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FILE COPY

DIRECT TESTIMONY OF CHARLES L. SWEAT
BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION
on behalf of
SOUTHERN STATES UTILITIES, INC. AND
DELTONA UTILITIES, INC.
DOCKET NO. 920199-WS

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

A. My name is Charles L. Sweat and my business address is 1000 Color Place, Apopka, Florida 32703.

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

A. I am employed by Southern States Utilities, Inc. and Deltona Utilities, Inc. (hereinafter referred to collectively as "Southern States" or the "Company") as Vice President of Corporate Development. During the 1991 test year in this proceeding, I served as Vice President in charge of Operations.

Q. **HOW LONG HAVE YOU BEEN AN EMPLOYEE OF SOUTHERN STATES?**

A. Approximately 28 years.

Q. **HOW LONG HAVE YOU BEEN EMPLOYED AS AN OFFICER OF SOUTHERN STATES?**

A. Approximately 17 years.

Q. **WOULD YOU PROVIDE A BRIEF HISTORY OF YOUR TRAINING AND EXPERIENCE IN THE WATER AND WASTEWATER INDUSTRY?**

A. My training includes attendance at management courses offered by Michigan State University, Rollins College, Management Institute of Virginia

Tech, Seminole Community College and participation in numerous seminars sponsored by the American Water Works Association.

Q. **ARE YOU A MEMBER OF ANY TRADE AND/OR PROFESSIONAL ORGANIZATIONS?**

A. Yes. I am Treasurer of the Florida Water Works Association as well as a member of the American Water Works Association, National Association of Water Companies and the Pollution Control Operators Association. I also am Chairman of the Customer Metering Practices Committee of the American Water Works Association and serve on the board of directors for SunBank, NA, College Park Office, Orlando, Florida.

Q. **HAVE YOU PREVIOUSLY TESTIFIED BEFORE A REGULATORY AGENCY?**

A. Yes. I have testified before the Florida Public Service Commission, the Polk County Utilities Board, and the Sarasota County Hearing Examiners on various occasions. I also have testified in proceedings involving the Florida Department of Environmental Regulation ("DER").

Q. **WHAT WERE YOUR RESPONSIBILITIES IN 1991 AS VICE PRESIDENT IN CHARGE OF OPERATIONS?**

A. As Vice President in charge of operations my

principal duty was to oversee all aspects of Southern States' water, wastewater and gas operations. Thus, I supervised, directed, coordinated and planned all activities of the operating divisions of the Company.

Q. PLEASE OUTLINE THE SCOPE OF YOUR TESTIMONY IN THIS PROCEEDING.

A. I will address various issues concerning the operation of the water and wastewater systems included in this proceeding. These issues include unaccounted-for water, quality of service and customer complaints. I also will briefly describe certain modifications and improvements affecting utility operations which were made to comply with the Commission's 1988 management audit of Southern States.

Q. ARE YOU SPONSORING ANY PORTIONS OF THE MINIMUM FILING REQUIREMENTS ("MFRs") WHICH HAVE BEEN INTRODUCED AS EXHIBIT ___ (FLL-1) IN THIS PROCEEDING?

A. Yes, I am the sponsor of the F-1 Schedules contained in Volume II, Book 11 for each of the water systems, the F-2 Schedules contained in Volume III, Book 6 for each wastewater system as well as the additional engineering information

included in Volume IV, Books 1 through 9. These schedules and other information were prepared by me or under my direction and supervision.

Q. WOULD YOU BRIEFLY DESCRIBE THE INFORMATION CONTAINED IN THE F-1 SCHEDULES?

A. The F-1 schedules indicate the amount of water pumped, sold, associated with other use, and unaccounted-for during the test year for each of the systems included in this proceeding.

Q. WHAT IS THE SOURCE OF THE DATA IDENTIFIED IN THE COLUMN ENTITLED "OTHER USAGE" ON THE F-1 SCHEDULES?

A. The data is obtained from operator records for line flushing, plant use, main or line breaks, leaks, stuck meters, fire department use, lift stations, tank flushing and water used for chlorination at water and wastewater treatment plants. The water used for these purposes is calculated or otherwise determined by the operator. This data is contained in the monthly operating reports filed each month with the DER. A review of the F-1 schedules indicates that negative unaccounted-for water levels are sometimes recorded. Negative unaccounted-for water levels are attributable to the following

factors: First, when customers are on bi-monthly or quarterly billing cycles, the gallons sold to customers will appear on account reports in the month the customer is billed, but the gallons pumped will be reflected on the MOR for the month of actual pumping. Thus, a negative unaccounted-for water level will be indicated in the month(s) where no billing occurred. Second, if a customer is over-billed one month due to an inaccurate meter reading, the customer is given a credit on his or her bill the following month. Depending on the frequency and size of inaccurate reads, the month of the over-bill could reflect a negative unaccounted-for water level, and the month of the credit could indicate a high level of unaccounted-for water. For example, assume that in January Southern States pumps 1,000 gallons of water to a customer. However, the customer's meter is misread and the customer is over-billed by 500 gallons (a total of 1,500 gallons). The unaccounted-for water level in January would be negative 500 gallons. In February, the customer receives a credit for the 500 gallons over-billed in January. This 500 gallons is then credited against the actual

February usage of 1,000 gallons for a net billing in February of 500 gallons. Thus, the unaccounted-for water level in February would be 500 gallons too high.

A third reason for negative unaccounted-for water levels occurs when a customer receives an estimated bill because the meter could not be read. The following month an actual reading is obtained. Assume that the actual usage is significantly different from the estimated usage reflected in the bill. If the estimated usage was too high, the unaccounted-for water level could be negative that month but would be deceptively high the following month. If the estimated usage was too low, the unaccounted-for water level could be high that month but probably would be negative the following month. A fourth cause of negative unaccounted-for water levels is created at our water treatment facilities. A slow in-line flow meter could under-record plant flows by 50% or more. The result would be negative unaccounted-for water levels. Indeed, of the seven systems which have F-1 schedules indicating annual negative unaccounted-for water levels, we discovered that five of these systems

had slow flow meters that were under-recording plant flows. The five slow flow meters are located at Gospel Island (Citrus County), Leisure Lakes (Highlands county), Palm Port (Putnam County), Pine Ridge Estates (Osceola County) and Pomona Park (Putnam County). We have replaced each of these meters. The cause for negative unaccounted-for water levels for the remaining 2 systems is the result of billing errors. The unaccounted-for water levels for each of these seven systems are within acceptable limits after adjustments are made to account for these facts.

Q. DO YOU AGREE THAT THE LEVEL OF UNACCOUNTED-FOR WATER IS AN INDICATOR OF SATISFACTORY SYSTEM PERFORMANCE?

A. Yes. The Commission has recognized the accepted industry standards as the basis for its non-rule policy on unaccounted-for water. For example, in past orders dealing with the unaccounted-for water issue, the Commission has cited articles published by the American Waterworks Association and recognized that:

> "Systems having 10 to 15 percent unaccounted-for-water are generally agreed to be performing well, and distribution

system losses of 10 to 20 percent are considered reasonable."

Also, page 10 of the AWWA Manual M8 states: "The proper amount of unaccounted-for-water in any given system is a function of that system alone," and "A fair average of unaccounted-for-water might be 10-20 percent for fully metered systems with good meter maintenance programs and average condition of service."

See Meadowbrook Utility Systems, Inc., Order No. 17304, at 21 (March 19, 1987).

Q. SHOULD AN ADJUSTMENT TO SOUTHERN STATES' OPERATION AND MAINTENANCE EXPENSES BE MADE FOR UNACCOUNTED-FOR WATER?

A. No. Of the 90 water systems included in this proceeding, the majority have less than 10% unaccounted-for water levels. According to Commission precedent, these systems are "performing well." We also agree that our systems which are experiencing unaccounted-for water levels between 10-20% are functioning reasonably well. Finally, we believe the explanations and adjustments contained in the MFRs for the systems experiencing unaccounted-

for water levels above 20% provide sufficient evidence of mitigating circumstances to justify acceptance of the indicated levels of unaccounted-for water without any adjustment for ratemaking purposes.

Q. HAS SOUTHERN STATES' DEVELOPED PROGRAMS TO IMPROVE UNACCOUNTED-FOR WATER LEVELS?

A. Yes. We have developed and implemented a revised reporting and monitoring procedure, which includes the maintenance of graphs to depict unaccounted-for water levels, flows and capacities to ensure more accurate recording of water usage. A visual review of the graph quickly indicates if any parameters are out of order. These charts are produced by the operations staff and forwarded to field operations personnel, who also are able to expeditiously detect errors in the reported numbers. We also have improved our metering program. The new metering program will help us identify large commercial meters that are functioning inaccurately (slow or fast). The new program will allow us to more expeditiously identify and correct meter problems, thereby reducing water losses. The decreasing levels of

unaccounted-for water during the 1991 test year reflected in the F-1 schedules for a number of the systems which have unaccounted-for water levels in excess of 10% (for example, Hobby Hills, Harmony Homes, Intercession City) confirm the successful implementation of the revised reporting and monitoring procedures and the new metering program.

Q. PLEASE BRIEFLY DESCRIBE THE F-2 SCHEDULES FROM VOLUME III, BOOK 6 WHICH YOU ARE SPONSORING.

A. Volume III, Book 6, Schedules F-2 provide the volumes of wastewater treated by our systems, by month, during the test year.

Q. PLEASE BRIEFLY DESCRIBE THE ADDITIONAL ENGINEERING INFORMATION WHICH YOU ARE SPONSORING.

A. Volume IV, Books 1 through 9 provide the chemical analyses, monthly operating reports, consumptive use and other permits, sanitary surveys, customer complaints, chemicals used and enforcement actions received, for each of the systems included in this filing. All of this information is filed in accordance with the Commission's rules. Specifically, Books 1 through 4 contain chemical analyses for each system filed in this case. All of the chemical analyses are performed

by an independent certified laboratory. Books 5 through 7 contain the monthly water and wastewater operating reports. These reports give operating data such as water treated, chlorine used, and samples taken for the test period for water and wastewater. Books 8 and 9 contain consumptive use permits issued by the various water management districts. Books 8 and 9 also contain Southern States' construction and operating permits. Construction and wastewater operating permits typically are issued by the DER. Also contained in Books 8 and 9 are sanitary survey inspection reports. Generally, the sanitary surveys are performed by DER. Finally, Book 9 contains the following information for each of the systems included in this proceeding: (1) a list of chemicals used; (2) a list of field employees; (3) a list of vehicles used by the Company; and (4) a list of complaints, consent orders, notices of violation ("NOVs") and warning letters.

Q. ARE THE WATER SYSTEMS WHICH HAVE BEEN INCLUDED IN THIS PROCEEDING IN COMPLIANCE WITH THE RULES AND REGULATIONS OF THE DEPARTMENT OF ENVIRONMENTAL REGULATION?

A. Yes. To the best of my knowledge, all of Southern States' water facilities which have been included in this proceeding are manned by certified operators in accordance with Chapter 17-602 of the Florida Administrative Code. The distribution systems are maintained at an operating pressure greater than the required 20 psi minimum pressure required under Chapter 17-555 of the Florida Administrative Code. In addition, Chapter 17-555 of the Florida Administrative Code was revised on January 3, 1991 to require auxiliary power generation capacity for all community water systems serving 350 or more persons. I believe Southern States either has completed installation of all such auxiliary generation systems, is in the process of completing such installations or is negotiating with DER as to whether this requirement applies to certain systems. Southern States also has established a cross connection control policy, as required by Rule 17-555.360, Florida Administrative Code. Our cross connection control policy is on file with each DER district office for the areas in which we conduct business. Thus, to the best of my

knowledge, all of the water systems included in this proceeding currently are in compliance with applicable DER rules and regulations. At this time I know of no outstanding consent orders, NOVs or warning letters regarding the water systems which have not been previously addressed by Southern States.

Q. HOW MANY WASTEWATER SYSTEMS HAVE BEEN INCLUDED IN THIS PROCEEDING AND WHAT METHOD OF EFFLUENT DISPOSAL IS USED BY SOUTHERN STATES AT EACH SYSTEM?

A. We have included 37 wastewater systems in this proceeding. With the exception of the Beacon Hills and Woodmere systems in Duval County, and a portion of the effluent from the University Shores system in Orange County, all of our effluent is disposed of through reuse techniques, including (1) percolation ponds and (2) land application (irrigation of golf courses, cemeteries or other recharge areas owned and operated by Southern States). Thus, virtually all of our effluent is placed back into the soil to recharge Florida's aquifers and a significant portion not only recharges the aquifers but also reduces the use of potable (drinking) water for

irrigation purposes, thus conserving potable water supplies. We are very proud of our efforts in the reuse area.

Q. I SHOW YOU EXHIBIT ___ (CLS-1) UNDER COVER PAGE ENTITLED "SOUTHERN STATES CONTRIBUTES TO INNOVATIVE REUSE OF TREATED EFFLUENT." WAS THIS EXHIBIT PREPARED BY YOU OR UNDER YOUR DIRECTION AND SUPERVISION?

A. Yes, it was.

Q. COULD YOU BRIEFLY DESCRIBE THIS EXHIBIT?

A. This exhibit contains a copy of an article entitled "Use of Cemeteries for Treated Effluent," which I co-authored. The article was published in the June 1992 edition of the Florida Water Resources Journal. The article notes as follows:

> Problems associated with the disposal of highly treated wastewater effluent have been a challenge for many years. Water shortages around the country have brought the issue of water reuse to the forefront of government, planners, and the private sector. Water reuse is currently being used independently or as a supplement to ground water, for irrigation of golf courses, parks,

agriculture, and subdivisions. It seems only logical that other areas with pervious areas, such as cemeteries, would also be used for this form of effluent disposal. Southern States is proud to have been a part of the innovative application of reuse water for cemetery irrigation.

Q. IS THERE ANY FURTHER EVIDENCE OF INNOVATIONS FOSTERED BY SOUTHERN STATES REGARDING OPERATING TECHNIQUES?

A. Yes. In 1991, a Southern States employee, Richard L. Sullo, designed a chlorination loss alarm device that could save Southern States thousands of dollars. The alarm, which monitors the amount of chlorine distributed in potable water, is similar to ones on the market, but more versatile. Mr. Sullo's system can be set to shut down the well pump and signal the main plant that a malfunction has occurred. Eighteen of the alarms are already installed and have had no problems. The alarm system costs about $200, including the additional shutdown and signalling features designed by Mr. Sullo. The basic chlorine loss alarm available on the market costs approximately $700. It is estimated that

Southern States will be able to save approximately $500 on every alarm. Also, state regulatory authorities such as the DER and St. John's River Water Management District have recognized Southern States' ability to "lead the pack" in regard to implementing new regulatory requirements such as the new lead and copper rules and the St. John's River Water Management District's conservation plan requirements. Southern States also has been asked by the Japan Productivity Council of Washington, D.C. to provide a presentation on water resources and conservation at the Council's annual United States/Japan round table. We look forward to continuing in our role as a leader and innovator in the water and wastewater industries in the future to insure high quality service while achieving safety, environmental and conservation related goals similar to those which I have just discussed.

Q. DOES SOUTHERN STATES HAVE ANY OTHER PROGRAMS WHICH HAVE BEEN RECOGNIZED FOR EXCELLENCE IN THE RECENT PAST?

A. Yes. Southern States has created one of Florida's leading water conservation programs.

Our program has received a commendation from Florida's Commissioner of Agriculture, Bob Crawford, as well as Florida State Representatives Bob Sindler and R. Z. Safley. The program also received second place in the Innovative Water Conservation Competition, sponsored by the Florida section of the American Water Works Association, and first place in the Education Category of the Florida Xeriscape™ Awards Program, sponsored by the Southwest Florida, South Florida and St. John's River Water Management Districts and the American Society of Landscape Architects.

The receipt of these awards has been even more gratifying in light of our customers' recent responses to a customer survey in which they stress the importance of water conservation in this State. In November 1990, Southern States employed Cambridge Reports of Massachusetts to conduct a scientific analysis of customer concerns and requirements as they relate to their water utility. The survey sample size was 600 customers, giving the survey a margin of error of ±4.0 percentage points at midpoint of the 95% confidence level. Among the responses, 81% felt

it was important/very important that water utilities "offer programs and services -- such as information and advice about water efficiency -- to help customers control their water use and the size of their bills." Over 93% of the customers felt "careful planning for the future water needs of the area" is important/very important. Finally, "making sure that (the water utility's) activities and facilities do not harm the environment" is important/very important to 93% of our customers. More precisely, 86% of Southern States' customers feel that water conservation is critical/very critical (nearly 60% in the very critical range) in their area. The survey results confirm that our efforts to conserve water and educate customers in water conservation techniques are consistent with our customers' desires.

Q. DO ALL OF THE WASTEWATER SYSTEMS HAVE VALID OPERATING AND/OR CONSTRUCTION PERMITS?

A. Yes.

Q. TO THE BEST OF YOUR KNOWLEDGE, ARE THERE ANY CONSENT ORDERS, NOVs OR WARNING LETTERS AGAINST THE WASTEWATER SYSTEMS WHICH HAVE NOT PREVIOUSLY BEEN ADDRESSED BY SOUTHERN STATES?

A. No.

Q. TO THE BEST OF YOUR KNOWLEDGE, ARE THE WASTEWATER SYSTEMS STAFFED ACCORDING TO CURRENT REGULATIONS?

A. Yes.

Q. ARE THE EFFLUENT DISPOSAL REQUIREMENTS CONTAINED IN THE RESPECTIVE OPERATING PERMITS BEING MET?

A. Yes, to the best of my knowledge, effluent disposal requirements contained in the respective operating permits are being met.

Q. WHAT IS THE LEAST COSTLY METHOD OF EFFLUENT DISPOSAL FROM AN OPERATING STANDPOINT?

A. In my experience and opinion, surface water discharge is the least costly method of effluent disposal. However, as we all are aware, the current rules and regulations regarding surface water discharges confirm that such discharges will no longer be the disposal method of choice and, indeed, it is highly unlikely that such discharges will even be permitted much longer for systems such as those operated by Southern States. Recognizing the State's environmental concerns early on, Southern States has worked assiduously to transform our Amelia Island, Point O'Woods, University Shores, Florida Central Commerce Park and Deltona Lakes systems into

Class I reliability or "public access" type reuse facilities. For example, in 1990 the effluent from one of our larger facilities, Deltona Lakes, was being discharged into Lake Monroe. Southern States constructed a force main and added filters and continuous disinfection facilities to the system to enable the effluent to be disposed of at both the Deltona and Glen Abbey golf and country clubs. While land application of effluent is indeed more costly, the recharging of Florida's aquifers is of critical concern to all in our industry as the population of Florida grows weekly.

Q. WHAT IS YOUR OPINION REGARDING THE QUALITY OF WATER AND WASTEWATER SERVICES BEING PROVIDED BY SOUTHERN STATES?

A. Southern States is meeting the standard set forth under applicable Florida law for water and wastewater service, that is, Southern States is providing safe, efficient and sufficient service to our customers.

Q. I SHOW YOU EXHIBIT ___ (CLS-2) UNDER COVER PAGE ENTITLED "COMPLAINTS RECEIVED BY THE FLORIDA PUBLIC SERVICE COMMISSION FROM SOUTHERN STATES' CUSTOMERS." WAS THIS EXHIBIT PREPARED BY YOU OR

UNDER YOUR DIRECTION AND SUPERVISION?

A. Yes, it was.

Q. COULD YOU PLEASE BRIEFLY DESCRIBE THIS EXHIBIT?

A. This exhibit contains a copy of a report issued by the Commission which indicates that of the approximately 120,000 customers that we serve under the Commission's jurisdiction, only 91 customers (or less than one in a thousand) complained to the Commission concerning miscellaneous matters during the 1991 test year. We have obtained copies of these 91 complaints from the Commission. From these files we have determined that many complaints (41) were in regard to alleged high bills. Only 50 complaints alleged service related problems. Moreover, of the 91 complaints, the Commission determined that only 34 or 37% were justified and only 17 or 19% were partially justified. Therefore, less than one of every two thousand of our customers made a complaint to the Commission which was at least partially justified.

This exhibit also contains a copy of another recent report issued by the Commission which establishes that the Commission received only 35 complaints against Southern States during the

first six months of 1992 (13 justified, 5 partially justified, 13 not justified and 4 undetermined). This number of complaints is approximately 20% lower than the complaints made to the Commission against Southern States during the first six months of 1991. These reports confirm the fact that Southern States not only is providing high quality water and wastewater service to our customers but that our service is continuing to improve.

Q. ARE YOU FAMILIAR WITH A MANAGEMENT AUDIT OF SOUTHERN STATES WHICH WAS CONDUCTED BY THE COMMISSION IN 1988?

A. Yes.

Q. PLEASE DISCUSS THE IMPACTS OF THIS AUDIT ON SOUTHERN STATES' DAY TO DAY OPERATIONS?

A. The financial impact of this audit on Southern States' administrative and general expenses is discussed by Mr. Forrest L. Ludsen. However, I would like to discuss the impact of the audit from an operating standpoint.

About the time the Commission performed this audit, Southern States was in a transition mode. The Company was emerging from a Mom and Pop type of organization to a viable small business.

Though the Company was in the throws of change, I believe the Commission audit hastened these changes. The audit identified areas of Southern States' utility operations which required improvement, such as operator training. Through implementation of various audit recommendations, the training of field personnel now is uniformly administered and coordinated at the management level. Our employee training process has been evaluated and future training processes for all field employees have been identified. Additional specialized training is addressed through Key Responsibility Area ("KRA") goals, and field employees are being trained in diverse areas including procedures when working in confined entry spaces and safe driving techniques. Also, as a result of an audit recommendation, we evaluated and revamped our vehicle maintenance procedures and have implemented a comprehensive scheduled preventative maintenance program for all company vehicles.

Q. DOES THAT CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

Exhibit ___ (CLS-1)
Cover Page

SOUTHERN STATES CONTRIBUTIONS TO INNOVATIVE REUSE OF TREATED EFFLUENT

Use of Cemeteries For Treated Effluent

Mickey Sheffield, Richard Johnson, Charles Sweat, and James Robards

Problems associated with the disposal of highly treated wastewater effluent have been a challenge for many years. Water shortages around the country have brought the issue of water reuse to the forefront of government, planners, and the private sector. Water reuse is currently being used independently or as a supplement to ground water, for irrigation of golf courses, parks, agriculture, and subdivisions. It seems only logical that other areas with pervious areas, such as cemeteries, would also be used for this form of effluent disposal.

The 1987 legislature passed FS-Ch. 87-207 indicating that those persons receiving treated effluent are no longer liable for damages that may occur from the disposal. This law then opened up cemeteries and similar type facilities with vast areas to be irrigated. It also satisfied the reuse criteria for any type of withdrawal permit, from the various water management districts.

This paper deals with two cemeteries in Central Florida that receive highly treated effluent.

> "...any cemetery that has excellent percolation, a low groundwater table, and suitable criteria to obtain a DER permit can be used as an effluent disposal reuse site."

Design Criteria

The design criteria for spray irrigation of effluent of cemeteries are identical to those for any facility with public access. This means the effluent must be treated, filtered, highly disinfected, and monitored. The chemical criteria for public access treatment plant effluent state that nitrate-nitrogen cannot exceed 10 mg/l, total suspended solids must be less than 5 mg/l, and turbidity must be less than 1. The law reads that at least 16 hours of operation must be provided at the treatment plant or that there be continuous monitoring of the chlorine residual and turbidity with a strip recorder.

Requirements for public access waters are addressed in FAC Chapters 17-610 and F17-600. The individual cemetery in many instances will place other requirements on the effluent that will include placement in a holding pond and/or on-site lake for pumping to the irrigation area of the cemetery.

Chapel Hill Cemetery

Chapel Hill Cemetery is 0.4 miles north of Highway 50 on Harrell Road in eastern Orange County. The cemetery owns a total of 95 acres, of which 67 acres are irrigated with treated effluent.

It is extremely interesting how the agreement was obtained in 1983, from the cemetery owners. The cemetery owners, who were in New Orleans, at first were very hesitant to allow treated effluent for irrigation. After numerous meetings with Southern States Utilities, owner of the University Shores wastewater treatment plant from where the effluent derives, the cemetery owners were convinced that the water placed on the grave sites would be anesthetically pleasing. The one single factor that led to the agreement was based on the fact the cemetery would be provided water without charge and the utility company would keep, maintain, and operate the major pumping system. This meant considerable savings to the cemetery owners. Another contributing factor was an existing pond on site that had been used for irrigation water. The treated effluent was placed in this pond and then pumped to the irrigation system. In actuality, then, they were pumping pond water, not directly treated effluent, onto the grave sites.

The University Shores wastewater treatment plant is a complete mix treatment system followed by filtration and breakpoint chlorination. Effluent is pumped to the 6 million gallon cemetery pond approximately 1/9 mile to the south. The water is then repumped with a 500 gallon per minute turbine pump to the irrigation system. DER approval included the monitoring schedule, and there are five monitoring wells.

The necessary hydrogeological investigations determined that the percola-

Table 1 - Chapel Hill Cemetery

		WWTP Effluent				Monitoring Well #1				Monitoring Well #2				Monitoring Well #5			
Date	Rainfall	Avg. Flow	BOD mg/l	TSS mg/l	pH	TDS	NO3N	Total Coliform	Turbidity	TDS	NO3N	Total Coliform	Turbidity	TDS	NO3N	Total Coliform	Turbidity
6/91	12	.093	5.8	6.3	7.1	25	.22	70	29	65	.07	3200	15	159	1.71	100	19
3/91	09	.089	3.5	1.5	6.94	32	0.17	-	18	49	.02	-	23	159	2.81	-	22
12/90	0	.140	2.125	2.3	7.05	37	0.28	-	14	55	.02	-	30	149	2.11	-	14
9/90	.06	.172	4.0	2.0	6.76	32	0.25	-	38	52	0.13						
4/90	.08	079	2.9	4.1	7.2	28	0.15	100	62	47	0.05	6	26	109	2.14	2	33
1/90	0	195	3.3	2.2	7.1	37	0.11	2	51	69	0.06	2	29	115	3.69	2	16
10/89	.03	212	.67	1.5	7.16	28	0.17	2	64	48	0.05	500	11				
7/89	.16	.066	1.1	1.0	7.1	35	0.59	100	20	56	0.05	100	19	75	0.52	1~0	12
4/89	062	219	2.9	2.25	7.13	45	1.38	100	65	60	0.08	-	19	77	1.32	400	20
9/88	1.85	0.118	2.0	2.3	7.0	58	1.68	12	8	61	0.09	50	20	108	1.63	100	12
7/87	0.5	0.06	2.5	9.0	7.16	27	0.34	600	4	85	0.18	270	4	108	3.12	10	10

Table 2 - Glen Haven Cemetery

		WWTP Effluent				Monitoring Well #1				Monitoring Well #2				Monitoring Well #3			
Date	Rainfall	Avg. Flow	BOD mg/l	TSS mg/l	pH	TDS	NO3N	Total Coliform	Turbidity	TDS	NO3N	Total Coliform	Turbidity	TDS	NO3N	Total Coliform	Turbidity
6/91	5.4	0.8	1.2	0.8	6.7												
5/91	8.0	0.07	2.0	0.9	6.7	10	0.8	1	2	375	-	1	2	107	0.4	1	2
4/91	11.6	0.09	1.8	0	6.7												
3/91	7.6	0.07	1.5	0.8	6.7	Dry Well				Dry Well				200	0.4	1	2
2/91	0.8	0.06	1.8	0.0	6.6												
1/91	—	0.08	1.2	0.8	6.7												
12/90	0-6	0.12	1.7	0.6	6.1	76	0.4	1	4	396	-	3	2	152	0.3	1	9
11/90	1.5	0.12	1.4	1.1	6.7												
10/90	2.1	0.12	0.9	0.9	6.6												
9/90	2.7	0.12	1.0	0.0	6.9	-	0.3	1	3	144	0.3	1	2	156	0.3	1	2
8/90	5.4	0.07	1.2	1.0	6.9												
7/90	4.9	0.06	0.8	0.4	6.8	68	0.6	1	6	456	4.4	<1	5	164	0.4	1	1
6/90	8.4	0.1	1.2	0.9	6.8												
5/90	0.9	0.14	1.4	1.0	6.9												
4/90	1.5	0.08	1.4	0.9	6.7												
3/90	1.8	0.08	2.0	1.1	6.5												
2/90	4.0	0.07	1.8	0.8	6.5	4	0.4	<1	0	332	5.7	<1	0	140	0.1	<1	0
1/90	0.45	0.12	3.1	0.0	6.6												
12/89	5.50	0.08	6.4	0	6.6												
11/89	1.35	0.127	4.0	1.2	6.7	86	0.7	<1	0	327	0.8	<1	0	184	0.4	<1	0
10/89	2.85	0.119	4.7	0.6	6.5												
9/89	9.65	0.075	1.5	1.6	6.4												
8/89	6.80	0.070	3.8	0.1	6.9	44	<.1	<1	0	82	1	<1	0	136	1	<1	0
7/89	4.90	0.105	8.3	0	6.7												
6/89	7.55	0.113	5.4	0	6.8												
5/89	4.20	0.154	3.4	0	6.9	16	-	<1	0.84	120	-	< 1	0.2	174	-	<1	2.4
4/89	3.10	0.079	3.3	0	6.9												
3/89	1.35	0.075	3.6	0	6.7												
2/89	0.1	0.099	4.8	0	6.8	210	1.0	909	-	210	1.0	<1	20	355	0.6	<1	39

tion rate was approximately 1.1 inches per week and a loading rate of 4,267 gallons per day per acre could be placed on the soils. This meant that approximately 285,000 gallons per day could be placed on the 67 acres of cemetery.

The original DER permit was obtained in February 1984 and construction began immediately. Southern States Utilities finished construction of the pumping station and force main to the cemetery pond on site.

The results of monitoring for the past four years have indicated no rise in nitrate, coliform bacteria, or adverse chemicals. In general, the 285,000 gallons per day being placed on the cemetery is an excellent means of providing effluent disposal and recycling water to the aquifer.

This type of reuse system is highly encouraged by the water management district and DER. It is anticipated that the cemetery will be a permanent effluent disposal system for Southern States Utilities due to the nature of the land use. The cemetery will provide a very long term, economically feasible means of effluent disposal. Southern States Utilities is to be commended for being a pioneer in obtaining approval and constructing an innovative method of effluent reuse disposal.

Glen Haven Cemetery

Glen Haven Cemetery is on Temple Drive in Winter Park. Winter Park was in need of disposal areas, but the cemetery owners were reluctant. When the 1987 law relieving land owners of liability was passed with the help of a Winter Park state legislator, the owners readily agreed to allow their land to be used for spray irrigation. The city hired the necessary engineers and hydrogeological geologist to obtain the required DER permits.

The cemetery is approximately 47 acres with 46 acres being under spray irrigation. The effluent is highly treated at the East Side Wastewater Treatment Plant, which has the filtration and breakpoint chlorination necessary for public access disposal. Data indicated the soils could handle a dosage rate of 1500 to 2500 gallons per day per acre.

Data from the monitoring wells indicate no adverse effect on the ground water. There has been no increase in the nitrate-nitrogen or other monitored parameters due to receiving the highly treated effluent for the past 2.5 years.

Conclusions

Promulgation of the law regarding liability to property owners was a positive step toward effluent reuse. With Class I Reliability public access water, any cemetery that has excellent percolation, a low groundwater table, and suitable criteria to obtain a DER permit can be used as an effluent disposal reuse site.

C. W. "Mickey" Sheffield, P.E. and Richard Johnson, P.E. are with Russell & Axon, Inc., Orlando. Charles Sweat is vice president of operations, Southern States Utilities Services, Inc., Apopka. James L. Robards, Sr., is utilities manager, city of Winter Park. This article was adapted from a presentation at the 1991 Florida Water Resources Conference, Pensacola.

Exhibit ___ (CLS-2)
Cover Page

COMPLAINTS RECEIVED BY THE FLORIDA PUBLIC SERVICE COMMISSION FROM SOUTHERN STATES' CUSTOMERS

WATER & WASTEWATER INDUSTRY

Complaints against water and wastewater companies decreased 18 percent in 1991, with 361 cases logged compared to 440 in 1990.

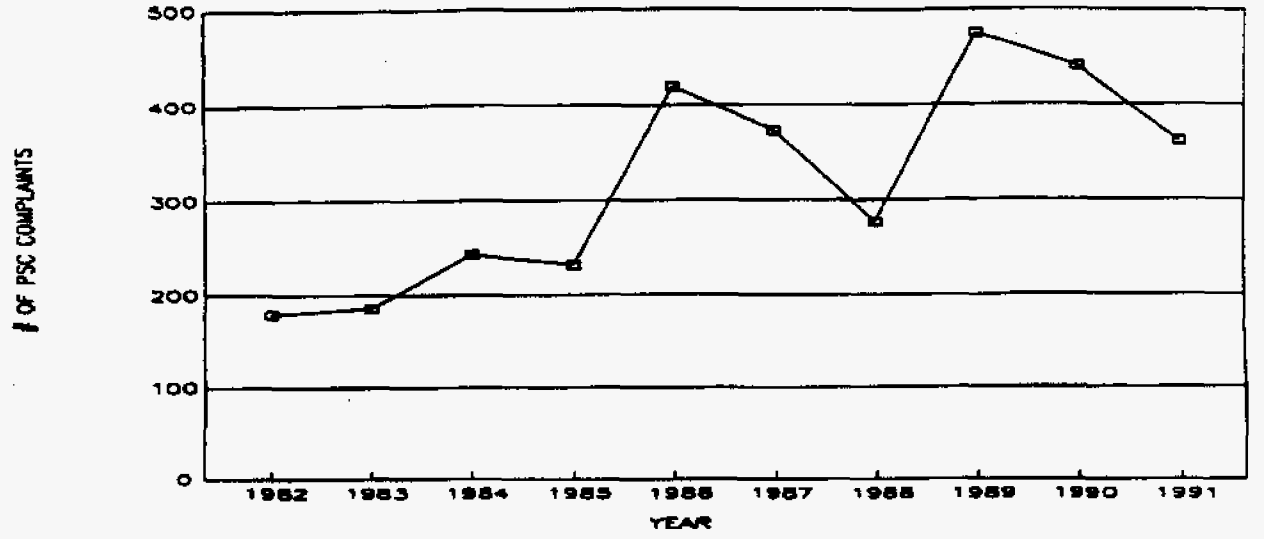
Fifty-five percent of the complaints were about service-related issues, with the major complaint type involving wastewater service problems. The major type of complaint resulted from sixty-three complaints logged against Rolling Oaks Utilities early in the year regarding sewage problems. Other issues customers complained frequently about included high bills, water quality, and water pressure. Water quality, high bill and service outage complaints decreased from a year ago.

In spite of the decrease in complaint activity, the percentage of justified complaints logged increased in 1991. Thirty-six percent of all water and wastewater complaints were found justified in 1990, and 45 percent were justified in 1991.

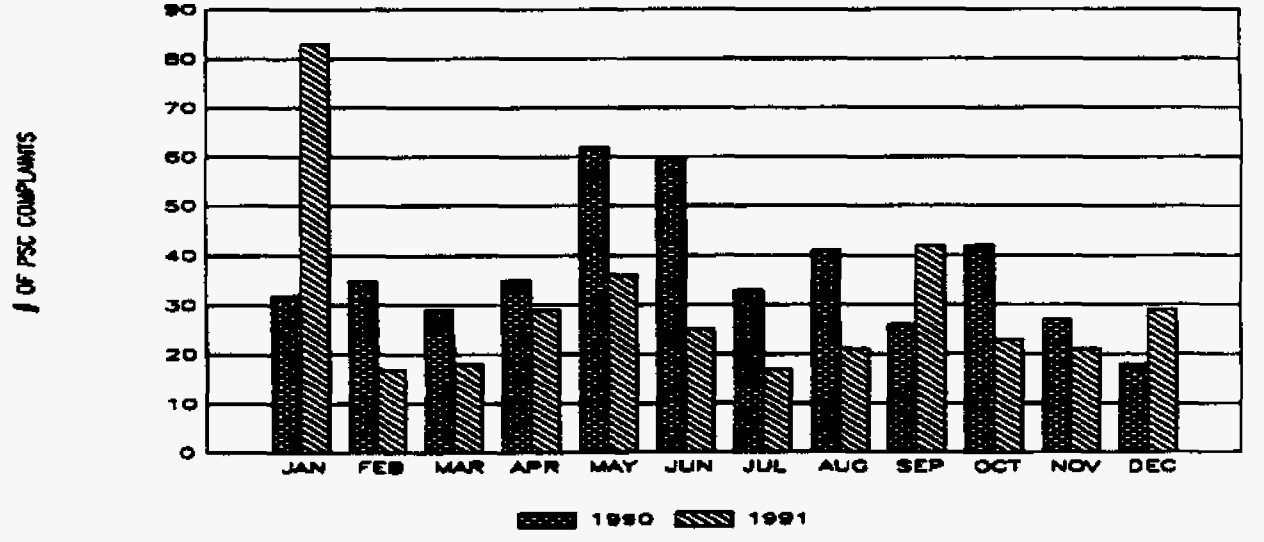
Complaints were logged against 82 of the regulated companies. Southern States Utilities received the most complaints, with 75 cases logged. Southern States customers complained most about low water pressure. Rolling Oaks Utilities was next with 67 complaints, followed by General Development Utilities with 17 cases.

Charts showing industry-wide complaint activity and a breakdown of complaints for each company, along with the justification for the complaints filed, follow.

Water & Wastewater Logged Complaints
10 Year Comparison



Water & Wastewater Monthly Comparison
1990 - 1991



Justification for Water & Wastewater Complaints

1990		1991	
Justified	36%	Justified	45%
Not Justified	46%	Not Justified	39%
Some Justification	18%	Some Justification	16%

Water & Wastewater Complaints by County - 1991

County	Number
Citrus	85
Pasco	42
Duval	26
Volusia	22
Martin	20
Lee	20
Osceola	18
Orange	13
Brevard	12
Seminole	11
Broward	10
Franklin	10
Marion	10
Hernando	8
Putnam	7
Palm Beach	7
Flager	7
Lake	6
Highlands	5
Clay	5
Other	17

1990 Division of Consumer Affairs Complaint Activity
WATER AND WASTEWATER INDUSTRY

Company	Service	Billing	Total	% Change From 1990	Major Type	Justification for Cases Received and Closed: Yes	No	Some	% Justified	% Late Responses
Airport Road Development	1	1	2	100%	Miscellaneous Service	1	0	1	50%	0%
Aloha Utilities	3	1	4	-71%	Miscellaneous Service (2)	0	4	0	0%	25%
Aquarina Development	0	1	1		High Bill	0	1	0	0%	100%
Atlantic Utilities	2	0	2	100%	Miscellaneous Service	1	1	0	50%	0%
Bayshore Utilities	0	1	1		High Bill	0	1	0	0%	0%
Beauclerc Utilities Co.	1	0	1	-50%	Water Quality	0	1	0	0%	0%
Betmar Utilities	1	5	6	500%	High Bill (4)	0	6	0	0%	17%
Blanton Lake Park	0	1	1	-50%	Delay in Refund	-	-	-	-	-
Broadview Park Water	0	3	3	-57%	Miscellaneous Billing	1	0	1	50%	0%
C. S. Water	1	1	2		Miscellaneous	0	1	1	0%	0%
Century Utilities	0	6	6	-45%	High Bill (4)	1	4	1	17%	83%
Cinnamon Ridge Utilities	0	1	1	-50%	Estimated Bills	1	0	0	100%	0%
Citrus Springs Utilities	1	0	1	0%	Service Refused	1	0	0	100%	0%
Decca Utilities	0	1	1	-50%	High Bill	1	0	0	100%	0%
Deltona Lakes Utilities	1	2	3	-57%	Miscellaneous Billing	2	0	1	67%	0%
Dixie Grove Estates	0	1	1		Billing Wrong Customer	1	0	0	100%	0%
Econ Utility Corporation	0	1	1	0%	Improper Rates	1	0	0	100%	0%
Ferncrest Utilities	1	4	5	-16%	High Bill (2)	1	3	0	25%	75%
Fisherman's Cove	2	0	2		Water Quality (2)	1	0	0	100%	100%
Floralino Properties	1	1	2	-33%	Miscellaneous	1	0	1	50%	50%
Florida Cities Water	3	4	7	-56%	Miscellaneous Billing	3	2	2	43%	29%
Forest Hills Utilities	1	1	2	-33%	Miscellaneous	1	0	0	100%	100%
Forty-eight Estates	1	0	1		Service Outage	1	0	0	100%	100%
General Development Utilities	5	12	17	-26%	Payment Not Credited (4)	4	11	2	24%	18%
Gulf Utility Company	3	4	7	75%	High Bill (2)	0	7	0	0%	14%
Harbor Utilities Company	1	1	2	100%	Miscellaneous	0	2	0	0%	50%
Heartland Utilities	0	3	3	200%	High Bill (3)	0	3	0	0%	33%
Hideaway Service	2	0	2		Miscellaneous Service	1	1	0	50%	0%
Hobe Sound Water	0	1	1		Improper Rates	0	0	1	0%	100%
Hudson Bay Company	1	0	1		Incomplete Outside Work	0	1	0	0%	0%
Hydratech Utilities	0	6	6	-14%	Miscellaneous Billing	2	2	1	40%	0%
Ibsco	1	1	2		Miscellaneous Billing	0	1	1	0%	0%

Company	Service	Billing	Total	% Change From 1990	Major Type	Justification for Cases Received and Closed: Yes	No	Some	% Justified	% Late Responses
Inglewood Water Systems	1	0	1		Water Quality	0	1	0	0%	0%
J. Swiderski Utilities	0	2	2	100%	Miscellaneous Billing	1	1	0	50%	0%
Jacksonville Suburban Utilities	4	5	9	-25%	Estimated Bills (2)	2	4	3	22%	22%
Jasmine Lakes Utilities	1	2	3		Miscellaneous Billing	1	1	0	50%	0%
JJ's Mobile Homes	0	1	1		Meter Reading Problem	0	1	0	0%	0%
Kings Point Utilities	1	0	1	0%	Water Quality	0	0	1	0%	0%
Kingsley Service Company	1	3	4	33%	High Bill (2)	1	2	0	33%	0%
L. C. M. Sewer	1	0	1	0%	Sewage	1	0	0	100%	0%
Lake Osborne Utilities	0	1	1	0%	Meter Reading Problem	-	-	-	-	-
Lehigh Utilities	0	1	1	-80%	Payment Not Credited	1	0	0	100%	100%
Leavil H. Dicks	0	1	1		Miscellaneous Billing	0	1	0	0%	0%
Light House Utilities Company	0	1	1	0%	High Bill	-	-	-	-	-
Lindrick Service Corporation	1	0	1	-66%	Restore Area	0	1	0	0%	0%
Longwood Utilities	1	2	3	-70%	Miscellaneous Billing	2	1	0	67%	0%
Mad Hatter Utility	1	1	2	100%	Miscellaneous	0	2	0	0%	50%
Marco Island Utilities	1	3	4	-20%	High Bill (2)	2	1	0	67%	100%
Marion Oaks Utilities	1	1	2		Miscellaneous	2	0	0	100%	0%
Martin Downs Utilities	0	1	1	-66%	Meter Problem	0	1	0	0%	0%
Miles Grant Water	1	0	1		Not Disconnected on Request	0	1	0	0%	0%
Ocala Oaks Utilities	1	1	2	100%	Miscellaneous	0	2	0	0%	50%
Ocean City Utilities	1	1	2	100%	Miscellaneous	0	1	1	0%	50%
Orange Osceola Utilities	5	6	11	-31%	High Bill (4)	5	4	2	45%	9%
Ortega Utility Company	1	2	3	200%	Miscellaneous	0	3	0	0%	0%
Palm Coast Utility	1	4	5	-62%	High Bill (3)	2	1	0	67%	0%
Park Manor Waterworks	0	1	1	-66%	Miscellaneous Billing	0	1	0	0%	0%
Pasco Utilities	0	2	2	100%	Miscellaneous Billing	0	2	0	0%	0%
Pine Island Utility	1	0	1	-75%	Miscellaneous Service	1	0	0	100%	100%
Placid Lakes Utilities	0	1	1	-50%	Billing Wrong Customer	0	0	1	0%	0%
Rolling Oaks Utilities	65	2	67	6600%	Sewage Service (63)	63	3	1	94%	91%
Royal Utility Company	0	1	1		Meter Problem	1	0	0	100%	100%
S & L Utilities	1	0	1		Sewage Service	0	0	1	0%	0%
S H Utilities	0	1	1	0%	High Bill	1	0	0	100%	0%
San Pablo Utilities	0	1	1		Improper Rates Applied	0	0	1	0%	0%
Sandy Creek Utilities	1	0	1		Frequent Outages	1	0	0	100%	100%
Sanibel Bayou Utility	0	1	1		Backbilling	0	0	1	0%	0%
Sanlando Utilities Corporation	1	0	1	-67%	Water Pressure	-	-	-	-	-

Company	Service	Billing	Total	% Change From 1990	Major Type	Justification for Cases Received and Closed: Yes	No	Some	% Justified	% Late Response
SCE Services	1	0	1		Sewage	0	1	0	0%	0%
Sebring Ridge Utilities	0	1	1	0%	Billing Wrong Customer	0	0	1	0%	100%
Shadowrock Utilities	2	0	2	0%	Miscellaneous Service	0	0	2	0%	50%
Shady Oaks Mobile	10	2	12		Business Office Problem (3)	4	4	4	33%	25%
South Broward Utility	0	1	1	0%	Miscellaneous Billing	1	0	0	100%	0%
Southern States Utilities	42	33	75	-1%	Water Pressure (13)	27	25	14	41%	36%
Sportsman's Harbor Utilities	2	0	2	0%	Miscellaneous Service	1	1	0	50%	50%
Spring Hill Utilities	4	2	6	-84%	Business Office Problem (2)	0	4	2	0%	17%
St. George Island	5	5	10	-81%	Restore Area (2)	2	4	4	20%	30%
Sunbelt Utilities	0	1	1	0%	High Bill	-	-	-	-	-
Sunshine Utilities	2	1	3	-40%	Miscellaneous Service	3	0	0	100%	67%
Terra Mar Village	2	1	3		Water Quality (2)	0	3	0	0%	67%
Utilities, Inc. of Florida	3	1	4	-33%	Water Quality (2)	0	3	1	0%	0%
Whiting Waterworks of Pinellas	1	0	1		Restore Area	0	1	0	0%	0%
INDUSTRY TOTALS	**200**	**161**	**361**	**-18%**	**SEWAGE SERVICE (72)**	**151**	**133**	**53**	**45%**	**40%**

COMPLAINT ACTIVITY
WATER & SEWER INDUSTRY
January - June, 1992

Company	Billing			% Change From 1991	Major Type	Justification For Cases Received and Closed				
						Yes	No	Some	Percent Justified	% Late Responses
Airport Road Development	1	1	2	100%	Miscellaneous	0	1	1	0%	50%
Aloha Utilities	19	3	22	1000%	Water Pressure (8)	9	5	2	56%	81%
Aquarina Developments	1	0	1	0%	Water Quality	1	0	0	100%	100%
Atlantic Utilities	0	1	1	-50%	Payment Not Credited	1	0	0	100%	0%
Blanton Lake Park	6	0	6		Service Outage (6)	6	0	0	100%	100%
Broadview Park Water	0	2	2	100%	Miscellaneous Billing (2)	0	2	0	0%	50%
Consolidated Water Works	1	2	3		Miscellaneous Billing (2)	0	0	0		
Continental Utility	1	1	2		Miscellaneous	2	0	0	100%	100%
Deltona Lakes Utilities	0	1	1		High Bill	0	1	0	0%	0%
Eagle Ridge Utilities	0	2	2		Miscellaneous Billing (2)	1	0	0	100%	0%
FIMC Hideaway	3	0	3		Water Quality (2)	1	0	0	100%	0%
Fisherman's Cove	1	0	1	0%	Miscellaneous Service	0	1	0	0%	100%
Floralino Properties	3	0	3	200%	Easement (2)	2	0	0	100%	0%
Florida Cities Water	1	2	3	200%	Miscellaneous Billing (2)	1	1	0	50%	50%
General Development	3	3	6	-25%	Improper Disconnect (2)	1	5	0	17%	0%
Gulf Utility Co.	0	4	4	33%	Miscellaneous Billing (4)	0	4	0	0%	25%
Hacienda Utilities	0	2	2		Not Receiving Bills (2)	0	0	1	0%	0%

Company	Service	Billing	Total	% Change From 1991	Major Type	Justification For Cases Received and Closed: Yes	No	Some	Percent Justified	% Late Responses
Harbour Oaks	2	0	2		Frequent Outages (2)	1	0	0	100%	0%
Homosassa Utilities	0	1	1		High Bill	0	1	0	0%	0%
Hudson Bay	0	2	2	100%	Miscellaneous Billing (2)	0	2	0	0%	0%
Hydratech Utilities	0	1	1	-50%	Improper Cut Notice	0	1	0	0%	0%
Jacksonville Suburban	8	2	10	150%	Improper Disconnect (3)	3	7	0	30%	10%
Jasmine Lakes	0	1	1	0%	Days to Pay	0	1	0	0%	100%
Kemple Water	1	0	1		Service Refused	1	0	0	100%	100%
Kingsley Service Co.	0	2	2	0%	Miscellaneous Billing (2)	0	0	1	0%	0%
Lake Griffin Utilities	0	1	1		Service Charge	0	1	0	0%	0%
Lake Osborne Utilities	0	2	2	.	Miscellaneous Billing (2)	0	0	2	0%	0%
Lehigh Utilities	0	3	3		Miscellaneous Billing (3)	1	1	1	33%	33%
Lindrick Service Corp.	1	1	2	100%	Miscellaneous	0	2	0	0%	0%
Longwood Utilities	2	0	2	100%	Miscellaneous Service (2)	1	1	0	50%	0%
Mad Hatter Utility	0	1	1		Not Receiving Bills	0	1	0	0%	100%
Magnolia Manor Water	3	0	3	.	Water Quality (2)	1	1	1	33%	0%
Marco Island Utilities	0	1	1	-50%	High Bill	0	1	0	0%	0%
Miles Grant Water	1	0	1	0%	Improper Disconnect	0	1	0	0%	0%
Ocean City Utilities	1	0	1		Miscellaneous Service	0	0	0		
Orange Osceola Utilities	1	2	3	-57%	Miscellaneous Billing (2)	0	2	1	0%	33%
Ortega Utility Co.	0	1	1	-50%	Water Quality	0	1	0	0%	100%
Palm Coast Utility	0	1	1	-67%	Delay Refund	0	0	0		
Pasco Utilities	0	1	1	0%	Not Cut on Request	1	0	0	100%	100%
People's Water Service	1	5	6		High Bill (2)	1	3	1	20%	0%

Company	Service	Billing	Total	% Change From 1991	Major Type	Justification For Cases Received and Closed: Yes	No	Some	Percent Justified	% Late Responses
Poinciana Utilities	0	1	1		High Bill	0	0	0		
Rolling Oaks Utilities	2	3	5	-92%	Miscellaneous Billing (3)	1	3	0	25%	25%
S.H. Utilities	0	1	1	0%	Estimated Bills	0	1	0	0%	0%
Sandy Creek Utilities	0	1	1		Miscellaneous Billing	0	1	0	0%	0%
Sanlando Utilities	0	1	1		Estimated Bills	0	1	0	0%	0%
Shadowrock Utilities	2	1	3		Service Outage (2)	0	1	2	0%	67%
Shady Oaks Mobile	17	1	18	350%	Service Outage (12)	14	3	0	82%	76%
South Broward Utility	0	1	1	0%	High Bill	0	1	0	0%	0%
Southern States Utilities	12	14	26	-30%	Water Quality (7)	10	8	4	45%	45%
Southside Utilities	0	1	1		Delay Refund	0	1	0	0%	0%
Spartaman's Harbor Utilities	2	0	2	0%	Water Quality (2)	0	2	0	0%	50%
Spring Hill Utilities	1	3	4	33%	High Bill (2)	0	3	1	0%	25%
St. George Island	0	1	1	-86%	Contribution-in-Aid	0	0	1	0%	0%
Sunny Hills Utilities	0	3	3		Payment Not Credited (2)	3	0	0	100%	0%
Tamiami Village Utility	0	2	2		Miscellaneous Billing (2)	2	0	0	100%	0%
Terra Mar Village	1	0	1	-67%	Water Quality	0	1	0	0%	0%
Utilities, Inc. of Florida	1	1	2	-33%	Miscellaneous	0	1	1	0%	0%
Weeki Wachee Woodlands	0	1	1		Improper Cut Notice	0	0	0		
Totals	99	88	187	-10%	Service Outage (24)	65	74	20	41%	40%