been built into the BCPM 3.1 distribution cable sizing methodology and have more appropriately filed distribution cable sizing factors ranging from 98.0% to 100.0% in this proceeding. Nevertheless, the resulting distribution cable fills are still aimed at maintaining historical embedded utilization levels rather than "least-cost, most-efficient, forward-looking" cable fills based on "currently available technology."

CABLE UTILIZATION RATES BEING MODELED ARE TOO LOW?

16 A. Yes. I believe that ILEC historical copper utilization rates, the basis upon which
17 ILEC copper cable fills for BCPM 3.1 have been developed, can be shown to be
18 low based on empirical evidence. This is because an excessive defective pair rate
19 can be attributed in large part to excessive spare capacity, which reduces the
20 incentive to clear defective copper cable pairs.

The cost of a loop is being estimated by the ILECs in this proceeding to be approximately \$xxxxx per loop. The ILEC cost to clear a defective pair is \$xx - \$xxx per pair (ILEC Responses to AT&T's First Set of Interrogatories, Item No. 33). Thus, there should be ample economic incentive to clear defective cable

1	pairs and keep the cable pair inventory in high working order, unless there was an
2	excessive surplus of spare cable pairs.
3	
4	An acceptable defective copper pair rate in the industry is 2% - 3%. AT&T's
5	First Set of Interrogatories, Item No. 25 requested data on defective pair rates.
6	GTE's defective pair rate was reported to be within industry standards.
7	Purthermore, there were practi as and data produced that indicate that GTE
8	makes clearing defective pairs and effectively managing the defective pair rate a
9	priority.
10	
11	However, EeliSouth's defective pair rate is more than four times the industry
12	standard, and growing. Furthermore, in response to AT&T's First Set of
13	Interrogatories, Item No. 33, Bell South responded that, "No data is kept on the
14	quantity and percentage of copper pairs and fiber stands cleared."
15	
16	Also interesting is Sprint's response that, "Without waiving its objection, Sprint
17	states that the information does not exist." However, in response to AT&T's
18	First Request for Production of Document, Item No. 12, Sprint furnished an
19	extensive practice on its "Defective Cable Identification and Prioritization
20	Process" that appeared to include a statistical reporting system
21	
22	It is difficult for me to believe that an ILEC would not keep track of and try to
23	effectively manage its defective pair rate. Unless, however, that ILEC had such a
24	large surplus of spare cable pairs that it was actually uneconomical to expend
25	resources to reclaim even excessive numbers of defective pairs.

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Q.	DOES	THE	EMPLOYMENT	OF	THE	TIGER	ROAD	NETWORK	BY
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A. Not really. This is another modeling idea that sounds good at first, but when its implementation in BCPM 3.1 is investigated reveals a number of concerns and uncovers just how shallow the perceived benefits really are.

BCPM 3.1 relies on a straigntforward promise that households and business typically reside near roads (Duffy-Deno Direct, Pg. 16). However, it is the converse of this premise upon which the BCPM 3.1 really operates. The actual modeling premise being that the presence of a road ensures the uniform distribution of households and businesses along that road. As stated in the BCPM Model Methodology, "[c]ustomers, assigned to microgrids within distribution quadrants, are subsequently placed uniformly in Road Reduced Areas" (BCPM 3.1 Methodology, Pg. 122 with italics added for emphasis). This is simply not the best premise for modeling customer locations.

Indeed, there are many roads that have no households or businesses, and many roads along which customers are not uniformly distributed. In rural areas, customers tend to be more concentrated at the end of their road, which may traverse several grids without any customer locations, before it gets to them. These models are supposed to design a network to serve all of the customer locations, not all of the roads.

However, if a model accurately locates the customers, then it can be reasonably assumed that roads exist to reach those customers without having to identify particular roads from a separate database. This is the modeling premise of HM 5.0a.

The BCPM 3.1 Model Methodology states another simple fact that "rights of way for provisioning teles are most frequently found along roadways" (BCPM 3.1 Methodology, Pg. 6). Once again, if a model such as HM 5.0a locates customers, then it can be reasonably assumed that roads exist with rights of way for cables to reach those customer location. BCPM 3.1 thus has no claim to any superiority in the matter of rights of way. Furthermore, BCPM 3.1 makes absolutely no use of the road network information to determine pathways that engineers would use to place facilities.

On the contrary, the need for road right of way actually indicts another assumption in the BCPM 3.1 in that it is necessary to model sufficient route distance to allow for the meandering of the road network. Typically, this is done in HM 5.0a and the BCPM 3.1 via right angle, or rectilinear, routing of the cables. However, in BCPM 3.1 the split, or angled, feeder route appears to take a direct route towards "the population centroid of the entire feeder quadrant" (BCPM Methodology, Pg. 43). If no allowance is made for conversion of "airline" route to "road" route distances, as is done in HM 5.0a, then the BCPM 3.1 will not model sufficient investment for the split feeder route to reach its destination.

Any perceived added value of applying the road network to locate customers below the CB level is suspect. As an example of how the road network is used to allocate customers from CBs to microgrids, the BCPM 3.1 Model Methodology (Pg. 30) uses an illustration of 20 miles of roads traversing a microgrid. However, a microgrid is only 1,500 feet by 1,700 feet and could not realistically contain a even minuscule fraction of 20 miles of roads.

8 Q. DO YOU HAVE CONCERNS WITH THE OSP SENSITIVITY

ANALYSIS CAPABILITY OF THE BCPM 3.1?

- 10 A. Yes. The BCPM 3.1 has two major, rather arbitrary, OSP network design
 11 assumptions which cannot be readily subjected to sensitivity analysis because they
 12 are only user adjustable via the cumbersome and time consuming one day
 13 preprocessing application. These two assumptions are:
 - 1. The preprocessor has a maximum threshold of 999 lines (or households plus business lines) for determining if microgrids are re-aggregating to form CSAs. As detailed earlier in my testimony, I believe that the BCPM 3.1 models far too many DLC RT sites because the number of lines modeled in its CSAs and DAs is well below capacity. It is very difficult to run a sensitivity analysis in the BCPM 3.1 to verify this and develop a more cost-efficient alternative threshold because it is only changeable in the one day preprocessing cycle.
 - 2. The preprocessing routine has a fixed distance of 10,000 feet from every wire center as the appropriate distance where it is economical and feasible to split a feeder route. This is also the fixed distance where the spacing of lateral subfeeder routes suddenly goes from roughly every 1,600 feet to roughly

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1		every 13,000 feet (BCPM 3.1 Methodology, Pg. 46). The BCPM Model
2		Methodology rationale is "that within 10,000 feet [of the wire center],
3		customers are generally located within the perimeter of a town and that the
4		town has some sort of gridded street complex" (BCPM 3.1 Methodology,
5		Pg. 43).
6		
7		BCPM 3.1 then applies this questionable fixed assumption to every feeder
8		route in every wire center in every ecographical area in Florida. Furthermore,
9		there is no economic justification offered by the BCPM modelers that 10,000
10		feet is the realistic or least-cost, most-efficient distance for any feeder route,
11		much less for every feeder route in every wire center. This number needs to
12		be more easily adjustable for sensitivity testing. Furthermore, this assumption
13		should be variable (perhaps in a look-up table) that is based on the size of the
14		wire center and/or the density of customers along the feeder route.
15		
16	VI.	OTHER CRITICISMS REGARDING THE HAI MODEL
17	Q.	WOULD YOU PLEASE RESPOND TO ANY OTHER BCPM 3.1
18		CLAIMS OR HM 5.0a CRITICISMS REGARDING OSP?
19	A.	Yes. There are six.
20		
21		1. The BCPM 3.1 alleges superiority in sizing distribution cables based on
22		ultimate pairs per house instead of current households. There is no
23		shortcoming of HM 5.0A in this regard. The distribution cable fill factors in
24		HM 5.0a are more than adequate to serve the number of empty houses that

may exceed the number of households in an area, even though this is not a

requirement of the mode. Furthermore, the BCPM 3.1's modeling of distribution cables sized specifically to serve empty houses has been rejected (Staff's Final Recommendation, LA Docket U-20833, 3/27/98, Pg. 16).

2. The BCPM 3.1 Model Methodology still continues show the Hatfield Model Release 4.0 ("HM 4.0") methodology for distribution road cables in rural areas. This methodology has been totally superseded by the clustering algorithms of HM 5.0a. Furthermore, BCPM 3.1 continues to misrepresent the road cables of HM 4.0 as two cables running in a straight line from the center to opposite corners of the quadrant (BCPM 3.1 Methodology, App. A, Ex. 2). What HM 4.0 did with road cables was model road cable investment based on twice the rectilinear distance from the centroid to the corner of the occupied area of the quadrant. The relevant points being that there could be more than two cables within the modeled total length and the total distance modeled is significantly understated in the BCPM 3.1 illustration.

3. The BCPM proponents are also still making outdated and totally irrelevant assertions in regards to 85% of the rural customers modeled as being in towns and served via a distribution cable grid on maximum three acre lots in HM 4.0 (BCPM 3.1 Methodology, Pg. 24). For many months, HM 5.0a has modeled main and outlier clusters in a way that is more precise and representative of the way that local loop networks are designed. (A description of the OSP enhancements of HM 5.0a is covered in the direct testimony that I filed in this proceeding.)

4. The BCPM proponents cite a study of five states performed for the FCC that
concludes that 12,000-foot grids result in lower per-line loop costs than
18,000-foot grids (Bowman Direct, Pg. 5). I have little doubt regarding the
reported results given the longer loop cost inefficiencies inherent in the
BCPM 3.1. Specifically, the previously documented excessive costs of the
REUVG range extension card for all loops in excess of 13,600 feet in length
and the use of 24 gauge cable only for the entire CSA when the copper loop
to any customer in the CSA exceed: 11,100 feet. If this study had been
conducted using the HM 5.0a assumptions of less costly RUVG2 range
extension card and 24 gauge for cables less than 400 pairs, the results would
no doubt have been markedly different.

5. In regards to the sharing of buried cable trenching, it has been written that, "Such proposals [for sharing buried cable trenches in the future] conveniently overlook the fact that GTE's network is in place today....With respect to buried cable, these parties [i.e., AT&T and MCI] apparently believe that GTE will dig up its existing cable in order to immediately rebury in a shared trench" (Tucek Direct, Pg. 8). These tatements reflect a serious lack of understanding of the "scorched node" a sumption that is to be applied to these models. As stated very clearly by mother ILEC witness, "the BCPM 3.1 model assumes that the entire networ is built at a single point in time" (Staihr Direct, Pg. 7).

 The BCPM sponsors have unilaterally declared that "data transmission over a 28.8 Kbps modern" constitutes "access to advanced services" for the purpose of implementing FCC Criterion 1 (Bo wman Direct, Exhibit RMB 3, Pg. 2). The FCC Criterion actually states that, "[t]he loop design incorporated into a forward-looking economic cost study or model should not impede the provision of advanced services. For example, loading coils should not be used because they impede the provision of advanced services." (FCC Report and Order, May 8, 1997, Paragraph 250, Criterion 1). While the FCC does not specifically define "advanced services." its use of the words "not impede" and the example of "load coils," which would actually preclude the transmission of digital signals, does provide ample guidance in this matter.

My understanding of "impeding advanced services" in regards to the issue raised in Exhibit RMB 3 would be to deny modem access to rural customers, which the existing ILEC networks certainly do today. The attempt by the BCPM sponsors to declare 28.8 Kbps modem access as the standard for advanced services (as opposed to say 14.4 Kbps or 56 Kbps) is blatantly self-serving and misleading.

Proponents of BCPM have noted a Bellcore Technical Memorandum TM25704 as support for why the Hatfield Model will not support modem speeds
of 28.8 Kbps (Bowman Direct, Exhibit RMB 3, Pg. 10). This TM is not a
transmission standard and was specifically developed as a worst-case
scenario. Mr. John Donovan, the leader of the HAI OSP Engineering Team
has reviewed this TM, talked with its author and makes the following
observations, which I support:

A close reading of the TM indicates exactly what I have been saying regarding the inexactness of analog modem performance. Worthy of note is page 12 of that TM, which tabulates the actual experiments performed. The purpose of the tests was not to validate the transmission characteristics of either the BCPM or Hatfield Models, but to examine worst-case scenarios. In fact the worst case is so bad, that none of the loops used in experiment meet tariff requirements, since all loops exceed the 8.5 dB maximum for POTS loops. Since other empirical data is not readily available on short notice, however, we can make certain observations about the data. First of all, I personally spoke with Rick Perez, the Bellcore author. He told me that the worst-case test loops had many gauge changes and many splices. This would cause high reflection losses in each splice, and is the most likely cause of the abnormal dB losses at the standard test frequency of 1004 Hz.

Test loop number 1 was 18,000 feet with no bridge tap. It supported 24.0 kbps on a 28.8 modem, but had a horrendous loss of 14.3 dB, 5.8 dB above the maximum allowed by tariff. Since each 3dB attenuation halves the signal strength, this means that the signal on this loop was at about ¼ or 25% of the strength it should be at 8.5 dB. The next longest loop was test loop number 6 which was 17,500 feet with 1,000 feet of bridge tap. Yet this loop still had 12.8 dB of loss, or about 3/8ths of the signal strength the Hatfield Model would provide at 8.5 dB. Still, this loop readily supported 26.4 kbps with a 28.8 kbps modem.

As one would surmise from the Bellcore Technical Memorandum, determining predicted modem speeds is not an exact science. The HAI OSP Engineering Team has estimated that the HM 5.0a will support minimum modem speeds of 21 - 24 Kbps for any loop, and 28.8 Kbps, or better, for most loops. I believe that this level of performance more than complies with a reasonable interpretation of the FCC requirement to provide access to "advanced telecommunications and

information services that are reasonably comparable to those services provided in urban areas."

The conclusion of this exhibit stated that, "[b]y utilizing the DSC architecture and the maximum 12 Kft copper loop, BCPM3 assures that the requirements for advanced telecommunications service access for remote rural customers is reasonably comparable to that enjoyed by urban customers, as mandated by the 1996 Act" (Bowman Direct, Exhibit RMB 3, Pg. 9, with italics added for emphasis). In this testimony it has been shown that the BCPM 3.1 clearly designs copper loops out to 18 Kft and even beyond. Not only is the conclusion statement above rather questionable, but any undue concern raised by Exhibit RMB 3 regarding modem speed is applicable to BCPM 3.1.

VIL SUMMARY

15 Q. WOULD YOU PLEASE SUMMARIZE YOUR TESTIMONY?

I recommend that the Commission adopt the HM 5.0a as the most appropriate model for determining the local loop cost of basic local exchange service in Florida. In Release 3.1, the BCPM modelers have taken steps to evolve their model by incorporating several of the concepts of the Hetfield Model plus some additional ideas to improve the accuracy and cost efficiency of the local loop model. Most of the evolutionary changes in this particular release of the BCPM have the initial conceptual appearance of being cost improvements. However, upon investigation, I have found that in the implementation of these ideas the BCPM 3.1 still falls well short of being the least-cost, most-efficient, forward-

looking and reasonable local loop cost model based on currently available technology, particularly in comparison to the HAI Model Release 5.0a.

3

Second, I recommend that many of the OSP input values proposed by BellSouth,

GTE and Sprint be rejected, since these inputs contain numerous fallacies and are

not the least-cost, most-efficient and forward-looking set of input values that are

required in this proceeding. The HAI Model 5.0a and the input values proposed

by AT&T and MCI for OSP are more appropriate to use in this proceeding for

determining the cost of the local loop network in Florida in order to size the

Universal Service Fund.

11

- 12 Q. DOES THIS CONCLUDE YOUR TESTIMONY?
- 13 A. Yes.

The second secon

	1		STATE OF THE	Input V				
REPUT VALUE DESCRIPTION	Dunnity Zone	Bolikosth - Delesif (1/14/38)	BCPM 3.1 SelfScyth-FL (B/3/92)	BOPM 3.1 Sprint-FL (9/9/98)	80766 2.1 978-PL (8/8/98)	Florido (9/0/00)		
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MPUT VALUE DESCRIPTION	Density Zero	BCPN 9.1 BellSouth - Dolests (1/16/06)	BOPM 9.1 Bullbouth-FL (879/98)	BOPM 9.1 Sprint-FL (8/9/99)	BGPM 3.1 6TB-FL (8/8/98)	(04 9.0a Piorida (8/9/90)
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		Section Con-		SEP LESS	The second	N.
ANS THE PROPERTY OF THE PARTY O	1200		30.575	10 miles 15 miles	100	1
	900				-	N N
	400		3.0		-	- 6
	1 100	100000	0.5			N.
7-9-4-10 (1915) (1916)	100		THE COLUMN			
1000			100	-		1 8
	80	4.000		12 05 14 14	275727 - 33	
	18	\$20000 A	15			
	A STATE OF THE PARTY OF THE PAR				-	
eble - Copper - Aerial - 20 Geuze (TOTAL)	4300	37.18 3 34.01		-	-	0 20
	2000	\$ 73,26	2		100	8 23/
	2400	5 26.26	272			0 20/
	2100	\$ 20.86				\$ 25, \$ 25, \$ 26, \$ 16, \$ 10, \$ 10, \$ 10, \$ 10,
	1200	5 18.28 8 12.76				6 16
	600	9.88	7	207.2		0 10,
SECTION OF THE PROPERTY OF	600			PERMITTENANCES		9 7
	400	Unidential / I			-	1 1
	100	1.0		10 30 00 00	1235	
	100	\$ 2.00		100000000000000000000000000000000000000	ESTANDAMENT.	4 2
CALL SEMILE DUG					Valle of	1 1
	A CONTRACTOR DESIGNATION OF	\$ 2.50 \$ 2.50		-		0 0
	12	2.50	D.C. BERT	119 100 100	rillous in the Co	0.
shis - Conger - Burled - 24 Gouge	4200	1 No. 10 P.	DIDC THE SOUTH THE	2000	100	
Orletorial Cost	2000	\$ 36,55				
The state of the s	3600	54,79		-	-	
	2100	22,28 27,82				22320
	1200	神野				B
Charles States and Charles	1203	17.21				
The same of the sa	800	\$ 9,60 \$ 9,00 \$ 7,20	-	-	12.00	302.70
	400	7.20		-		1000

		BOPSE 3.1		The second		Sauce C
SPUT VALUE DESCRIPTION	Dendty Zona	Buildouth - Defeats [1/14/98]	Bellbeuth-FL (8/2/98)	BOPM S.1 Sprine-PL (B/S/98)	809M 9,1 GTE-PL (6/9/66)	Florida (B/3/96)
tructure Cost - Asriel S'clas) - Distribu	600000000000			W870		6 4176
COOLER COST - Name of Costs - Control	200	5 4.45	96 3 T 49 2 1	770		N
The same of the same of the same of	100	3.04	(2) (20 to 1)		7 2 3 5	N
	50	150				
THE RESERVE TO SERVE WAS IN THE RESE	15 TO		E R. DE COUNTY	1		
	18	5 1.97			7.7	N
	4200	The second of the second	Control Control			N N
able - Copper - Buried - 24 Gauge	3600			The Course of the Party	HP 01 - 374	1
Sur ply Cost)	5000	1	SCHOOL STREET	2500-1	7	t t
	2400	\$ 1.11 position	Acceptance of the Assessment		3.545,675	N
Device the light of the control of t	3000 3400 2100 1800	100000	100 F 10 TO 1	1003		N
	1800		Cupinghilform	STARTED ITS	100	N
TO AN AREA THE TAPE TO MINISTER FOR	1,200	10000 10000 10000 10000				N
The United States	800	\$ 1000 mm.				1
The state of the s	400	10000000000000000000000000000000000000	Table Society	- 10345.Co. 16	100	Columbia
	#00 #00	1000000	A 1000 N 2			h
	200	S/HERO	Marie Cons	THE SALE OF	1000	N N
A CONTRACTOR OF THE PARTY OF TH	100	S AUTO TO A	Real Property	14.	1000	N
Same in the same	50	\$1040	THE STREET			
CALLES THE STATE OF THE STATE O	25	100 miles	STATE OF THE REAL PROPERTY.		-	
	THE TABLE OF THE LOSS	S. P.G. Phillips	2000 St. L. W. A. S.	100		-
CONTRACTOR OF THE SECOND	Annual Property	1	1000		-	
able - Corper - Buried - 24 George	4350	I STREET	STATE OF STATE	SEANOR TO SE	1000	
Tel	3000			177		
	3000	200	-	-	1	
	2100		PRETENTINE	2007 1177 5		
	1300		California de la Califo	0.75.000		
	1200	BASINE VINE	500000000000000000000000000000000000000	Policy I	IN THE	
TO HOME AND WASHINGTON	800	A PERSONAL PROPERTY.		400 m		
	800	\$100 miles	(1) - Y-0-1	SERVE	T. Parett	
	400		- CONT.			2.77
	100	A Vocal Comme	ALL CONTRACTOR		-	
AND AND SUBSTITUTE STREET, STR	200	1	1421 127 221	-	1	
	100				THAT I	
	ERRORS DELINE	100	7777	- 77 S.V		
A Parity of the	100000	A CONTRACT OF	Sec. 15. (8)		The second	1
	ASSOCIATION AND HER	15	STATE OF STREET	PERSONAL PROPERTY.	1 - 3	
eble - Copper - Buried - 24 Gauge	4200	A COLUMN			- U	
able - Copper - Reried - 24 George (Planing)	2800				-	
THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAME	3000	15	-		-	
ASSESSMENT OF THE PROPERTY OF	2400	Section 1	-		-	32.7
	2100	1	-		2.35	
(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	1800		-	-		
	900	1				
PROBLEM TO STREET WAS ARRESTED AND ADDRESS.	600	18		ALC: YES		
	400					1
	300	1			- E-V	
A. 中、中国基本区域。 新用原序,加强	200 100	-	WW - 3		-	
Appendix and a contract	100				-	
	60	-			-	1
AND SHIP WAS INCOME.	A CONTRACT OF THE PARTY OF THE	18		-		
	12		1		Land St.	
able - Cooper - By Hed - 24 Gauge	4300					
Referred	4 00 9 00 9 00 9 00 2400 3 1 09 1 1 00	THE RESERVE OF THE PARTY OF THE			THE REAL PROPERTY.	1
COMPANIE VISE IN THE CO.	3000			2000	1 5 19/5	
	2400			-	-	
	2100	1 1000	-		-	1
	1,500		-	-	-	
	100	A CASES OF MESS		35.000,000,000		
THE RELIEF SET TO SERVICE MANAGEMENT	600		100	Zersen Zers		
	THE RESERVE THE PERSON NAMED IN	A STREET, SALE	J. C.			
	400		Part State Comment	PERSONAL PROPERTY.	The The Item	
	300		-			
	100 100	1	18,281			-
	909 909 300 100					
		-				
	100					
	PROPERTY STATES					ACCURATION OF THE
	PROPERTY STATES					
	PERMITS AND A WARRANT					

INPUT VALUE DESCRIPTION	Dunstry Zone	BOPSES,1 SubSough - Defenit [1/96/00]	SCPM 3.1 Belliouth-FL (8.76/96)	BOPM S.1 dprint-FL stra/pt)	BOPM S.1 GTS-FL (M/S/B0)	9436 6,0a Florida (8/5/941)
Structure Cost - Aerial (Poles) - Distribu	COCOPYCHOCOS			-		4 41%
	1800	第三日日 (1000年)	8022 LSW-110	1990		N N
WE EIGHT STEEL	1 200		marriage to	100000	-	N N
	900 600	\$ \$1750E55 15		Section 1		- 14
THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT	400			DESIGNATION OF THE PARTY OF THE	700 703 700	N N
11.000 12.700 12.000 14.000 14.000	300	Contract of		March Control	Sec. 25.	N
Aug September	200		方出を 京都とい	AND RELIGIOUS	120	N N
C1000 - W 1000 - 1000	100				-	N
	- 13	100000000000	Water Reserve	Control of the last	1.530	1 3
	DESCRIPTION OF THE PERSONS	1200 PRINTS	SERVICE OF STREET	W 1.	5000	N.
The second second	医髓体检查 下期的结构	基本的企业的工作证明	TO A STATE OF THE PARTY OF THE		200	N N
able - Cooper - Buried - 24 Geuge	4200	5 50.37	BOWLES IN		2000	\$ 30,
(TOTAL)	2600	\$ 36.58 \$ 34.70	BV6 10		-	\$ 27/ \$ 23/
1948 1 (2) (p. 1948 2798 2798)	2400	3 32.36				1 20,
		5 27.52			25 10,000	9 18,
	1900	\$ 25.57	Schill Posts	10 7 mg	RELEVED BY	9 16,
TO SERVICE STATE OF THE SERVIC	1200	E SCHOOL 17-15	THE PERSON	CENTER STORY		10 12
1. SPRITA CHI (12 PERSON)	900 900	13.80	500 OF 1000	-	Contract policy	9 10,
		9,08 7,20			77.10 ap. 8	1 1
	400 500	6.26		SEC. 10.00	100000	1 0 6.
	200	4.46	200 Tel. 5 - 5	5-> Value (58m)		4 4
	100	1 1/2	MARIE VE TOUR	STORES N	# 1 - 20 E(I)	4
The state of the s	60		The second of	S. S. Sancia		1 1
	BELLEVI BURNE	2.06	SERVICE SERVIC	Cold Cold	Andrew Comment	1 1
200	12	\$ 2.05	100	A SECURITY OF THE SECURITY OF	-	8 O.
	6	\$ 5,67				N N
able - Copper - Buried - 28 Gauge (Motoriel)	4200 3800	30,18	W. 1509.219	100000		
(Motarial)	3000	1 200	PARKATO TRYONS	personal contract of	200	N 1
	2400	\$ 26.76		Property and		N. A.
79	2400 2100	\$ 22.60	SHOW FOR	1000000		
E 164 6 11 20 12 12 12 12 12 12 12 12 12 12 12 12 12	188	\$ 20.46			-	
マローアーク デリア R がいかき	1200	8 13.20		-	-	
	600	\$ 10.76 \$ 7.27		-	-	
	400	5 5.57		1.000		
	300	8 4,30		7 D. W.	WELL 12 12	
	200	3.49				1 1
Comments of the second	100	2.02			-	-
	50	2.16 1.85	-	-	-	
	25 18	3 1,93	700000	1000		1
100 100 100 100 100 100 100 100 100 100	12	1.63		15 MILE 1		
sbis - Copper - Burled - 20 Gauge	4200	1	20 Mary 20 10 10 10 10 10 10 10 10 10 10 10 10 10	1000		1
(Supply Cart)	3600	A BENNY	THE STATE OF			
	1 3000	1	30.15		-	
Company of the Compan	2400			-	-	-
	2100	\$ 100 mm	-	-	1	
DISERSE III SE VIII	1300		1911	2 4 10		1 .
	1800 1200 600 600 400 400	1 :	有等			
	600				4.	1
	400		1	-	-	1
	300		-	-	1	
	100	15 .	-	-		1
	80	\$100.00				
THE RESIDENCE OF	SELECTED CROSS STREET, SEC.	14	Sept Manager	In Contract		2 3 3 3 3
Complete States	DESCRIPTION OF THE PERSON	1000	SAME AND LOCAL	Stall Service	-	1
A CONTRACT OF THE PROPERTY OF	(I) 1113. PHI TO RESERVE	120,000,000,000	100000			
skie - Cooper - Burled - 28 Gauge (Tex)	2000		-	100000	-	1
11 mg	3000			Page 1		-
THE RESERVE OF THE PROPERTY OF THE PERSON NAMED OF THE PERSON NAME	2400	3 (17) A	DE NACE TO	W. HODE Z.O.	1	
	2100	\$	STRUKEN - P.	Service Control	ALC: NAME OF	
	1900		100			
	1300		-	-	-	
	600		-	10000000		
	400		35/2005/7			
	300		100			
				NSATE A	-	
	100	1		-	-	
			-	-	-	

MPUT VALUE DESORPTION	Country Steen	BCPM 3.1 BellBouts - Defeat [1/30/06]	BOPM S.1 BullSouth-FL (S/S/RB)	BOPM S.1 Sprint-FL (6/2/99)	BCPM 2.1 GYE-FL (R/2/96)	NA 6.00 Florida (3/9/00)
Structure Cost - Aerial (Poles) - Distribut	00000100005	\$ 790,68		MINESCO IN	GP (14-13)	8 4176
1. A CHEV To 2017 SHOPE MINER CHAIN	4300	SHIP STATE	PURE STATE	THE WORK		94/ 94/
Ceble - Copper - Surled - 26 Geogra (Plesing)	5000	Maria Sales		2 414	-	N/
N. TORIN		MONTH PROPERTY.	Extendion.			1 14
	2400	Constitution of	F 40-8	200		N/
3 S C TO HE LEVEL TO A SHEET WAS	2100			-	-	N/
			5 (See Sec. 1971)			94/
	900	100 miles (100 miles (V -20-77			N/
	900 800	5	1000			N/
	400 100 100	-	- Commercial Commercia	-		N/
			-	-		1 10
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	102	100000000000000000000000000000000000000	# Y 30 X Marie 10 1			
	60	Chille or the con-				N/
	26		-			100 M
		3				N
Cable - Copper - Buried - 26 Grane	ACCORDING TO A PARTY OF THE PAR		CAN PERSONS	TO LOUIS	C 25 ST	N/
Cable - Copper - Buried - 26 Gayge (Sphore)	CONTRACTOR STATEMENT OF THE PARTY OF THE PAR			A LONG THE	51 (312)	N/
		Marie Str	TO WAR	77.750	**************************************	
	1400 1100		-			
	1233	The same	State State			N/
は は は の は の は の の の の の の の の の の の の の		West Committee			1260	N/
	600 600 400 500 200	Maria Salar	SCHOOL STATE	der de la constant de	1000	N.
	800			-	-	N/
	200	1	Park William	Control of the		N/
3000 NO-REPERENTAL	200			075-0755		14/
	100		10	205970555777		N
	50		-	Carl Talle		No.
	18	10000		F 7 F80 (475)	W. T.	1 1
TO THE RESIDENCE	CONTRACTOR OF THE PARTY.	2010/00/10/10	DESIGNED TO	RESERVED TO SERVED	D175110 6	
ebis - Copper - Barles - 28 Geogr	4200	MONTH OF STREET	200			1 16
(Engineering)	1800	P.M. (144)				N/
	3000					1 94/
	2100	A SECTION OF	SESENDER			N/
	1000		The second			14
E-Zalandin, Salesting Bally						N/
			-	-	-	N.
The second second second second second	400	\$				N/
CONTRACTOR OF THE CONTRACTOR	300					34,
100 A	200	E MINISTER CONTROL	-	-		- N
	80			10/07/05	1000	96/
MALE AND INCOME.	28	35 Calc. 100		Sealing of Sealing	T 100 100 100	960
	10				1 10 10 10	N.
AL CONTRACTOR	4304	viu.			-	8 20,1
able - Copper - Burled - 26 Gauge (TOTAL)	420d 3500	\$ 30.30				16 27.6
	2000	23.16 20.20 28.16				0 23.5
A STATE OF THE STA	2000 2102 2102 2102 200 200 200 200 200	110		700 E 11 E 10 E	STATE VALUE	
	2100	3 30			-	18.7
	1200	10.48 19.30 10.70		-		0 16.4
Accessed years and a second	500	\$ 10,70				9 10,4
	800	7.27	-		-	1 1/
	200	3 3/67			777777	11
	200	5.40	N. C.	2 22 212	COLUMN TWE	4 4/
ACCUSED OF THE PARTY OF THE PAR	100	\$ 2.52		BINGS IN	Per Contract	9 2
THE RESERVE OF THE PARTY OF THE	69	5,07 4,15 5,40 2,13 2,18 1,18 1,18 1,18 1,18 1,18 1,18 1,18	21/12		Name of the last	1
	19	1 103	702		THE SECTION	0.0
	CONTROL SAMPLE		Salved Sk	100 100 100	THE RESERVE	9 0.0
ntile - Copper - Underground - 24 Gas (Material)	6220	44.48	Barrier Com	- Marie	DEPOSITIVO	No. of the last
(Meterial)	360	1 44		-		1
	3000	1—20		-	21.00	N. N.
	2100	\$ 973b			10000	N
	1200	34.27				N4 N6 N6 N6 N6 N6 N6 N6 N6 N6 N6 N6 N6 N6
	1200	\$ 18,72 \$ 13,62			-	1
	800 800	5 9.84 5 9.84			-	N

INPUT VALUE DESCRIPTION	Danelty Zons	BOPM 8.1 Sullibooth - Defends \$1/15/8/00	SCPM S.1 SubSouth-FL (B/S/95)	BOF94 3.1 Sprint PL (8/0/94)	BOPM 9.1 GTE-FL (8/9/99)	Florida Florida (8/9/98)
Structure Cost - Aerial (Poles) - Distribu	05052450001	8 702 E	Automobile)	STATE STATE	200 1210-2	9 413
	300	\$ 5,26	diselection.	SHEDWILL	277	
Section of the sectio	100	1 22		200		
		\$ 2.16				
	Commission of the Published Street, or other Designation or o	1.50	NAME OF TAXABLE PARTY.	2007	The second	
THE RESERVE OF THE PARTY OF THE		1 13	3 S. C. S. S. S.	With the second		200
	DANGERS / AMERICA	1,39	SEPTEMBER OF STREET	Statement Committee	Miles Inches	1.1670971.16
ebie - Copper - Underground - 24 Geo		ACCUMENTATION		PERSONAL PROPERTY.	Barrier States	
(thoply Cost)		\$	200874TEHES	CONTRACTOR PORT		30000
- AT 18 ST 1			ORSEDIC ALCOHOL		No Hart Co	
		101242011	THE RESERVE OF THE PERSON NAMED IN		-	
	1100	Children Co.	THE RESERVE		-	2007 II
	1,500	56. Str. 9	Professional Control	V		200
THE RESERVE OF THE PERSON OF T	named comment of the comment of the	SELVE CO.	CHIEF CONTROL	115 St. 3 Factor	10000	10.009
		Section 1	No. of the last of	331000 and 4-2	TO USE OF S	100000
	400	PRODUCTION OF	EFERSION SHIPLES			
15 TO 15	300	THE WHITE SE	STATE LABOR	44.44 MISS.		7000
	100	Parallel San	500000000000000000000000000000000000000		THE REAL PROPERTY.	
100000000000000000000000000000000000000	11/2	A CONTRACTOR OF THE PARTY OF TH	-	Search Search		701,000
	COLUMN TO SERVICE STREET		-		100	3,200,77
			-	-		2000
		-		-		
dia Committe Delimental and Pro-	4300	THE RESERVE AND ADDRESS OF THE PARTY OF THE	-	-		-
tile - Copper - Underground - 24 Ges Text		100000	CONTRACTOR OF STREET	State of the state		
		100000000000000000000000000000000000000	MEDIE COL	Market Control	3.02 V.S.	
7/8/10/10/15/10/8/19/19	3400	A THE REST	Register 7 birth	STATE OF THE PARTY OF	100	100
	2100	MINISTER STATE	SERVING THE RES		SEE SEE SEE	STREET, STREET,
	1800	Section 1997	SOCIETY CHES	CONTRACTOR OF THE PARTY OF	Annual Control	M30671550
2.13加三级表现《美观众诗》的问题	1200	DESCRIPTION AND DESCRIPTION OF THE PERSON NAMED IN COLUMN TWO PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO PERSON NAMED I	11505-117	THE REAL PROPERTY.		
		Married Inc.	15 (15 m)			
CALSE DESIGNATION OF THE SECOND	400	3700 14000	STREET, S. S.			
THE STATE OF THE S	Secretarian Property and personnel	10 . (Call Party 12	(F) 48 (F) 18 (F)	-		
2.5	200	120000000000000000000000000000000000000	100			
	100	100000000000000000000000000000000000000		-	1550	100
	100		Section 1		- T- 12 H	
**************************************	26	3	-	-		
2. 数据证据5. 3. WWW. 100000000000000000000000000000000	机震震器 T 取得的基	CONTRACT ON	200	CHERO.	10000	
	MATERIAL PROPERTY AND ADDRESS OF THE PARTY AND	The second second	NEW TOTAL			
bis - Copper - Underground - 24 flex	4200		EVAL 3	Water and the same	1000	
Recing)			Charles of Par	The Transfer		
	3000	SERVICE AND				
	3100				-	-
	2160 1800					
STATE OF THE PARTY		■ 155% (1 × 7)	The same of the sa	-		
	- 60	STREET, STREET, STREET,	100		California de la calenta	
	600	WEEKS - 55	No.		100000000000000000000000000000000000000	
	400	10000	SEC 18 11	7.1		1
	300					
	200	THE RESERVE AND PARTY AND PARTY.				
	100		232			
	- 10	Parameter Commence			-	
		-	Control of the last	77500 7780	-	
	COLUMN DESCRIPTION OF THE PERSON OF THE PERS					
ole - Copper - Underground - 24 Gau	4200			C. 100C. C. C. C.		
tile - Copper - Underground - 24 Geo.		100000000000000000000000000000000000000	15000000	TO CASO IS		
	\$000	\$1000 CO.	E-22 - 17 - 18			
	3403		Brut our	27	1	10 miles
	2100			-		
	1800	1		-		
	POD T	100 TO 10		-		
	A STATE OF THE PARTY OF THE PAR		-		No. of All Park	
The second secon	400	100 (F) - 11).	72		Water Street	
TO SEE STATE OF THE PARTY OF TH	300	100000000000000000000000000000000000000	種類であります	312 N 2 N 1	Town I compare	-
The second state of the second second	300	A STATE OF THE PARTY OF THE PAR	SWSTEELS	5-31-5-17-10-B	CONTRACTOR	1
THE STREET STREET, STR	100		SUNTERED STATE	(CIN)	77.7	2 -0.20
	- 8	1000	M	100		
		All Control of the		-	-	N
		2001001		-	100	N N
dde - Copper - Underground - St Gay		Contractor of the Contract of		***************************************	-	
Engineerings	\$5000		-		7 7 7	
	2000	the state of the s		Commence of the Commence of th		

SHPUT VALUE DESCRIPTION	Density Essa	Boliseyth - Default [1/16/00]	BOPSE S.1 Bolifouth-FL (9/3/96)	BOPSI D.1 Sprice-PL (M/9JBB)	BOPM 9.1 GTE-FL (G/G/68)	HMA 6.0 Florida (B/G/BG
Structure Cost - Aerial (Poles) - Distribu	000004000005	780,80	ARCHIO CONTRACTOR	ACT OF SHIP OF SHIP	400-14125	8 412
	2100	A DESCRIPTION	Sautistic Committee	THE SASTES.	BULCHER	
-CH545-4	1800	Telephone and		STREET, STATES	S. E. D	797 4 7
75775170		A PROPERTY AND A SECOND	SCHOOL STREET		Description of	
A 100 miles		1	STREET, DELT.	4-11-097-0	-	
	400		-		-	
	400	DESCRIPTION OF THE PROPERTY OF	Control of the Control			
					-	100
		Supplement of	The second second	-		1
1000		Marketine Sec.	PERMIT STATES			
7,762,752,15	3	ACCOUNTS ON	TOR/ART		CONTRACTOR OF	
	DESCRIPTION OF STREET	STATE STATE STATE OF	SAME UNITED STATES	F789-	vedet in said	
100000000000000000000000000000000000000		SECTION SECTION	WAS PRINCED AND	ARTES STATES		
able - Copper - Underground - 24 Gau		A8.40	OF RESPECTATION	CONTRACTOR OF THE PARTY OF THE	Noth Edite	1
CLATOTI	3600	3 201	BATTER STATE OF	CONTRACTOR OF	APPENDING S	1 8
		\$ 34,25	SERVICE CONTRACTOR	78-555 THE ST	Haras	
人。2 Hand Strate	2400	1 19 17	BARRIE STORES		ALL CONTRACTOR	0 20
775 937 933	2100	17.00		MINISTER IN		10 10 10 10 10 10 10
	1800	24.17	CARSO HERE WAS	157.79	-	0 10
		19.72	MANUFACTURE STATE	-	HUTE STATE	6 12
	900	THE PERSON NAMED IN COLUMN		-		6 10
	600	5 9/54 7/89		55 min 1	-	1 7
		\$ 525			-	
		1 13	-			0 6
	100	100		-		1 1
	STATE OF THE PARTY NAMED IN	170		-		
	-	- Commonwell -		100000000000000000000000000000000000000	100000000000000000000000000000000000000	
	MASSES CONTRACTOR	1 18		Mark Commission (Inches	THE SECTION	
0.12		1 130	-		-	0.0
uble - Copper - Underground - 26 Geu		35.50	-		-	
Metarial		\$ 33.30	Children and the same			
print (a)	2000	1 程程				
U 1967 AURIO	2400	21,00	-	The Later of	Three Control	
	2100	\$ 19.45	5007 O.E. S.S.S.Z.O.E.	The second second	7.21	100 Per 1
	1800	\$ 17,36		Section of the later	2175	
1392-31798	1200	11,85				
146 25 97 85	800 800	3 9.50 T		7		
	800	7.52				
お音(い)が明り次次数	400	18	NALES DANS COMP		100	
	400 300	5 4.42	William Charles		81107 80	
100 (60) (91) (91)	300	3.30				
U. 80 m/m SHA	100	2,88	TOTAL STATE OF THE			
	100		Trible Control			
		1,00				
	12		200	-	-	
N- 6 (CV)	7,02	1.00	-			-
chie - Copper - Underground - 26 Gau Supply Cost)	4200	TOTAL SECTION AND ADDRESS OF THE PARTY NAMED IN COLUMN ASSESSMENT OF THE PARTY NAMED I		-	-	
	3000 3000 3400				100 miles	
	2400	- Andrewson - Commence			-	16.0
	2100		1347-1121-201	-		
THE PARTY OF THE P	1800	\$15-8265 • NO	Name of the last			
	1200	\$50 (B. 60 0.0)			Spill minds	
CHECK STOWN	800	400 (500) (500)	REPORT TO			THE CALL
	800	A 100 TO			150 37	
28 13645426	800 800 800 160	100 E			SHEWNELL	N
- WALTER CASE	300		PROUDS AND		STANFOLD DV	N
The second second	200					- 91
	100					- 8
The second second second	25		Service			-
	18		Allert Harrison	-		- 1
337 3803537 85	SATISFACE AND ADDRESS OF THE PARTY OF THE PA		The second second	100	STUD GLUTS	
bis - Copper - Underground - 28 Gar	4300	CALIFORNIA PROPERTY AND ADDRESS OF THE PARTY A	THE PERSON NAMED IN		and the same of the same of	
Teid	4300 3800 3000 3400 2100			-		
	2000	\$ 100 mm ()	C-17-15-5-5-5			1
	3400	ENVISORE CLE	210000000000		THE PERSON NAMED IN	
	2100	100000000000000000000000000000000000000	DESCRIPTION OF THE PERSON NAMED IN	DIRECTO		N
TAX TO SELECT ON THE PARTY OF T	1800	Phillips 18	O'clinearing to	ASSESSED FOR THE PARTY OF THE P	Horaco Table	N
	1200	\$ 13.5 PM.	A STATE OF THE PARTY OF			N
	809 600	MENER		5-25 V. III		N
5 - FW TI - A S S S S S S S S S S S S S S S S S S	600 600	THE CULT S		SHANSHIELDEN.		N
	400		A THE STREET, SALES	NAME OF THE OWNERS	The second	N
	400 300 300 100					N
	200	Section .	101	2000		
	100	Shirt Accessors	THE PERSON NAMED IN COLUMN TWO	With the second second second	ALCOHOL:	- A

45. yelli6000

4.300

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DIPUT VALUE DESCRIPTION	Decelly Zona	BOPSI 5.1 BullBouth - Delguis	SCPM 9.1 Selfend-FL (8/9/60)	SCPM S.1 Sprint-FL (S/S/90)	BOPM D.1 GTE-PL (8/0.90)	Hit 6.0a Plorida (9/2/90)
Structure Cost - Aeriel (Pales) - Dietribu	60000000000000000000000000000000000000	1/14/881 9 780.68	***************************************		-	4 4176
Commence of the Commence of th	STATE OF THE STATE	And in contrast of the latest	WINDS WEDIE	CHECK TO ST		N
(WO) (10 CH)		1	STREET, CAL	ADDA ON THE		N/
Celile - Copper - Underground - 28 Gmi	4300		HIS WELL			N/
Plesing)	3000				75.00	N.
30. 200000000000000000000000000000000000	2100	\$ 1				N/
	2100	1,01				N/
	1800	11/1/20	Hale Dalling	75		N/
State of the state	800		THE STATE OF			14/
(1879) 一方面的問題自己的主義	809 400		RC 2000 23			14/
	300	1 :- :	Account to	-	-	No.
		\$ 111 b			- 5	N
			10 to		3711-27-32	N/
	25		-	-	-	N.
STATE OF STA						N.
	12				16.6	160
shie - Copper - Underground - 26 Gau (Spining)	4200	-	- million Control	other description		- A
the second second second	4200 3850 3000 4400 1000	100 miles			7.7	N N
SACREMENT OF STREET	2450		3 TO 1 SQUING			1
	2100				-	I
	1800	10000	100000000			N N
	900	1	1 2500	-	-	N.
	600	100000000000000000000000000000000000000				l N
	400	1000	A THE WELL			N.
The second secon					-	Pé Na
	100		100000			N.
	80 25					N.
	18	1.000				96
	Nils with Entering Street Services	1000	-	19 3		No.
Cable - Copper - Underground - 20 Gas	4200	1000000	STEEL SHAW	1010		N.
(Engineering)		1 (000000000000000000000000000000000000	16.36 37.5			N/ N/
ter of the control of	2400	1000		-		N/
	2100	1000				Pi,
SETTOTO SECTION TO ASSESS THE ABOVE THE DESIGNATION OF THE PERSON OF THE	1800		1000			N
	1200	1000	1,0/50/30/201	THE PARTY		N N
	600	1000				N.
THE RESERVE OF THE PARTY OF THE	400	1				N/
		100				N.
PARTITION OF THE PARTY.	199	1000			-	N/
	and the second of the second o	E BOOD OF THE REAL PROPERTY.	7-1			1 14
	25 10			100		N.
Bridge Colonia	12			7177		M
side - Copper - Univerground - 26 Gau	4200					9 29.0
(TOTAL)	3500	33.50				9 20,0 9 20,0 9 23,0 9 23,0 9 20,0
	2400	21,80 18,40	X			\$ 23.0 \$ 20.0
	2100 1800 1300	18.45			THE COURT OF	9 18,0
	1870	STATE OF THE PROPERTY OF THE P		-		9 18.0 9 16.0 9 12.0
AND THE RESERVE OF THE PARTY OF	800	8,06	2			9 10,0
	800 600 400	7.52		2000		9 7.7
	400	一提	NA COLUMN	-		10.0
	200	\$ 3,60	W. Commission	S Thursday	S. 147.5	1.0
	100	\$ 2.66	Comments.	Name and Address of the Owner, where		6 21
				-		
	19	80				6 0,
Marin State		1.00		The second	-	9 0,5
etia - Fiber - Aerial (staterial)		\$ 12.02	and the same	of all the second		N/
	144	8 8.88 B	No. 3004 - 715	2.5%	1000	N
		7.18 7.18 6.76 6.76	信以为 [[[]]	A LOUIS PROPERTY.	THE WAR	14/
	SHACE 7.2	8.76		STORY AND DESCRIPTION OF THE PERSON OF THE P		14/
	60 48 30	E 5.27 (THE STREET		3,-11-30	N/ H/
	Charles (C. Charles)	\$ 4,87	AND DESCRIPTION OF THE PERSON	-		N/

PIPUT VALUE DESCRIPTION	Dundry Zone	BCP96 3.1 BellSouth - Defeats [1775/08]	BOPM 9.1 Bolifiestb-FL (8/2/90)	BOPSE 3.1 Sprint-FL (9/3/99)	BOPM S.1 GTZ-FL (S/0/96)	HM 5.0s Plantda (8/3/95)
Structure Cost - Aerial (Poles) - Distrib	000000000000000000000000000000000000000	\$ 78G.84			1275-19	6 41%
Called the control of the control	NAME AND ADDRESS OF THE OWNER, WHEN PERSON WHEN	8 3.29	37.5			
Cebio - Fiber - April	203	3 3.04	1300			
(Supply Cost)	210	N/A	200		75577385	
	144	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			The second	
	100		Marie Desirem	Carlo Fall Clay	THE SHARE	
A STATE OF THE STA	1 4		2010			-
	4		-			1
	34		mile or south			
	34			2.27		N
Nacinal College Districts Consideration	10	and the state of the state of the state of		COURT IN		-
Cable - Fiber - Aerial						, h
(Tex)	218	THA	100000000000000000000000000000000000000			, N
· 1000年11月1日 - 1000年11月 - 1000年11月 - 1000年11月 - 1000年11月1日 - 1000年11月 - 1000年11月 -	144		extreme and			1
	9.6	\$ KIND .	100000			1 1
	1 71	-	X STATE OF THE STA	185,002.6		N.
	48		-	70.77		N N
Manual Indiana Manager Committee (1997)		110		-		1 8
	24	\$100 mg + 20				P.
	18	1				h
	12	-			-	-
Cattle - Fiber - Acrist (Pating)	210	NA.	Control of the	1000000		
	144	\$	Coule Co	307 9 137 0		
THE MAN DESCRIPTION OF THE PARTY OF THE PART	80	E CHILDREN CO.		THE PARTY OF THE P	70	1 1
	BENEFIT MINES					
	60			-		
	49				-	
	24	1 .	Mineral III	-		1
	10	100 miles				N N
	12	5	17-12-3-1-5-1			- B
Cable - Fiber - Aprilel		3	- ECSUMEN			
(Spining)	218	N/A				h
1.00 age 10 P.A. (200 May William)						1
The state of the s	12 10 10 10 10 10 10 10 10 10 10 10 10 10		0.7	10 N TO 10	(1.25-1.1)	- N
	60	A Charles of the State		Contract of the		, b
	था था					, h
	24					N N
	12	\$100 m				1 6
The second secon	DESCRIPTION OF THE PARTY			William Property		N
able - Fiber - Aerial	204	\$				N
(Ingineering)	164	NA				N N
	643					
Special Decision Commission						N N
						N N
	40	-g-	7.		100	N N
				-	-	N
	19					N
	STATE OF STREET	10000	120			N N
elste - Filter - Agriel	269	\$ 12.00		_	-	I N
(TOTAL)	718 164	1 60s	10			0 13.
	89	7.10		- 2 V		1 7.
All War and Call Description	72	8 6.75	4	UT DESCRIPTION		6 B.
	60	6.02	200	-	The second second	4 5.
	A PRINCIPAL TRANSPORT	5.27	995 111.773	A100 100	X-46.1 2 1 - 10	1 1
		\$ 4,87 \$ 3,46		7		0 3.
	A STATE OF THE STA	3 3,28 1	307	100		1 1
	100000000000000000000000000000000000000	3.04 [9 2.1
obio - Piper - Burisel Material	250 MINE	B 12.79 I	SERVICE STATE	DIVIDED DESCRIPTION		N
Meteriel	SHARES I BESIDES	1 0.00 8 0.00	(E) 10 (E)	1000	The second second	6 13.
	164	7/43				1 9
	72	8 600	DOTAL CRIP	-		
THE RESERVE OF THE CONTRACT OF THE CO	A STATE OF THE PARTY OF THE PAR		and the second second second	Cherry	E SUE	
		4.88	ALC: UNIVERSITY			1 41
	1 1	3.93 3.25		THE PARTY OF	0.5 1.110/05/0	8 23
	AND RESIDENCE OF THE PARTY OF T	Marie Control 1	CHARLES THE RESERVE OF THE PARTY OF THE PART	March Company of the	The second secon	1 32

The case of the second second second second second

THE PARTY OF THE P	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		-	Input Value Con		
INPUT VALUE DESCRIPTION	Dansky Zone	BCPSE 5.1 Bell Duyds - Defeatt (1/16/00)	DOPM B.1 BellDount-FL (0/2/98)	BOPM 9.1 Sprint PL (9/9/90)	BOPSE 8.1 GTE-PL (8/9/96)	Hid 5.0s Florido (9/3/98)
Structure Cost « Aerial (Peles) » Distribu						6 415
Cable - Fiber - Buried	289	100	EURISHE TO		1000	
(Supply Cost)	216	NA.	CONTRACTOR OF THE			3700
The state of the s	948		C 219 2 11 A	776 2-1217	013-300	18.
MARKET STATE OF THE PARTY OF TH	72	CHECK-2018		W		
	80	1.0	757		A. September	, h
	48				Penning States	1
	30			100		-
	18	1	A COLUMN TO		100	7.80
	dissent allows	\$ 2000000	NAME OF STREET	Middle Color	T. 17	1
able - Fiber - Buried	269	1.00 Dec. 10	1100000000	CONTRACTOR		
(Tax)	218	NA	SOUTH P			I
	144	12.			TO THE PAR	
THE RESERVE OF THE PARTY OF THE	36		75. 97.1 (0.1)	ALC: HER V	United the	
	72				-	1
	90					-
	CARL SHAPE THE PARTY NAMED IN			-		
		1000	-	-		
	18	1000	-	277		
HAR DESIGNATION FOR THE	12		724 - 4-2			
dde - Fiber - Buried	CHARGE TO STANKING	1 Maria 1980	Contact to a contact	19712	The Street	
Placing)	MARKET I MARKET	N/A			10 10 10 10	Gran I
	144	S SECRETARIAN	THE PERSON NAMED IN	DESTRUCTION	20 S V 10 F F F	1
	66 72	I WAS THE TAX	WHEE SALES	SPACE HUNDE	THE COURSE OF	
A STATE OF THE STA			- 1 FA WO		-	1
	60		The state of the s		- 1	
	36		-			
	34		SUCCESSION OF THE PARTY OF THE	SCHOOL ST	70	
	Day 1 1		THE COURSE OF	23772	7	
	AND DESCRIPTION OF THE OWNER, THE	10 mm	GENERAL III	15 H	300000000000000000000000000000000000000	1
ide - Piber - Buried	200		Ar very large	725-02-11	CTRL COLLEGE	
Splings	210	N/A	The Paris	7.m.		
	144					
THE RESIDENCE OF THE PARTY OF T	96			977		
	72	-		-		
	48	-		-		
	36					
	24					
STATE OF THE PARTY OF THE PARTY OF	STREET, BOOK	100000000000000000000000000000000000000	100			l
A CONTRACTOR OF THE PARTY OF TH	12	3	The same of the			
tile - Fiber - Buried	Controls 200 Television	3		Service Control		
Engineering)	216	NA	No. of Contract of		-	
A STATE OF THE RESERVE OF THE RESERV	144	3	10 117 - 100			1 6
	90	1 :				
	60	1				
	(80 chie 44 lev 60			B-12-57 Y-13		
CONTRACTOR DESCRIPTION	36	B				
	24	100 CO				
	Carried Section			division in the second		N A
	PROPERTY AND DESCRIPTION OF THE PERSON OF TH	5	20 TH 904	-		1
tale - Filter - Buried	168	8 12.79		-	A SHANDER -	
TOTAL	218 144	N/A 8 9.96		-		9 13
	24	7.0		PER PER		4 7
		8.00		1.000	77.	
Carlo and the Carlo and the Carlo and the	60	5.17	Section 1	250000	- Jan 200	0 6.
THE RESERVE THE PARTY OF THE PA	60 49	5 465	ne.	(R. 10)		4 4
	30	1 401 500	The state of the s	Market Branch		
		3.93				1 1
	1		-			6 3.
ble - Piber - Underground		11401	The second second	N. J. T		100
	216	11/4	AND DESCRIPTION	201		6 13
	144	8 1636	1550 C 1 9757		-	0 0.
DECEMBER OF SECURIORS	99	\$ 7,40	ASSESSED FOR			9 7.
		1/0	100000000000000000000000000000000000000			1
A A STATE OF THE S	60	\$ 5.50	3-27-36			
	- 69	4.75 (EAST OF SOL		-	1 4
		4,15				THE CONTRACTOR
The state of the s	10	1.78			-	1
The state of the s	Annual Conference of the Confe	97.99	A CONTRACTOR OF THE PARTY OF TH	-		A Personnella
Charles and the second	PROGRAM - MENNAMA	1.0	State of the second	FOR 1222 TO THE		1

ROUT VALUE DESCRIPTION	Density Zona	SCPM 2.1 Delitopth - Delicate [1/15/80]	BOPM 9.1 BellSouth-FL (879/60)	SCPSE 2.1 Sprint-FL gs/5/90)	BCPM 3.1 GTE-FL (8/3/00)	1681 S.0a Plestido (9/6/6/8)
Schrigteris Cost - Asriel (Poles) - Distribu	2000001300006	9 2007.50 I				4 4130
CONTRACTOR OF STREET	DESCRIPTION OF THE PARTY OF	8 1,865,00				84/
	200 500 400	\$ 2,130.00	SPIDESE CHIMINA		-	34/4
	300	2,366,00 5 2,560,00				N/A
	800	\$ 6,509,00			2 17 20 7 1272	14/
	800	8 6,545,00				N/
SURFIGURE CONTRACTOR	1200	\$ 7,598,50				19/
	1800	8 8,717,00				140
	2100	1 11/490,00			-	N/
	3400 1000 3600	\$ 11,480,00 \$ 11,713,00		-		1//
	3600	\$ 14,055,60	Service of the			14/
	4200	8 48 566 50 1	STATISTICS.	5 7.6 4	1	14//
CAN DESCRIPTION OF THE PARTY OF THE PARTY.	5400	NA				NE
A STATE OF THE PARTY OF THE PAR	7300	MA				NU
Service Area Interface (SAS - Outdoor	SMIRS STREET	CHICAGO CONTRACT				1//
(Butchy Cost)	50			-		140
	300			-		11/1
Control of the second second	- 25		The second second			10
	100 300 300 400	1980 (20	Service Service	VIII CO		N/A
	600	(TEACHERS	OF THE PERSON	T. T. A.	ESSENTED S	N//
	CARRIED STREET, STREET				THE PLANE	96/
	1300		A STATE OF THE STA	200	ALTERNATION STATES	14//
	1800 2100		-			No
	2100			-	-	N/A N/A
	2400 3000 3500		10000			14/
CAMBOROUS STREET, STRE	3800		Park Control		- TEXT	90/4
	4900	No. of Concession, Name of Street, or other party of the Concession, Name of Street, or other pa	THE TOWN COLOR		September 18	14/
	9400	100000000000000000000000000000000000000	THE PERSON NAMED IN		William Town	NU
	7500	建加尼亚岛 图			-	94//
Service Area Interface (SA) - Dutdoor (Text	1000000		200	-		147
(1ed	100			-	_	N/A
I A Security of the second of the second	200	Marian Control		T 2 2 3		N/A
CARRY TO STREET, STREE	200	127200		17100		N/A
	400				100	N/
	600		25.45.45.40.40	21		N/A
THE VOICE OF STREET	300	1000	-			M//
		1000	-			N/A
	1800 2100		-			14//
	1000	HOUSE	and the same and			N//
	1000		Metal State of			11/
TOTAL TOTAL SERVICE SERVICE SERVICE	3600	**************************************	State of the state of			N//
	4300			-		N/A
	8400 7200			-		N/A
Service Arua Interface (SAS - Outdoor	B	SC1-31-7		-		100
lervice Area Interface (SAI) - Outdoor (Pleaters)	100	British File				N/A
	100			3-0-2		N//
	188 188 188	The second	AT COURS			NAS NAS
	300					No.
	400					N/A
NO. OF THE SAME SHAPE	500		-			N/A
	1200				75	14/7
	1800	THE RESIDENCE	Tell Sent Sel	Warrier Co.		100
	2100		1000	2 17	-	一場
	2400		and an action of	Control of the Control		N/A
	3455		The same of the			N/A
ALCOHOLD THE THE	4200		ELECTRICAL STREET			14//
A STATE OF THE PARTY OF THE PARTY.						MA
	7200		(647 SEL	Water Street or Street or Street		PU/
ervice Area Interface (SAG - October		Children Co.	The second second	10 miles	(at property	- 100
(Setsing)	60			THE PERSON NAMED IN	CONTRACTOR OF	N//
						74/
	300		THE PARTY OF	State of Ballynoon	College II	N/A
	400		NAME OF THE OWNER, OF THE OWNER, OF THE OWNER,	200	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	140
	600	Marie To	SERVER ST.	(Letterate)	1775	
	809		CONTRACTOR OF CO.	(938,111A 189-	CALL COLUMN	N/A
HISTORY DAWN WORKS IN THE		100000000000000000000000000000000000000			200	MA
The state of the s	1300					N/A
COMPANY OF THE RESIDENCE OF THE PARTY OF THE		-	-	white the same of	-	NA

IMPUT VALUE DESCRIPTION	Closedty Zone	BCPRE 9.1 Swittlesth - Defects E1/16/6003	BOPM 2.1 Subtreeth-FL (8/2/00)	BOPM 9.1 Spring-PL (9/9/90)	BCPM 9.1 GTE-PL (0/9/90)	Historida Historida (M.O./GO)
Structure Cost - Aerial (Pales) - Dietric	000000000000000000000000000000000000000					4 418
	3600	100000000000000000000000000000000000000	200000000000000000000000000000000000000		1200 1100	0.000
	6400	•		-	100,000	-
THE RESIDENCE OF STREET	7200	100000000000000000000000000000000000000	AND DESCRIPTIONS		1000	
Service Aree Interfece (SAC - Outdoor	BURNES MINISTER		K (S. AN-18), (1)			
(Engineering)	80					
	200		Mary Sanita	Garage Control		77.
The second second second second second	100000	(A. 1308, 3006, 251)	NEW 75-200		Other Land	
AND THE WAY AND ADDRESS OF THE PARTY.	400	10,000		ofference follow	USS STORY	
No. of the Control of	600	00 B			-	
	1200		100	3.3557 70		
	1900				1750	
	2100	Section 1	WZSHISIUS		BOOK OF THE	100000
	2400	100000	The state of the s	JAC EUC	7 675 5136 6136	
	3600	The same of	State 27755		1 1 1	
		1	77 300 115 1			74.62 P. C.
	8400	1000	STATE OF THE			C 5040 F
ender Area beneficial Wall - Carlott	7200					
ervice Area bitarfesa (SA) - Outsisez (OTAL)	60	STATE THE PARTY	W. Ser. Vo.		1000	\$ 250
	100	3 1,683.00	MANAGE PAR		4 SE 199	6 350
	1 300	\$ 2,120,00 \$ 2,566,00			THE REAL PROPERTY.	
	Section 1995	2 4 255 25			100	4 1,000
20 二点100 X ME 300 ME	600	\$ 5,500.00	27 5 60 10 10	SANSAYEE	5 - 7167	0 1,400
en en en la	1809	9 9,645,00	84720480	WY. STATE	1.300	8 1,000
and the second second second second	1309	7,566,00		12 27 - 575	Str. Str. Str. Str. Str.	8 2,400
	1800 2100	8 8,717,00 8 (1,490,00	V125-232-2021-1		-	9 3,400
	2400	8 11,490,00	12.1	1025	100	4 4,300
CONTRACTOR DE LA PRIMA DE LA COMPANIO	3000	8 11 715 00			9.852	193000
MATCHE MARK MEDICAL CONTROL	3800	14,063,80	A CONTRACTOR	ELSO EURAS		6,000
and the second s	5400	\$ 16,360,20				6 8,200
	7200	18 CH.	V3 SE V	FACE F	-	9 10,000
ervice Area Interfere (SA) - Industr	Berline Ministra	\$ 340.00	350,000,00	Marine and Miles	12.5	
(Meterial)	50	\$ 509.43		757		
restates most of protection)	200	\$ 611,60 \$ 1,293,00				-
	300	2,554,63	Windship Page 1970		A COLUMN	
AND DEPOSITE TO SEE	400	2,554.63		1,235	100	
	800	8 2,757,00		20,400,0		
	1200	4 401 36 6 667 08				
	1900	\$ 6,655.30	0.0	P. Devot.		l N
	2100	E 11.095.80 I				
	2400 2000	13,569,71 18,569,77			-	
	2500	3 10.605.47	the state of the s			100/00/00
	4300	10 AGE AT 25 342 AT				
	\$400	The same of the same of				, N
andre Area breedom WAR. Life	7,00	1		-		
ervise Area koortase ISAS - Indust (Busply Cest)	50			A CONTRACTOR	1000	
	100	\$ 100 Page 1	and the second	GRADES AND SEE	SHARE PLANE	
The state of the s	205			3/01=3	1 - Sept. 2	
		100 Page 1		STATE OF THE	190 2	
AND DESCRIPTION OF THE PARTY OF	600	\$15.538E3975-#3773	V-1			
	100		10.61			N
	CONTRACTOR OF THE PROPERTY OF	1000000			-	
	2100		STATE OF THE PARTY OF	12 V C	38.5	
	2400	\$10000 C	CONTRACTOR OF	SECTION AND	5379. 32. 346	N
	3000					-
	100	20 CA2 - 5	1	Service - In		- 1
Control of American Control of Co	5400		Maria de Santo		77	N
		DESCRIPTION OF THE PERSON OF T	No. of Concession, Name of Street, or other party of the Concession, Name of Street, or other pa	250/1917	200000000000000000000000000000000000000	
ervice Area Istarface ISAN - Indoor					1.12	N
Text	100 000 600	8 -	U76 2 25	William Street	-	SCOUNT HEAD
	The state of the s	-		CONTRACTOR OF THE PARTY OF THE		100
	200	100000000000000000000000000000000000000		and the latest terminal to the latest terminal t		-

WAPUT VALUE DESCRIPTION	Osselly Zena	BOPM S.1 SubSouth - Default [1/16/08)	BOPSE D.1 BellGouth-FL (92/3/98)	SCP14 3.1 Sprint-PL (S/3/96)	SCPM 9.1 GTE-FL (8/8/99)	Florida (SAS)
Structure Cost - Aerial Polesi - Darribu	COST COST	8 780.58				4 41%0
			刑権会ので	339		- N
STATE OF RESIDENCE AND SALES	1200					N/
The state of the s	1800 2100 3400		RVE I		Asset Secretaria	N/
	2400	10 Last	Bed Steel St.	33.0	SECOND BUILDING	N/
- Chicago and American	3000	1000	COD SERVE	The latest and the	177	- 8
	4700	1000000 E			-	N/
THE SALE INC. OF MARKET SALES	2.450		103 - 100		AND DOM:	N/
	7200	建物作用。	され マルチュリッド			15/
Service Area Interfece (SAI) - Indoor (Placing)	BENEFIT TOTAL			Visit de la constant	25 0	N/
(Placing)	NO	A MARKET CO.	Section 10 Page 19		100	N/
	200	1 1000000000000000000000000000000000000	Carried Control of the	the contract of		A A A
P. WALLY LOUIS CONTROL OF THE	300		-			N
	400	COLUMN TO SERVICE				PA/
	600		-			N/
	900	2000	THE STATE OF			N/ N/
	1900	With the Land				14
11 C 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1	A STATE OF THE PARTY OF THE PAR	Separate Separate	OFFI PRO		265	N/
	5259			11 Sept. 12		- N
	Contraction of the Contraction of	S WADON OF	-		-	N/
	4300	1	-	1235	No. Top. Co.	N.
THE RESIDENCE OF THE PARTY OF T	\$400	PROFILE OF				16
A STATE OF THE PARTY OF THE PAR	7200					N
Bervice Area Interface (SAS - Impor (Seeming)		100000	-116 ME V2	THE RESERVE	-	N N
1217 27 4	163	10000	1.03			N
AMERICAN CHIEF WAS ASSESSED.	200		VIC 1835	THE PARK		No.
	200	200	REPORTED BY	STATE OF STREET	Total Control	N/
THE CONTRACTOR OF THE CONTRACTOR	400		780		-	- 8
	600			DE VENT		N/
	1200	1 000 m (14)	for the sound	Children and the second	200	N/
	Contract of the last of the la	100000				N/
	2100			U.S. Barrier	-	H/A
	2400				-	N.
	5600	100 YOUR 100	7011-71 - C	24.607.91		I No
	4700	200009045		En Concession	10-10-10-10-10-10-10-10-10-10-10-10-10-1	No.
AND STATE OF	8400	-				M
Bervice Area Interfese (BAS - Indoor	7200	Control of the Contro				N/
(Engineering)	50	Water Street	The state of the s	53.5		No.
Section 200 miles of the party of	100					I N
	Annual State of the State of th	1		54, 39		94) 84)
	400			-		N/
	600	3		-	1	N/
	900	nez-s	2 2 2		0007	N/
	1200	3				64 84 84 84 84 84 84 84
and the second second second	1900		-		-	N.
97 SAL 239 No. 1 (1997)	2400		-	-		N/
Line of the business of the second second	\$000			N 200		14/
STATE OF THE STATE	3800	Steel Control			3 10 20	N/
	200					- 1
The second of th	100	CAMESTO S		-	BUZ S	
Service Area interfese ISAII - Indicate (TOTAL)	BOOK NEED	CONTRACTOR OF STREET			Table III	H
TOTAL	10	CONTRACTOR OF THE PARTY OF THE	43.1123	Same	200	9 99,0
	100	1 1 2017		-	100000000000000000000000000000000000000	8 290,0
The second secon	300	9 1,645,71	No.	AL RESIDENCE	Service Street	N
	400				SON CHARLES	6 502.0
	990	1 27E/A	-			0 808.0
COLUMN TO THE PROPERTY OF THE	1,000	2 22 75			200	1,332.0
	1800	1.00		STATE AND	THE PERSON NAMED IN	9 2,405.0
	2199	\$ 11,090.80	BS VASTRE	STATE OF THE PARTY OF		N.
	2400	13,059,71				9.393.0
		1 1000	1	-	-	1 4,928,0
	100 100 100 100 100 100 100 100 100 100				100	The second second
Committee of the second	5400	NUMBER OF STREET	19 bit Colley		Description of	1 -7,392,0 8,656,0

BIPUT VALUE DESCRIPTION	Dendity Zano	BOPSE 9.1 Religions - Defeat (1/14/98)	BOPM 3.1 Sulfaceb-FL (8/5/98)	BQPM 9.1 Sprint-FL 98/9/989	BOPM 9.1 GTE-FL (R/9/08)	HM U.Go Florido [8/0/84]
Stopp Text Good Calerial William - District Orles ories	NI COMME LENGTS	750,25	100 House 2 - 7		1-741-2-03	0 451.0
(Majerial)	12	\$ 05.50	240000000000000000000000000000000000000	-		N/i
	26	\$ 216,00	10.00	and only in		6 128,0
Drop Terminal Cost - Audal	per Line				1000	N/
(Gungly Cost)	12					N/
		I THE RESTREE	All Control of the Co	Car Car Car		11/0
Drop Terminal Cost - Asrial (Text)	per Line					N/
	STATE OF THE PARTY OF	1		Name of the last	750	N/
	28	1	- OHOSE ETGEL			N/
Prop Terminal Cost - Asrial	per Line	8 .				N/
	12 300	1 10000000	Sava Suel			100
Drop Yerminal Cost - Aerial	per Line					H/s
(figliologi	6	3	PROFESSION P			, NJ
	12	1	195	7 1		160
Drop Terminal Cost - Aerial	per Line	\$ 000 mm 2 mm		10 2		N/
(Engineering)	SE PROPERTY PROPERTY	3.00	- 135 APT			N/
			1020			N/
Drop Terminal Cost - Aurial	per Une	100	27500			0 32.0
(TOTAL)	DESCRIPTION OF THE PERSON	\$ 85.56	200		-	M/
	12	\$ 131,81	-2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	-		6 128.0
Drep Yerminal Cost - Suried	per Une	ET THE EXPLICATION	THE R. P. LEWIS CO., LANSING, MICH.	Branch Committee		N/
Drietariel)	C - House of the later	\$ 157,06		45.79		N/
	12	\$ 440.67				N/ H/
Drop Terminal Cost - Buried	per Line	Name and Park	341			N/
(Suggely Cost)	0	-		0.00		N/ N/
	CO POLICIONA CONTROL (CONTROL CONTROL	3	100			N/
Orop Terminal Cost - Suried	greet Lima	Marie Commence				N/
Πed	12	1	-	100000000000000000000000000000000000000		N/
STATE OF THE STATE	28	3				\$2/
Oreo Yerminel Cost - Buried	per Line				N-0	N
Plening	12			376 1355	T. C. C. C.	N/
	SE ESCRIPTION OF REPORTS	A SECTION AND		734278		10/
Grap Terronal Cost - Burled (Optional	per Line			-	-	N/
1999-54	12		W 10 10			N/
	25	1		3.00		N/s N/s
Drep Terminal Cost - Buried (Engineering	per Line	1 .		-		N/A
	12	C482				N/
Corne Verminal Cont - Build	28	125.7				6 42.6
Orog Terminal Cost - Buried (TOTAL)	per Line	9 157,05		10.150 MB100		MA NA
	12	\$ 440,87				6 170,0
	THE PERSON NAMED IN COLUMN 2 I	Targette and the same	7.0	7 12 1	-	The second second
Drop Cost - Aerial per Foot (2 Part	00000 - 00005 00008 - 00100	0.77		15177		6 0.1
Printerial	00008 - 00100 00100 - 00290	8 0.77		The sale		0.1
	00200 - 00050 00960 - 00850	0.77			100	0.1
	00050 - 00350	0.77	A THE RES	-		0 0.1
	02550 - 02550	6.77			The second	0.1
	10000 +	8 8,77	STATE OF THE PARTY		Parties of the second	6 0.1
Prop Cost - Anniel per Foot (2 Pair)	50000 - 00006	9.77				0,1
(Foundy Cost)	90000 - 00000 90000 - 00100			-		N/
	00 100 ± 00 200 00 200 ± 00 850 00 00 0 ± 00 850		The Court of the C	AND THE RESERVE	10	No.
	00010 - 00050		STATE OF SERVICE	SERVICE STATE		N.
THE PERSON NAMED IN COLUMN TWO	00880 - 02580 02580 - 08000					W W
	05000 - 10000	Addition to	130	*********		1
	10000 +					PEZ
Orop Cost - Aerial per Fost (2 Pair) (Text)	I coops - pones		1111111	20.	100000	M/ M/ M/
TRANSPORT OF THE RESIDENCE	00004 - 00100 00100 - 00200	8	SELECTION OF THE PERSON OF THE	29500 XX ES		100

INPUT VALUE DESCRIPTION	Density Zens	BoPSI 9.1 BellGouth - Defacts [1/16/985	BCPSI 3.1 BellSouti-FL (6/3/88)	BOPM 8.1 uprint FL (9/5/90)	BCP(6 3.1 GTE-PL (5/3/90)	Vilit S.Ou Plotids (N/S/SE)
Structure Cost - Arrist (Poles) - District	00900 - 00498	9 790.58	-			0 41%
	C0850 - 00850 00850 - 07540		100	7.00		150
	1 02550 + 05000	ALX	Section 1		100 750	N/A
	09000 + 10000 19000 +		750 756			14/
Orași Cost - Aarial per Fost (2 Per)	0000 - 0000	1				6 0,1
(Placed)	90005 - 00100	3	777	775		6 0.1
	00100 - 00050					9 0,1
A Company of the State of the S	00850 - 00850 00850 - 02550	1 .	10 Sept 10 Sep	TO COLUMN		0.2
- 17 ALEXANDER 27 13 X 11 2 2 11 1 MG	02880 - 05000					8 0.2
	1 95000 - 10000		10 / To 12 / To 1		100	4 0,1
Balanti waka ake ka Mahamata ka ka pila	10000 +		WINDS AND AND			0,2
Orso Coet - Aarlel per Foot (2 Pair) (Splicing)	90000 - 0000 90000 - 00100				100	N/
	00100 - 00200	\$.				14/
	00250 - 00850	00.000	2.00		THE RESERVE	10 N
MESTICAL AND STREET	00050 - 00840 00050 - 02840		7000 L	10000	100000	1 14/
	02130 - 05501				-	N/
					-	16/
Drop Cost - Aerial per Foot (2 Pair) (Engineering)	00000 - 00005	1		-		H/
[Digmesting]	1 60100 - 00260	ACTION AND ADDRESS OF THE PERSON NAMED IN	PERMITTER CO.		THE COLUMN	N/
	00200 - 00630 00850 - 00850	-	60011V5011000		We say	N/
	00850 - 00850	The second second second	251111111111111111111111111111111111111			N/
	02580 - 08000	1 :	Brown Co.			N/
	02580 - 08000 08000 - 10000					N/
Dron Cost - Aurial per Foot (2 Parl	10000 +	0.77				W 0,2
Drop Cost - Aeriel per Frot (2 Per)	80008 - 00100 00100 - 00300	\$ 6,77	32.		7	6 0.2
	00100 - 00300 00300 - 00050	\$ 0.77	3 0 4	-		0.2
	00850 - 00850 00850 - 02550	\$ 0.77				0.3
	62880 - 03680 62880 - 04000	\$ 0.77				6 0.3
	05000 - 10000	6 0.77	A			\$ 0.3 \$ 0.3
	10000 +	\$ 0.77				0.7
Drop Cost - Buried per Foot 13 / 6 Pairl (Metarial)		THE RESERVE THE PERSON NAMED IN			_	6 0.1
	00100 - 00200	5 0.77				6 0.1
	00200 - 00440	\$ 0.77	-		-	0.1
Land Company	00850 - 00850 00850 - 02850	\$ 0.77		175		0 0,1
	02980 - 05000 08000 - 10000					8 0.1 8 0.1
	10000 +	\$ 0.77				6 0.1
Orap Cent - Buried per Fact (1) / il Pair)	**************************************	Comments of the Comments of th				N/
Black Cort	00100 - 00200			TAID ROLL		N/ N/
	00300 - 60690					1 160
	00100 100100 00100 10020 00100 10080 0010 10080 0010 10180 0010 10180 0010 10180 0010 10180		(401)			No.
	03160 - 01000					Pd/
	10000 +	-				PM M4
Drup Cost - Buried per Foot (3 / 6 Pair)	00000 - 00005				1000	100
II med	00100 - 00100					N/
The second of th	T00200 - 00065					1 166
	1 00650 - 00830 1	100000000000000000000000000000000000000	minute NOTE			N/
	00850 - 02550 02550 - 05000					N/C
William To the Control of the Contro	10000 - 10000					94.6
Prop Cost - Buried per Fact (8 / 8 Fabr	20000 - 0000E		100 100		X TOTAL STREET	0.6
Prop Cost - Buried per Foot (8 / 6 Pair) Program	00008 - 00100		Marie Trends	SWESSELLS	HARMAN	0,6
	60100 E 003003 000 = E 00300 000 = E 003100	100 E	101		1.00	0.0 0.0 0.0 0.0 0.0
and the state of the state of	00000 - 00000					0.00
	00940 - 0 950 62240 - 04600	170000000		- F - 1 4 7 1	V (8.5 6.40	1 0.5
	09000 - 10000	THE RESERVED	STATES SHOWING	100		0 1.5
	10000 +	-0000000	DOMESTIC STATE	500		6 6,00 H/r

INPUT VALUE DERONPTION	Density Zone	SiGPSE S.1 Solification - Dislands (1/18/96)	British B.1 But leasth-FL 4-78/903	BOPM 9.5 Sprint-FL (S/2/98)	80FM 9,1 GTE-FL (9/2/98)	146 S.O.s Florida (872/00)
Stitutheira Cost - Austal (Paine) - Distribu	60008 - 800001	3 790.58	as Torres			0 4120
process and process of the second	60169 - 60200	9	W 555 1	(H) E		100
	90950 - 00990 90950 - 00990					N/
and the second second second	00000 - 02500		300		-	N/
The State of the second second second	02600 - 05000		UZ SILVE			N/
	10000 +		-		-	N/
Drop Cost - Buried per Foot (3 / 6 Pair)			The Parity	19		N.
(Engineering)	00000 - 00100		THE TALK	BACK TO SE	0.00	14/
	60100 - 00200 00200 - 00650		The state of			1 10
- Anna Carlos de Carlos (Altremonia de Carlos	0080-0080			-		N/
	TAXABA CARRA		-	-		10/
	02850 - 05000				- 5	166
	09000 - 10000			-		N/
Drop Cost - Buried per Font (3 / 6 Petr)	1 10000 +	8 6.77	700	500		8 0.7
TOTAL	00004 - 00100 00100 - 00200		1871			0.7
Professional Action (Action Control Co	00100 - 00200	\$ 6.77	SVI 97587			8 0.7
	00300 - 00850 00850 - 00850		-	711	-	9 0.7
		\$ 0.77	THE RESERVE	25.7		0.7
	02880 - 08000	6 0.77				0.1
	95000 - 10000	\$ 0.77 \$ 0.77	The state of	-	-	9 1/4
Seturark Interlece Davice (980)	10000 +	\$ 30.73	100	-		16 10,0
Material	Business	\$ 30.73	100	Land Control		4 25.4
wiscler of Children in the Company	Funidentisi	Company of the	70.00	-		4.6
Metarica	Business	1020000 N. O.	STATE OF STREET			4 44
darface	Residential	255		2000	-	N.
Material Interest Interface Device (NIC)	Residential	-			-	I N
(Shapely Coet)	Business		3.4		-	N
rotestof	Residential		100		10	N/
(Supply Cost)	Business		2807			N.
reterfoor (Napply Cost)	Residential		1000			N/
istwork startes Device (MD)	Presidential	3				N.
Clex	Business					N.
retester			7/			N.
Clerk		1		-		N N
nterface (Tax	Business		200			N
Seturork Interface Device (980)	Residential	\$1000	-			9 15.0
(Plantes)						9 15,0
rotautor	Residential	100			-	N N
Plating) Mariaco	Panisharpine		200	100 PM	Fire	I N
(Plening)		1 .				16
Vetweek Interface Device (NID)	Recidential		2 75	2517 AL - 3891		N.
(Rollofing)		1 :		-	-	N.
(totelno)	Business	3				I N
nterfeca	Deplotantial					N
Spinong - Comment of the comment of	Business	1		-	-	- N
isteerk Interface Device (HID) Inglassing)	1 PleasSeption		-	10000	35.47	N N
volunt	AND REPORT OF THE PARTY OF THE PARTY.	Commission of	1000	V - 0-1	100000	I N
4, -	Rosinson				1777	N
House Comments	Residential		-			N N
street but f as Device (ND)	and recommendation of the SALAND recommend	-	-	7157 3	Marian Company	6 25,
TORDE	Businese		3176	2 5 80 50	Taken Page	\$ 40,
TOTALISM	Projetantial	Marie St.		124 Car 1		6 4.0
(Tetal)	Surrison Co.	Control of the last			-	6 16,0
otariasa Foruit	Action and Company of the Company	1				9 18.6
III), Protestor & Interfece	Married Street, or other Designation of the last	1	Purellellas			\$ 20.0
(Green) Yeapt) - Investigat	Busines	BUSINESS VILLE		1.00	1 - 3 - 1	8 44,
Plattel Lean Cerrier IDLG: Plant Cent.		\$ 18,120,17		CONTRACTOR OF		# 18,900 / # 18,900 /
	75 49	1-13/25列		200	17 JUNE 17 JUN	6 18,300.0 6 18,300.0
	67	\$ 23,604,68	CHARLES OF THE PARTY OF THE PAR		277	1 27,700,6 1 27,700,6 1 37,100,6
	121	1470			-	11-57-7994

DIFFUT VALUE DESCRIPTION	Density Zuns	BOPM 0.1 BellSouth - Default [1/16/00]	BOPM 8.1 belikestirFL gg/2/08)	BOPM S.1 Sprint-FL (8/3/93)	80FM 9.1 676-FL (6/9/86)	104 U.Sa Florido (U/3/90)
tructure Cost - Aeriel (Poles) - Dietrib	000004 90000B	\$ 647MILEO	-			9 37,400,0
	175	\$ 68.377.00 \$ 68.869.00				6 70,0-X0,0 6 BB,800,0
	1 1340	\$ 165,236.00	Sales V.	£ (89 51		******
igital Loop Cerrier IDLCI per Line Co.	(VO: 0-192	\$ 84.00	HERE BEEN AND		-	8 100.0 6 77.8
	Y0: 192 - 2016	\$ 19,41	2 4 10 10	Charles Inch	-	9 77.8 N
	D81		House of	A4 11 11		N.
	DOS	-				N
	ENS.	1000	1974 (58.9) 56	C 1/0/4 - 17		N N
	CON 95th Dens.	E SEESTIMES SHE	OCTOBRA SE	390 1-62.0		6 128.
	ADEL.					N N
Factors - Sectronics	TO STATE OF THE PARTY OF THE PA	85,00%	ZCUUNT ST	911 - E		90.0
colonium Concess Commission College	right.	12,000				18.0
or / Copper Brestignist		12,000	Seminary Control			
ire per Houseling Units		99		1000000	TO THE T	0.000
eximum Piter Feeder eximum Copper Distribution Size	NAME OF THE OWNER,	3600				2.4
ant Mix - Distribution - % April	00000 - 00000	40.00	See 10 10 10 10 10 10 10 10 10 10 10 10 10	200		26.0
	00003 - 00100		PARE CONT.	restory, re-		29.0
The same of the sa	00200 - 00010	NO. NO.	A CONTRACT OF THE RESIDENCE OF THE RESID		Val. 10/2/2014	30,0
	06650 - 00850	80,00		100		30,0
	02580 - 08000	8.00%		10 Per	10000	30,0
TOX CLEMENTS IN AN	06000 - 10000	5.00%	0.620	7 - 6	-	85.0
ant Mix - Distribution - % Buried	10000 +	0.00%			d amount	78.0
ant Max - Distribution - 7s Burney	00005 - 00100	91.00%	25.527162.2	17.0		78.0
	1 80 100 - 60 100	62,000%	STATE OF THE PARTY.	Spirite / Con	-	78.0
	00000 00469	82.00% 85.00%			311113	70.0
	00050 - 02650	65.00%	20720			70,0
A STORY OF THE STO	02660 - 04000	58.00% 38.00%		-		85.0
	88900 - 10000 10000 +	10.00%		Sec. 11.		6.0
ant Mix - Distribution - % Undergrou	PLE 00000 - 000005	6.65%		100		0,0
AND STREET, ST	00008 - 00100	5.00%		SE 9750.	100	0.0
P. Colonia de Colonia	00200 - 00050	6.00%				0,0
	00650 - 00850			-		0,0
V. P. Santa	0.2550 - 05000	40.00%	7.565			6.0
CONTRACTOR OF THE PARTY OF THE	05000 - 10000	80,009			The state of the s	10.0
ant Mix - Copper Feetler - % Aerial	10900 + 00000 - 60009	40,009		700	-	60.0
	00006 - 00100	40,003				\$0.0
	00100 - 00200	40,009		-		40.5
	90200 - 00850 90850 - 00950	25,009	7.7			30.0
	00850 - 02550	10.005			-	18.6 18.6 10.6
	05000 - 05000 05000 - 10000	0.001		27		10.0
III I I I I I I I I I I I I I I I I I	10000 +	0,009	6			6.0
and Mix - Copper Feeder - % Buried	00005 - 00100	60,009		-	-	45.6 46.6 46.6
The state of the s	1 00100 00100	40,003	151			46.0
	00 0 2 00 10 00 0 2 0 2 10 00 0 2 0 2 10 0 2 0 2 0 0 0 0 0	40,007 36,007 20,007 28,007 20,007	10000	0.00	-	30.6
	0000 - 0 450	23.003		100 miles		20.0
	02560 - 01000	20,009				10.0
	16000 +	5,003				0.0
ant Mix - Capper Feeder - % Under	re 00000 - 00000	200 0000	A STATE OF THE RESERVE AND ADDRESS OF THE PARTY OF THE PA	-		5.0
The state of the s	T 000008 - 60100	15.005				5.0
	00 100 7 00 200 00 00 2 100 20 00 00 2 100 20 00 00 10 10 10 10 10 10 10 10 10 10 10 1	26.005	6			8.0 29.0 40.0 90.0
	00410 - 00990	45,005			-	40.0
	- 02223 - 0278 60	65,007		-		79.5
	1 05000 - 10000	89,009	4		-	85.0
	10000 +	68,007	CS224A 378			90,6 86,6
Sort Mor - Fiber Position - % Ameial	00000 - 91909 00005 - 00100 00100 - 00200 00100 - 00860	40,001			accuracy plant	38.0 36.0 30.0
	00100 - 00200	40,005 40,005 40,005			-	30.7

MOUT VALUE DESCRIPTION	Density June	SCPRE S.1 Existings - Defeat (1/16/98)	BOPSI 2.1 Bellicuth FL (6/2/04)	BGP56 3.1 Spelet-PL (0/3/80)	ECPM 3.1 QTE-PL (9/3/90)	HM E.On Plottde (8/3/98)
Scruoture Cost - Aarlel (Peiss) - Cletybu	00000 - 00000	\$ 75055 to		1000 000 500	Commence of the	\$ 60,00W
	coeso - 02650	10.00%	15175EFC 5216E		110 C. U. V. V. S.	20.00%
	02880 · \$16000	0.00%	SEX REPORTS	200	THE WAY	16,009
PASSURED PROPERTY.		0.00%				10.00%
- 1-2 mm - 2 m	10000 +	0,00%	图 图 图 图	ROP TON I		6,00%
lant Mir - Fiber Fooder - % Guried	00000 - 6-2005	50,00%	March Control		SHOW AND A SECTION	60,00%
	00005 - 00100	45,00%			2.11	60,00%
- YEAR 25 08 YOURS AND SEE	00100 - 00200	40.00%	THE REAL PROPERTY.	-		60.00%
	00300 - 00620	38,0926		198.7		60.00%
	00880 - 00880	29,99%	-	200	-	30,00%
	00860 - 03600	75.00%	and the second second	And the second	100	20,001
The University of the Control of the	01280 - 02000	20,00%	-	-	The second	19,009
	06000 - 10000	10,00%		200		5,009
	10000 +	10,00%	-	-		8.00%
lant Mix - Fiber Feeder - % Undergroun	00000 - 00100 00006 - 00100			POST III		8.00%
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THE SOLD THE PROPERTY OF THE PARTY OF THE PARTY.	00200 - 00860	25.00%				10.00%
	00850 - 00850	45.00%	403	12/17/19/19		40,00%
	00880 - 02850	68.00%	S	-		60,00%
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	05000 - 16000	80.00%	San			85,00%
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d Festore - Distribution	80000 - 00000	100,00%		Transfel to	\$74JPEREDITORS	80,009 88,009 88,009
A THE RESERVE OF THE PARTY OF T	50008 - 00100	100,00%		-C14/0184/02	ALTERNATION (A)	65,00%
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	05000 - 10000	100,00%	400			76.009
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il Festore - Feeder	00000 - 00005	78.00%		VIII CONTRACT		65,00%
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	00200 - 00000	85.00%		-		50,00%
	00850 - 00850	65.00% 45.00%		-		80,001
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	10000 +	65,00%	-			80,00%

Chart III. OSP Cable Pair Resistance vs. Length, in kilofeet, for CSA & ECSA Zones, with 1-ldtz Nonloaded Cable Loss between 600-ohm Terminations

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Efficiency of Reciangular Lots
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ALL SIDEWALKS AT EXPENSE OF DEVELOPER USEABLE LOT SIZE IS REDUCED BY AMOUNT OF ROAD, GRASS STRIP & SIDEWALK AREA ALL GRASS STRIPS AT EXPENSE OF DEVELOPER NOTE: ALL ROAD PAWNG AT EXPENSE OF DEVELOPER

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J. W. Wells Exhibit No. _____(JWW-6)
Efficiency of Rectangular Lots
Page 2 of 3

SQUARELOTS XXXX 2000 Y000 **** 2000 ******* ****** ***** *** RECTANGULAR LOTS 44000 ***** 20002 20002 ***** **** **** **** max ***** **** ***** mon ***** **** 5000

S ROADS 18 LENGTHS OF GRASS STRAP 18 LENGTHS OF SIDEWALK

12 LENGTHS OF GRASS STRU

12 LENGTHS OF SIDEWALK

USEABLE LOT SIZE IS REDUCED BY AMOUNT OF ROAD, GRASS STRIP & SIDEWALK AREA ALL GRASS STRIPS AT EXPENSE OF DEVELOPER NOTE: ALL ROAD PAVING AT EXPENSE OF DEVELOPER ALL SIDEWALKS AT EXPENSE OF DEVELOPER

Docket No. 980696-TP J. W. Wells Exhibit No. Efficiency of Rectangular SQUARELOT - 141.4FT -Page 3 of 3 NE FICIENT RECTANGULAR LOT 20,000 SQ. FT. LAND - 200 FT -RECTANGULAR LOT

74 00E

4.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing was furnished to the following parties by U.S. mail or Hand Delivery (*) this 2nd day of September, 1998.

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