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DOCKET NO.: 060368-WS - Application for increase in water and wastewater rates in Alachua, Brevard, Highlands, Lake, Lee, Marion, Orange, Palm Beach, Pasco, Polk, Putnam, Seminole, Sumter, Volusia and Washington Counties by Aqua Utilities Florida, Inc.

WITNESS: Direct Testimony of Jay W. Yingling, appearing on behalf of the Staff of the Florida Public Service Commission.

DATE FILED: August 21, 2007

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DIRECT TESTIMONY OF Jay W. Yingling

Q. Please state your name and professional address.

A. My name is Jay W. Yingling. My professional address is 2379 Broad St., Brooksville, Florida 34604-6899.

Q. By whom are you employed and in what capacity?

A. I am employed by the Southwest Florida Water Management District (SWFWMD or District) as 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 of 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 Florida Public Service Commission (FPSC or Commission) and the five water management districts in 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 a Senior 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. I also was the District's project manager for a recently completed statewide study of water price elasticities for single family residential customers (Whitcomb, 2005). This was the largest known study of single family residential water use in the United States. The results of this new research have been incorporated into a new version of our rate simulation model (WATERATE 2006) that has been made available free of charge to utilities within our District. They are also provided with four free hours of telephone or email assistance from the model's developer. For ease of reference, I have included a list of articles that I have referred to in my testimony. It is attached as Exhibit JWY-1.

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 and sewer price (hereafter referred to as 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. Our latest research further validates the economic theory of response to marginal price.

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. Master metering of residences also diminishes the water conserving effects of rates.

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 to, 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.

That said, utilities may also use an inclining block rate structure to fund conservation programs designed to reduce the number of customers with consumption well in excess of average. Those who pay for the program through the higher block rates benefit from programs that can help them reduce the excessive use.

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" (Interim Minimum Requirements). In essence the Interim Minimum Requirements prohibit the use of two rate structure forms based on the marginal price signal. 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 needed 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 per day or more that are located in the Southern and Northern Tampa Bay Water Use Caution Areas (WUCAs). In addition, rule development is underway to expand the water conserving rate structure requirement to utilities in the entire District. 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 water conserving rate structure requirement in the Southern Water Use Caution area is found in Section 3.6 of the Basis of Review. The authority to require the use of water conserving rate structures and the District's flexible approach to the implementation of the requirement as outlined in the Interim Minimum Requirements 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 Interim 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 (where allowed by law). A low fixed charge increases the revenue required from gallonage charges and therefore higher gallonage charges result. 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 a range of 30% to 40% of its revenues from fixed charges. The 30% is more applicable in areas of low to moderate seasonality in population whereas the 40% is more applicable in areas of high seasonality. In cases of extreme seasonality, circumstances may justify a higher percentage.

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 has been 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 (DWR), 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 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 using the District's WATERATE model. Although no formal statistical analysis of the effect of the rate structure has been performed, in a 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.

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, informed me that he 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.

In 1991, the Spalding County Water Authority (Georgia) changed from a declining block rate structure to an inclining block rate structure. As a result, the average customer's bill increased 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).

In our most recent research on single family residential price elasticity, statistical analysis indicated that when comparing a uniform rate structure and an inclining block rate structure with equal weighted marginal prices, the inclining block rate structure had more of a water conserving effect. Therefore, an inclining block rate structure should be employed in lieu of a uniform rate to maximize conservation and preserve scarce, high quality water resources whether required or not.

The statistical analysis showing inclining block rates to be more water conserving was validated by the responses of surveyed customers when asked their opinions of the water conservation effect of the rate structure of their utility (Whitcomb, 2005). Many (21%) of the customers of utilities with inclining block rate structures essentially identified themselves as "block targeters" that focus on reducing water use to avoid going into higher usage blocks. This recent research only strengthens our belief that water conserving rate structures, and inclining block rates in particular, are effective. The WATERATE 2006 model greatly enhances the ability of utilities to estimate the effectiveness of changes in both rates and rate structures.

Q. For the Aqua systems in this proceeding that are located within the District, does the Aqua systems' existing and proposed rate structures comply with the District's water conserving rate structure requirement?

A. Of the Aqua systems located in the Southern Water Use Caution Area (SWUCA), only Lake Josephine is required to comply with the water conserving rate structure permit condition. In 2005, Lake Josephine had a daily per capita water use of 107 gallons and therefore was in compliance with its per capita requirement. Lake Josephine is also in compliance with its pumpage limits and has no active compliance issues. The other Aqua systems in the SWUCA -- Leisure Lakes, Sebring Lakes and Orange Hill/Sugar Creek -- are below the permitted quantity threshold of 100,000 gallons per day that would require them to adopt a water conserving rate structure. They are also in compliance with their pumpage limits and other permit conditions. Information regarding water conservation rate structure requirements and active compliance issues is summarized on Exhibit JWY-2.

Of the Aqua systems located in the Northern Tampa Bay Water Use Caution Area (NTBWUCA), only Jasmine Lakes is required to comply with the water conserving rate structure permit condition. In 2005, Jasmine Lakes had a daily per capita water use rate of 72 gallons and therefore was in compliance with its per capita requirement. Jasmine Lakes is also in compliance with its pumpage limits and has no active compliance issues. The other Aqua system in the NTBWUCA, Palm Terrace, is in compliance with its pumpage limits and has no active compliance issues.

The SWFWMD permitted Aqua systems that are not in water use caution areas but could be subject to the water conserving rate structure requirement under the proposed rules (the Zephyr Shores, Gibsonia Estates and Lake Gibson Estates systems) are permitted for less than 100,000 gallons per day and therefore would not be subject to the water conserving rate structure permit condition. The three remaining Aqua systems in the SWFWMD -- Rosalie Oaks, Village Water, and the Woods -- fall below the permitting thresholds of the District based on information provided by Commission staff.

Of the two systems required to comply with the District's water conserving rate structure permit condition, neither Lake Josephine nor Jasmine Lakes employs a minimum gallonage charge. Therefore, they are in compliance with the minimum charge requirements of the Interim Minimum Requirements.

According to data provided by the Commission, the percent of revenues from fixed charges for the Jasmine Lakes system in Pasco County is proposed to be increased from 45% to 50% if viewed on a stand-alone basis. Similarly, the percent of revenues for Lake Josephine from fixed charges is proposed to be increased from 47% to 56%. The District does not believe that such a high percentage of revenues from fixed charges is consistent with the intent of a water conserving rate structure. Based on data contained in the utility's Minimum Filing Requirements, 20% of Jasmine Lake's billable gallons is captured at monthly bills of 1,000 gallons or less. For Lake Josephine, the

corresponding percentage is 16%. This analysis indicates that these are mild (Lake Josephine) or moderately (Jasmine Lakes) seasonal service areas. Therefore, we recommend that the proposed increases in percent of revenues from fixed charges not be approved, and that the fixed charges be reduced closer to 40% of revenues unless there is compelling evidence demonstrating the need for higher base charges for revenue stability purposes.

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

A. First, in the simplest terms, price elasticity is the percent change in demand for a percent change in price. 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. However, there is a wide range of water prices in the District due to source water of varying quality.

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.

Dr. Whitcomb's most recent research is believed to be the largest and most comprehensive study of single family residential price elasticity in the United States and includes monthly observations from over 3,500 homes over an approximate 5 year period. The estimation of price elasticity was refined by estimating elasticities for four different profiles of property value. The estimation was further refined by estimating different elasticities for those utility service areas where alternative, low cost irrigation sources such as shallow wells and canals, were readily available, and those where they were not. The different elasticities have been incorporated into the WATERATE 2006 rate simulation models so that utilities can customize the elasticities to be appropriate for the

characteristics of the individual utility. The estimated price elasticities are provided on Exhibit JWY-3.

For example, a 1% increase in the volume charge for a Profile 2 customer with a 50th percentile assessed value home (the median value for the State) would be expected to result in a 0.51% reduction in water use in a service area where substitutes are readily available. In a service area without substitutes, the price elasticity would decrease to a 0.44% reduction in water use for a Profile 2 home. As can be seen, the response to an increase in the volume charge increases with property value up to the 4th profile. This makes sense in that lower value homes generally have less discretionary water use and discretionary water use generally increases with property value due to increased outdoor water use. Water and sewer bills for Profile 4 households generally are not a significant portion of household income and this likely explains the lower price elasticity. The lower price elasticities for households without ready access to cheaper irrigation substitutes makes sense as well. Without a cheaper substitute irrigation source, customers can become more efficient in their use, but cannot switch to a substitute source, so the price response is lower.

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 2005 revised elasticities are generally consistent with the range of other residential price elasticity estimates conducted in Florida. The slightly greater range of elasticities can be explained by the fact that the 2005 elasticities are estimated for discreet property value profiles and not the average of all customers. Not taking into account the repression effect of these estimated price elasticities 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?

A. No. Both Lake Josephine and Jasmine Lakes are in compliance with the unaccounted water requirements of the SWUCA and NTBWUCA, respectively, based on information supplied by the utilities for 2005.

Q. Does this conclude your testimony?

A. Yes.

BEFORE THE PUBLIC SERVICE COMMISSION

In re: Application for increase in water and wastewater rates in Alachua, Brevard, Highlands, Lake, Lee, Marion, Orange, Palm Beach, Pasco, Polk, Putnam, Seminole, Sumter, Volusia, and Washington Counties by Aqua Utilities Florida, Inc.	DOCKET NO. 060368-WS DATED: AUGUST 21, 2007

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the DIRECT TESTIMONY OF JAY W. YINGLING has been served by U.S. Mail to Kenneth A. Hoffman and Marsha E. Rule, Esquires, Rutledge, Ecenia, Purnell & Hoffman, P. A., P.O. Box 551, Tallahassee, FL 32302-0551, on behalf of AQUA UTILITIES FLORIDA, INC., and that a true and correct copy thereof has been furnished to the following by U. S. Mail, this 21st day of August, 2007.

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AQUA UTILITIES FLORIDA, INC. (AUF)
DOCKET NO. 060368-WS
Water Conservation Rate Structure Requirements and Active Compliance Issues for AUF Water Systems Located in the Southwest Florida Water Management District

Location of System	Name of System	Subject to Water Conservation Rate Structure Requirements?	Active Compliance Issues?
Southern Water Use Caution Area	Lake Josephine	Yes	No
	Leisure Lakes	No	No
	Sebring Lakes	No	No
	Orange Hill / Sugar Creek	No	No
Northern Tampa Bay Water Use Caution Area	Jasmine Lakes	Yes	No
	Palm Terrace	No	No
Not Located in a Water Use Caution Area	Zephyr Shores	No	No
	Gibsonia Estates	No	No
	Lake Gibson Estates	No	No
No Permit Required: Below SWFWMD Permitting Thresholds	Rosalie Oaks	No	n/a
	Village Water	No	n/a
	The Woods	No	n/a

Source: Southwest Florida Water Management District, Water Use Permit Information Manual, 2005 Estimated Water Use Report (June 2007), Regulatory Performance Management data.

SINGLE FAMILY RESIDENTIAL PRICE ELASTICITIES

Profile	Statewide Property Value Percentile	Assessed Value (2002 Dollars)	Elasticity with Substitutes	Elasticity without Substitutes
1	25%	$57,890	-0.39	-0.28
2	50%	$84,330	-0.51	-0.44
3	75%	$126,932	-0.84	-0.65
4	90%	$197,400	-0.56	-0.33

Source: Whitcomb, Dr. John B. "Florida Water Rates Evaluation of Single Family Homes." Prepared for the Southwest Florida Water Management District. July 2005.