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February 11, 2002

BY HAND DELIVERY

Ms. Blanca Bayó, Director
Division of Records and Reporting
Room 110, Easley Building
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850

Re: FPSC Docket No. 990649A-TP - Testimony and Exhibit Filings

Dear Ms. Bayó:

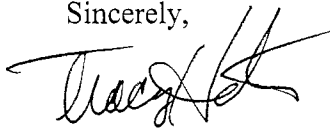
Enclosed for filing on behalf of AT&T Communications of the Southern States, Inc. and MCI WorldCom, Inc. are an original and fifteen copies of the following documents in the above-referenced docket:

1. Supplemental Rebuttal Testimony of John C. Donovan with Exhibits JCD-10.1, JCD-10.2, JCD-10.3, and JCD-10.4; **01622-02**
2. Interim Revised Supplemental Rebuttal Testimony of Joseph Gillan with Exhibits' JPG-1, JPG-2, JPC-3, and JPC-4; and **01623-02**
3. Supplemental Rebuttal Testimony of Brian F. Pitkin with Exhibits BFP-14. **01624-02**

Please acknowledge receipt of these documents by stamping the extra copy of this letter "filed" and returning the same to me.

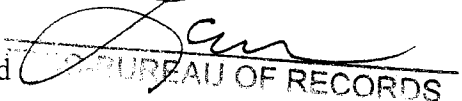
Thank you for your assistance with this filing.

Sincerely,



Tracy W. Hatch

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TWH/amb
Enclosure

cc: Parties of Record

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

SUPPLEMENTAL REBUTTAL TESTIMONY OF

JOHN C. DONOVAN

ON BEHALF OF

AT&T COMMUNICATIONS OF THE SOUTHERN STATES, INC.

And

MCI WORLDCOM, INC.

Docket No. 990649A-TP

February 11, 2002

PUBLIC VERSION

DOCUMENT NUMBER-DATE

01622 FEB 11 8

FPSC-COMMISSION CLERK

I. Introduction.....1

II. BellSouth Still Incorrectly Calculates Engineering Costs2

III. BellSouth's Model Still Fails to Appropriately Capture Manhole Costs.7

IV. BellSouth's use of a 40 Percent Additional Factor for Underground Manholes,
Conduit,..... and Excavation Costs Are Completely Inappropriate. 12

V. Summary15

Attachments:

JCD-9 Engineering Factors (Proprietary).

JCD-10 Manhole Drawings.

1 **I. INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is John C. Donovan. I am President of Telecom Visions,
4 Inc., a telecommunications consulting company. My business address
5 is 11 Osborne Road, Garden City, NY 11530.

6 **Q. ARE YOU THE SAME JOHN C. DONOVAN THAT**
7 **PREVIOUSLY FILED TESTIMONY IN THIS DOCKET?**

8 A. Yes.

9 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

10 A. The purpose of my testimony is to comment on BellSouth's January
11 28, 2002 revised cost studies and direct testimony. As such, this
12 testimony should be taken together with my December 10, 2001
13 rebuttal testimony to identify all of the changes I support to
14 BellSouth's original filing. Second, I have withheld from commenting
15 on BellSouth's surrebuttal testimony because I understand it is outside
16 the scope of this additional testimony. However, my silence on those
17 issues should not imply agreement with anything stated in the
18 surrebuttal testimony of BellSouth's witnesses. Third, since BellSouth

1 still continues to provide information requested in discovery, I would
2 like to reserve the opportunity to comment on that information as it is
3 supplied between now and the time of the hearing.

4 **Q. HOW IS YOUR TESTIMONY ORGANIZED?**

5 A. In Section II, I address the fact that although BellSouth made a
6 mistake in claiming that BSTLM estimated engineering costs in the
7 same manner as its Outside Plant Construction Management Program
8 ("OSPCM"), the error discovered has not been adequately repaired,
9 despite BellSouth's alteration of model code to use a new factor, and
10 that the engineering factors submitted are unreasonable for a TELRIC
11 model. In Section III, I discuss the fact that although BellSouth's new
12 cost study alleges to have fixed some admitted shortcomings in
13 calculating manhole investments, BellSouth still has failed to
14 appropriately capture forward looking costs. In Section IV, I address
15 BellSouth's application of a 40-percent factor that is inappropriate and
16 should be rejected. In Section V, I summarize this testimony.

17 **II. BELLSOUTH STILL INCORRECTLY CALCULATES**
18 **ENGINEERING COSTS AND FAILS TO ADHERE TO TELRIC**
19 **REQUIREMENTS.**

1 **Q. DID BELLSOUTH ADMIT THERE WAS AN ERROR IN ITS**
2 **ENGINEERING FACTOR?**

3 A. Yes. In my rebuttal testimony, I pointed out the three ways that
4 engineering costs are related to direct labor costs: 1) by sheath feet of
5 cable placed by technicians, 2) by number of splice locations created
6 by technicians, and, 3) by the number of pairs spliced by technicians.
7 In its January 24, 2002 letter to the Commission, BellSouth admitted
8 that "the engineering factors BellSouth used in its original cost study
9 are the same factors used in BellSouth's internal cost estimating
10 system, OSPCM." In the letter, BellSouth also admitted: "In
11 gathering information for a Staff-requested late-filed deposition
12 exhibit, BellSouth learned of a discrepancy in the way the OSPCM
13 system applies the factors and the way the BSTLM applies the
14 factors." Not surprisingly, BellSouth discovered that its own internal
15 cost estimating system calculated engineering costs following the
16 philosophy that, "The engineering factors in the OSPCM are applied to
17 Telco labor plus contractor costs." (January 24, 2002 BST letter).

1 **Q. DID BELLSOUTH ALTER THE BSTLM MODEL CODE**
2 **APPROPRIATELY TO CALCULATE ENGINEERING COSTS**
3 **CONSISTENT WITH GENERALLY ACCEPTED OUTSIDE**
4 **PLANT ENGINEERING PRACTICE?**

5 A. No. Although BellSouth revised its BSTLM model code, it amazingly
6 failed to do it consistent with the OSPCM practice described in its
7 January 24, 2002 letter. As expressed in my rebuttal testimony, and as
8 revealed by its own internal outside plant engineering practices,
9 BellSouth should have created an engineering cost that correlates with
10 technician labor. BellSouth has muddied the waters by creating a
11 factor that treats engineering cost to be proportional to labor costs plus
12 material costs. This inappropriately includes the cost of materials in
13 the allocation of engineering costs. Engineers create Engineering
14 Work Orders to instruct *technicians* what to do. They do not create
15 Engineering Work Orders to instruct materials. Engineering Work
16 Orders are the "how to build it" documents that BellSouth and the
17 industry recognize as the work product of the outside plant engineer.

18 **Q. WHAT DO YOU RECOMMEND BELLSOUTH BE REQUIRED**
19 **TO ALTER IN ITS MODEL LOGIC?**

20 A. BellSouth has already modified the logic of BSTLM to change the
21 way it handles engineering costs; however, it has done so incorrectly.
22 The Commission should require BellSouth to modify the logic of

1 BSTLM to have engineering costs reflect a correlation to internal
2 direct labor plus contract direct labor, and to eliminate material cost as
3 a driver of engineering allocations.

4 **Q. WHAT SHOULD THE RATIO OF ENGINEERING TO**
5 **TECHNICIAN LABOR BE?**

6 A. I believe a ratio should be based on a realistic "span of control" of
7 engineers to technicians. I have analyzed BellSouth's embedded base
8 data for the years 1997 through 2000, and note that the "span of
9 control" varies between 1 engineer per 5.2 technicians to a ratio of 1.1
10 engineers per technician. The ratio of 1.1 engineers per technician is
11 absurd because such a ratio would indicate that as much time was
12 spent on the engineering and paperwork as was spent on building a
13 piece of outside plant. Based on my experience, a productive
14 engineering force will create sufficient Engineering Work Orders to
15 keep many construction technicians gainfully employed. I have
16 provided my analysis in Attachment JCD-9. At the very least, I would
17 expect that one engineer should be able to keep at least 6 technicians
18 busy. Therefore, BellSouth's cost model should be modified to reflect
19 a 16.7 percent engineering to labor ratio ($1/6 = 16.7\%$).

1 **Q. WHY WOULD EMBEDDED ENGINEERING COSTS VARY SO**
2 **MUCH BETWEEN FIELD REPORTING CODES?**

3 A. There are a number of reasons why embedded engineering costs would
4 vary among Field Reporting Codes and might be higher than expected
5 using a reasonable 1:6 "span of control." First, engineering costs will
6 vary among Field Reporting Codes because the engineering involved
7 is likely to be more complex for some types of construction than for
8 others. Second, BellSouth has its stable of engineers on the payroll. If
9 construction investment is reduced for a period of time, BellSouth still
10 has to charge its engineering time to something, which can inflate
11 engineering costs in any particular short period of time. By using a
12 multi-year average, engineering costs are levelized and more
13 accurately reflected.

14 **Q. IS BELLSOUTH CORRECT IN CHOOSING ONE YEAR TO**
15 **DETERMINE ITS ENGINEERING RATE?**

16 A. No. Work must be planned by engineers, funding must be secured,
17 and detailed engineering must be completed even before technicians
18 begin work. Therefore it is unrealistic to assume that one year should
19 be selected to determine an appropriate ratio. We have requested, and
20 BellSouth has provided, data from 1997 through 2000. I recommend
21 that an average be used to levelize those obvious year-to-year timing
22 differences.

1 **Q. DO YOU HAVE A RECOMMENDATION THAT COULD BE**
2 **USED WITHOUT CHANGING THE MODEL LOGIC?**

3 A. Yes. Exhibit JCD-9 indicates a "TELRIC BSTLM Engineering Factor
4 Input" that can be used in lieu of a change in logic. Such a factor
5 would result in an Engineering Factor Input, as currently allowed into
6 the BSTLM logic, of between 5% and 12% depending on Field
7 Reporting Code, with an overall average just under the 10% that I
8 advocated in my rebuttal testimony. This variation takes into account
9 engineering complexity differences based on BellSouth's actual costs.

10 **III. BELLSOUTH'S MODEL STILL FAILS TO APPROPRIATELY**
11 **CAPTURE MANHOLE COSTS.**

12 **Q. WHAT CHANGES DID BELLSOUTH MAKE TO ITS**
13 **JANUARY 28, 2002 MODEL REGARDING MANHOLE**
14 **COSTS?**

15 A. By making changes to its model regarding manhole costs, BellSouth
16 essentially admits that I was correct in my criticism that it had
17 included an unrealistic cost of manhole covers and collars in its
18 average cost of manholes. However, as part of its "fix", BellSouth
19 simply attempts to manipulate the numbers to suit its own purposes,

1 rather than to accurately capture the TELRIC investments appropriate
2 for manhole investment.

3 **Q. WHAT ARE THE KEY ISSUES INVOLVED IN BELLSOUTH'S**
4 **CHANGING ITS TREATMENT OF MANHOLE COSTS?**

5 A. BellSouth admits that it made a mistake in its originally filed manhole
6 costs, and is now trying to recoup its incorrect investment allocations.
7 Particularly, BellSouth alleges that this Commission can now correct
8 its 30 manhole cover per manhole assertion, but that BellSouth forgot
9 to include other costs that more than account for the difference.

10 **Q. WHAT NEW EVIDENCE HAS BELLSOUTH ADDRESSED BY**
11 **CHANGING ITS MANHOLE INVESTMENT VALUES?**

12 A. BellSouth now alleges that its depiction of required manhole sizes,
13 capacities, costs per cubic foot of space, and miscellaneous material
14 costs are at issue.

15 **Q. HOW HAS BELLSOUTH MANIPULATED THE COST OF**
16 **DIFFERENT SIZED MANHOLES?**

17 A. The key issue for manhole costs is the appropriate number of cables
18 that can be accommodated by a particular sized manhole. In the tables
19 on pages 25 and 26 of Ms. Caldwell's amended surrebuttal testimony,

1 she indicates manholes that can accommodate 1 cable, 2 cables, 3 to 4
2 cables, or 5 or more cables. Despite my rebuttal testimony to the
3 contrary, BellSouth now claims that its single sample for Type M031A
4 contractor costs represents multiple manholes, rather than a single
5 manhole, at a higher cost per cubic foot than larger manholes.
6 Interestingly, it has provided absolutely no evidence in support of that
7 claim that would contradict my testimony that the cost is simply a
8 single outlier manhole that should be excluded from the average cost
9 per cubic foot in a very limited non-TELRIC sample. In fact,
10 BellSouth's new input values indicate that a 4-foot by 8-foot by 7-foot
11 (224 cubic-foot) manhole costs much more than a 6-foot by 12-foot by
12 7-foot (504 cubic-foot) manhole which is almost twice the size
13 (\$19,337.15 for a 224 cu. ft. manhole vs. \$15,330.54 for a 504 cu. ft.
14 manhole). The contention that a smaller manhole costs much more
15 than a larger manhole is ludicrous. BellSouth is attempting to cleverly
16 cloud the issue by using selective cost per cubic-foot values rather than
17 simply providing the straightforward data – cost by type of manhole.
18 In addition, a major issue is how many cables can be accommodated
19 by a particular sized manhole in a TELRIC environment.

1 **Q. HOW MANY CABLES CAN BE ACCOMMODATED IN A**
2 **STANDARD MANHOLE?**

3 A. BellSouth claims that its smallest manhole is 4 feet wide by 3 feet
4 deep by 6 feet long (72 cubic-feet). Exhibit JCD-10 clearly shows that
5 such a manhole can accommodate not 1, or 2, or 3, or 4, but far more
6 than 4 cables. The manhole drawings that I provide show that such a
7 manhole can support 4 cables plus a large opening for several
8 additional cables. Even a smaller 3-feet wide by 3.5 feet deep by 5
9 feet long (52.5 cubic-foot) manhole can accommodate at least 4 cables.

10 **Q. WHAT IS THE CORRECT COST OF A MANHOLE?**

11 A. The correct cost of a manhole can be determined by the least-cost
12 method. BellSouth has not presented any substantiated data for any
13 volume purchases. Even its claim for higher costs per cubic-foot of
14 manhole space is unsupported by data, and fails the test of logic in
15 looking at the comparison between a 224 cubic-foot and 504 cubic-
16 foot manhole presented above. In addition, BellSouth stacks costs
17 upon costs to drive up its final value far beyond using reason by using
18 a 75.6% adder ($1.2543 \times 1.40 = 1.756$). I discussed BellSouth's
19 25.43% "fudge factor" in my rebuttal testimony so I will not repeat
20 that discussion here, except to mention that the grab-bag of alleged
21 contractor items have nothing to do with manholes, and certainly

1 nothing to do with manhole covers. One must ask, "How many dump
2 trucks does it take to place a manhole cover?"

3 Besides the 25.43% closure factor, BellSouth advocates
4 multiplying the inflated total by another 40% "fudge factor" to account
5 for additional alleged costs, which I will address in the next section.
6 However, I note that the majority of BellSouth's claimed basis for the
7 40% factor is exorbitant engineering costs and a double-counting of
8 exempt material loadings. BellSouth has produced new information in
9 discovery that reveals that manhole covers and collars are actually
10 listed as exempt material. (BellSouth reply to AT&T/WorldCom Tst
11 Set of Interrogatories, Item No. 5).

12 BellSouth should not be allowed to recover the costs of
13 manhole covers and collars through its exempt material loading factors
14 and also include the cost of that material directly in its computation of
15 total manhole costs. The only appropriate exempt material associated
16 with a manhole is the cover and collar. I have included that cost in my
17 recommended input values. The table below is my recommended
18 reconstruction of BellSouth's costs tables produced in Ms. Caldwell's
19 amended surrebuttal testimony pages 25 and 26 and utilized in the
20 most recent filing of its model.

Unit Cost Development from Contractor Table (as submitted by AT&T/WorldCom)			
Contract Unit Cost	Applicable Manhole sizes	Contractor costs without 25.43% Miscellaneous Loading Factor	Contractor costs without 25.43% Miscellaneous Loading or 40% Miscellaneous Material Loading Factor
\$16.90	< 351 cu. ft.	\$16.90/cu. ft.	\$16.90/cu. ft.
\$16.90	>= 351 cu. ft.	\$16.90/cu. ft.	\$16.90/cu. ft.
\$246.48	Manhole Cover	\$246.48 ea.	\$246.48 ea.

1

BSTLM Input Development (as submitted by AT&T/WorldCom)					
Conduit Size	Manhole Dimensions	Applicable Cubic Foot Costs	Manhole costs based on Total Cubic Feet	Manhole Cover Costs	BSTLM Underground Contract Labor Inputs: Total Manhole Cost with Cover
1	72 cu. ft.	\$16.90	\$1,216.88	\$246.48	\$1,463.36
2	72 cu. ft.	\$16.90	\$1,216.88	\$246.48	\$1,463.36
3	72 cu. ft.	\$16.90	\$1,216.88	\$246.48	\$1,463.36
5	224 cu. ft.	\$16.90	\$3,785.60	\$246.48	\$4,032.08

2

Q. WHAT DO YOU RECOMMEND?

3

A. I believe that this Commission should require BellSouth to use the least-cost forward looking value for the most efficient cost per cubic foot. The fact that a 224-cubic foot manhole can support any number of cables modeled by the BSTLM indicates that an input value as low or lower than what I presented in my rebuttal testimony is reasonable and appropriate.

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IV. BELLSOUTH'S USE OF A 40 PERCENT ADDITIONAL FACTOR FOR UNDERGROUND MANHOLES, CONDUIT, AND EXCAVATION COSTS IS INAPPROPRIATE.

10

11

1 **Q. WHAT CHANGES DID BELL SOUTH MAKE TO ITS**
2 **JANUARY 28, 2002 MODEL REGARDING LOADINGS ONTO**
3 **MANHOLES, CONDUIT, AND EXCAVATION COSTS?**

4 A. BellSouth claims that the 40% factor for Miscellaneous Material
5 Loading Factor never made it through its model.

6 **Q. WHAT IS THE BASIS OF BELL SOUTH'S CLAIM FOR THE**
7 **40% COST?**

8 A. According to Ms. Caldwell's Attachment 5, the 40% consists of
9 approximately 28% Engineering, 8% Exempt Material, and 4% Other
10 (Plant Labor, Supply Expense, Contract Labor, Right of Way, and
11 Interest During Construction).

12 **Q. IS THE 28% ENGINEERING FACTOR REASONABLE?**

13 A. No. As discussed in the engineering portion of this testimony, I
14 recommend using a factor of 12% for the 4C Manhole, Conduit, and
15 Excavation Field Reporting Code, as indicated in Attachment JCD-9.

1 **Q. WHAT EXEMPT MATERIAL COSTS ARE APPROPRIATE**
2 **FOR MANHOLES?**

3 A. I have considered additional costs based on my experience in the
4 industry. In my review of BellSouth's list of Exempt Material items as
5 provided in response to AT&T/WorldCom's 1st Set of Interrogatories,
6 Item No. 5, I found that BellSouth considers items such as manhole
7 covers and collars to be exempt material, as indicated earlier in this
8 testimony. We have included that cost already in the manhole cost
9 table provided earlier in this testimony.

10 **Q. WHAT EXEMPT MATERIAL COSTS ARE APPROPRIATE**
11 **FOR PVC CONDUIT PIPE?**

12 A. None. There are no exempt materials that are added to plain white
13 pipe. A pipe is a pipe, and things such as nuts and bolts don't apply.

14 **Q. WHAT EXEMPT MATERIAL COSTS ARE APPROPRIATE**
15 **FOR TRENCHES?**

16 A. None. There are no exempt materials that are added to an excavation
17 trench. A trench is a ditch and things such as nuts and bolts don't
18 apply.

1 **Q. WHAT IS YOUR OVERALL RECOMMENDATION**
2 **REGARDING THE 40% FACTOR?**

3 A. I recommend reducing that factor to 16%, consisting of 12%
4 Engineering and 4% Other, while excluding exempt material costs in a
5 category where they have already been accounted for (in the case of
6 manholes) or do not belong as being inappropriate (in the cases of
7 conduit pipe and excavation trenches).

8 Also, as I indicated in my rebuttal testimony, it is both industry
9 common practice and BellSouth's practice to apply exempt material
10 loadings to labor costs, not to material costs. BellSouth uses
11 contractors to build its manholes and conduit systems. Therefore
12 exempt materials would not apply in any case, since it is not using
13 telco labor.

14 However, the real crux of the issue is that the contractor costs
15 for manholes and conduit pipes *already* include all of the costs,
16 including sales tax and handling. The contractor prices used in this
17 cost study were developed from vendor contracts and are inclusive of
18 all additional materials that may be required. As such, the 40 percent
19 adder is inappropriate and should be disallowed by this Commission.

20 **V. SUMMARY**

1 **Q. WILL YOU PLEASE SUMMARIZE YOUR TESTIMONY?**

2 A. Engineering costs should be based on a "scorched node" TELRIC
3 environment using a reasonable high productivity span of control
4 based on one engineer per 6 technicians. Manhole costs should be
5 based on available BellSouth data for the least cost per cubic foot and
6 manhole sizes appropriate for the number of cables involved in a
7 particular route. Conduit and manhole costs should not be increased
8 by over 75% because BellSouth's 25% closure factor and 40% exempt
9 material (and other miscellaneous loadings) should not apply to
10 contractor bills for conduit and manhole construction.

11 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

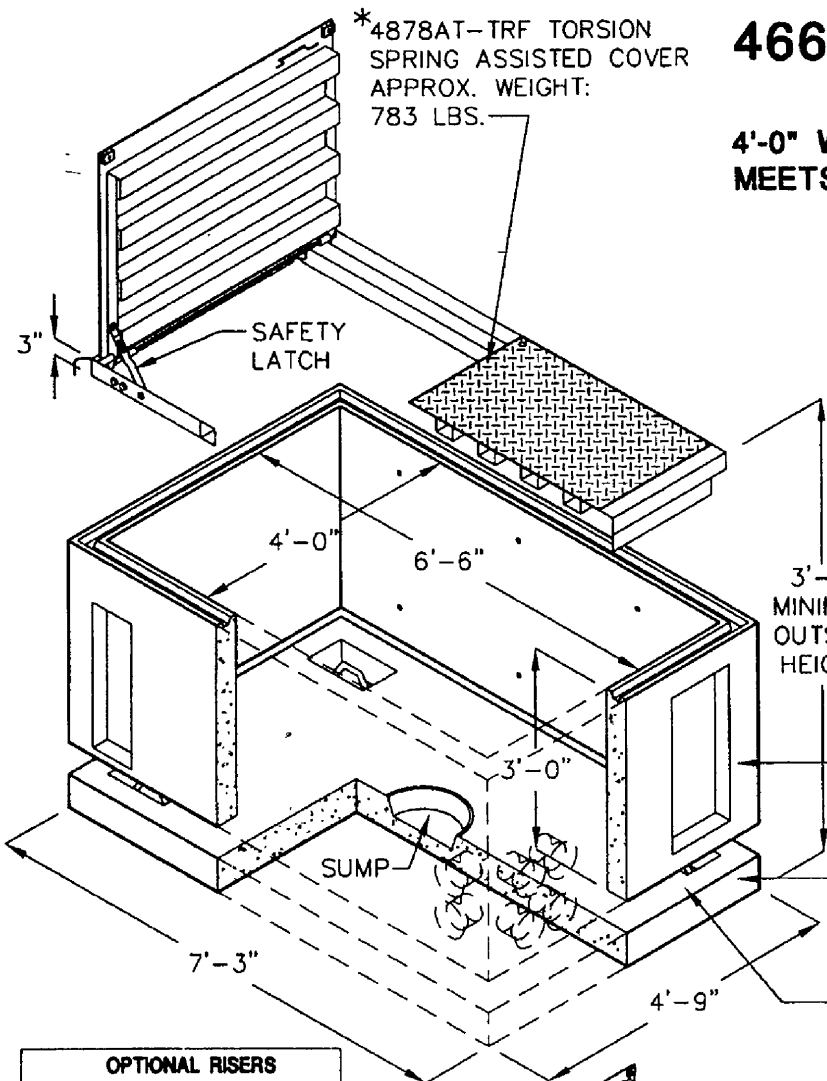
12 A. Yes. However, as mentioned earlier in this testimony, I would like to
13 reserve the right to comment on any future information provided by
14 BellSouth.

EXHIBIT JCD-9

PROPRIETARY

466TA-I INTERCEPT PULLBOX

4'-0" WD. x 6'-6" LG. x 3'-0" H. I.D.
MEETS PTS4878 SPECIFICATIONS



***NOTE:**
THIS COVER MEETS H-20 WHEEL LOADING, HOWEVER, IT IS NOT RECOMMENDED FOR IN STREET USE OR HIGH DENSITY TRAFFIC. BEST FOR USE IN OFF STREET LOCATIONS OR OCCASIONAL TRAFFIC.

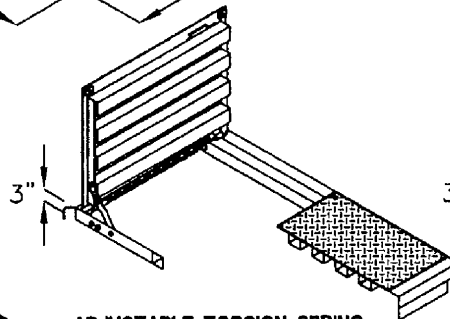
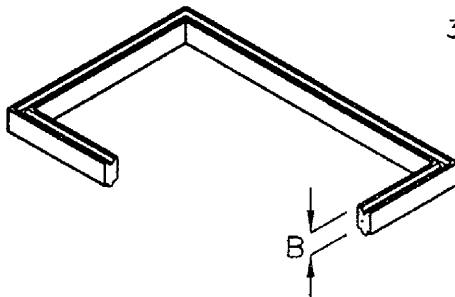
KNOCKOUTS, DUCT TERMINATORS, RACKING, PULLING IRONS, INSERTS, ETC. PER CURRENT NEVADA BELL AND PACIFIC BELL SPECIFICATIONS.

BOX DESIGN LOAD: H-20 TRAFFIC WEIGHT: 3044 LBS.

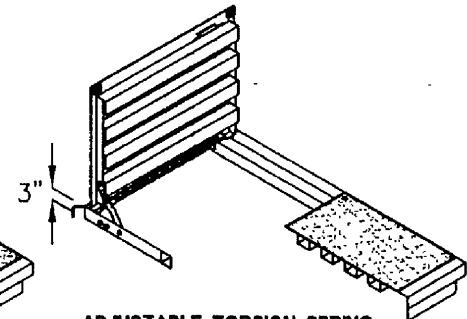
BASE WEIGHT: 2397 LBS.

KEYED JOINT, TYPICAL (NOT SHOWN)

OPTIONAL RISERS (EXTENSIONS)		
MODEL NO.	B	WEIGHT
466-R6	6"	646 LBS.
466-R12	12"	1190 LBS.



ADJUSTABLE TORSION SPRING ASSISTED COVERS (DIAMOND PLATE SURFACE)
*4878AT-TRF, 783 LBS. (H-20 TRAFFIC)
OR
4878AT-PKY, 631 LBS. (NON TRAFFIC)



ADJUSTABLE TORSION SPRING ASSISTED COVERS (NON-SLIP SURFACE)
*4878AT-TRF-AG, 493 LBS. (H-20 TRAFFIC)
OR
4878AT-PKY-AG, 626 LBS. (NON TRAFFIC)

FOR COMPLETE DESIGN AND PRODUCT INFORMATION, CONTACT JENSEN PRECAST.

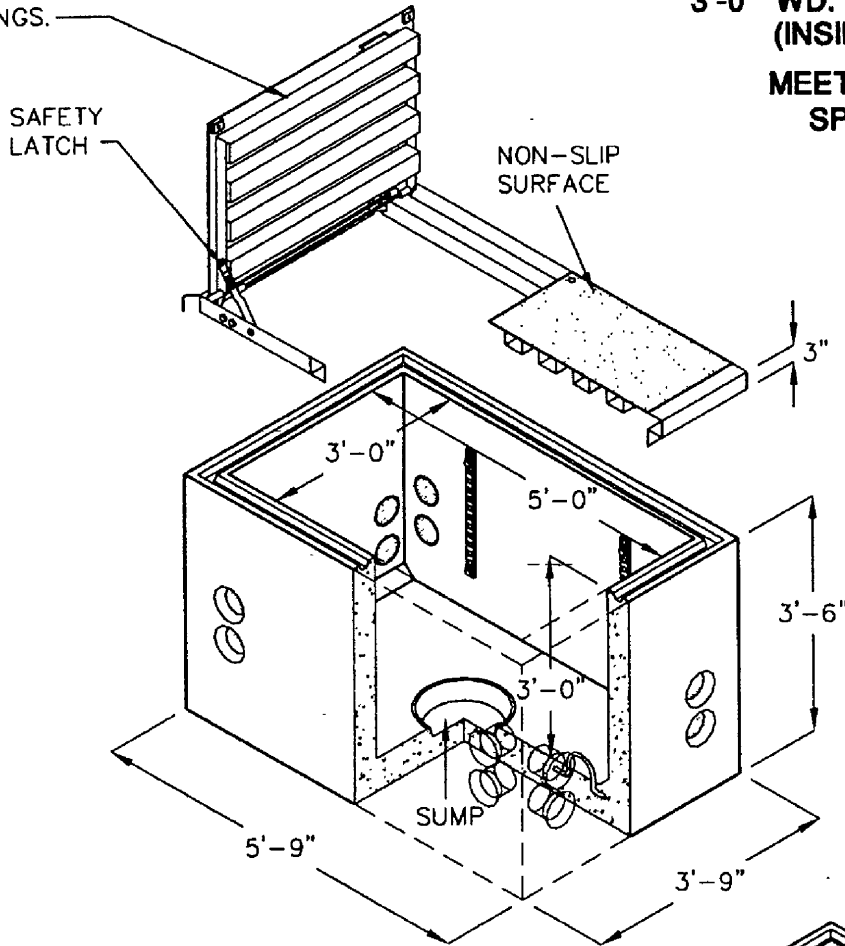
11/8/00

3660AT SPRING ASSISTED COVER. WEIGHT: 519 LBS. AVAILABLE IN PEDESTRIAN OR INCIDENTAL H-20 TRAFFIC RATINGS.

PTS3660 PULLBOX

3'-0" WD. x 5'-0" LG. x 3'-0" H. (INSIDE DIMENSIONS)

MEETS PACIFIC BELL SPECIFICATIONS



APPROX. WEIGHT OF BOX: 4379 LBS.

KNOCKOUTS, DUCT TERMINATORS, RACKING, PULLING IRONS, ETC. PER CURRENT PACIFIC BELL SPECIFICATIONS.

RISERS		
MODEL NO.	A	WEIGHT
RS366006	6"	419 LBS.
RS366012	12"	834 LBS.

FOR COMPLETE DESIGN AND PRODUCT INFORMATION, CONTACT JENSEN PRECAST.

11/8/00



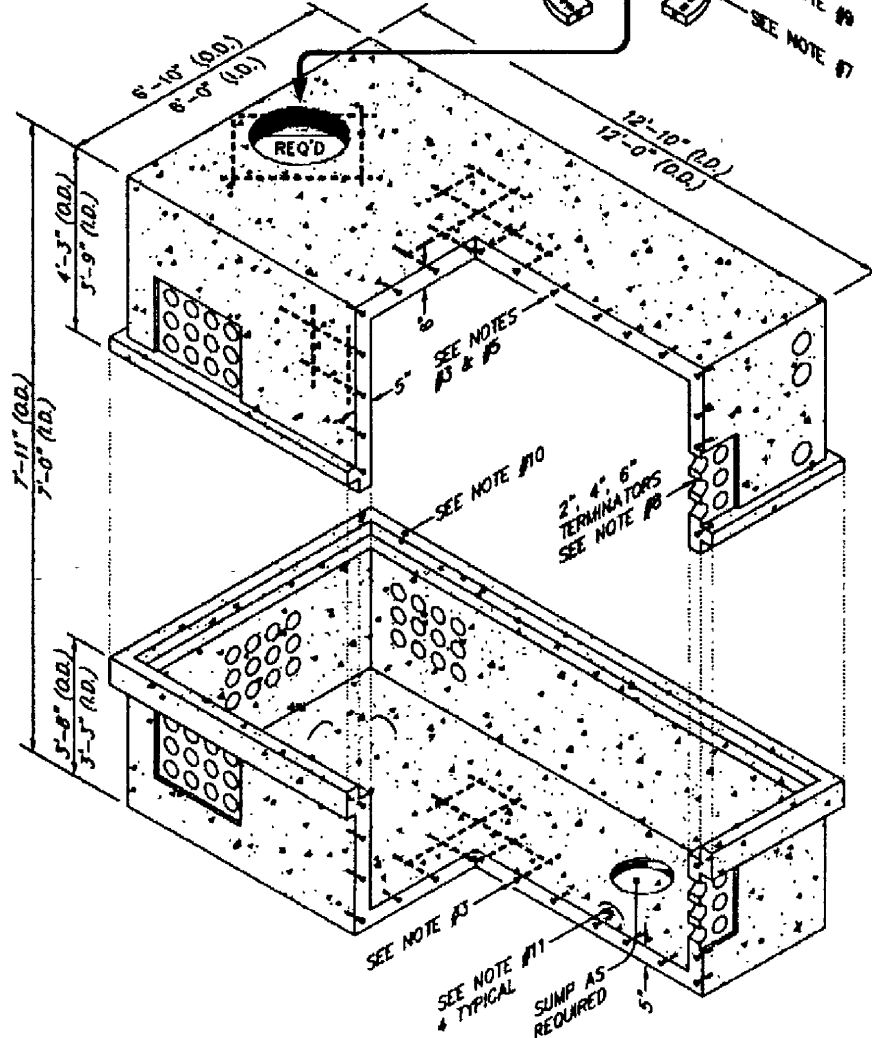
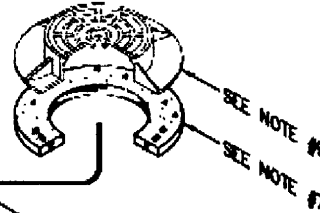
**Carolina Precast
Concrete, Inc.**

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Dunn, North Carolina 28335
(810) 882-6411 Fax: (810) 882-4894
www.carolinaprecast.com

DATE
FEB 15, 1999
DRAWING No
UV-72144

GENERAL NOTES:

1. DESIGN SPECIFICATIONS CONFORM TO ASTM C 858 SPECIFICATIONS "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE".
2. CONCRETE COMPRESSIVE STRENGTH 4,000 PSI MINIMUM.
3. STEEL REINFORCING DESIGN TO CONFORM TO THE REQUIREMENTS OF ASTM C657 SPECIFICATIONS FOR "STRUCTURAL DESIGN FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES" AND SHALL UTILIZE GRADE 60 RE-BARS CONFORMING TO THE REQUIREMENTS OF ASTM A615 OR WWF CONFORMING TO THE REQUIREMENTS OF ASTM A188 OR BOTH.
4. ADDITIONAL REINFORCING AT OPENINGS.
5. DESIGNED FOR H-20-44 LOADING.
6. STEPS NOT PROVIDED.
7. CONTRACTOR TO ADJUST TO GRADE AS REQUIRED.
8. TERMINATORS, KNOCKOUTS OR BLOCKOUTS AS PER JOB SPECIFICATIONS.
9. CAST IRON RING AND COVER TO BE AS PER SPECIFICATIONS, SUPPLIED BY EITHER C.P.C. OR CUSTOMER. GROUT IN PLACE BY OTHERS.
10. JOINTS TO BE SEALED WITH PREFORMED BUTYL RUBBER JOINT SEALANT CONFORMING TO THE REQUIREMENTS OF ASTM C990, OR MORTAR AS PER NCDOT REQUIREMENTS.
11. PULL EYES, GROUND ROD HOLE AND INSERTS FOR CABLE RACKS AS REQUIRED PER JOB SPECIFICATIONS.
12. WEIGHTS: TOP SECTION - APPROX. 18,226 LBS.
BASE SECTION - APPROX. 13,000 LBS.



**6'-0" x 12'-0" x 7'-0"
TELEPHONE VAULT**

DETAILS PROVIDED BY APF, INC. CONSULTING ENGINEERS, P.A.



**Carolina Precast
Concrete, Inc.**

P. O. Box 1051
Dunn, North Carolina 28335
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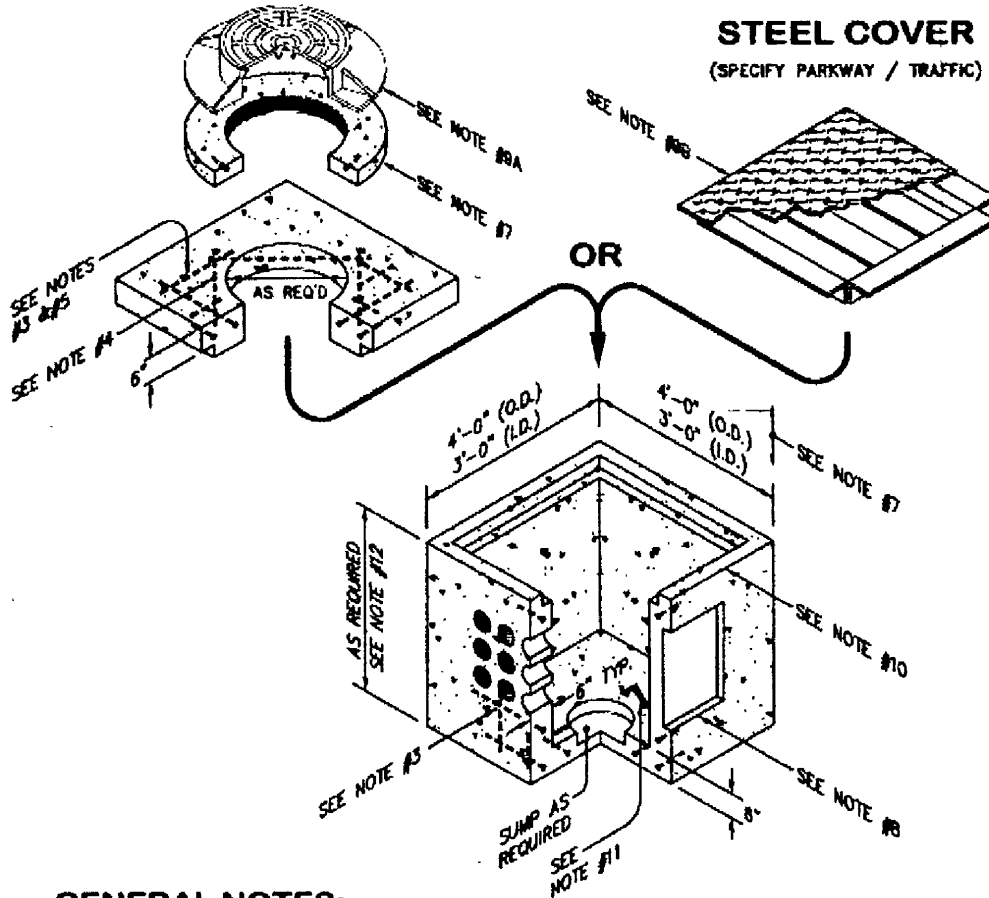
DATE
FEB. 15, 1999

DRAWING No
PB-3636

CONCRETE COVER

STEEL COVER

(SPECIFY PARKWAY / TRAFFIC)



GENERAL NOTES:

1. DESIGN SPECIFICATIONS CONFORM TO ASTM C 858 SPECIFICATIONS "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE".
2. CONCRETE COMPRESSIVE STRENGTH 4,000 PSI MINIMUM.
3. STEEL REINFORCING DESIGN TO CONFORM TO THE REQUIREMENTS OF ASTM C857 SPECIFICATIONS FOR "STRUCTURAL DESIGN FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES" AND SHALL UTILIZE GRADE 60 RE-BARS CONFORMING TO THE REQUIREMENTS OF ASTM A615 OR WWF CONFORMING TO THE REQUIREMENTS OF ASTM A185 OR BOTH.
4. ADDITIONAL REINFORCING AT OPENINGS
5. DESIGNED FOR H-20-44 LOADING.
6. STEPS NOT PROVIDED.
7. CONTRACTOR TO ADJUST TO GRADE AS REQUIRED.
8. TERMINATORS, KNOCKOUTS OR BLOCKOUTS AS PER JOB SPECIFICATIONS.
- 9A. CAST IRON RING AND COVER TO BE AS PER SPECIFICATIONS, SUPPLIED BY EITHER C.P.C. OR CUSTOMER.
- 9B. STEEL COVER TO BE CAST-IN, SUPPLIED BY EITHER C.P.C. OR CUSTOMER.
10. JOINTS TO BE SEALED WITH PREFORMED BUTYL RUBBER JOINT SEALANT CONFORMING TO THE REQUIREMENTS OF ASTM C990, OR MORTAR AS PER NCDOT REQUIREMENTS.
11. PULL EYES, GROUND ROD HOLE AND INSERTS FOR CABLE RACKS AS REQUIRED PER JOB SPECIFICATIONS.
12. WEIGHTS: ROOF SLAB - APPROXIMATELY 1,800 LBS.
 PB 3636 x 24" - APPROXIMATELY 3,300 LBS.
 PB 3636 x 36" - APPROXIMATELY 4,300 LBS.
 PB 3636 x 48" - APPROXIMATELY 5,300 LBS.
 PB 3636 x 60" - APPROXIMATELY 6,400 LBS.

DETAILS PROVIDED BY APRIL CONSULTING ENGINEERS, P.A.