STATE OF FLORIDA

OFFICE OF THE PUBLIC COUNSEL

c/o The Florida Legislature
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Room 812
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JACK SHREVE
PUBLIC COUNSEL

June 28, 1996

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

RE: Docket No. [redacted]S Application by Palm Coast Utility Corporation for rate increase

Dear Ms. Bayó:

Enclosed for filing on behalf of the Office of Public Counsel are the original and 15 copies of Revised Ted L. Biddy's prefiled direct testimony, as of June 28, 1996, with Exhibit TLB-1 and Revised Exhibits TLB-2 and TLB-3. The revisions are being made as the result of discovery received since the testimony was originally filed and Mr. Biddy's onsite inspection of utility facilities. Copies of the revised testimony will be hand-delivered today to counsel for the utility and the Dunes Community Development District.

Please acknowledge receipt of the foregoing by stamping the enclosed extra copy of this letter. Thank you for your assistance.

Sincerely,

Stephen C. Reilly
Associate Public Counsel

ACK ✓
AFA 3
APP
CAF
CMU
CTR
EAG
LEG Edmonds (delivered by OPC)
LIN 5
OPC
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SEC 1
WAS delivered by OPC
OTH

SCR/ddj
Enclosures

Scott Edmonds, Esq.
B. Kenneth Gatlin, Esq.
Richard Melson, Esq.
Jim Martin
Manuel D. Rivera

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FPSC-BUREAU OF RECORDS

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FPSC-RECORDS/REPORTING

DIRECT TESTIMONY OF TED L. BIDDY, P.E. / P.L.S.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

ON BEHALF OF THE

CITIZENS OF THE STATE OF FLORIDA

DOCKET NO. 951056-WS

June 28, 1996

Q. WHAT IS YOUR NAME AND BUSINESS ADDRESS?

A. My name is Ted L. Biddy. My business address is Baskerville-Donovan, Inc. (BDI), 2804 Remington Green Circle, Tallahassee, Florida 32308.

Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A. I am Vice-President of Baskerville-Donovan, Inc. and Regional Manager of the Tallahassee Office.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE?

A. I graduated from the Georgia Institute of Technology with a B.S. degree in Civil Engineering in 1963. I am a registered professional engineer and land surveyor in Florida, Georgia and Mississippi and several other states. Before joining BDI in 1991, I had operated my own civil engineering firm for 21 years. My areas of expertise include civil engineering, structural engineering, sanitary engineering, soils and foundation engineering and precise surveying. During my career, I have designed and supervised the master planning, design and construction of thousands of residential, commercial and industrial properties. My work has included: water and wastewater design; roadway design; parking lot design; stormwater facilities design; structural design; land surveys; and environmental permitting.

I have served as principal and chief designer for numerous utility projects. Among my major water and wastewater facilities designs have been a 2,000 acre development in Lake County, FL; a 1,200 acre development in Ocean Springs,

A. Yes, I did.

Q. DO YOU AGREE WITH THE MARGIN RESERVE PROPOSED BY PCUC FOR USED AND USEFUL CALCULATIONS?

A. No, I do not think the margin reserve requested by PCUC in this rate filing is appropriate. While it may be appropriate for a utility to have reserve capacity to accommodate demands placed upon the system because of growth, it is not appropriate to make current customers pay for this reserve capacity in a margin reserve. It is more appropriate to collect these costs from the cost causers, namely the future customers. Funds to support prudently constructed reserve capacity should be collected from future customers in the form of contribution-in-aid-of- construction (CIAC), paid by customers upon connection, or prepaid, in the form of plant capacity charges, connection charges for distribution and collection mains, advances for construction collected from developers and distribution and collection lines contributed by developers. Even the carrying charges for plant which is not needed to serve current customers may be paid for by the utility receiving guaranteed revenues from future customers, which is being done in the instant case. The Commission also permits utilities to collect an allowance for funds prudently invested (AFPI) which also reimburses the utility for the carrying charges for nonused and useful plant. Collection of these contributions and prepaid fees from future customers should render a margin reserve allowance, paid by current customers, to be unnecessary.

Under Florida conditions of economy and tightening environmental

regulation, increasing water costs and water conservation concern, it is reasonable to believe that the water consumption and wastewater generation of existing customers will not increase. Therefore, the margin reserve requested by PCUC is solely for new customers. If the PSC allows margin reserve in the used and useful calculations, then it will penalize existing customers by burdening them to pay extra cost for new customers. Allowing margin reserve will further increase water and wastewater rates to existing customers. High utility rates reduce the financial ability for customers and that will hinder future development. Therefore, the PSC should eliminate margin reserve allowance in used and useful analysis. The utility should recover the costs of plant addition from new customers or developers through other measures.

Q. DO YOU HAVE ANY COMMENTS ON THE FIRE FLOW REQUIREMENT PCUC APPLIED IN ITS USED AND USEFUL CALCULATIONS?

A. Fire flow capacity should be included in the used and useful calculation only if fire flow provision is proven by sufficient records or supporting documents. PCUC did not provide this information in the original filing of the MFR's.

Many components of a water distribution system dictate the delivery of fire flow. They include high service pumps, distribution storage tanks and water mains. Because of economic concerns, for many systems fire flows are provided partially by high service pumps and partially by storage. It is not cost effective to use source of supply and treatment plant to meet instantaneous demands, such as

peak hourly flows and fire flows. For this reason, I have not included a fire flow provision in my used and useful calculations for source of supply or water treatment plant.

PCUC currently has a total of 4.15 million gallons for storage which seems adequate for fire flow and peak hour demands. Therefore, I have included fire flow in my used and useful calculations for water storage. ~~However, OPC has requested PCUC to provide the fire flow test information to further confirm the fire flow provision. Revised used and useful calculations will be submitted if PCUC does not provide adequate information.~~ According to Citizen's Document Request No. 58, PCUC provided some fire flow test records to confirm the fire flow provision. The records show that the available fire flow in PCUC's distribution system varies from 1,377 gpm to 5,503 gpm at 20 psi residual pressure. The average fire flow available is 3,552 gpm. Though the information provided is not extensive, I believe the fire flow requested by PCUC is reasonable.

Q. DO YOU HAVE ANY COMMENTS ABOUT THE LEVEL OF UNACCOUNTED FOR WATER PRESENTED BY PCUC IN THE MFR'S?

A. To encourage efficiency, PSC should allow no more than 10% unaccounted for water. PCUC projected a 4.68% unaccounted for water in its Schedule F-1 of MFR's. However, an unusual negative (-8.21%) unaccounted for water existed

in January 1995. PCUC should justify the causes of such a negative percentage of unaccounted for water. ~~Adjustments may be necessary depending upon PCUC's responses to pending discovery.~~

From the response to Citizen's Interrogatory No. 83, I do not believe PCUC has excess unaccounted for water. However, the flushing water used for water quality compliance is extraordinarily high as shown in responses to Staff's Interrogatories No. 8 and 9. The average quantity of water used for flushing in 1995 was equal to 25.9% of water sold or 19.2% of total gallons pumped. A well designed system should have no more than 5% water use for flushing. In my opinion use of more than 5% of total finished water for flushing is excessive.

Q. DO YOU RECOMMEND THAT A SINGLE MAXIMUM DAY FLOW SHOULD BE USED IN USED AND USEFUL CALCULATIONS?

A. No, the single maximum day flow should not be used in used and useful calculations in this filing. The single maximum day flow may include undetected or unrecorded leaks, flushing and unusual usage, in addition to the PSC allowed unaccounted for water. Normally, a water main leaks for days before detection and that amount of water loss is hard to keep track of. Main breaks and line flushing have similar situations because good records are hard to keep. Therefore, an average of the five highest maximum daily flows in the maximum month is justified and should be used for all used and useful calculations for water facilities. This has been the policy historically used by the Commission.

Q. DO YOU HAVE ANY COMMENTS ON THE USED AND USEFUL CALCULATIONS PREPARED BY PCUC FOR WATER SUPPLY WELLS?

A. Besides the margin reserve, I disagree with the inclusion of fire flow in supply wells used and useful calculations. As stated before it is not appropriate to meet instantaneous demands from water supply, especially when adequate storage exists to meet such demands. Therefore, it is inappropriate to include fire flow allowance in the supply wells used and useful calculations.

PCUC used called "firm reliable capacity" in calculating the used and useful percentages for water supply wells. The firm reliable capacity excludes the largest well capacity by assuming it to be out of service. When there are more than ten wells, the largest two wells are assumed to be out of service. The combined capacity of the remaining supply wells is the "firm reliable capacity."

However, when storage or high service pumping facilities are available, the "firm reliable capacity" method is not applicable. According to Section 3.2.1.1 Source capacity of *Recommended Standards For Water Works*:

> "The total developed groundwater source capacity shall equal or exceed the design maximum day demand and equal or exceed the design average day demand with the largest producing well out of service."

This design criteria should be used to calculate used and useful percentage for supply wells. For the above reason, the "firm reliable capacity"

method should not be applied to supply wells where the water system is also equipped with storage and high service pumping facilities. Adjustments have been made according to the above principles in Exhibit TLB-2.

Q. DO YOU HAVE ANY COMMENTS REGARDING USED AND USEFUL CALCULATIONS OF THE FINISHED WATER STORAGE?

A. In the MFR's, Exhibit JFG-1, Table D, PCUC used 50% of the maximum daily flow (MDF) as equalization and emergency storage. However, I believe a half (50%) of the average daily flow (ADF) is adequate for equalization and emergency storage. This allowance is more than adequate for equalization (peak hour demand) storage, compared with the 20 to 25% ADF mentioned in the AWWA M32. The excess storage can be used as a provision for emergency storage. The one day ADF storage criteria used in "10 States Standards" was reduced to one half day because MDF design is used for supply wells and treatment plant. With this provision for excess storage, I do not believe it is justified to add more allowance for emergency storage.

PCUC requested ten percent (10%) of the total finished water storage as "retention storage" because that portion of storage is unusable. These concerns are not true for all storage facilities, especially for elevated tanks. For ground storage facilities, as-built drawings should be able to reveal the minimum operating level. It is not justified to assume 10% of the storage capacity is retention storage for every single storage tank. PCUC provides no supporting

explanation to justify 10% retention storage allowance for each storage tank. Retention storage is not applicable to elevated storage tanks.

When designing storage tanks and high service pumps, engineers have to check the available net positive suction head (NPSH) and ensure that it is greater than the net required positive suction head to avoid cavitation problems. Therefore, the vortex situation is rare because high service pumps are always placed at a low grade to obtain the maximum NPSH. Based on my field inspection and response to OPC's Document Request No. 59, I believe some retention storage adjustment is necessary. A weighted average of 6% retention ~~Full~~ storage ~~tank capacity~~ was applied in my used and useful calculations, per Exhibit TLB-1 and Exhibit TLB-2.

Q. DO YOU AGREE WITH THE 100% USED AND USEFUL REQUEST FOR FACILITY LANDS?

A. No, PSC should not automatically grant 100% used and useful on facility lands. Every system has different sizes of facilities and lands. The current demands and available facilities are also unique between systems. These factors all dictate the facility usage. Therefore, a used and useful assessment is necessary for every facility land because all facility lands are part of the system. Facility lands are designed and used to serve the whole system, including new and existing customers. The higher the existing demand, the higher the used and useful percentage. Therefore, the used and useful percentages of facility lands should

be the same as the specific facility on it. However, based on the site plans provided in response to OPC's Document Request No. 61, I measured the acreage occupied by water and wastewater treatment facilities and total available land to calculate the used and useful percentages. Adjustments were made in my used and useful calculations as shown in Exhibits TLB-2 and TLB-3.

Q. DO YOU HAVE ANY COMMENTS ON THE USED AND USEFUL PERCENTAGES FOR WATER TRANSMISSION AND DISTRIBUTION FACILITIES REQUESTED BY PCUC?

A. The used and useful analysis for a water transmission and distribution system is not a flow measurement or flow projection technique. Therefore, it is inappropriate to use fire flow allowance in the used and useful calculation. Used and useful analysis is about allocating construction costs fairly to both existing and future customers. Normally engineers design the water transmission and distribution system with fire flow delivering capability. Therefore, the cost of laying water mains also includes the cost for fire flow provision. However, the fire flow provision is for all existing and future customers. The used and useful calculations proposed by PCUC shifts more cost burden to existing customers, especially in new or sparsely developed areas. By using a fire flow allowance factor, PCUC added an extra 33.1% to the used and useful percentages of water distribution mains and off-site mains.

On the other hand, the "lot count" method allocates the water main costs

evenly to all customers, after engineers have properly designed the whole system. The lot count method assigns a fair share of the total construction cost to every customer. The lot count method does not fail to recognize water main cost to accommodate fire flow and looped lines, because it allocates the total cost through used and useful percentages. Existing customers do not get a free ride because the construction costs of fire flow accommodation and looped lines are included in the total cost.

Water transmission and distribution systems are designed for all existing and future customers. The lot count method gives an equal cost share to all customers. Therefore, the lot count method will not discourage future development, as opposed to the method proposed by PCUC, which will probably discourage future development. However, in some instances the lot count method still favors future customers. If there is no future development, engineers would design a smaller size system for existing customers. However, most of the time water transmission and distribution mains are oversized for existing systems to accommodate future phases of development.

When lots located in future phases of a development are not connected to existing water mains, those lots are not included in the lot count method so as to reduce the used and useful calculation for existing customers. To the extend existing mains can serve those unconnected future lots, existing customers will support more than their share of the cost for the existing oversized mains. Therefore, existing customers in these instances are carrying extra costs for

laying larger sizes of water mains that ultimately will be connected to serve future development. Under those conditions, existing customers pay more than their fair share. PCUC should recover the cost of unused water mains by collecting contributions from new customers and AFPI and guaranteed revenues to cover the carrying costs of nonused and useful utility plant.

In addition, fire hydrants are part of the distribution system and there is no need to perform a separate used and useful analysis. Appropriate used and useful adjustments have been made in the Exhibit TLB-2.

Q. DO YOU HAVE ANY COMMENTS REGARDING THE USED AND USEFUL PERCENTAGES REQUESTED BY PCUC FOR THE WASTEWATER COLLECTION SYSTEM?

A. The lot count method should also be used to determine the used and useful percentage for the wastewater collection system. This method should be used because the overall collection system is designed for existing and future customers. Lot count provides an equal share for all customers, so that existing customers will not subsidize future customers. ~~It is inappropriate and unnecessary to break down the collection system used and useful into gravity main, pretreatment effluent pumping (PEP) main, PEP tanks, force main, and service lines as PCUC has proposed.~~ In Exhibit TLB-3, a combined used and useful percentage was calculated for gravity mains, force mains, and pumping plants. However, due to large numbers of sewer service lines and PEP mains

installed on vacant lots, I also calculated separate used and useful percentages for gravity sewer service lines and PEP mains in Exhibit TLB-3.

Q. SHOULD GALLONS OF WASTEWATER TREATED EXCLUDE EXCESS INFLOW AND INFILTRATION IN ENGINEERING SCHEDULE F-2(S)?

A. Yes. For used and useful analysis, the amount of wastewater treated should not include any excessive inflow and infiltration. Engineering Schedules F-2(S) filed by PCUC did not show the inflow and infiltration condition of its wastewater collection system. The inflow/infiltration information should be presented to show the conditions of collection system. It is inappropriate to add an inflow and infiltration allowance in the used and useful calculation for wastewater systems.

Many guideline criteria are available and can be used for infiltration allowance on gravity sewers. In the *Recommended Standards for Wastewater Facilities,* 200 gallons per inch of pipe diameter per mile per day is the recommended guideline and that criteria is generally used by the Florida Department of Environmental Protection (FDEP) staff.

Any excessive inflow and infiltration should be excluded from the amount of wastewater treated. ~~Currently no excess inflow and infiltration was determined in my used and useful analysis. However, OPC is requesting more information to confirm there is no excess inflow and infiltration in the wastewater collection system. Future adjustments may be necessary pending the results of~~

further discovery. Based on the response to OPC's Interrogatory No. 65 and information provided in the MFR's, I calculated there is 7.85% excessive inflow and infiltration, as my Exhibit TLB-3.1 illustrates. Proper adjustments were applied to my used and useful percentages in Exhibit TLB-3.

Q. WHAT IS THE CAPACITY OF EFFLUENT DISPOSAL/REUSE FACILITIES OF PCUC?

A. According to FDEP permit No. DC18-244706, modified on February 16, 1995, PCUC has a total of 4.2 million gallons per day (MGD) effluent disposal and reuse capacity. ~~Therefore, this capacity was used in my used and useful calculation in Exhibit TLB-3~~. However, during my field investigation, the utility engineer explained that the current available capacity is 3.4 MGD not 4.2 MGD and DEP is revising its construction permit. Therefore, I have reduced the effluent disposal capacity to 3.4 MGD and revised my used and useful calculation in Exhibit TLB-3.

Q. DO YOU AGREE WITH PCUC THAT 20% OF THE FACILITY COST SHOULD BE INCLUDED IN RATE BASE REGARDLESS OF EXISTING DEMANDS?

A. No. Every customer should pay his or her fair share for the overall facility cost. PSC should not allow PCUC's request to include 20% of the cost in rate base without regard to current demands.

Q. DID YOU PREPARE ANY USED AND USEFUL CALCULATIONS IN

THIS TESTIMONY?

A. Yes, I have calculated the used and useful percentages for all water and wastewater systems, according to my positions on the above issues. However, some information was not provided by PCUC, and I had to make many assumptions in the calculations. For example, fire flow provision was included without confirmation. All numbers filed by PCUC were used, and assumed to be genuine and correct. The calculated used and useful percentages of water and wastewater systems are presented in Exhibit TLB-2 and Exhibit TLB-3, respectively. A summary which explains the rationale behind my various used and useful calculations can be found in Exhibit TLB-1. However, these used and useful numbers are subject to change pending further responses to discovery.

Q. DOES THIS CONCLUDE YOUR PREFILED TESTIMONY?

A Yes, that concludes my testimony filed on May 21, 1996.

EXHIBIT TLB-1

KEY AND RATIONALE

FOR

OPC USED AND USEFUL CALCULATIONS

KEY AND RATIONALE FOR OPC USED AND USEFUL CALCULATIONS

I. SUPPLY WELL

Used & Useful % = **MDF/Total Capacity** or **ADF/Reliable Capacity,**

Whichever is greater.

Rationale ---- ADF/Reliable Capacity is used because the percentage is greater than MDF/Total Capacity. "10 States Standards" states that "the total developed groundwater source capacity shall equal or exceed the design maximum day demand and equal or exceed the design average day demand with the largest producing well out of service."

Notes: 1. PHF = Peak Hourly Flow; MDF = Avg. 5 Max Day Flows in Max Month; ADF = Annual Avg. Day Flow; FF = Fire Flow.

2. Water flow shall be adjusted for excess unaccounted for water, if any.

3. No margin reserve was included in OPC's calculations.

II. WATER TREATMENT PLANT

Used & Useful % = **MDF/Total Capacity**

Rationale ---- It is not cost effective to size water treatment plant to meet instantaneous demands like fire flow and peak hour demands.

III. FINISHED WATER STORAGE

Used & Useful % = **(1/2 ADF + FF)/Total Capacity**

Rationale ---- AWWA M32 suggests that equalization storage is about 20 to 25 percent of the average day demand. Fire storage shall be included if fire flow is provided. Emergency storage is an owner option.

---- "10 States Standard" requires fire flow storage where fire protection is provided. The minimum storage capacity for systems not

providing fire protection shall be equal to the average daily consumption (ADF). This requirement may be reduced when the source and treatment facilities have sufficient capacity with stand by power to supplement peak demands of the system. Emergency storage is not mentioned in this reference.

---- PCUC uses 50% maximum day demand for equalization and emergency storage.

---- OPC believes fire storage should be included when and where fire protection is provided.

When the system is furnishing fire flow, a half day ADF storage is appropriate. That volume is more than adequate for peak hour demand storage compared with 20 to 25% ADF mentioned in the AWWA M32. Storage of a half day ADF is also close to PCUC's method. The excess storage can be considered as a provision for emergency storage. The one day ADF storage criteria used in "10 States Standards" was reduced to one half day because MDF design flow is used for supply wells, treatment plant and high service pumps.

No additional emergency storage is included because it is an owner's option. Total capacity is used because PCUC used 10% for retention storage without confirmation. Retention storage is not applicable to elevated storage tanks.

IV. WASTEWATER TREATMENT PLANT

Used & Useful % = **Max. ADF of 3-Month/Total Capacity**

Rationale ---- Though the capacity permitted is annual ADF, OPC agrees to use the maximum ADF of 3-month.

Note: Wastewater flow should be adjusted for excess inflow/infiltration, if any amount is confirmed.

V. EFFLUENT DISPOSAL AND EFFLUENT REUSE FACILITY

Used & Useful % = **Max. ADF of 3-Month/Total Capacity**

Rationale ---- Same as WWTP.

VI. WATER DISTRIBUTION SYSTEM AND WASTEWATER COLLECTION SYSTEM

Used & Useful % = **Lots Connected/Total Lots Available**

Rationale ---- See direct testimony.

EXHIBIT TLB-2

OPC USED AND USEFUL CALCULATIONS
OF
WATER SYSTEMS

OPC USED AND USEFUL CALCULATIONS
Water Treatment Plant - Schedule F-5 (W)

Line No.	Docket No. 951056-WS Company: Palm Coast Utility Corporation Schedule Year Ended: 12/31/95 Historic [x]; Projected [x]	Palm Coast
1	1994 MAX DAY FOR YEAR (GPD)	4,890,000
2	**1994 AVG MAX 5 DAYS IN MAX MONTH[1] (GPD)**	4,346,000
3	1994 ANNUAL AVG DAILY FLOW (GPD)	3,466,123
4	FIRE STORAGE ACCEPTED (GAL.)	600,000
5	FIRE FLOW PROVISION (GPM)	2,000
6	Unaccounted for Water Level (%)	4.68%
7	Unaccounted for Water Allowed (%)	4.68%
8		
9	**SOURCE OF SUPPLY AND PUMPING:**	
10	**Supply Wells:**	
11	Total Capacity (gpd)	10,719,360
12	Reliable Capacity (gpd)	7,768,600
13	OPC Calculated Used & Useful (%)	**44.62%**
14	PCUC Requested U & U (%)	81.90%
15		
16	**Land & Land Rights:**	
17	OPC Calculated Used & Useful (%)	**44.62%**
18	PCUC Requested U & U (%)	100.00%
19		
20	**WATER TREATMENT PLANT:**	
21	**Water Treatment Equipment:**	
22	Total Capacity (gpd)	8,000,000
23	Capacity less 10% plant use (gpd)	7,400,000
24	OPC Calculated Used & Useful (%)	**54.33%**
25	PCUC Requested U & U (%)	95.20%
26		
27	**Land & Land Rights:**	
28	OPC Calculated Used & Useful[2] (%)	**41.72%**
29	PCUC Requested U & U (%)	100.00%
30		
31	**TRANSMISSION AND DISTRIBUTION:**	
32	**Finished Water Storage:**	
33	Total Capacity (gal.)	4,150,000
34	Less Retention Capacity[3] (gal.)	3,900,000
35	OPC Calculated Used & Useful (%)	**59.82%**
36	PCUC Requested U & U (%)	100.00%
37		
38	**Land & Land Rights:**	
39	OPC Calculated Used & Useful (%)	**59.82%**
40	PCUC Requested U & U (%)	100.00%
41		
42	**USED AND USEFUL CALCULATIONS** **Water Transmission & Distribution System**	
43	**Schedule F-7(W)**	
44	**WATER TRANSMISSION AND DISTRIBUTION SYSTEM:**	
45	Connected Lots in 1995 (Total water bills/12)	11,409
46	Total Number of Lots (Exh. JFG-1, Tables E-1)	46,438
47	OPC Calculated Used & Useful (%)	**24.57%**
48	PCUC Requested U & U (%)	65.90%
49		
50	**SERVICE LINES:**	
51	Connected Lots in 1995 (Total water bills/12)	11,409
52	Total Number of Services (Exh. JFG-1, Tables F)	15,172
53	OPC Calculated Used & Useful (%)	**75.20%**
54	PCUC Requested U & U (%)	89.60%
55		

56 Notes:
57 1. PCUC claimed 1994 experienced higher demands.
58 2. Derived from site plans of response to OPC POD No. 61.
59 3. Derived from as-built drawings of response to OPC POD No. 59.

EXHIBIT TLB-3

OPC USED AND USEFUL CALCULATIONS
OF
WASTEWATER SYSTEMS

OPC USED AND USEFUL CALCULATIONS

Line No.	**Wastewater Treatment Plant** **Schedule F-6 (S)** Docket No. 951056-WS Company: Palm Coast Utility Corporation Schedule Year Ended: 12/31/95 Historic [x]; Projected [x]	**Palm Coast**
1	PERMITTED PLANT CAPACITY, ANNUAL ADF (GPD)	4,000,000
2	EFFLUENT DISPOSAL CAPACITY, ANNUAL ADF (GPD)	3,400,000
3	MAXIMUM 3-MONTH DEMAND (GPD),(Exh. JFG-1, Table N-1)	2,089,080
4	Less Excess Inflow/Infiltration (GPD)	1,925,164
5	EXCESS Inflow/Infiltration (%), (See Exh. TLB-3.1)	7.8%
6	EXCESS INFLOW/INFILTRATION (GPD)	163,916
7		
8	**TREATMENT PLANT AND EFFLUENT DISPOSAL:**	
9	**Treatment Plant:**	
10	OPC Calculated Used & Useful (%)	**48.13%**
11	PCUC Requested U & U (%)	87.20%
12	**Land & Land Rights:**	
13	OPC Calculated Used & Useful[1] (%)	**66.17%**
14	PCUC Requested U & U (%)	100.00%
15	**Effluent Disposal/Reuse Facilities:**	
16	OPC Calculated Used & Useful (%)	**56.62%**
17	PCUC Requested U & U (%)	87.20%
18	**Land & Land Rights:**	
19	OPC Calculated Used & Useful (%)	**56.62%**
20	PCUC Requested U & U (%)	100.00%
21		
22	**USED AND USEFUL CALCULATIONS**	
	Wastewater Collection System	
23	**Schedule F-7(S) (Exh. JFG-1, Table L)**	
24	**COLLECTION SYSTEM (Gravity and Force Mains):**	
25	Connected Lots in 1995 Average[2]	10,192
26	Total Number of Lots (Exh. JFG-1, Tables J & L)	46,438
27	OPC Calculated Used & Useful (%)	**21.95%**
28	PCUC Requested U & U (%)	59.00%
29		
30	**COLLECTION SYSTEM PUMPING PLANT:**	
31	OPC Calculated Used & Useful (%)	**21.95%**
32	PCUC Requested U & U (%)	57.10%
33	**Land & Land Rights:**	
34	OPC Calculated Used & Useful (%)	**21.95%**
35	PCUC Requested U & U (%)	100.00%
36		
37	**SEWER SERVICES:**	
38	Residential Gravity Connected Lots (OPC Int. No. 72)	8,573
39	Total Number of Services (Exh. JFG-1, Tables J & L)	25,062
40	OPC Calculated Used & Useful (%)	**34.21%**
41	PCUC Requested U & U (%)	46.30%
42		
43	**PEP MAIN:**	
44	Residential PEP Connected Lots (OPC Int. No. 72)	1,286
45	Total Lots Served by PEP (Exh. JFG-1, Table J)	21,376
46	OPC Calculated Used & Useful (%)	**6.01%**
47	PCUC Requested U & U (%)	6.70%
48		
49	Notes:	
50	1. Derived from site plans of response to OPC POD No. 61.	
51	2. Information from the response to OPC Interrogatory No. 72.	
52		
53		
54		
55		

EXHIBIT TLB-3.1

OPC USED AND USEFUL CALCULATIONS

OF

INFLOW/INFILTRATION ESTIMATE

ON

PALM COAST SYSTEM

OPC USED AND USEFUL CALCULATIONS

Palm Coast
Wastewater Treatment Plant
Inflow & Infiltration Estimate
Docket No. 951056-WS

PALM COAST

Schedule Year Ended: 12/31/95
Historic [x]; Projected [x]

Line No.				
1	Water Sold to Wastewater Customers in 1995 (GPD)[1]	1,249,000		
2	85% Return as Domestic Wastewater (GPD)[2]	**1,061,650**		
3	Wastewater from Sewer Only Customers (GPD)	0		
4	Total Wastewater Flow from Sewer Customers (GPD)	**1,061,650**		
5	Inflow/Infiltration Allowance (GPD)	510,514		
6	**MAX ADF OF 3-MONTH (GPD)**	2,089,080		
7	Reject Concentrate from Menbrane Treatment Estimate (GPD)[3]	353,000		
8	**Excess Inflow and Infiltration (GPD)**	**163,916**		
9	**Excess Inflow and Infiltration (%)**	7.85%		
10				
11	**ALLOWANCE OF IFLOW/INFILTRATION (200 gpd/in/mi)**	GPD	FEET	IN
12	**Gravity Mains[1]:**			
13	8" CI/DI	43	143	8
14	10" CI/DI	187	494	10
15	12" CI/DI	24	52	12
16				
17	8" PVC	246,417	813,175	8
18	10" PVC	28,087	74,149	10
19	12" PVC	14,653	32,236	12
20	15" PVC	6	10	15
21	16" PVC	13	21	16
22				
23	8" VCP	95,086	313,785	8
24	10" VCP	6,001	15,843	10
25	12" VCP	5,906	12,994	12
26	15" VCP	2,648	4,660	15
27				
28	**Pressure Sewer[1]:**			
29	4" DIP	9	60	4
30	2" PVC	12,877	169,976	2
31	2.5" PVC	62,642	661,498	2.5
32	3" PVC	20,853	183,503	3
33	4" PVC	8,298	54,767	4
34	6" PVC	6,765	29,767	6
35	**Total Inflow/Infiltration Allowance (GPD)**	**510,514**		
36	NOTES:			
37	1. Responses to OPC Interrogatories No. 65.			
38	2. MFR's Vol. I, page 137-N.			
39	3. Exhibit JFG-1, Table B, Membrane Concentrate .353 MGD.			