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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PREPARED DIRECT TESTIMONY OF YAPING WANG

ON BEHALF OF SANLANDO UTILITIES CORPORATION

DOCKET NO. 930256-WS

MAY 1994

Q1: Please state your name, business address, and occupation.

A1: My name is Yaping Wang. I am a resource economist with the St. Johns River Water Management District.

Q2: Please describe your position with your employer and your duties and responsibilities in that position.

A2: I have been with the District as a resource economist since April, 1989. My duties include preparing the Economic Impact Statement (EIS) as part of the rule-making process, and a wide range of economic studies concerning land acquisition, wastewater reuse, and water conservation.

Q3: Please summarize your education and work background.

A3: See attached resume.

YAPING WANG, AICP
Resource Economist
St. Johns River Water Management District

Areas of Specialization

Economic impact statement, wastewater reuse, leak detection, rate structure, alternative water use, water conservation, comprehensive planning, cost/benefit analysis, socio-economic and population studies.

Education

1989	M.S., Urban Planning, University of Wisconsin-Milwaukee
1982	B.A., Architecture, Tong Ji University, China

Professional Experience

1989-Present	Resource Economist, St. Johns River Water Management District. Prepared all the economic impact analysis (EIS) for the District as part of rule-making process. Conducted a wide range of economic studies concerning land acquisition, wastewater reuse, and water conservation.
1987-1989	Consultant, SRI International Assessed economic development opportunities for Saginaw, Michigan, State of Nebraska, Iowa, and North Dakota. Conducted statistical analysis on factors attributed to regional productivity difference.
1986-1988	Research Assistant, University of Wisconsin-Milwaukee Provided statistical analysis for various research project. Conducted surveys on education programs among state planners. Taught graduate students computer applications.
1984-1985	Research Analyst, Shanghai Investment and Trust Corp., China Identified and assessed business opportunities for foreign companies in real estate development projects. Conducted feasibility studies for hotel and condominium development.
1982-1984	Architect, Shanghai Architectural Design Institute, China Selected and planned sites for residential, institutional and commercial development. Designed apartment buildings and commercial complex.

Q4: What is the purpose of your testimony?

A4: My testimony will explain the effect an inverted rate structure has upon water consumption by a customer of a water utility company in general. In particular, I will explain the effect the inverted rate structure as proposed by Sanlando Utilities has upon water consumption by its customers.

Q5: What methodology have you used in preparing your testimony?

A5: The methodology as presented in Definition of Water Conservation Promoting Rates, Feb. 1993, Water Price Elasticity Study, August 1993, and Water Conservation Promoting Rate Structure Computer Model, September 1993. These reports were prepared by Brown and Caldwell in cooperation with the Southwest Florida Water Management District.

Q6: Please explain the effect upon water consumption that an inverted rate structure is intended to have.

A6: The law of demand in economic theory states that as the price of a commodity increases, the demand for that

commodity decreases. Price elasticity is the measure of the change in quantity demanded caused by the change in price. The demand for a commodity can be elastic or inelastic. An elastic demand is the one that has a greater percentage change in demand than in price. An inelastic demand is one that has a lower percentage change in demand than in price. Discretionary uses such as irrigation and car washing are relatively elastic demands because they are the most sensitive to changes in water rates.

By incorporating a per unit charge that increases with incremental change in water use, an inverted rate structure intends to discourage discretionary water uses. An inverted rate structure generally has no effect on necessary potable water uses (drinking, cooking, bathing) since they are relatively insensitive to rate changes. Therefore, reduction in water consumption by an inverted rate structure is mainly experienced in the areas of the larger users and discretionary uses. In the case of Sanlando, the larger users would be considered those customers who use more than 10,000 gallons per month.

Q7: Please explain any variables that would affect the conservation that would result from an inverted rate

structure and how changing those variables change the conservation, in Sanlando's service area.

A7: An inverted rate structure is not necessarily a water conservation rate structure if it is not properly designed. All the variables listed below would have certain impact on the effectiveness of an inverted rate structure.

1. Price elasticity - Individual customers' demand for water can be either elastic or relatively inelastic depending on price level. Since Sanlando Utilities does not have historical records to demonstrate what would occur with the proposed rate structure, we must look at other utilities or studies to determine what effect an inverted rate structure should have on water consumption.

   A study done in southwest Florida has shown that at prices below $1.00/1,000 gallons or above $6.00/1,000 gallons, the demand for water was relatively inelastic regardless of wealth. In addition, price elasticity is different among different wealth groups. The same study suggested that less wealthy customers are more price elastic

at $1.50, whereas wealthy customers are more price elastic at $3.00.

In the Sanlando service area, the price is relatively inelastic due to high property values and low water prices. Therefore, it is not expected that water consumption will be significantly reduced under the proposed inverted rate structure due to price elasticity.

2. The block rate pricing - The price of the second block needs to be sufficiently higher than the price of the first block so that customers have an economic incentive to conserve water. As a guideline, the price of the second block should be at least 25 percent greater than the price of the first block.

3. Block threshold - The threshold between the first and second blocks for a given customer classification should be equal to or less than 125 percent of the average water usage for that customer classification. For example, if the average monthly single family water use in a community is 10,000 gallons and the block threshold

for the second block is defined as 30,000 gallons, very little single-family customer water use will be assessed at the second block rate. As a result, the effect on water consumption will be minimal.

4. Customer classification - There should be different block thresholds for each customer classification (single family residential, commercial and industrial, irrigation, etc) because different classifications have different needs for water use. For example, if the first block is designed based on a monthly average single-family residential water usage of 10,000 gallons, it would be unlikely that the rate would have any effect on water consumption of a commercial customer such as a 300 unit hotel.

5. Duration - Like other water conservation rate structures, an inverted rate structure is effective in the short term, but it tends to diminish over time because consumers become accustomed to the new rate structure and because the real price falls over time. Therefore, the inverted rate needs regular monitoring and updating to be effective over the long term.

6. Communication - The potentials of water conservation by the inverted rate structure will be maximized if the utility has communicated this rate to its customers frequently. Customers need to be informed about the price of water and how much they have used so that they can respond to the pricing signal and use water efficiently. Better communication to customers can be achieved through clear documentation of water rates, historic and current water use on water bill and the water use should be presented in gallons per day. Additionally, billing frequency should be monthly or, at least, bimonthly as opposed to quarterly.

Q8: Please explain the overall effect of an inverted rate structure upon water consumption and consequent reduced water withdrawals from the aquifer.

A8: The inverted rate structure is the most well known of the conservation rate structures, and it has been used by many utilities in Florida and throughout the U.S. An inverted rate structure may affect customers, the utility, and the water resources of the state. The overall effect of an inverted rate structure, if properly designed, would primarily reduce customers' discretionary

uses such as irrigation and car washing. At a high enough price, demands for potable uses may also be reduced. However, demand for potable uses are relatively inelastic to small or moderate changes because these uses are essential to an acceptable lifestyle.

As the demand for water is reduced, the utility may be able to delay plant or wellfield expansion. The delay in plant or wellfield expansion can be translated to cost savings to the utility and its customers as well.

If an inverted rate structure can reduce water consumption, the withdrawals from the aquifer or other sources can also be reduced. This is especially beneficial in an area which has experienced, or may experience in the future, water shortage problems or in an area of water quality concerns.

Q9: Have you had the opportunity to review the Proposed Water Reuse Program First Amendment Dated 1/31/93 Sanlando Utilities Corporation which was attached to the petition filed by Sanlando Utilities Corporation in this case?

A9: Yes.

Q10: If put into effect, what will be the conservation effect of the rate structure that Sanlando Utilities Corporation has included in its Reuse Plan?

A10: Using the computer model developed by Brown and Caldwell in cooperation with Southwest Florida Water Management District (Water Conservation Promoting Rate Structure Computer Model), it is estimated that total water consumption of Sanlando Utilities would be reduced by 4.6 percent if the proposed inverted rate structure is adopted. This is about half of the reduction rate (9.7 percent) estimated by Sanlando Utilities. The lower reduction rate is due primarily to a relatively high percentage of "wealthy" customers within Sanlando's service area and relatively low water price even after the inverted rate structure is put in place.

The customer base is categorized as wealthy based on a number of variables defined by the model. One variable in determining wealth is the property value in the area as determined from census data. In the customer service area of Sanlando, over 80% of the homes are valued over 81,000. Therefore, the increased rate will not have as large an effect as it would if the increased rate were imposed on a service area with homes of a lesser value.

Q11: Please summarize your testimony.

A11: The inverted rate structure is the most well known of the conservation prompting rate structures. It has been used by many utilities in Florida and throughout the U.S. By incorporating a per unit charge that increases with incremental change in water use, an inverted rate structure intends to discourage discretionary uses such as irrigation and car washing. At a high enough price, demands for potable uses may also be reduced.

Adopting an inverted rate structure does not guarantee reduction in water consumption. Among many variables that would affect the effectiveness of an inverted rate structure, price elasticity is the key variable to determine the reduction level of different customer groups.

If Sanlando Utilities' proposed inverted rate structure is adopted, it is estimated that total water consumption of Sanlando Utilities would be reduced by 4.6 percent. The low reduction rate is due primarily to relatively high percentage of wealthy customers within its service area and relatively low water price of Sanlando Utilities.

Q12: Does this conclude your testimony?

A12: Yes.