*DOCKET NO.:* 020071-WS - Application for rate increase in Marion, Orange, Pasco, Pinellas, and Seminole Counties by Utilities, Inc. of Florida.

*WITNESS:* **Direct Testimony of Jay W. Yingling**, Appearing on Behalf of the Staff of the Florida Public Service Commission.

*DATE FILED:* June 16, 2003

DIRECT TESTIMONY OF JAY W. YINGLING

Q. Please state your name and professional address.

A. Jay W. Yingling, 2379 Broad St., Brooksville, Florida 34604-6899.

Q. Where are you employed?

A. The Southwest Florida Water Management District (District).

Q. What is your position with the District?

A. Senior Economist.

Q. Please describe your duties in this position.

A. My duties include economic analytic work in support of key District research, planning, programmatic and regulatory functions. More specifically, I participate in rulemaking activities, evaluate proposed rules, prepare or supervise the preparation of Statements of Estimated Regulatory Costs (SERCs), prepare or supervise the preparation economic analyses of water and land issues concerning the District and existing, proposed, and potential District programs. Since the development of the Memorandum of Understanding (MOU) between the FPSC and the five water management districts (1991), I have acted as a liaison to Commission staff on issues of mutual interest addressed in the MOU. This duty has included working with Commission and utility staff on water use permittee related rate structure and conservation issues, attending and presenting at utility customer meetings, and providing testimony in rate hearings.

Q. Please describe your training and experience.

A. I received both B.S. (1982) and M.S. (1984) degrees in Food and Resource Economics from the University of Florida. My academic training included courses on both economic theory (supply and demand) and applied quantitative analysis (econometrics and statistics). Since March of 1987, I have been employed by the SWFWMD, first as an economist and then as Sr. Economist since June 1991. Prior to working for the SWFWMD, I worked as a Staff Rules Analyst for the St. Johns River Water Management District. I have prepared or supervised the preparation of dozens of SERCs, numerous articles, presentations and reports on water resource economic issues. Perhaps most relevant, I was the District's project manager for the development of the Water Price Elasticity Study completed in 1993 and for the development of the Waterate Model. As stated before, I have also coordinated with Commission staff on rate structure and conservation issues since before 1991. I have testified both on the behalf of the Commission and utilities in rate hearings.

Q. Why does the District promote the use of water conservation-oriented rate structures?

A. For the benefit of all water customers within its jurisdiction, the District promotes the efficient use of water. The longer that we can maintain demand within the limits of available high quality water sources, the longer we can avoid the higher costs of having to develop lower quality sources. For water to be used efficiently, it must be priced in a manner that provides incentives for efficient use.

Over the years, water price elasticity studies have shown that water utility customers are responsive to changes in water price. Extensive statistical studies of utility water demand show that when the price of water increases, demand for water decreases, all other factors equal (such as weather). Economic theory indicates that persons respond to marginal price, the price of the next unit of a good purchased. The marginal price is, therefore, the appropriate incentive for efficient use.

In much of the SWFWMD, potable quality water is at least a seasonally scarce resource. Water conservation-oriented rate structures reinforce the concept of scarcity and the need to conserve through the marginal price of water. If there is no marginal cost for additional water use or the marginal cost of water declines as more water is used, the scarcity of high quality potable water sources is not adequately reflected and behavioral changes and the adoption of water conserving technologies will be less likely to occur. A flat charge rate structure in which there is no volume charge or marginal cost, or a rate structure that approaches being a flat charge because a large portion of the customer class's use is covered in a minimum use charge, does not send an adequate conservation incentive to customers and does not reward small households that conserve.

Q. What is the purpose of a water conservation-oriented rate structure?

A. From the District's perspective, the purpose of a water conservation-oriented rate structure is to provide economic incentives to reduce per capita water use, or maintain it at a given level. The primary goal is not to change or generate additional revenues for a utility. The intent is to provide incentives for conservation within the rate structure itself through manipulation of fixed and variable charges and the level and/or location of marginal price changes. It is one of a number of tools that can be used to reduce or maintain per capita use, but one that is required in Water Use Caution Areas.

Q. How is a water conservation-oriented rate structure determined?

A. From a permitting perspective, the District has used the same guidelines on water conservation-oriented rate structure since 1993. These guidelines are called "Interim Minimum Requirements for Water Conserving Rate Structures." In essence the Interim Minimum Requirements prohibit the use of two rate structure forms based on the marginal price signal: flat rates and any other rate structure that includes a large gallonage allotment in the base facility charge.

Flat rates, in which there is a single fixed charge for water use and no gallonage charge, has a marginal price of zero. There is no additional charge for additional gallons used. This structure does not reflect scarcity and provides no disincentive to profligate use. Uniform rate structures, or any other rate structures that are essentially flat rates because a significant portion of the customer class's use falls within the minimum use charge allotment, are not acceptable. The Interim Minimum Requirements indicate:

"Any rate structure in which a significant percentage of a customer class's water use is paid for under a minimum charge would not be considered a water conserving rate structure." (p. 2)

The American Water Works Association (AWWA) M1 rate manual (1991) suggests that only 5% to 15% of residential water bills be rendered under the minimum charge and that "The percentage should not be so high, and the water allowance so great, that it effectively approaches a flat rate for a large number of customers. This would encourage waste of water by those customers who normally would use a smaller quantity of water than that included in the minimum charge." (p. 34) The Interim Minimum Requirements indicate that the permittee may be required to demonstrate the revenue need to exceed the 15%

suggested by the AWWA.

Declining block rate structures are also not acceptable because the marginal price declines as more water is used. Such a structure does not reflect the scarce nature of the resource because the marginal cost of water to the consumer declines as more water is used.

In the literature, many types of rate structures are considered water conserving. The most common among these are inclining block, seasonal, uniform with a seasonal surcharge, ratchet, and excess use charge. All involve some form of higher marginal price for water use based on usage or season. Uniform rates, with a constant marginal price, are sometimes also considered a water-conserving rate structure. To minimize costs to regulated utilities, the District will accept a uniform rate structure when the utility is in compliance with per capita requirements. If it is not in compliance, then a more aggressive rate structure, such as those mentioned where the marginal prices increases based on usage or season, must be implemented.

Q. What permittees are required by rule to comply with the water conserving rate structure requirement?

A. Public water supply utilities with permitted quantities of 100,000 gallons or more that are located in the Southern and Northern Tampa Bay Water Use Caution Areas (WUCAs). The Buena Vista, Orangewood, Summertree/Paradise, and Lake Tarpon systems are located within the Northern Tampa Bay WUCA (see attached map). The rate structure requirements for utilities in the Northern Tampa Bay WUCA is found in Section 7.3.1.2 of the Basis of Review for Water Use Permitting. The authority to require the use water conserving rate structures and the District's flexible approach to the implementation of the requirement as outlined in the "Interim Minimum Guidelines for Water Conserving Rate Structures" were established in the Division of Administrative Hearings Case No. 94-5742RP commonly referred to as the "SWUCA rule challenge." The hearing officer recognized that "the general concepts as to what constitutes a water conserving rate structure are well recognized in the industry (Final Order, p. 799)." The District's Guidelines are consistent with those general concepts.

In addition to the conditions contained in the Interim Minimum Requirements, there may be other occasions when the District may encourage or require the implementation of a water conserving rate structure or the implementation of a more aggressive water conserving rate structure. One of these occasions would be when the utility is violating the water quantity limits of its permit and may cause or contribute to harm to water resources. Water conserving rate structures are recognized as one of a number of reasonable tools that may be necessary to bring a permittee into compliance when water resources are being harmed.

Q. What other guidance is there on the development of water conserving rate structures?

A. There are other features of a water-conserving rate structure for which the District does not have specific guidelines. However, the District has made available additional recommendations to permittees and the Commission (Whitcomb, 1999) and the literature is rich with recommendations for developing water conserving rate structures (American Water Works Association, 1992; California Department of Water Resources, 1988; California Urban Water Council, 1997).

For example, the fixed charge portion of the bill should be kept to the minimum commensurate with the need for revenue stability. However revenue stability can be enhanced with the establishment of a revenue stabilization fund while keeping the fixed charges reasonably low. A low fixed charge increases the revenue required from gallonage charges and therefore higher gallonage charges. This provides more of a disincentive to wasteful use and more of a reward to the customer for reducing use. Anecdotal information from rate practitioners indicate that a water conserving rate structure should generally not generate more than 30% to 40% of its revenues from fixed charges.

A utility that purchases all of its water does not need to be as concerned about revenue stability as does a utility with its own withdrawals financed by revenue bonds which must be paid regardless of the demand for water.

The marginal price change(s) for an inclining block rate structure should be large enough to give the customer an incentive to reduce usage to the previous block. The higher or last block(s) thresholds(s) should be low enough to cover a significant portion of the customer base or the structure will only have a significant impact on a small portion of the customer base and not have the water conserving effect desired. Similar types of considerations should also be made in the development of other types of water conserving rate structures. Economists would generally agree that the price of the highest block be at least the marginal cost of the next source of water for the utility.

Q. How effective are water conserving rate structures?

A. This is a difficult question to answer - but difficult to answer for a number of good reasons. However, theoretical considerations, their relatively common use, and common sense would indicate that well designed water conserving rate structures are effective. The authors of the Guidebook on Conservation-Oriented Water Rates (California Department of Water Resources, 1988), described the dilemma quite well.

> "First, DWR knows of no city that has adopted conservation-oriented water rates without at the same time enacting a general water rate increase. Therefore, it is not possible to tell how much of the subsequent drop in per capita water consumption was due to a revised rate structure and how much was due to higher water costs.
>
> However, the experiences of Washington, D.C., and Tucson, Arizona, which switched to conservation-oriented water rates in the late 1970's, show significant water savings can result from conservation-oriented water rates. Refer to the excerpts from DWR Bulletin 198-84 (in the back pocket of this guidebook) for more information.
>
> When a city adopts conservation-oriented water rates, some customers will get lower water bills, others will face higher water costs, and some residential customers might see no difference in their annual water costs. The incentive to conserve will come from several factors. First, most users will experience increased summer water bills and lower winter water costs. This is desirable, for conservation is more valuable during the peak

summer months.

Second, large water users will tend to get higher bills under the revised rate schedule, which would provide them with incentives to reduce use.

Third, large residential users, with above-average outdoor use, will tend to get higher water bills under conservation-oriented water rates. Because outdoor use has been found to be more responsive to price than indoor use, the drop in exterior water use by large users should outweigh any increase in water use by apartment dwellers, most of whom will face lower water bills.

A fourth factor in conservation-oriented water rates that leads to reduced water consumption over time is the fact that everyone now knows if a household gets careless and increases its water use, its water bill will increase more under the revised rate schedule than it would have under the old rate schedule.

The final factor explaining the use of pricing incentives to encourage conservation is the concept of marginal cost. Marginal cost is the cost of purchasing one more unit of a good or service. Although switching to conservation-oriented water rates will mean that some users will face lower average costs, virtually everyone should face significantly higher marginal water costs (if the new rates are truly conservation-oriented).

Economic studies often indicate that consumers make purchase decisions based more on marginal costs than average costs.

So although it is not possible to quantify the above five factors for each city to determine exactly how much water would be saved by switching to conservation-oriented water rates, DWR believes that a city with typical water rates (a conservation index number of approximately 0.7) switching to these conservation rates (an index number of 1.0) would be equivalent to the effect of raising the average price of water by 10 to 20 percent, while keeping the old rate structure.

This would mean that if the above typical city (with a winter PED[1] of -0.25 and a summer PED of -0.35) were to adopt these conservation rates, it could expect a decline in per capita residential winter water use of 2.5 to 5 percent and a decline in summer per capita residential water use of 3.5 to 7 percent. Commercial, industrial, and public-authority water use could also be expected to decline if conservation-oriented water rates are applied to those user classes."

As noted above, it is quite difficult to find a utility that has adopted a water-conserving rate structure that has not also included an increase in revenues. Further, to isolate the effects of the structure change from other water demand variables, it may be necessary to perform complex and expensive statistical analyses. Utilities are not inclined to perform such analyses. There is, however, some anecdotal evidence of the effectiveness of the water conserving rate structures.

In 1995, the Homosassa Special Water District implemented a revenue neutral water conserving rate structure. The rate structure was designed

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[1] PED is the price elasticity of demand.

using the District's Waterate model. Although no formal statistical analysis of the effect of the rate structure has been performed, in a recent telephone conversation between myself and utility superintendent Dave Purnell, Mr. Purnell was quite firm in his conviction that the water conserving rate structure (inclining block) played a significant role in reducing per capita water use in the service area (telephone conversation on October 23, 2001).

In 1993, Sarasota County changed their inclining block rate structure to a more aggressive inclining block rate structure. Again, the change was designed to be revenue neutral. Per capita use declined significantly in the years following the structure change. No other significant conservation programs were implemented during the same period. Although no formal statistical analysis of the effect of the rate structure has been performed, David Cook, Manager of Finance and Administrative Services for Environmental Services, was confident that the rate structure change played a significant role in the decline in per capita water use in Sarasota County's service area (telephone conversation on October 25, 2001).

In 1991, the Spalding County Water Authority (Georgia) changed from a declining block rate structure to an increasing block rate structure. As a result, the average customer's bill increase by $1.99 per month. The estimated price elasticity for the rate change was -.33. In 1993, the average bill was increased by $2.13 per month without a change in rate structure. The estimated price elasticity for the 1993 rate change was only -.07. A simple 't' test was conducted to determine if weather was significantly different between the two periods. It was not. In addition, no other conservation programs were implemented during either period of time. The author concludes that the change in rate structure was a significant contributing factor to the larger response to the rate change in 1991 (Jordan, 1994).

Another study in Georgia in 1992 indicated that the daily water use for systems using declining block rate structures was 503 gallons per connection, 428 gallons for systems using uniform rate structures, and 352 for systems using inclining block rate structures (Jordan and Elnagheeb, 1993).

Q. Do the subject Utilities, Inc. of Florida utilities' existing and proposed rate structures comply with the District's water conserving rate structure requirement?

A. All of the utilities located within the SWFWMD appear to be within their per capita water use requirements so we would not require a more aggressive rate structure such as an inclining block structure. The proposed uniform rates would be considered sufficient. We also think that moving from a bi-monthly to a monthly billing period, so long as the meter reading is also monthly, is an improvement. However, the Wis-Bar and Buena Vista systems have proposed maintaining minimum gallonage charges. According to information provided by the Commission, 96% of bills in the Wis-Bar system fall below the 3,000 gallon minimum charge allotment. At the Buena Vista system, 93% of the bills fall below the 5,000 gallon minimum charge allotment. Both of these greatly exceed the 15% minimum gallonage charge thresholds contained in the District's Interim Minimum Requirements document and the AWWA's M1 Water Rates manual. In effect, these are flat rates which the District does not consider to be water conserving. There is little incentive in such a rate structure for further conservation.

According to data provided by the Public Service Commission, the percent of revenues from the combined fixed charges for all four of the utility's systems in Pasco County exceed 40% and are being proposed to increase from 72% to 76% of revenues. The District does not believe that such a high percentage of revenues from fixed charges are consistent with the intent of a water-conserving rate structure. The Lake Tarpon utility's fixed charges also exceed 40% of revenues under both the current and proposed rate structures. The District recommends that the percentage of revenues from fixed charges be lowered as close to the 30% to 40% range as practical.

Q. What level of price elastic effect (repression) from price increases can be expected?

A. In 1991 the District was developing the WUCA rules which included the requirement for water conserving rate structures to be used as a demand management tool. At the time there were no large sample estimates of water price elasticities that included a wide range of prices in the sample. There is a wide range of water prices in the District due to source water of varying quality. In the simplest terms, price elasticity is the percent change in demand for a percent change in price.

Given the proposed rule changes, it was deemed desirable to conduct a large-scale price elasticity study to assist utilities in the District in estimating reductions in demand due to rate structure and price level changes. Brown and Caldwell in association with Dr. John Whitcomb were engaged to conduct the study. The price elasticity study, the most comprehensive ever known to be conducted in the State of Florida, was completed in 1993. The study demonstrated that single-family residential water price elasticity changes over a large range of prices.

Over the years Dr. Whitcomb has revised the single-family residential price elasticity estimates to make them more accurate. In spite of changes to the single-family estimation equation, the price elasticities have remained quite stable in the relevant price ranges and within the ranges of other single-family residential price elasticity estimates. The 1999 revised estimates of single-family residential water and sewer price elasticities are:

| Water/Sewer Marginal Price[2] | Price Elasticity |
|---|---|
| Under $1.50/kgal | -.393 |
| $1.50 to $3.00/kgal | -.687 |
| Over $3.00/kgal | -.242 |

For example, a 1% increase in price in the $1.00 to $1.50 range would be expected to result in a .393% reduction in water use. Previous studies of overall (indoor & outdoor) single-family residential price elasticity studies in Florida estimated elasticities ranging from -.23 (Brown and Caldwell, 1990), to -.81 (Lewis et al., 1981). As can be seen, the 1999 revised elasticities are consistent with and well within the range of other residential price elasticity estimates conducted in Florida. Not taking into account these estimated price elastic effects in rate making creates the risk of falling short of revenue requirements.

In terms of the timing of price elastic response, Dr. Whitcomb believes that approximately 50% of the price elastic effect occurs within the first year with the remaining 50% spread over the following two years. This allocation is reflected in the Waterate rate model developed by Dr. Whitcomb.

Q. Are there any other compliance issues that should be addressed?

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[2]Expressed in 1992 dollars.

A. Yes. Subsection 1.3 of Section 7.3 of the District's Basis of Review for Water Use Permitting indicates that utilities in the Northern Tampa Bay Water Use Caution Areas must take remedial actions to address reduction of unaccounted water uses that exceed 12%. According to data provided by the Public Service Commission, the Orangewood (17.5%), Summertree (16.2%), and Lake Tarpon (20.6%) systems all exceed the 12% threshold for utilities in Water Use Caution Areas.

Section 3.6 of the Basis of Review also indicates that utilities outside of Water Use Caution Areas may be required to address reduction of unaccounted water uses that exceed 15%. The Golden Hills/Crownwood system's unaccounted use exceeds 22% and far exceeds the 15% threshold. Given the amount by which these utilities exceed the respective thresholds, actions must be taken to reduce unaccounted use below the appropriate thresholds.

Q. Does this conclude your testimony?

A. Yes.

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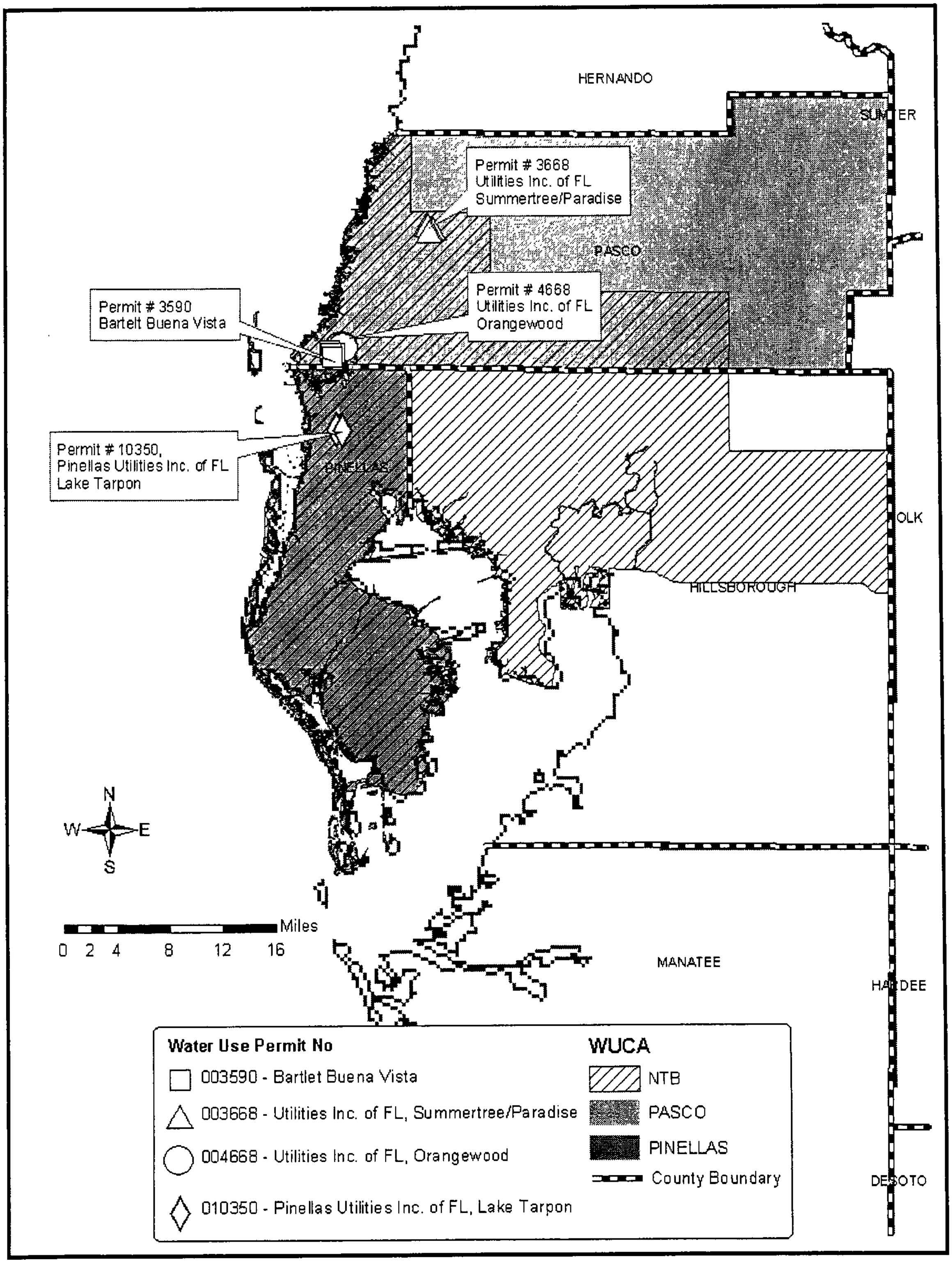
HERNANDO
SUMTER
Permit # 3668
Utilities Inc. of FL
Summertree/Paradise
PASCO
Permit # 4668
Utilities Inc. of FL
Orangewood
Permit # 3590
Bartelt Buena Vista
Permit # 10350,
Pinellas Utilities Inc. of FL
Lake Tarpon
PINELLAS
POLK
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Water Use Permit No
003590 - Bartlet Buena Vista
003668 - Utilities Inc. of FL, Summertree/Paradise
004668 - Utilities Inc. of FL, Orangewood
010350 - Pinellas Utilities Inc. of FL, Lake Tarpon
WUCA
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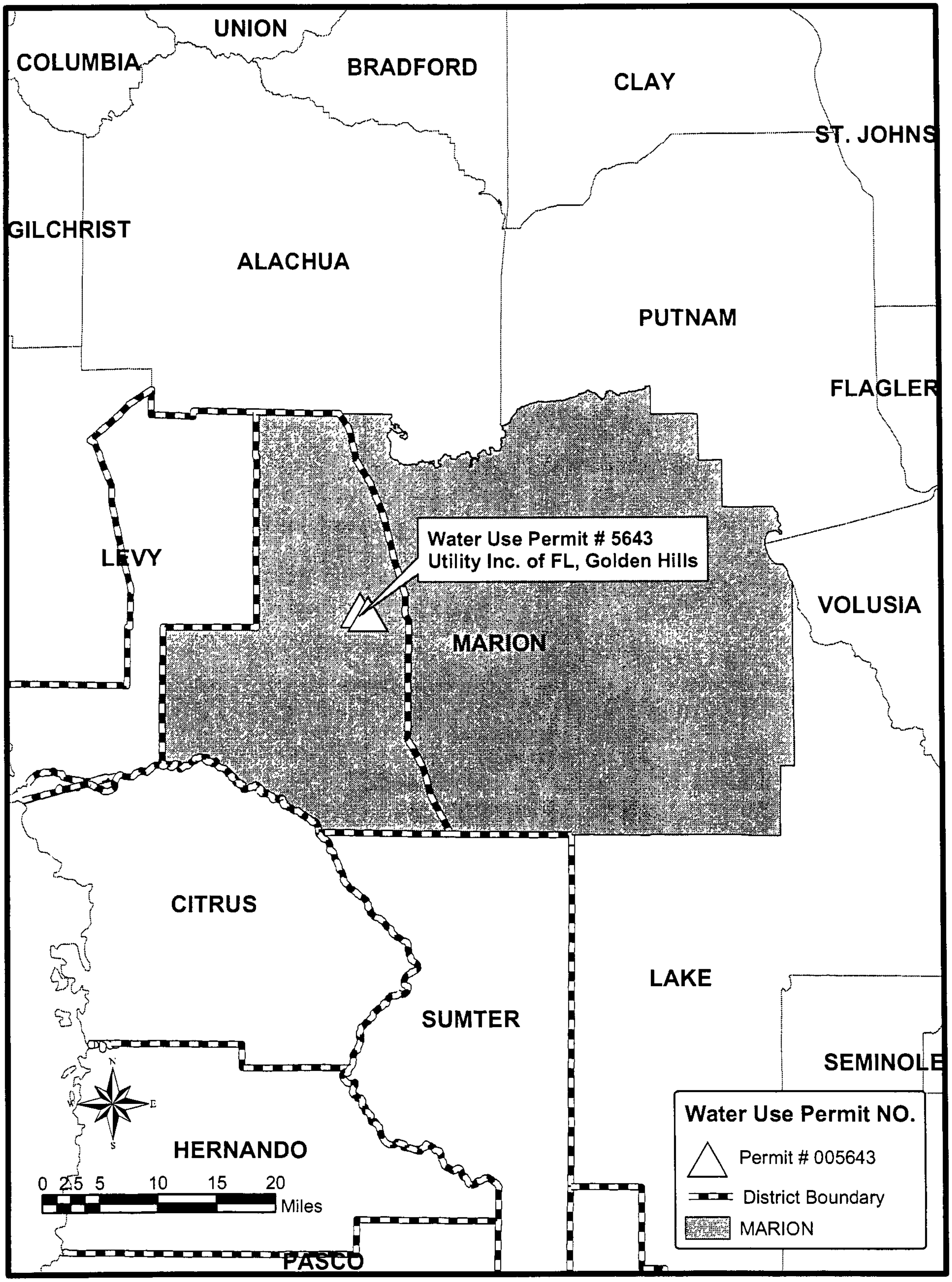
PASCO
PINELLAS
County Boundary


UNION
COLUMBIA
BRADFORD
CLAY
ST. JOHNS
GILCHRIST
ALACHUA
PUTNAM
FLAGLER
Water Use Permit # 5643
Utility Inc. of FL, Golden Hills
LEVY
VOLUSIA
MARION
CITRUS
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PASCO
Water Use Permit NO.
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District Boundary
MARION

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

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| In re: Application for rate increase in Marion, Orange, Pasco, Pinellas, and Seminole Counties by Utilities, Inc. of Florida. | DOCKET NO. 020071-WS<br>FILED: June 16, 2003 |

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing Direct Testimony of Jay W. Yingling has been furnished to **Martin S. Friedman, Esquire**, Rose, Sundstrom & Bentley, LLP, 600 S. North Lake Blvd., Ste. 160, Altamonte Springs, Florida 32701, and **Stephen Burgess, Esquire**, Office of Public Counsel, c/o The Florida Legislature, 111 W. Madison St., Room 812, Tallahassee, Florida 32399-1400, by U.S. Mail, this 16th day of June.

Lorena A. Holley

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