JACK SHREVE
PUBLIC COUNSEL

# STATE OF FLORIDA
## OFFICE OF THE PUBLIC COUNSEL

c/o The Florida Legislature
111 West Madison St.
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Tallahassee, Florida 32399-1400
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March 22, 1999

Ms. Blanca S. Bayó, Director
Division of Records and Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0870

RE: Docket No.971065-SU

Dear Ms. Bayó:

Enclosed are an original and fifteen copies of Prefiled Testimony of Ted L. Biddy, P.E./P.L.S. for filing in the above-referenced docket.

Please indicate receipt of filing by date-stamping the attached copy of this letter and returning it to this office. Thank you for your assistance in this matter.

Sincerely,

Stephen C. Burgess
Deputy Public Counsel

ACK ____
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SCB/dsb
Enclosures

# PREFILED 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. 971065-SU**

**March 22, 1999**

**Q. WHAT IS YOUR NAME AND BUSINESS ADDRESS?**

A. My name is Ted L. Biddy. My business address is 2308 Clara Kee Boulevard, Tallahassee, Florida 32303.

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

A. I am currently self-employed as a professional engineer and land surveyor.

**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, Mississippi and several other states. I was the vice-president of Baskerville-Donovan, Inc. (BDI) and the regional manager of Tallahassee Office from April 1991 until February, 1998. 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 facility design; roadway design; parking lot design; stormwater facilities design; structural design; land surveys; and environmental permitting.

I have served as the principal and chief designer for numerous utility projects. Among my major water and wastewater facilities designs have been a 2,000 acres development in Lake County, FL; a 1,200 acres development in Ocean Springs, MS; a 4-mile water distribution system for Talquin Electric

Cooperative, Inc. and a 320-lot subdivision in Leon County, FL.

**Q. WHAT ARE YOUR PROFESSIONAL AFFILIATIONS?**

A. I am a member of the Florida Engineering Society, National Society of Professional Engineers, and Florida Society of Professional Land Surveyors.

**Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE A STATE OR FEDERAL COURT AS AN ENGINEERING EXPERT WITNESS?**

A. Yes, I have had numerous court appearances as an expert witness for cases involving roadways, utilities, drainage, stormwater, water and wastewater facilities designs.

**Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION (PSC OR COMMISSION) FOR USED AND USEFUL ANALYSIS AND OTHER ENGINEERING ISSUES?**

A. Yes, I have testified before the PSC for Docket Nos. 950495-WS, 950387-SU, 951056-WS and 960329-WS on engineering issues and used and useful analysis. I also testified on the remand case of Docket No. 950387-SU on behalf of the Citizens of State of Florida.

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

A. The purpose of my testimony is to provide engineering testimony on the used and useful calculation issues for this rate case, including the wastewater treatment plant, effluent disposal system, collection system and other engineering related issues. In particular, I address why it is appropriate, from an engineering perspective, to use annual average daily flow in both the numerator and denominator of the used and useful calculation for the WWTP of Mid-County Services, Inc.'s (Mid-County).

**Q. DO YOU AGREE WITH THE USED AND USEFUL METHODOLOGY PROPOSED BY MID-COUNTY FOR ITS WASTEWATER TREATMENT PLANT (WWTP), AND EXPLAIN WHY?**

A. No, I do not. Mid-County asserts that the average daily flow of the maximum month (ADFMM) should be used for the numerator in the calculation of used and useful percentage, regardless of how the plant capacity (denominator) is permitted or designed. Mid-County witness Mr. Seidman argues that ADFMM should be used even though the plant is permitted on the basis of annual average daily flow (AADF) because PSC has been using it for numerous rate cases. However, it is clear that AADF and ADFMM are not on the same basis. I agree with PSC staff's recommendation to use the correct match method to calculate the used and useful percentages.

The capacity of a wastewater treatment plant can be designed on the basis of either AADF or ADFMM. The Florida Department of Environmental Protection (FDEP) generally depends on the engineering design report to issue the plant permit capacity. Therefore, if AADF is used in the design report, the permit will be in AADF or vise versa. I am not aware of any case that FDEP had issued a permit in a different flow basis than the one used in the engineering design report. Therefore, I cannot agree with Mid-County's proposal because it does not match the flow with the permitted capacity of the plant.

**Q. IS IT CORRET THAT USED AND USEFUL IS A CONCEPT, AN ABSTRACT IDEA, SO MATHEMATICAL RULES AND SCIENTIFIC TERMS DO NOT APPLY?**

A. No, that is incorrect. The used and useful determination indeed is a concept but

it is not an abstract idea. However, all the mathematical rules and scientific terms should be followed and applied to the concept. The used and useful process is a combination of economic regulation and engineering design concept. The engineering design perspective still should dictate the economic regulation in the used and useful calculations.

**Q. WHAT IS THE APPROPRIATE METHOD IN CALCULATING THE USED AND USEFUL PERCENTAGE FOR A WASTEWATER TREATMENT PLANT AND THE EFFLUENT DISPOSAL FACILITIES?**

A. It depends on what basis the wastewater treatment plant capacity is permitted by FDEP or designed by the engineers. If the plant capacity is permitted or designed on the basis of AADF, then the test year AADF should be used for the numerator. On the other hand, if the plant capacity is permitted or designed on the basis of ADFMM, then the test year average daily flow of maximum month (ADFMM) should be used. Generally, the FDEP permitted capacity is the same as the original designed capacity. Normally the treatment plant and its effluent disposal facility have the same capacities.

This method will insure that both numerator and denominator are arrived at from the same basis, i.e. apples to apples or oranges to oranges. To compute the used and useful percentage as Mid-County suggests would be to mix comparisons of ADFMM to AADF and would yield a percentage with no meaning, as would comparing apples to oranges.

**Q. CAN YOU USE AN EXAMPLE TO DEMONSTRATE THE APPROPRIATE METHODOLOGY?**

A. Yes. See the following examples for a simple demonstration.

Example 1 Wastewater Plant A:

Plant Design Capacity = 1.0 MGD on ADFMM basis

FDEP Permit Capacity = 1.0 MGD on ADFMM basis

Plant ADFMM = 0.9 MGD during the test year

Then, Used & Useful % = 0.9 MGD/1.0 MGD = 90%

Example 2 Wastewater Plant B:

Plant Design Capacity = 1.0 MGD on AADF basis

FDEP Permit Capacity = 1.0 MGD on AADF basis

Plant AADF = 0.7 MGD during the test year

Then, Used & Useful % = 0.7 MGD/1.0 MGD = 70%

Example 3 Wastewater Plant C:

Plant Design & Permit Capacity = 1.0 MGD on ADFMM basis

or 0.8 MGD on AADF basis

Plant AADF = 0.7 MGD during the test year

Plant ADFMM = 0.9 MGD during the test year

Then, Used & Useful % = 0.7 MGD/0.8 MGD = 87.5%

or 0.9 MGD/1.0 MGD = 90%

The inappropriate methodology requested by MID-COUNTY can be seen from the following example.

Example 4 Wastewater Plant D:

Plant Design & Permit Capacity = 1.0 MGD on AADF basis

Plant ADFMM = 0.9 MGD during the test year

Plant AADF = 0.7 MGD during the test year

Then, Used & Useful % = 0.9 MGD/ 1.0 MGD = 90%

On the other hand, the correct used and useful percentage should be 0.7 MGD/1.0 MGD = 70%. This is a 20% difference which should not be granted to the utiltiy.

Clearly, this method of computing the used and useful percentage artificially inflates the results by using the ADFMM value in the numerator rather than the AADF value which would obviously be much lower.

Note: The above used and useful calculations do not include any adjustments for margin reserve, excess inflow and infiltration, etc.

Examples 1 and 2 illustrate the significance of plant flow design and permit basis in calculating the used and useful percentages. Example 3 demonstrates that the AADF match calculation generates a similar used and useful percentage as the ADFMM match to account for the peak flows. Example 4 illustrates a meaningless used and useful percentage and demonstrate the unjustified extra used and useful credit given to the utilities in the past.

Although the FDEP permit may be expressed in AADF, the plant still can handle a higher hydraulic peak flow as designed by the engineer. Therefore, it is fair and logical to use AADF flows to AADF capacity for the used and useful calculation. This certainly does not mean all hydraulic peak flows are ignored, it just assumes the peak flow to average flow ratio stays the same as designed by the engineer.

**Q. DOES THE FDEP PERMIT ALWAYS HAVE A CLEAR DESIGNATION OF THE PLANT'S PERMITTED CAPACITY?**

A. In the past, the FDEP permits normally did not specifically state the permitted plant capacity is in terms of AADF or ADFMM. However, since 1992 or 1993

all FDEP permits are clear on the flow basis because the permit applicants are required to fill out the basis of design flow in the permit application forms.

**Q. DOES THE METHODOLOGY PROPOSED BY MID-COUNTY INFLATE THE USED AND USEFUL PERCENTAGE AND ADVERSELY IMPACT THE CURRENT CUSTOMERS?**

A. Yes, the mismatch of ADFMM to AADF will create a higher used and useful percentage than the correct match of AADF to AADF calculation. Therefore, the current customers will pay higher rates because the rate base will be inflated.

**Q. WILL THE CORRECT MATCH OF AADF PLANT FLOW TO AADF PLANT CAPACITY OR ADFMM PLANT FLOW TO ADFMM PLANT CAPACITY GENERATE A FAIR USED AND USEFUL PERCENTAGE FOR THE UTILITY?**

A. Yes. The correct match of plant flows to plant capacities will generate fair used and useful percentages for the customers and the utilities. The reason is that a WWTP is designed by the utility's engineer, and the FDEP uses the engineer's preliminary design report to rate the permit capacity. In the preliminary design report, the plant design flow is determined by the engineer: it could be AADF, ADFMM, three-month average daily flow or other flow basis as permitted by FDEP. The engineers also determined the appropriate design influent characteristics: such as biochemical oxygen demand (BOD), total suspended solids (TSS), total nitrogen, total phosphorous, etc. for the particular plant flow designed for. Therefore, the correct flow basis match will generate a fair used and useful percentage because everything is based on the engineering design.

**Q. DOES THE CORRECT MATCH METHOD IGNORE THE**

**ASSOCIATED PLANT COSTS TO HANDLE THE PEAK FLOWS?**

A. No. Though most of the time engineers use AADF as the basis of design flow, peak flow conditions are still considered in the hydraulic loading design. Historic peaking factors are generally used to project the peak flow conditions from the AADF. Therefore, the used and useful percentage should be the same or very close, whether AADF or ADFMM is used as the basis for used and useful calculation.

The correct match method does not ignore peak flows since the costs of plant facilities to handle the peak flows are included in the total plant construction costs (i.e. plant in service or rate base). The ratios or peaking factors between AADF and ADFMM are determined by the utility engineer. That relationship cannot be skewed by only applying peaking factors to the test year flow and not the plant capacity.

**Q. IS THERE ANY BENEFIT THE UTILITY CAN ENJOY FROM THE CORRECT MATCH OF PLANT FLOW TO PLANT CAPACITY CALCULATION?**

A. Yes. The PSC is only comparing the hydraulic loading rate to the WWTP capacity which is actually based on both hydraulic and biological loading rates, i.e. the design flows and wastewater strength. When the influent wastewater strength is less than the original design, the same plant will be able to handle more flow because less solids are generated. However, the original plant design capacity is still used as the denominator for the used and useful calculation. Generally speaking a WWTP is designed to handle a hydraulic flow rate greater than the designed AADF flow rate.

In reality, the PSC could increase the plant capacity and lower the used and useful percentage. However, I do not recommend that practice because it will be a time consuming and controversial task for the PSC staff. Some components in a WWTP are designed for not just the maximum day flow but the peak hourly flows. In addition, an equalization tank is normally designed to dampen the peak hourly flows for small wastewater treatment facilities. Most of the time, the PSC staff calculates a single used and useful percentage based on the total plant design capacity instead of individual used and useful calculation for each component in the plant. Therefore, I believe that the utilities still will benefit from the correct match of plant flows to plant design capacities for the used and useful calculations.

**Q. DO YOU HAVE ANY COMMENTS REGARDING THE FIRM RELIABLE CAPACITY USED IN THE MFR'S SCHEDULE F-6 AND WHAT IS THE APPROPRIATE PLANT CAPACITY THAT SHOULD BE USED IN THE CALCULATIONS OF WWTP AND EFFLUENT DISPOSAL FACILITY?**

A. Normally the term of firm reliable capacity is applied to the groundwater wells and water storage tanks. For example in the *Recommended Standards for Water Works,* 3.2.1.1 Source Capacity, the similar concept is stated:

> 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.

In the wastewater industry, Class I reliability is frequently used and it is

required for a WWTP discharging effluent to surface waters. I assume the firm reliability used by the Utility is referring to the Class I reliability requirement. However, according to the general guidance of MCD-05 in Chapter 62-610.300(1)(C ), F.A.C., the remaining components are not required to handle the full design plant flow when one unit is out of service. For example, with one chlorine contact chamber (CCC) out of service, the remaining CCC shall handle 50% of the total design flow. For final sedimentation basins and filters, with one unit out of service, the remaining unit(s) shall be able to handle 75% of the total design flow. Apparently the reliability requirement does not mandate the remaining treatment unit(s) to handle the full design plant flow. Therefore, I believe that using the firm reliable plant capacity and the test year plant flow will inappropriately inflate the used and useful percentages.

According to Mid-County's consulting engineers, the plant design flow is 1.1 MGD. This information has been stated in several documents and they are attached as Exhibits TLB-1, 2 and 3. It is my understanding that in 1980 a 600,000 GPD plant expansion was made to the original 500,000 GPD plant. Though the existing permitted capacity is 0.9 MGD AADF, I believe that the plant still has 1.1 MGD capacity. The 0.9 MGD permit capacity was derived from converting 200,000 gallons of the aeration basin into the existing equalization basin. Other than that, all the treatment and effluent disposal facilities are still designed for 1.1 MGD. For example, the denitrification filters are designed and constructed at 1.1 MGD for the average flows and 3.3 MGD under the peak flow condition. See Exhibit TLB-4 for the specification of gravity deep-bed filters.

Mid-County's WWTP is an advanced wastewater treatment plant because it discharges treated effluent to Curlew Creek. To meet the stringent standards, this facility utilizes chemical treatment to remove the nitrogen and phosphorous nutrients. Ferric sulfate is added at aeration basins for phosphorous removal and methanol is applied at the denitrification filters to remove nitrogen. In other words, this is not a biological nutrient removal plant. Therefore, the nutrient removal process is not heavily dependent upon the hydraulic retention time of the aeration basins. To maintain the 1.1 MGD design capacity, the current design mean cell residence time or solids retention time (SRT) needs to be maintained and that can be achieved by keeping a higher concentration of mixed liquor (MLSS) in aeration basins and wasting less sludge. The normal MLSS range is 3,000 to 6,000 mg/L. The hydraulic retention time (HRT) loss to the equalization basin will make the WWTP operation toward the modified extended aeration mode. For 1.1 MGD design flow the HRT will be 19.6 hours instead of 24 hours. However, it is still within the design range of 18 to 36 hours for the extended aeration process. See Exhibit TLB-5 for the normal ranges of process design parameters. Therefore, it is fair to say this plant still has the 1.1 MGD design capacity with 900,000 gallons of aeration basin volume.

During my file review at FDEP Tampa Office, I found out that the plant capacity has been in question throughout the years. In the past, the original utility owner had requested the plant to be rated at a lower permit capacity than the actual design capacity to reduce the testing and operator requirements. This is stated in the May 25, 1993 letter from Mid-County to FDEP, per Exhibit TLB-6. On the other hand, when the committed flows were near or exceeding

the permit capacity, Mid-County requested FDEP to add 100,000 GPD capacity back to the permit and recalculated the committed flows to prove adequate plant capacity to serve new development. This is also documented in Exhibit TLB-7. Therefore, I believe that 1.1 MGD capacity should be used for calculating the used and useful percentages of WWTP and effluent disposal facilities.

**Q. IS IT APPROPRIATE TO USE A PEAKING FACTOR TO INCREASE THE USED AND USEFUL PERCENTAGE?**

A. No, it is inappropriate to apply a peaking factor after the used and useful calculation as proposed by the Utility's witness Mr. Seidman. Peaking factors are used to estimate the peak hourly flows and maximum daily flows from the average daily flows when engineers are designing water or wastewater treatment process units. For example on pages 10-4 and 10-5 of the *Recommended Standards for Wastewater Facilities*, a peaking factor is used to estimate the hydraulic capacity for a wastewater facility to serve its collection system. Therefore, the treatment plant is designed to handle the anticipated peak flow conditions, though the design flow basis may be in AADF instead of ADFMM or maximum daily flow. Applying a peaking factor to the test year plant flow and not to plant capacity will again artificially inflated the used and useful percentage. Arbitrarily applying a peaking factor in the used and useful determination is incorrect, and it is controversial because the peaking factors can vary in a wide range.

**Q. HAVE YOU PREPARED ANY USED AND USEFUL CALCULATION SCHEDULES FOR THIS CASE?**

A. Yes, please see Exhibit TLB-8 for the recommended used and useful

percentages of the wastewater treatment plant and the effluent disposal facilities.

**Q. DO YOU AGREE THAT THE COLLECTION SYSTEM SHOULD BE 100% USED AND USEFUL? IF NOT WHAT IS THE APPROPRIATE USED AND USEFUL PERCENTAGE?**

A. No. Though the Mid-County's service area apparently is reaching the build-out condition, there are still many vacant lots that can be developed in the future. For example, the Brookfield Villas subdivision was under development during the test year 1996. According to Mid-County's August 1998 Capacity Analysis Report on page 3, "The major known development in this service area, Brookfield Villas Project, could add approximately 150 additional units over the next 5 - 10 years." See Exhibit TLB-1. Currently it still has one house under construction at the Brookfield Villa Phase II. Therefore, it is not justified to request 100% used and useful for the collection system. These new units will utilize the existing collection system which is already constructed, including gravity sewers and lift stations. This condition is revealed by the service area map filed with the MFR's.

I do not separate the gravity sewer systems and the force main systems because they are integrated together and individual used and useful percentage will be difficult to determine. For example, when a force main discharge wastewater into a gravity sewer downstream, it will be more meaningful and feasible to determine the overall used and useful percentage for the force main and the gravity sewer systems together.

Normally the used and useful percentage of the collection system is based on the test year ERC and total ERC available of the existing system. In

this case, Mid-County only provides sewer service and the water service is provided by adjacent municipalities. It is difficult to figure out exactly how many gallons of water are used by an average single family customer. In addition, there are so many commercial customers within the service area. Therefore, no accurate ERC information was provided in the MFR's. For example, Mid-County used 275 gpd/ERC as the yard stick to calculate the existing and total ERC numbers for Schedules F-8 and 10. Actually 275 gpd/cap is the EPA guideline for excess inflow determination.

Therefore, the regular procedure is not feasible for this case. One alternative is to count the gravity sewer linear footage to determine the used and useful percentage. Wherever the gravity sewer line runs through undeveloped property, that section of sewer line is considered non-used and useful. By this method, the collection system should be 90.47% used and useful. See Exhibit TLB-9 for more details.

**Q. IS A 5-YEAR MARGIN RESERVE APPROPRIATE FOR THE USED AND USFUL DETERMINATION?**

A. No. This issue has been discussed in many prior cases that I have been involved. The rationale used for the 5-year time period is from the FDEP rules Chapter 62-600.405(8)(a), F.A.C. The purpose of this rule is to ensure that the utilities will make timely planning, design and construction of needed expansion. However, the only requirement is to have a professional engineer registered in Florida to sign and seal a statement that "planning and preliminary design of the necessary expansion have been initiated" when the permitted capacity will be equaled or exceeded within the next five years. It is not

justified to require existing customers to pay for the future 5-year plant capacity just based on that statement. The utility owner is required to comply with the rules not the existing rate payers.

**Q. DO YOU HAVE ANYTHING ELSE TO ADD TO YOUR TESTIMONY?**

A. Yes. There is a total amount of $296,659 of Construction Work in Progress in Schedule A-6 on page 10B of the MFR's. Besides two of the nine projects which are operation and maintenance related, the remaining projects are capital investment.

The two operation and maintenance projects are: (1) Line No. 4-Remove sand and grit from the WWTP tankage; and (2) Line No. 6-Clean and televise portion of the sewer lines impacted by the telephone cable installation.

However, two of the remaining seven projects are associated with relocating sanitary sewer lines along Curlew Road and Belcher Road. These projects are required because the roadways were widened and all utility lines need to be relocated according to the new right of way line. The total of these two projects are $195,891.

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

A. Yes.

# EXHIBITS LIST

| | |
|---|---|
| EXHIBIT TLB-1 | Capacity Analysis Report, August 1998. |
| EXHIBIT TLB-2 | Operation and Maintenance Performance Report, March 1992. |
| EXHIBIT TLB-3 | Minimal Negative Impact Study of Curlew Creek |
| EXHIBIT TLB-4 | Sample Specification TETRA Gravity Deep-Bed Filters |
| EXHIBIT TLB-5 | Wastewater Engineering: Treatment/Disposal/Reuse |
| EXHIBIT TLB-6 | May 25, 1993 Mid-County Services, Inc. letter to FDEP |
| EXHIBIT TLB-7 | April 25, 1993 FDEP letter to Mid-County Services, Inc. |
| EXHIBIT TLB-8 | Used and Useful Calculations for WWTP and Effluent Disposal Facilities |
| EXHIBIT TLB-9 | Used and Useful Calculation for Wastewater Collection System |
| EXHIBIT TLB-10 | 1997 Annual Report, Page S-7. |

COPY



# CAPACITY ANALYSIS REPORT

# FOR THE

# MID-COUNTY ADVANCED WASTEWATER TREATMENT PLANT

Permittee: Donald Rasmussen

Professional Engineer: Michael T. Dunn, P.E.

August 1998

Mid-County Services, Inc.
200 Weathersfield Avenue
Altamonte Springs, FL 32714

## 1.0 General

Utilities, Inc. of Florida acquired ownership of the Mid-County Advanced Wastewater Treatment Plant on November 18, 1991 from the Public Service Commission. In accordance with Chapter 62-600.405, Utilities, Inc. of Florida is required to submit a Capacity Analysis Report to the Florida Department of Environmental Protection (FDEP) with its application for an operating permit renewal.

Utilities, Inc. engineering staff was requested to assist in the preparation of this Capacity Analysis Report for the Mid-County Advanced Wastewater Treatment Plant (AWT), see Figure 1 for project location map.

In order to prepare this report, Utilities, Inc. staff has performed the following:

- o Visited the plant.
- o Reviewed monthly Operating Reports.
- o Reviewed drawings of the existing facilities.

## 2.0 Description of Existing Facilities

The Mid-County AWT was designed to provide a hydraulic detention time of 24 hours. Secondary clarification is provided as well as sludge holding. The wastewater effluent is discharged to Curlew Creek for final disposal.

The WWTP consists of the following components:

| | | |
|---|---|---|
| One | - | Master Pump Station |
| One | - | Equalization Tank |
| Two | - | Aeration Tanks |
| Two | - | Clarifiers |
| Three | - | Filters |
| One | - | Chlorine/Dechlorination/Reaeration Tank |
| Two | - | Sludge Holding Tanks |
| One | - | Flow Meter |

The plant is presently operated by staff of Utilities, Inc. of Florida. Residuals generated at the facility are lime stabilized to meet Class B standards and land disposed of on a contract basis.

## 3.0 Existing Permit Capacity/Performance Requirements

The plant design flow is 1.1 MGD and the existing permitted capacity of the WWTP is 0.9 MGD. It is assumed that the basis for the permit is annual average daily flow.

Based upon two recent samples the raw wastewater characteristics are as follows:

| | BOD (mg/l) | TSS (mg/l) |
|---|---|---|
| Sample 1 | 110 | 150 |
| Sample 2 | 130 | 210 |

These values are typical of domestic wastewater.

The existing plant discharges to Curlew Creek (surface discharge) and is required to meet the following conditions:

o Advanced Treatment Effluent Criteria

- 5 mg/l BOD
- 5 mg/l TSS
- 3 mg/l TN
- 1 mg/l TP

o High Level Disinfection
o Dechlorination
o Reaeration to 5.0 mg/l

Plant performance data from the past five years of operation are summarized in Appendix A.

Residuals from the plant are lime stabilized by plant operation staff and land applied by a private contractor requiring this facility to comply with the requirements of FAC Chapter 62-640.

## 4.0 Historical Flow and Loading Data

Appendix A presents historical flow data from the treatment plant.

The current annual average daily flow at 0.74 MGD is approximately 82% of the design capacity. Historical raw wastewater hydraulic and loading data to the plant is shown in the appendix.

## 5.0 Projected Flows and Loadings

The Mid-County AWT was designed to treat a flow rate of 1.1 MGD. Past flows are summarized in Appendix A. The current average daily flow to this plant is approximately 0.74 MGD. The service area is near buildout with limited vacant land remaining.

The growth trend since 1993 based on past flow data is as follows:

| Year | Yearly Average MGD | Minimum Month MGD | Maximum Month MGD |
|---|---|---|---|
| 1993 | 0.65 | .536 | .743 |
| 1994 | 0.67 | .595 | .808 |
| 1995 | 0.75 | .649 | .878 |
| 1996 | 0.72 | .648 | .828 |
| 1997 | 0.74 | .642 | 1.00 |
| 1998 | 0.84 | .698 | 1.04 |

The data shows that flows have been somewhat constant since 1995. A significant portion of the service area is built out. A small percentage of remaining land is available for growth; it is not anticipated that the treatment plant will reach its capacity within the next five years. The major known development in this service area, Brookfield Villas Project, could add approximately 150 additional units over the next 5 - 10 years. Higher flows in 1998 are predominantly attributable to excessive rainfall which occurred in the winter months.

## 6.0 Actual Capacity

As indicated in Section 5, flows projected for the next five year period are not anticipated to exceed the permitted capacity of 0.9 MGD. For the 5-10 year period it is uncertain whether projected flows may exceed the permitted capacity due to continued development of vacant parcels and infiltration/inflow (I/I). It may be necessary to add an additional flow equalization tank and reconvert the existing equalization tank back to flow equalization if flow becomes excessive.

# OPERATION AND MAINTENANCE PERFORMANCE REPORT FOR THE MID-COUNTY ADVANCED WASTEWATER TREATMENT PLANT

Permittee: Donald Rasmussen

Lead Operator: Gary Armstrong

Professional Engineer: David A. Weber, P.E.

March 1992

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**
5300 W. Cypress Street, Suite 300
Tampa, Florida 33607

# SECTION 1

# INTRODUCTION

## 1.1 General

Utilities, Inc. of Florida has been evaluating improvements to the Mid-County Advanced Wastewater Treatment (AWT) Plant since acquiring ownership approval on November 18, 1991 from the Public Service Commission. The treatment plant was in a state of disrepair upon purchase primarily because of neglect and lack of routine maintenance by the previous owner.

The Mid-County AWT plant utilizes the staff of Utilities, Inc. of Florida to operate the facility located off of U.S. 19 in Pinellas County, Florida. See Figure 1 for project location and service boundary. The facility was designed as a 1.1 mgd extended aeration activated sludge facility but is presently permitted for 0.8 MGD since the addition of a flow equalization tank. Disinfected effluent from the facility is discharged to Curlew Creek as a surface discharge.

This report is an operation and maintenance (O&M) assessment of the wastewater treatment facility in accordance with Chapter 17.600.735 F.A.C. The current average daily flow (ADF) from January, 1991 through December, 1991 was approximately 0.63 mgd.

## 1.2 Overall Performance

The overall performance and treatment efficiency appears to be sufficient in BOD and total phosphorus (TP) removal, but has periodic violations of daily maximum and monthly average concentration limits for total nitrogen (TN) and total suspended solids (TSS). See Appendix A for summary of flow and plant data. The existing filter is recommended for replacement with a new denitrification filter in order to improve effluent quality.

See Appendix B and C for additional influent and effluent sampling data, and Appendix D for sludge analysis data.

# POST, BUCKLEY, SCHUH & JERNIGAN, INC.



JS → Dave → DER Biologists in our file
9/15

PBS&J

**MID-COUNTY ADVANCED WASTEWATER TREATMENT FACILITY MINIMAL NEGATIVE IMPACT STUDY OF CURLEW CREEK**

# Section 2
# EXISTING ADVANCED WASTEWATER TREATMENT PLANT

## 2.1 MID-COUNTY AWT FACILITY

The Mid-County AWT facility has a design capacity of 1.1 MGD and an 0.8 MGD permitted capacity and has been upgraded to meet advanced wastewater treatment standards. The plant consists of an extended aeration biological system with chemical addition for phosphorus removal. The tertiary filters with methanol addition achieve both filtration and denitrification (nitrogen removal). The effluent is chlorinated and then dechlorinated with sulfur dioxide to remove the chlorine residual. The facility has a FDER construction permit No. DC52-211951 to complete the design and construction of new tertiary denitrification deep bed filters to further improve effluent quality and treatment efficiency.

## 2.2 FDER EFFLUENT REGULATIONS

The present effluent discharge requirements of the Mid-County AWT Plant for maximum average annual limits are as follows:

| | |
|---|---|
| Carbonaceous Biochemical Oxygen Demand (CBOD) | 5 mg/l |
| Total Suspended Solids (TSS) | 5 mg/l |
| Total Nitrogen (TN) | 3 mg/l |
| Total Phosphorus (TP) | 1 mg/l |
| Dissolved Oxygen (DO) | 6 mg/l |
| Chlorine Residual (CL) | 0.01 mg/l |

MID COUNTY (1381)



# SAMPLE SPECIFICATION
# TETRA GRAVITY DEEP-BED FILTERS
# (CONCRETE UNDERDRAIN)
# (STEEL VESSEL)

## Section 1.0 - Scope of Work

The work under this section includes furnishing, installing and testing a gravity deep-bed filter system complete with steel filter vessels and internals, instrumentation and controls, valves, backwash air blower(s) and backwash pump(s).

Steel filter vessels, concrete filter underdrains, media support gravel, filtration media, automatic valves, isolation valves, backwash air blowers, backwash water pumps, field instrument devices and control panels with controls necessary for the proper operation of the filter system shall be supplied by one manufacturer. Concrete, grout, mechanical equipment anchor bolts, filter access platforms and ladders, and filter system piping shall be furnished by the installation contractor.

## Section 2.0 - Design Basis

The deep-bed filter system shall be designed to operate under the following conditions.

| | Average | Peak |
|---|---|---|
| Flow (gpm) | 764 | 2310 |
| (MGD) | 1.1 | 3.3 |
| Suspended Solids (mg/L) | | |
| Filter Influent | 20 | 30 |
| Filter Effluent | 5 | 5 |

## Section 3.0 - Filter System Manufacturer

The manufacturer of the deep-bed filter system shall be TETRA Technologies, Inc. of Pittsburgh, Pennsylvania.

# WASTEWATER ENGINEERING: TREATMENT DISPOSAL REUSE

SECOND EDITION

METCALF & EDDY, INC.

Revised by
GEORGE TCHOBANOGLOUS
Professor of Civil Engineering
University of California, Davis

McGRAW-HILL BOOK COMPANY

New York St. Louis San Francisco Auckland Bogotá Düsseldorf
Johannesburg London Madrid Mexico Montreal New Delhi Panama
Paris São Paulo Singapore Sydney Tokyo Toronto

**Table 10-4 Design parameters for activated-sludge processes**

| Process modification | $\theta_c$, d | $F/M$, kg $BOD_5$ applied/ kg MLVSS · d | Volumetric loading, kg $BOD_5$ applied/$m^3$ · d | MLSS, mg/L | $V/Q$, h | $Q_r/Q$ |
|---|---|---|---|---|---|---|
| Conventional | 5–15 | 0.2–0.4 | 0.3–0.6 | 1,500–3,000 | 4–8 | 0.25–0.5 |
| Tapered aeration | 5–15 | 0.2–0.4 | 0.3–0.6 | 1,500–3,000 | 4–8 | 0.25–0.5 |
| Continuous-flow stirred-tank reactor | 5–15 | 0.2–0.6 | 0.8–2.0 | 3,000–6,000 | 3–5 | 0.25–1.0 |
| Step aeration | 5–15 | 0.2–0.4 | 0.6–1.0 | 2,000–3,500 | 3–5 | 0.25–0.75 |
| Modified aeration | 0.2–0.5 | 1.5–5.0 | 1.2–2.4 | 200–500 | 1.5–3 | 0.05–0.15 |
| Contact stabilization | 5–15 | 0.2–0.6 | 1.0–1.2 | (1,000–3,000)[a]<br>(4,000–10,000)[b] | (0.5–1.0)[a]<br>(3–6)[b] | 0.25–1.0 |
| Extended aeration | 20–30 | 0.05–0.15 | 0.1–0.4 | 3,000–6,000 | 18–36 | 0.75–1.50 |
| Kraus process | 5–15 | 0.3–0.8 | 0.6–1.6 | 2,000–3,000 | 4–8 | 0.5–1.0 |
| High-rate aeration | 5–10 | 0.4–1.5 | 1.6–1.6 | 4,000–10,000 | 0.5–2 | 1.0–5.0 |
| Pure-oxygen systems | 8–20 | 0.25–1.0 | 1.6–3.3 | 6,000–8,000 | 1–3 | 0.25–0.5 |

[a] Contact unit.
[b] Solids stabilization unit.

*Note:* $kg/m^3 \cdot d \times 62.4280 = lb/10^3\ f^3 \cdot d$
$kg/kg \cdot d \times 1.0 = lb/lb \cdot d$
$mg/L = g/m^3$

MID-COUNTY SERVICES, INC.
AN AFFILIATE OF UTILITIES, INC.
200 WEATHERSFIELD AVENUE
ALTAMONTE SPRINGS, FLORIDA 32714

CORPORATE OFFICES:
2335 Sanders Road
Northbrook, Illinois 60062
Telephone: 708-498-6440

Telephone: 407-869-1919
Florida: 800-272-1919
Fax: 407-869-6961

May 25, 1993

Ms. Lorri A. Floyd, Engineering Technician
Florida Department of Environmental Regulation
Domestic Wastewater Section
Southwest District
3804 Coconut Palm
Tampa, Florida 33619

D.E.R.

MAY 27 1993

SOUTHWEST DISTRICT
TAMPA

Re: Mid-County Wastewater Plant
Permit No. DT52-206904
NPDES No. FL0034789
Pinellas County

Dear Ms. Floyd:

In response to your letter dated April 28, 1993, please review the following information regarding reconciliation of committed flows at our Mid-County wastewater plant.

1. Chesapeake Apartments - As stated in my letter of December 14, 1992, this project was originally permitted for 650 units. The project was reduced to 354 units because of financial difficulties. Enclosed are copies of the water and sanitary sewer plans (Sheets #6 & #7 of 11) for Phase I of the project. We believe that these plans represent the "As-Built" condition. A physical inspection of the site also revealed that only the Phase I facilities have been installed.

2. Country Oaks Estates - This is a subdivision comprised of single family homes lying north of County Road 39 and east of the future Belcher Road extension. It is within the Pinellas County Sewer System service area and is served by Pinellas County. A county pumping station (PS-347) is located within the subdivision. I have enclosed a copy of the portion of the County's sewer atlas sheet containing this subdivision.

The design capacity of the plant was not addressed in your response letter. As stated in my letter to Mr. Snipes, it is our understanding that in 1980 a 600,000 GPD plant addition was made to the existing 500,000 GPD plant. The previous owner requested that the 600,000 GPD plant only be rated at 500,000 GPD, keeping the total capacity at 1.0 MGD. Supposedly, the purpose for rating the capacity of the plant lower than the actual capacity was to reduce the testing and operator requirements. In 1990 an aeration capacity of 200,000 gallons was removed and used as an equalization basin, thus reducing the rated capacity to 800,000 GPD. As requested in my letter, we would like the additional 100,000 GPD capacity be placed back into the rated capacity, thereby increasing the total plant capacity to 900,000 GPD. ←

I hope the additional information supplied in this letter will address your concerns. I appreciate your assistance in resolving this matter.

Sincerely yours,

Donald Rasmussen

Donald Rasmussen
Regional Director

DR/jr

Enclosures

cc: Mr. Edward Snipes, P.E. - DER

Florida Department of Environmental Regulation

Southwest District • 3804 Coconut Palm • Tampa, Florida 33619

Lawton Chiles, Governor • 813-744-6100 • Carol M. Browner, Secretary

April 28, 1993

Mr. Donald Rasmussen
Regional Director
Mid-County Utilities, Inc.
200 Weathersfield Avenue
Altamonte Springs, FL 32714

Re: Mid-County Wastewater Treatment Plant
Pinellas County
Request for Reconciliation of Committed Flows

Dear Mr. Rasmussen:

Please refer to your December 14, 1992, letter to Ed Snipes in which you requested that the record of committed flows to the Mid-County Utilities Wastewater Treatment Plant be changed to reflect the actual connections to the plant. Some of the changes have been made, while others will require further clarification before we can comply with your requests. I submit the following questions and comments for your consideration.

1. Chesapeake Apartments - You stated that the number of units in this project was reduced from 650 to 354, and that the committed flows should be subsequently reduced. Before I can change the records to reflect this reduction, you will need to verify that the sanitary sewer lines for the remaining 296 units were never installed, regardless of whether the buildings were constructed.

2. Country Oaks Estates - Although your letter adequately explains the flow diversion that took place in October of 1986 between the North Pinellas County PCF and Mid-County Utilities, our records do not indicate that Country Oaks Estates was part of that diversion. In fact, there is no reference in the files to indicate that this project was ever intended to go anywhere but to Mid-County Utilities. Please verify that the flows from Country Oaks Estates do, in fact, go to the North Pinellas County PCF.

3. Committed flows for the remainder of the projects listed in your letter have been transferred back to the North Pinellas County PCF records, resulting in a reduction of 101,775 gpd in committed flows against the Mid-County Utilities WWTP.

When you have responded to items 1 and 2 above, I will be able to complete the reconciliation you requested. I apologize for the delay in processing your request.

Sincerely,

Lorri A. Floyd
Engineering Technician

cc: Ed Snipes, DER Domestic Wastewater Program

Used and Useful Calculations:

(1) Wastewater Treatment Plant

1996 AADF = 720,956 gpd (MFR's, page 82)

Plant Design Capacity = 1.1 MGD (Original Design Capacity)

Used & Useful % = 1996 AADF / Plant Design Capacity

= 720,956 gpd / 1,100,000 gpd

= 65.54%

Note: The shortage of 200,000 gallon aeration basin can be compensated by keeping a higher MLSS in the basin.

(2) Effluent Disposal Facilities

1996 AADF = 720,956 gpd (MFR's, page 82)

Plant Design Capacity = 1.1 MGD (Original Design Capacity)

Used & Useful % = 1996 AADF / Plant Design Capacity

= 720,956 gpd / 1,100,000 gpd

= 65.54%

Note: The shortage of 200,000 gallon aeration basin has no effect to the effluent disposal facilities and other treatment components.

Used and Useful Calculation:

Wastewater Collection System

From the engineering and public standpoint, the gravity sewer should be considered non-used and useful when it goes through empty lots to serve other customers. Therefore, based on the Utility's Service Map, the following sections of the gravity sewers should be considered non-used and useful:

| Location | Linear Feet | Type |
|---|---|---|
| Brookfield Villas (Phase II) | 2,630 | |
| Lake & County Rd. 94 (Oak Lake Heights) | 150 | |
| Home Depot & Congress Ave. | 400 | |
| Congress Ave. | 100 | |
| Richter Street & County Rd. 70 (Belcher Rd.) | 600 | 8" VCP |
| Curlew Ave. (Unrecorded Sterling Subdivision) | 1,300 | 8" VCP |
| Tracy Court & County Rd. 70 | 350 | 8" VCP |
| Evans Rd., Belle Haven Dr, Cypress Dr. & Park Dr. | 1,100 | 8" VCP |
| Summerdale Dr. & Skylark Mobile Home Park | 1,080 | |
| TOTAL: | 7,710 L.F. | |

Note: VCP = Vitrified Clay Pipe; DIP = Ductile Iron Pipe and PVC = Polyvinyl Chloride Pipe.

According to 1997 Annual Report, Page S-7, the total linear footage of gravity mains is 80,942 LF for 8" & 10" VCP, 8" PVC and 8" DIP. See attached Exhibit TLB-10. Therefore the used and useful % should be:

Gravity Sewer Used and Useful = 1 - (7,710 / 80,942) = 90.47% used and useful

This used and useful percentage is used to represent the whole collection system, because force mains and gravity mains are integrated together.

Mid-County Services, Inc.'s service area is surrounded by the City of Dunedin, City of Clearwater and Pinellas County. The service map (1" = 300' scale) was prepared by Lloveras, Baur & Stevens Engineers - Surveyors, last revision in August 1990.

Used and Useful Calculations:

(1) Wastewater Treatment Plant

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| Tracy Court & County Rd. 70 | 350 | 8" VCP |
| Evans Rd., Belle Haven Dr, Cypress Dr. & Park Dr. | 1,100 | 8" VCP |
| Summerdale Dr. & Skylark Mobile Home Park | 1,080 | |
| TOTAL: | 7,710 L.F. | |

Note: VCP = Vitrified Clay Pipe; DIP = Ductile Iron Pipe and PVC = Polyvinyl Chloride Pipe.

According to 1997 Annual Report, Page S-7, the total linear footage of gravity mains is 80,942 LF for 8" & 10" VCP, 8" PVC and 8" DIP. See attached Exhibit TLB-10. Therefore the used and useful % should be:

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Mid-County Services, Inc.'s service area is surrounded by the City of Dunedin, City of Clearwater and Pinellas County. The service map (1" = 300' scale) was prepared by Lloveras, Baur & Stevens Engineers - Surveyors, last revision in August 1990.

YEAR OF REPORT
DECEMBER 31, 1997

UTILITY NAME: MID COUNTY SERVICES, INC.

UTILITY SYSTEM: MID-COUNTY SERVICES, INC.

## COLLECTING MAINS

| COLLECTING MAINS: | | | | | | | |
|---|---|---|---|---|---|---|---|
| Size (inches) | 8" | 10" | 8" | 8" | 8" | | |
| Type of main | VCP | VCP | VCP | P.V.C. | D.I.P. | | |
| Length of main (nearest foot): | | | | | | | |
| Beginning of year | 74141' | 5010' | 266' | 0 | 0 | | |
| Added during year | | | | 1300' | 225 | | |
| Retired during year | | | | | | | |
| End of year | 74141' | 5010' | 266' | 1300' | 225 | | |
| MANHOLES: | | | | | | Σ = | 80942 |
| Size | 4' | | | | | | |
| Type | CONC | | | | | | |
| Number: | | | | | | | |
| Beginning of year | 372 | | | | | | |
| Added during year | 10 | | | | | | |
| Retired during year | | | | | | | |
| End of year | 382 | | | | | | |

## FORCE MAINS

| FORCE MAINS: | | | | | | |
|---|---|---|---|---|---|---|
| Size (inches) | 4" | 6" | 8" | | | |
| Type of main | V.C.P. | V.C.P. | V.C.P. | | | |
| Length of main (nearest foot): | | | | | | |
| Beginning of year | 13410' | 5130' | 5950' | | | |
| Added during year | | | | | | |
| Retired during year | | | | | | |
| End of year | 13410' | 5130' | 5950' | | | |

**CERTIFICATE OF SERVICE**
**DOCKET NO. 971065-SU**

I HEREBY CERTIFY that a true and correct copy of the foregoing Prefiled Testimony of Ted L. Biddy, P.E./P.L.S. has been furnished by U.S. Mail or *hand-delivery to the following parties, this 22nd day of March, 1999.

Jennifer Brubaker, Esquire*
Division of Legal Services
Florida Public Service Commission
Room 370
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Richard D. Melson, Esquire
Hopping Green Sams & Smith, P.A.
Post Office Box 6526
Tallahassee, Florida 32314

Stephen C. Burgess
Deputy Public Counsel