DOCKET NO.: 010503-WU - Application for increase in water rates in Pasco County by Aloha Utilities, Inc.

WITNESS: **DIRECT TESTIMONY OF FRANCES J. LINGO,** APPEARING ON BEHALF OF THE STAFF OF THE FLORIDA PUBLIC SERVICE COMMISSION

DATE FILED: November 21, 2001

DIRECT TESTIMONY OF FRANCES J. LINGO

Q. Would you please state your name and business address for the record?

A. My name is Frances J. Lingo. My business address is 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850.

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

A. I am employed by the Florida Public Service Commission (Commission) as an Economic Analyst in the Bureau of Economics, Finance and Rates in the Division of Economic Regulation.

Q. How long have you been employed by the Commission?

A. I have been employed by the Commission since June 12, 1989.

Q. Would you please state your educational background and experience?

A. I received a Bachelor of Science Degree with a major in Accounting, and a Bachelor of Science Degree with a major in Economics, both from The Florida State University, in August 1983.

From October 1983 to May 1989, I was employed by Ben Johnson Associates, Inc. (BJA), an economic and analytic consulting firm specializing in the area of public utility regulation. During my employment at BJA, I performed research and analysis in more than 75 utility rate proceedings, assisting with the coordination and preparation of exhibits. I also assisted with the preparation of testimony, discovery and cross-examination regarding rate design issues.

In particular, I prepared embedded cost-of-service studies, made typical bill comparisons and examined local service rate and cost relationships. I studied residential and general service rates, customer charges, management decision-making processes, slippage in the engineering and construction of nuclear power plants, nuclear versus coal plant costs and seasonal load and usage patterns.

In June 1989, I joined the Commission as a Regulatory Analyst II. In June 1990, I was promoted to Regulatory Analyst III; in October 1991, I was promoted to Regulatory Analyst IV; and in April 1996, I was promoted to my current position of Economic Analyst.

Q. Would you please describe your experience and duties at the Commission?

A. Yes. My experience at the Commission includes but is not limited to:

(a) reviewing water and wastewater cases to identify economic and rate issues associated with rate structure, repression and forecasted billing determinants;

(b) performing accounting, engineering, economic and statistical analysis on those issues, and presenting recommendations (and expert testimony when necessary) on those issues;

(c) developing and promoting liaison activities with other governmental agencies, including the Department of Environmental Protection, the Water Management Districts (WMDs), and other government agencies;

(d) reviewing and evaluating staff-assisted rate case (SARC) filings, auditing utilities' books and records, developing rate base, rate of return and revenue requirements, and preparing and presenting recommendations in cases in which I am involved;

(e) conducting overearning investigations; and

(f) conducting research and other duties relating to water and wastewater utilities subject to the Commission's jurisdiction.

In addition, I have been a faculty member of the NARUC Annual Regulatory Studies Program at Michigan State University since 1998, and a faculty member of the Eastern Utility Rate School since 1997, lecturing on water pricing concepts.

Q. Have you previously testified before this Commission on behalf of Commission Staff?

A. Yes. In January 1993, I testified in the show cause portion of Docket No. 900025-WS regarding the application for a staff-assisted rate case by Shady Oaks Mobile-Modular Estates, Inc. (Shady Oaks). In August 1994, I testified in Docket No. 930944-WS regarding the revocation of the water and wastewater certificates of Shady Oaks. In October 1996, I testified in Docket No. 950615-SU regarding the application for approval of a reuse project plan and an increase in wastewater rates by Aloha Utilities, Inc. And in May 2001, I filed testimony in Docket No. 991437-WU regarding the application for an increase in water rates by Wedgefield Utilities, Inc.

Q. What is the purpose of your testimony in this case?

A. The purpose of my testimony is to:

(a) evaluate the projected customer growth contained in the utility's Minimum Filing Requirements (MFRs) and addressed in the prefiled testimony of utility witness Robert Nixon;

(b) evaluate the projected growth in consumption contained in the utility's MFRs as addressed in the prefiled testimony of utility witness David Porter, and to address the consumption growth projection filed by OPC witnesses Ted Biddy and Stephen Stewart;

(c) respond to the calculation of inclining-block rates as contained in the utility's MFRs and addressed in the prefiled testimony of utility witnesses Robert Nixon and Stephen Watford, and addressed in the testimony of Southwest Florida Water Management District (SWFWMD) witnesses John Whitcomb and Jay Yingling;

(d) explain the Memorandum of Understanding (MOU) that exists between the Commission and the five Water Management Districts (WMDs), and how the Commission and the WMDs work together in cases;

(e) discuss conservation programs as addressed in the prefiled testimony of SWFWMD witness Lois Sorensen; and

(f) develop a series of illustrative rate designs.

Q. Have you prepared exhibits in this case?

A. Yes, I have prepared 11 exhibits. The exhibit numbers and titles are listed below.

Exhibit No.	Exhibit Title
FJL-1	Test of Forecast Methodologies
FJL-2	Customer Growth Projections
FJL-3	Analysis of Aloha's Consumption Projection
FJL-4	Aloha's Projection Periods: Customer Growth v. Consumption Growth
FJL-5	Aloha Service Area Drought Severity Classifications: 2000-2001
FJL-6	Moisture Deficit Variables
FJL-7	Weather Variables: Correlation to Average Monthly Residential Consumption per ERC
FJL-8	Consumption Projections

FJL-9 Comparison of Consumption Projections
FJL-10 Analysis of Aloha's Requested Rate Design
FJL-11 Illustrative Rate Designs

Q. Thank you. Please begin with a discussion of the utility's customer projections. Have you read the testimony of utility witness Robert Nixon, as well as analyzed MFR Schedule F-9 which was sponsored by Mr. Nixon?
A. Yes, I have.
Q. Would you briefly explain the utility's customer growth forecast methodology?
A. Yes. To forecast customer growth, the utility based its Equivalent Residential Connection (ERC) forecast on a time trend of historical residential ERCs as required by the MFRs. This forecast is presented on pages 1 and 2 of Schedule F-9.
Q. Do you believe the utility's customer growth forecast produces a reliable result?
A. Yes, I do.
Q. Would you please explain how you concluded that Aloha's customer growth forecast is reliable?
A. Yes. Because the utility has relied on a time trend to forecast ERC growth, I constructed a separate econometric model of ERC growth. This model explains ERC growth using the rate of growth in the number of households in Pasco County as measured by the University of Florida's Bureau of Economic and Business Research. The purpose of this model is to provide a benchmark projection that can be used to test the reasonableness of the utility's ERC

forecasts.

Q. Why do you believe this comparison is necessary?

A. Forecasts derived from time trends incorporate within them the intrinsic assumption that the level of change in the future will be equal to the level of change observed in the historical data. This assumption ignores any other causal factors that may influence growth, such as changes in economic and/or demographic conditions, and forces the forecasts to grow at the same level as that observed in the historical data.

An econometric model differs from a time trend model in that it incorporates changes in economic and/or demographic conditions to explain growth. In periods when future conditions are very much like those observed in the past, an econometric model would yield forecasts that are very similar to those produced by a time trend. However, when future conditions are expected to differ from those observed in the past, an econometric model is capable of reflecting these expected changes in its forecast. For example, if population growth were expected to slow in the future, an econometric model of future ERCs would show future ERC growth slowing as well. This sensitivity to changing conditions cannot be incorporated into a time trend forecast. Therefore, econometric models tend to produce more reliable forecasts over a wider range of conditions.

I believe it is important for the Commission to verify that the projections produced by a time trend approach are appropriate for setting rates. In particular, I believe that it is important to verify that the ERC growth forecasts submitted by the utility are a proper reflection of the expected economic and demographic conditions in which the utility will be operating. This can be achieved by comparing the ERC forecasts produced by the time trend method to those produced by an econometric model. If the two approaches produce similar forecasts, the Commission can have additional assurance that the utility's projections are reasonable. If, however, the two differ significantly, this may serve as a signal that the trended forecasts may need to be adjusted.

Q. How well did Aloha's forecast compare to the forecast produced by your econometric model?

A. As shown in Exhibit FJL-1, the econometric model produced an ERC forecast for the test year ending December 31, 2001 of 10,448, compared to Aloha's forecast of 10,560. This difference of 112 ERCs represents a statistically significant difference.

Q. Did you perform additional analysis on the utility's ERC forecast?

A. Yes. As shown in Exhibit FJL-2, I performed a time trend analysis similar to that of Aloha, but performed the analysis by customer class by quarter from the period January 1996 through December 2000.

Q. Why did you perform a quarterly time trend analysis on the utility's ERC forecast?

A. In a time trend series, the more data points that are available, the better the regression line. The additional data points may bring out subtle trends in the data that are eliminated when data is combined, as is the case when combining 12 months of data into one single data point. Therefore, in this case, rather than use a trend analysis with only five data points, I performed the same analysis by quarter, which yielded 22 data points over the period ended June 2001.

Q. What were the results of your additional analysis?

A. As shown on Exhibit FJL-2, performing a quarterly time trend analysis projected 17 fewer ERCs than did Aloha's model. Because my result deviates from Aloha's projected ERC growth by only -0.2%, I do not recommend that Aloha's yearly time trend analysis be adjusted.

Q. Thank you. Regarding the utility's consumption projections, have you read the testimony of utility witness Porter, as well as analyzed MFR Schedule G-9 which was sponsored by Mr. Porter?

A. Yes, I have.

Q. Would you please explain the utility's consumption projection analysis?

A. Certainly. As shown on MFR Schedule G-9, page 1, Mr. Porter analyzed consumption over the period of July 2000 through June 2001. His analysis involved three sets of calculations of both annual average monthly demand and annual average daily demand per ERC for: 1) total water sold to customers in all subdivisions; 2) total water sold to customers in subdivisions created more than 10 years ago; and 3) total water sold to customers in subdivisions created less than 10 years ago. I have summarized this portion of Mr. Porter's analysis on Exhibit FJL-3.

Q. What was his stated purpose for performing water demand calculations in this manner?

A. According to Mr. Porter, due mainly to a demographic shift from retirement households to younger households and larger homes, the average water demand per ERC of 258 gallons per day (GPD) is not representative of the demands being placed on the system by its newer customers. He concluded that the water demands in subdivisions created in the past 10 years of 500 GPD/ERC are more reflective of water demand on a going-forward basis. Mr. Porter then multiplied 500 GPD/ERC times Aloha's projected 473 additional ERCs in 2001 to arrive at additional water demanded during 2001 of 86,322,500 gallons.

Q. Do you agree with Mr. Porter's consumption projection methodology?

A. No, I disagree with Mr. Porter's methodology for several reasons. As shown on Exhibit FJL-4, the utility's customer growth projection was based on the period of 1995-2000. However, the consumption projection did not rely on the same five-year period. Instead, a 12-month period that overlapped the end of the historical test period was used.

Q. Please continue.

A. Linear regression is the Commission's preferred method for projecting customer and consumption growth, because it considers data trends, both up and down, in the projection calculation. In this case, linear regression was used to project customer growth, but Mr. Porter's consumption projection is based on an averaging calculation, which does not recognize data trends. The result is that data trends evident in the five years of data used to project customer growth were ignored when projecting consumption for those same customers.

Q. Have you read the testimony of the Office of Public Counsel (OPC) witnesses Ted Biddy and Stephen Stewart in response to Mr. Porter's consumption projection?

A. Yes, I have. These witnesses also disagree with Mr. Porter's consumption projection methodology.

Q. What is their main area of disagreement with Mr. Porter's projection?

A. Both Mr. Biddy and Mr. Stewart testify that Mr. Porter's calculation is flawed because it ignores the abnormally dry weather in 2000. They testify that the abnormally dry weather during that period would reflect increased water usage due to irrigation needs and that consumption under normal weather circumstances would be less than projected by the utility. They recommend basing the projected consumption on average consumption per ERC during the years 1995-2000. This results in OPC's recommended projected consumption per ERC of 265 GPD.

Q. Do you agree with Messrs. Biddy and Stewart regarding the weather during 2000?

A. No, I do not. Based on information obtained from the National Drought Mitigation Center, I have prepared Exhibit FJL-5 which compares the monthly drought classifications for Aloha's service area for the years 2000 and 2001. I have prepared a ranking system based on the drought classifications, with a drought classification of D 0 (abnormally dry) being assigned a value of 1, while a drought classification of D 4 (exceptional drought) receives a score of 5. As shown on my exhibit, the total annual drought score for the year 2000 is 33, resulting in an average monthly drought score of 2.8. Similarly, the total annual drought score for the year 2001 through the month of November is also 33, resulting in an average monthly score of 3.0. Even in the event that December 2001 does not receive a drought classification, both the total annual and average monthly scores for 2001 will be identical to those of 2000. Therefore, I believe the weather during the years 2000 and 2001 are comparable, and that no adjustment should be made to rectify a perceived abnormal weather period.

Q. Do you recommend an alternative consumption projection methodology to those recommended by Aloha and OPC?

A. Yes, I do. Consistent with Commission practice, I recommend that multiple linear regression produces a more reliable result and should therefore be used to project consumption. Also consistent with Commission practice, I recommend that these projections be done separately for the residential and general service classes.

Q. Would you please explain why you believe multiple regression is the appropriate consumption projection methodology to use in this case?

A. Certainly. Many factors, such as the number of persons in the household and weather - have an impact on consumption. Therefore, it is appropriate to select a consumption projection methodology which enables analysis of these factors on water demand.

Q. Were you able to obtain data such as the average number of persons per household for inclusion in your analysis?

A. Unfortunately, no. In an interrogatory propounded by the Commission staff, the utility was asked to provide this data. However, Aloha responded by stating that they did not have any such data. I also attempted to obtain the data from the Pasco Chamber of Commerce, but was unsuccessful there as well.

However, I was able to obtain information regarding other variables which I believe affect consumption. For example, I was able to obtain information on several types of weather variables which may reasonably be expected to influence consumption. I believe total monthly rainfall, average daily precipitation and average daily temperature are examples of such variables that should be analyzed with respect to each variable's effect on consumption. In addition, I also examined the possibility that other weather variables might also impact consumption.

Q. Would you please explain?

A. Yes. For example, rainfall tends to have a negative effect on consumption, while temperature typically has a positive effect on consumption. As temperature rises, it increases the evaporation rate of rainfall, thereby influencing the extent that rainfall decreases consumption. Therefore, a single variable that incorporates the effects of both temperature and rainfall might also be relevant. The moisture deficit variable (MDV) incorporates average daily temperature for the month and total rainfall for the month. The MDV is somewhat similar to the net irrigation requirement (NIR) variable, which the Commission recognized in Order No. PSC-96-1320-FOF-WS, issued October 30, 1996, in Docket No. 950495-WS as having a positive correlation to consumption in the majority of months analyzed. I have calculated MDVs for each month during the period 1996 through 2000, and the results are presented on Exhibit FJL-6.

Q. Has the MDV been recognized by the Commission in prior cases as a relevant weather variable to consider when projecting consumption?

A. Yes. The MDV has been approved in several prior Commission cases as an appropriate weather variable to use in a multiple regression equation.

Q. What was your next step in your consumption projection calculation?

A. As shown on Exhibit FJL-7, I regressed each of the following weather variables against residential consumption per ERC to find the variable with the highest r^2 score: 1) average daily temperature; 2) average monthly temperature since 1948; 3) average daily precipitation; 4) total precipitation for each month; 5) average monthly precipitation since 1948; 6) effective precipitation; and 7) MDV.

Q. What is the significance of r^2?

A. r^2 is a measure of how much variation in the dependent variable can be explained by the independent variable. Assuming all other things being equal, the higher the r^2 value, the better the variable will perform in a projection model. As indicated on page 7 of Exhibit FJL-7, the variable with the highest explanatory power is the MDV. I have graphed the MDV and residential consumption per ERC on page 8 of FJL-7 to demonstrate how well residential consumption moves in relation to changes in the MDV.

Q. Would you please provide an overview of the model you used to forecast test year consumption for the residential class (RS)?

A. Yes. The model used to forecast test year consumption for the RS class is based upon billing analysis data for the period from January, 1996 through June, 2001. This data is aggregated into quarterly data for the purposes of estimating the model. The model specifies consumption per residential ERC in each quarter as a function of two primary drivers: weather (as measured by MDV) in the current quarter and a four quarter lagged value of consumption per residential ERC. This specification implies that consumption per ERC in each quarter is dependent upon current weather conditions but will look at consumption per ERC observed during the same quarter of the prior year. As established earlier, weather affects consumption. Therefore, the model also includes a variable to adjust for the difference in weather between the current and lagged period. Also, three binary variables used to account for atypical rainfall observed in the historical weather data. This model and the resulting consumption per ERC forecast is shown in my Exhibit FJL-8.

Q. What did this model predict for total consumption for the RS class for 2001?

A. The model results, when combined with the ERC forecast described above, predicted total consumption for the RS class to be 890,535,306 gallons. This forecast is based on 6 months of actual data for the period January through June, 2001 and six months of forecasted consumption for the period July through December, 2001.

Q. Would you please provide an overview of the model you used to forecast test year consumption for the general service class (GS)?

A. The model used to forecast consumption for the GS class is similar to that used for the RS class. The model is based on historical billing analysis data from January, 1996 through June, 2001. It aggregates this data into quarterly observations and estimates consumption using weather and prior usage from the same quarter in the previous year. The model also contains four binary variables used to adjust for atypical weather conditions. The results of this model are also presented in my Exhibit FJL-8.

Q. What did this model predict for total consumption for the GS class for 2001?

A. The model results, when combined with the ERC forecast described above, predicted total consumption for the GS class to be 110,486,540 gallons. This forecast is based on six months of actual data for the period January through June, 2001 and six months of forecasted consumption for the period July through December, 2001.

Q. What do your models predict total water consumption to be for 2001?

A. Based upon the forecasts for the RS and GS classes, the total water consumption forecast for 2001 is 1,001,021,846 gallons.

Q. Have you prepared a comparison of the results of Aloha's consumption projections, versus yours and those of OPC?

A. Yes. A comparison of my projection, versus those of the utility and OPC may be found on Exhibit FJL-9.

Q. Let us move on to the utility's rate structure and proposed revenue recovery portion of your testimony. Have you also read the testimonies of utility witness Stephen Watford and SWFWMD witness Jay Yingling?

A. Yes, I have.

Q. Would you please describe Aloha's current rate structure?

A. Yes. The utility's current rate structure consists of a base facility charge (BFC) and uniform consumption charge rate structure. For residential customers, a gallonage allotment of 3,000 gallons (3 kgal) is included in the BFC, while the gallonage allotment for general service customers varies by meter size. This type of rate structure is generally considered a nonconservation-oriented rate structure because the customer does not receive pricing signals to conserve at or below the gallonage allotment level. However, according to SWFWMD witness Jay Yingling, the current structure does meet the requirements of the SWFWMD's guidelines with respect to per capita usage.

Q. Please describe Aloha's proposed rate design and cost recovery methodology.

A. Certainly. The utility has proposed a two-tier inclining block rate structure to be applicable to the residential class, with usage blocks set for monthly consumption: 1) at 0-10 kgal; and 2) for consumption in excess of 10 kgal. The utility has also proposed maintaining its BFC and uniform consumption charge rate structure for the general service class, and eliminating the gallonage allotments for all customers. Finally, the utility proposes to generate their full revenue requirement through a combination of the first tier of consumption charges, all base facility charges and general service gallonage charges. Aloha has proposed that monies received through the second tier of consumption charges be set aside and used for: 1) paying the cost of water as purchased from Pasco County, and 2) for utilization for various conservation measures.

Q. Have you analyzed Aloha's proposed rate structure?

A. Yes. Aloha's proposed rate structure is consistent with inclining-block rate structures previously approved by the Commission in that the first tier (block) is not greater than 10 kgal and the usage block rate differential for the second block is at least 25% greater than in the first block. However, as shown on Exhibit FJL-10, an analysis of price increases to customers at various consumption levels reveals that customers using 3 kgal will receive the largest percentage increase. This is understandable, because the 3 kgal allotment is being removed from the BFC. However, customers using between 4 kgal and 6 kgal receive approximately the same percentage price increases as those customers using between 20 kgal and 100 kgal. In fact, customers using a mere 4 kgal per month will receive virtually the same percentage increase as those customers using 100 kgal. Therefore, I believe it is appropriate to modify the utility's proposed rate design.

Q. Would you please explain why you believe this is appropriate?

A. Yes, I will. The reason why inclining-block rates reduce average usage is because demand in the higher usage block(s) should be more responsive to price than demand in the first block. Therefore, water users with low monthly usage benefit through lower rates, while water users with high monthly usage will pay increasingly higher rates and be subjected to increasingly greater percentage increases. Thus, high water users will have a greater incentive to conserve. However, the utility's proposed inclining-block rate structure does not distinguish between low and high use. Under Aloha's proposal, there is a relatively flat 27 percentage point spread in price increase for consumption ranging from 3 kgal to 300 kgal.

Q. Do you have any recommendations as to how to modify Aloha's proposed rate structure?

A. Yes. I will discuss a series of illustrative rate designs, as well as my recommendations for Aloha's rate structure, later in my testimony.

Q. Please address Aloha's proposed cost recovery methodology.

A. Considering the manner in which the utility has proposed to recover their full revenue requirement of $3,044,811 as shown on MFR Schedule B-1, their requested rates generate an amount in excess of their requested revenue figure. Removing miscellaneous service revenues of $32,284 results in revenues from monthly service rates of $3,702,822.

Q. Has the utility further explained their proposal?

A. Yes. In response to Staff's First Set of Interrogatories, No. 15, utility witness Nixon states that the $3,735,106 revenue calculation "... is linear, and does not factor in any reduction in revenue due to conservation related to the proposed price of water. [The] $401,377 represents the net reduction in revenue predicted by the SWFWMD Water Rate Model. The $288,918 is ... the predicted revenue that will be collected after implementation of the proposed conservation rates. To the extent this predicted excess revenue is realized, it will be used for conservation programs as required in cooperation with SWFWMD."

Q. Do you have concerns about this proposed method of cost recovery?

A. Yes, I do. It is my understanding that the Commission does not approve revenue requirements (rate of return times rate base) in excess of what was requested by the utility. In addition to utility witness Nixon stating that the excess revenues generated from rates would be used for conservation programs, utility witness Watford states in response to Staff's First Set of Interrogatories, No. 18(a), "the utility has conferred with SWFWMD several times concerning the types of conservation programs the district is going to require Aloha to implement as part of it's [sic] conservation program that is going to be a part of it's [sic] final consent order with the district."

Q. What is the status of the Consent Order between the SWFWMD and Aloha?

A. SWFWMD witness John Parker, the District's Water Use Regulation Manager, has testified in regard to the Consent Order that "after several meetings and a formal mediation, the parties have been unable to reach a settlement." Therefore, at this time, it does not appear that the District has approved a utility-specific conservation program for Aloha.

Q. What is your opinion regarding Aloha's requested conservation expenses?

A. Because there is no Consent Order, and, therefore, no approved conservation programs, I do not believe the utility's rates should be set at a level that generates excess revenues for those programs' expenses. However, given the Memorandum of Understanding (MOU) that exists between the Commission and all five of the state's Water Management Districts (WMDs), I believe it is important to work with the SWFWMD on this issue.

Q. Would you please explain the MOU that exists between the Commission and the five Water Management Districts, and how the Commission and the WMDs work together in cases?

A. Yes. The Commission has a MOU with the SWFWMD, as well as with the four other WMDs. In June 1991, the Commission and the five WMDs recognized that it is in the public interest that they engage in the joint goal to ensure efficient and conservative utilization of water resources in Florida, and that a joint, cooperative effort is necessary to implement an effective state-wide water conservation policy. The MOU memorializes the common objectives, principles and responsibilities of each agency in order to implement an effective state-wide water conservation policy.

Q. What are the common objectives of the two agencies as they relate to public water systems?

A. The common objectives as stated in the MOU include, but are not limited to:

(a) fostering conservation and the reduction of withdrawal demand of ground and surface water through, among other measures, employment of conservation promoting rate structures, maximization of reuse of reclaimed water, and through customer education programs;

(b) to effectively employ the technical expertise of the WMDs regarding water resource development and water resource management, and to employ Commission expertise in the economic regulation of utilities for the promotion of efficient water consumption in the public interest; and

(c) that the agencies shall exchange pertinent available information regarding water systems experiencing water availability problems.

Q. With regard to water conservation programs, have you read the testimony of SWFWMD witness Lois Sorensen?

A. Yes, I have.

Q. Would you briefly summarize her testimony?

A. Yes. Witness Sorensen, the SWFWMD's Water Shortage Coordinator, testified regarding conservation that water utilities in the District must develop and implement a utility-specific water conservation plan or program. She provided testimony regarding the four main types of measures that could be elements of a utility's water conservation program - education, operation, regulation and incentive - and also provided cost effectiveness ratios for several of the programs discussed. She suggested that Aloha could pay the conservation program expenses by "... revenues generated ... to create a dedicated water conservation fund, or allocate(d) funds from other disallowed expenses ..." She further testified that many of the conservation program measures discussed in her testimony could be done fairly quickly, if necessary, to help Aloha come back into compliance with its Water Use Permit (WUP).

Q. Do you believe water conservation programs for utilities are important?

A. Yes, I do, especially when a utility is not in compliance with its WUP.

Q. Is Aloha in compliance with its WUP?

A. SWFWMD witness Parker has testified that Aloha is not in compliance with its WUP because it is exceeding the permitted annual average day withdrawal.

Witness Parker goes on to testify that, "Aloha needs to implement a water conserving rate structure, and water conservation programs to comply with SWFWMD rules and its WUP....to date Aloha has not taken adequate measures to conserve water."

Q. Do you agree with witness Sorensen's suggestion regarding how to pay for conservation program expenses for Aloha?

A. Since it is my understanding that the Commission does not approve revenue requirements in excess of what was requested on MFR Schedule B-1, I believe the only method of funding Aloha's conservation programs in this case is through reductions in operating expenses, thereby freeing up monies to apply toward the conservation programs. Finally, to the extent conservation programs are funded, I believe the Commission staff should work with the SWFWMD to insure that the conservation program monies are being spent appropriately.

Q. Thank you. Earlier in your testimony, you stated that, through a series of illustrative rate designs, you would explain how Aloha's proposed rate design should be modified. Would you please begin?

A. Certainly. There are several steps involved in evaluating and calculating an inclining-block rate structure including (but not limited to) determining: 1) the appropriate "conservation adjustment," if any; 2) the appropriate usage block rate factors; and 3) the appropriate usage blocks. So that my comparisons to Aloha's proposed rate design are as comparable as possible, I have based Exhibit FJL-11 on Aloha's requested revenues from monthly service rates of $3,702,822, as well as used Aloha's projected bills, ERCs and gallons. In Exhibit FJL-11, the analysis is first categorized by the selection of different usage blocks. Aloha has proposed usage blocks of 0-10 kgal and 10+ kgal. I believe an alternative set of usage blocks that merits consideration is for usage at 0-8 kgal, 8-15 kgal and 15+ kgal. The utility's proposed usage blocks are shown on pages 1 through 3 of Exhibit FJL-11, while the alternative set of usage blocks is shown on page 4 through 6 of my exhibit.

Q. Why did you select this alternative usage block group to consider?

A. As I discussed earlier in my testimony, Aloha's proposed rate design does not send increasingly higher price signals to those customers at high consumption levels. In fact, a review of Exhibit FJL-10 will indicate that, for usage between 8 kgal and 15 kgal, the percentage increases are less than those for customers using less than 8 kgal. One way to mitigate this disparity is to create a usage block so that usage in the 8 kgal to 15 kgal range can be assigned a higher gallonage rate than for usage in the 0 to 8 kgal range.

Q. Do you have any concerns about dropping the first usage block threshold to 8 kgal?

A. No, I do not. An analysis of utility witness Nixon's Late Filed Deposition Exhibit No. 2 (revised MFR Schedule E-14) indicates that the 10 kgal threshold captures 73% of the utility's bills and 68% of its consumption. Lowering the first block threshold (cap) to 8 kgal captures 66% of the utility's bills and 61% of its consumption - not a large change from those percentages at the 10 kgal cap. Furthermore, lowering the cap from 10 kgal to 8 kgal will send a stronger conservation price signal to a larger group of customers. When lowering the first usage block threshold, however, it is important to consider that the Commission in past cases has recognized that, as a revenue stability consideration, at least 50% of the bills and gallons be captured in the threshold of the first usage block.

Q. Please continue with the explanation of your illustrative rate designs.

A. Thank you. For the two sets of usage blocks being evaluated, there are three alternatives for base facility charge (BFC) v. gallonage charge cost recovery for each usage block set: BFC = 31%, BFC = 28%, and BFC = 25%. For example, Page 1 of Exhibit FJL-11 is based on usage blocks of 0-10 kgal and 10+ kgal, with a BFC allocation of 31%. Page 2 of Exhibit FJL-11 also examines the 0-10 and 10+ kgal set of usage blocks, but at a BFC allocation of 28%. Page 3 of Exhibit FJL-11 lowers the BFC allocation to 25%. The lower the BFC allocation percentage - and, therefore, the greater the gallonage charge allocation percentage - the more conservation oriented the rate is considered.

The same pattern is repeated for pages 4 through 6 of Exhibit FJL-11, but for the 0 to 8 kgal, 8 kgal to 15 kgal and 15+ set of usage blocks. Finally, pages 1 through 3 of Exhibit FJL-11 contains the same 5 sets of usage block rate factors: 1) 1.0/1.25, 2) 1.0/1.5, 3) 1.0/1.75 and 4) 1.0/2.0. Pages 4 through 6 of Exhibit FJL-11 contain the following usage block rate factors: 1) 1.0/1.25/1.5, 2) 1.0/1.25/1.75, 3) 1.0/1.25/2.0 and 4) 1.0/1.5/2.0.

Q. How should an appropriate BFC allocation percentage be designed?

A. The appropriate BFC allocation percentage is one that permits the utility to recover a significant share of its fixed costs while at the same time sending customers the proper pricing signals to encourage them to control their water usage.

Q. Would you please explain?

A. There are several things to keep in mind when selecting an appropriate BFC v. gallonage charge allocation. One is that, in this case, due to the elimination of the 3 kgal allotment in the BFC, the customers at 3 kgal of usage will receive the greatest percentage price increase. This problem is mitigated somewhat by decreasing the BFC allocation percentage. However, due to revenue stability concerns, the BFC allocation percentage should not be decreased to the point that the new BFC is less than the current BFC. In addition, a competing point to consider is that the gallonage charge allocation percentage should be at a level such that the resulting gallonage charge in the first block is not less than the utility's current gallonage charge.

Q. Do you agree in theory that placing more of the cost recovery burden in the gallonage charge places the utility at risk for greater revenue instability?

A. In theory, a move away from revenues generated through fixed charges to revenues generated through gallonage charges will increase the uncertainty about the revenue stream. In practice, however, the variability of revenue received exists within a continuum. For example, if the Commission were to set the BFC at zero, making the utility's revenue requirement totally dependent on the number of gallons sold, in months of extremely low usage there could be the risk that revenues generated might not cover fixed costs. This situation could place the utility at greater risk. At the other extreme, the Commission could set the BFC at 100% of the utility's revenue requirement and thereby eliminate any variability in revenue associated with usage.

Q. Will placing 31% of the utility's cost recovery burden on the BFC place the utility at a greater risk for revenue instability?

A. Yes. However, as may be calculated from MFR Schedule E-13, this is the same BFC v. gallonage charge allocation split proposed by the utility. On Schedule E-13, the utility's proposed rate design generated BFCs of $1,152,330, plus corresponding gallonage charge revenues of $2,550,492. This represents 31% of the revenues recovered through the BFC, with the remaining 69% of revenues recovered through the gallonage charges in Aloha's proposed rate design.

Furthermore, I believe the magnitude of the cost recovery shifts resulting in a BFC allocation percentage of 25% are insignificant compared to the resulting improved conservation pricing signals sent to customers, while at the same time minimizing the price increases for largely nondiscretionary use.

Q. You mentioned earlier that the appropriate BFC allocation percentage is one that permits the utility to recover a significant share of its fixed costs while also sending customers the proper conservation pricing signals. How would this analysis be performed?

A. This analysis is based on the fact that there will be a certain baseline level of water sold to customers during the year. I believe it is reasonable to assume this baseline level is represented by the sum of residential usage in the first usage block plus water sold to the utility's general service customers. It is not necessary for 100% of the utility's fixed costs to be recovered solely through the BFC if a combination of the BFC and the revenues generated by this baseline level of usage combine to cover fixed costs. After fixed costs are recovered, it is entirely appropriate for the incremental variable costs to be recovered through the revenues generated by the number of gallons sold.

Q. What does the analysis of Exhibit FJL-11 reveal?

A. Based on the results of my analysis, as shown on page 6 of this exhibit, a preferable rate structure to that proposed by Aloha is one that is based on the alternative set of usage blocks, and a BFC allocation percentage of 25%. The price signals sent to the medium and high consumption users based on this rate design are greater than on any other page of the exhibit. My recommendation is based upon a balancing of the utility's financial stability and generally accepted conservation principles.

Q. Thank you. Moving on the next portion of your testimony, have you read the testimony of SWFWMD witness John Whitcomb, Ph.D.?

A. Yes, I have. Dr. Whitcomb testified regarding the SWFWMD's 1999 price elasticity study, as well as the development and application of the Waterate 2001 software used by Aloha in this filing. Waterate 2001 is an Excel workbook that may be used as a planning tool to simulate how changes in water and sewer rate structures impact water revenues and water demand.

Q. Do you believe a reduction in water demand (repression) will occur in this case, and, if so, how should the demand reduction be estimated?

Q. Yes. I believe it is reasonable to expect a reduction in demand (repression) caused by an increase in the water rates. I also believe it is reasonable to estimate demand reductions based on the long-run price elasticities found in the District's study. Specifically, when gallonage prices are below $1.50 per kgal, price elasticity is estimated to be -0.398, for prices between $1.50 per kgal and $3.00, the price elasticity is estimated to be -0.682, and for prices above $3.00 per kgal, price elasticity is estimated to be -0.247. Furthermore, as testified by Dr. Whitcomb, it can be expected that 50% of the long-run price impact will occur in the first year.

Q. Do you have any concluding remarks?

A. Yes, I do. I would like to emphasize first that staff's final recommended customer growth and consumption projections should be carried through to any other related projection factors used. Finally, the conclusions I draw from Exhibit FJL-11 are based wholly on the utility's proposed filing. To the extent this exhibit is used in staff's final recommendation in this case, the rate calculations should be based on staff's final recommended revenue requirement, as well as on staff's final recommended bills, ERCs and consumption.

Q. Does this conclude your testimony?

A. Yes.

TEST OF FORECAST METHODOLOGIES

Utility's Time Trend Forecast v. Econometric Model Forecast

ERCs EXPLAINED BY UTILITY'S TIME TREND MODEL

Year	Time Period	Utility's ERCs	
1995	1	8,118	
1996	2	8,393	
1997	3	8,836	
1998	4	9,306	
1999	5	9,835	
2000	6	10,087	
2001	7	10,560	= X1

Regression Output:

Constant		7631.733333
Std Err of Y Est		84.15031902
R Squared		0.990835064
No. of Observations		6
Degrees of Freedom		4
X Coefficient(s)	418.3142857	
Std Err of Coef.	20.11577375	

ERCs EXPLAINED BY STAFF'S ECONOMETRIC MODEL

Year	Pasco County Households	Utility's ERCs	
1995	132,542	8,118	
1996	135,871	8,393	
1997	139,038	8,836	
1998	142,089	9,306	
1999	145,206	9,835	
2000	148,392	10,087	
2001	150,721	10,448	= X2

Regression Output:

Constant		-9535.585
Std Err of Y Est		92.911025
R Squared		0.9888274
No. of Observations		6
Degrees of Freedom		4
X Coefficient(s)	0.1325863	
Std Err of Coef.	0.0070467	

Hypothesis Test:

Null Hypo.	No Difference between Utility's Time Trend Forecast and Staff's Econometric Model Forecast	
Alt. Hypo.	Utility's Time Trend Forecast and Staff's Econometric Model Forecast are Different	
Critical Value:	1.86	(2-tailed t distribution: 8 degrees of freedom @ 95% confidence level)

Parameter	Utility	Staff	
n	6	6	= number of observations
s^2	7,081	8,632	= square of std error of Y estimates from regression outputs above

Test Statistics		
S^2	7,857	
(X1 -X2)	112	X1 and X2 from above
t-statistic	2.19	

Conclusion: t-statistic is greater than critical value.
Conclude difference is statistically significant.

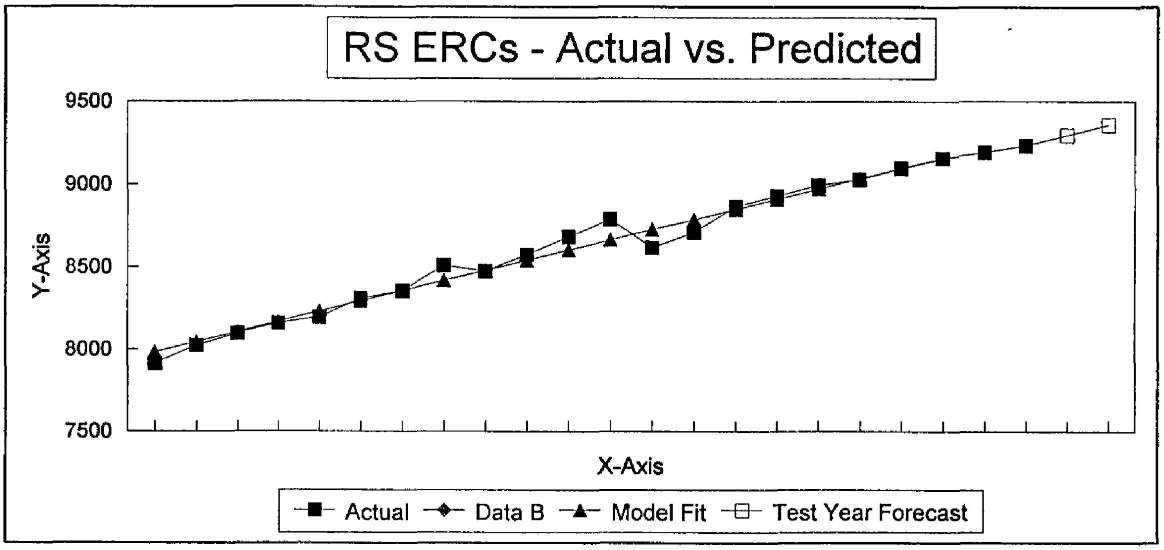
CUSTOMER PROJECTIONS

RESIDENTIAL CLASS

Regression Output:		
Constant		7921.642857
Std Err of Y Est		54.69530833
R Squared		0.982700861
No. of Observations		22
Degrees of Freedom		20
X Coefficient(s)	61.9539808	
Std Err of Coef.	1.838043529	
t-stat	33.70648183	

Yr-Qtr	Period	RS ERCs	Y-Hat	Growth	Test Year Forecast
9601	1	7,916	7,984		
9602	2	8,025	8,046	62	
9603	3	8,099	8,108	62	
9604	4	8,159	8,169	62	
9701	5	8,195	8,231	62	
9702	6	8,309	8,293	62	
9703	7	8,357	8,355	62	
9704	8	8,510	8,417	62	
9801	9	8,475	8,479	62	
9802	10	8,576	8,541	62	
9803	11	8,684	8,603	62	
9804	12	8,788	8,665	62	
9901	13	8,620	8,727	62	
9902	14	8,713	8,789	62	
9903	15	8,868	8,851	62	
9904	16	8,933	8,913	62	
0001	17	8,998	8,975	62	
0002	18	9,032	9,037	62	
0003	19	9,101	9,099	62	
0004	20	9,160	9,161	62	
0101	21	9,196	9,223	62	9,196
0102	22	9,236	9,285	62	9,236
0103	23		9,347	62	9,298
0104	24		9,409	62	9,360

CUSTOMER PROJECTIONS



CUSTOMER PROJECTIONS

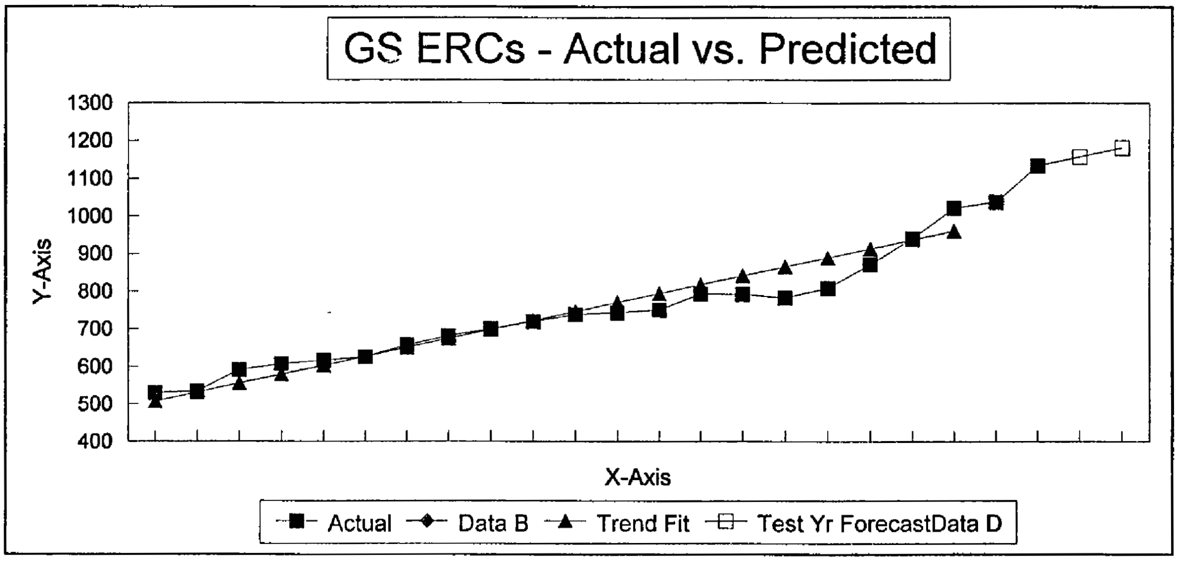
GENERAL SERVICE CLASS

Regression Output:

Constant		483.2359307
Std Err of Y Est		47.68041011
R Squared		0.917918968
No. of Observations		22
Degrees of Freedom		20
X Coefficient(s)	23.96301525	
Std Err of Coef.	1.602306887	
t-stat	14.95532188	

Yr-Qtr	Period	GS ERCs	Y-Hat	Growth	Test Year Forecast
9601	1	530	507		
9602	2	535	531	24	
9603	3	591	555	24	
9604	4	608	579	24	
9701	5	617	603	24	
9702	6	626	627	24	
9703	7	658	651	24	
9704	8	682	675	24	
9801	9	701	699	24	
9802	10	720	723	24	
9803	11	739	747	24	
9804	12	744	771	24	
9901	13	751	795	24	
9902	14	794	819	24	
9903	15	794	843	24	
9904	16	784	867	24	
0001	17	809	891	24	
0002	18	873	915	24	
0003	19	942	939	24	
0004	20	1,022	962	24	
0101	21	1,039	986	24	1,039
0102	22	1,135	1,010	24	1,135
0103	23		1,034	24	1,159
0104	24		1,058	24	1,183

CUSTOMER PROJECTIONS



CUSTOMER PROJECTIONS SUMMARY

		2001 ERCs
Residential		9,360
General Service		1,183
FJL Projected YE:		10,543
Aloha Projected:		10,560
Difference:	Amount	(17)
	Percent	-0.2%

Sources: Aloha's Response to Citizens' First Set of Interrogatories Nos. 47-48; MFR Schedule F-9, p. 1.

ALOHA UTILITIES, INC.
DOCKET NO. 010503-WU
PROJECTED TEST YEAR ENDING DECEMBER 31, 2001

EXH FJL-3

ANALYSIS OF ALOHA'S CONSUMPTION PROJECTION

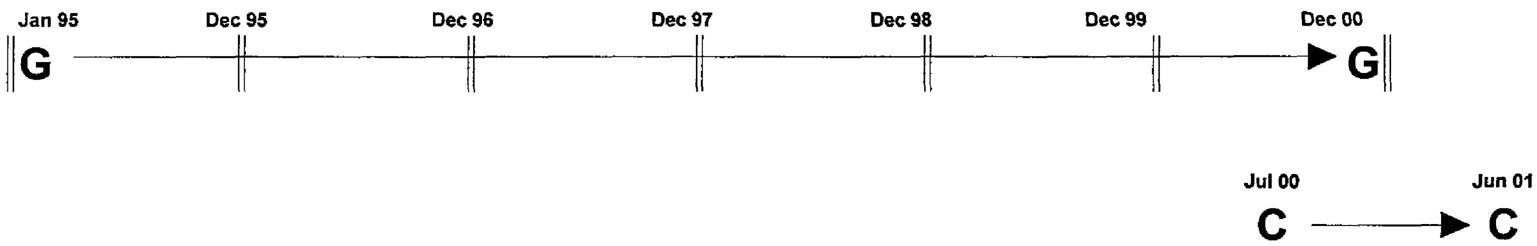
		Comparison to All Subdivisions: Percentage Chg
Total Water Sold: Residential Customers in All Subdivisions		
Annual average monthly demand per ERC	7,839	
Annual average daily demand per ERC	258	
Total Water Sold: Residential Customers in Subdivisions Created > 10 Years Ago		
Annual average monthly demand per ERC	5,149	
Annual average daily demand per ERC	169	-34%
Total Water Sold: Residential Customers in Subdivisions Created < 10 Years Ago		
Annual average monthly demand per ERC	15,200	
Annual average daily demand per ERC	500	94%

Sources MFR Schedule G-9, p. 1.

ALOHA UTILITIES, INC.
DOCKET NO. 010503-WU
PROJECTED TEST PERIOD ENDING DECEMBER 31, 2001

EXH FJL-4

ALOHA'S PROJECTION PERIODS: CUSTOMER GROWTH v. CONSUMPTION GROWTH



G = period used to forecast customer growth
C = period used to forecast consumption growth

Sources: MFRs Schedules Nos. F-9, G-9.

ALOHA UTILITIES, INC.
DOCKET NO. 010503-WU
PROJECTED TEST YEAR ENDING DECEMBER 31, 2001

EXH FJL-5

ALOHA SERVICE AREA DROUGHT SEVERITY CLASSIFICATIONS: 2000 - 2001

		DROUGHT	---------- DROUGHT SCORE ----------		
YEAR	MONTH	CLASSIFICATION (1)	MONTH	TOTAL ANNUAL	AVERAGE MONTHLY
2000	January	D 0	1		
	February	D 0	1		
	March	D 1	2		
	April	D 2	3		
	May	D 2	3		
	June	D 3	4		
	July	D 3	4		
	August	D 2	3		
	September	D 1	2		
	October	D 1	2		
	November	D 3	4		
	December	D 3	4	33.0	2.8
2001 (2)	January	D 4	5		
	February	D 4	5		
	March	D 4	5		
	April	D 3	4		
	May	D 3	4		
	June	D 3	4		
	July	D 3	4		
	August	D 0	1		
	September	D 0	1		
	October	(3)	0		
	November	(3)	0		
	December	(4)	(4)	33.0	3.0

(1) Drought classifications provided by the U.S. Drought Monitor. Classifications are for the first posting for the month.
Drought classifications: D 0 = abnormally dry
D 1 = drought moderate
D 2 = drought severe
D 3 = drought extreme
D 4 = drought exceptional

(2) Drought scores through November 2001.

(3) No drought classified during these months, resulting in scores of 0.

(4) December data not available prior to filing of testimony.

Source: U.S. Drought Monitor, National Drought Mitigation Center.

ALOHA UTILITIES, INC.
DOCKET NO. 010503-WU
PROJECTED TEST YEAR ENDING DECEMBER 31, 2001

EXH FJL-6

MOISTURE DEFICIT VARIABLES

YEAR	MONTH	(a) AVG TEMP	(b) TOTAL RAINFALL	(c) MOISTURE DEFICIT VARIABLE FACTOR	(d) EFP= EFFECTIVE PRECIPITATION	(e) PET = POTENTIAL EVAPO-TRANSPIRATION	(f) = (e) - (d) MOISTURE DEFICIT VARIABLE
1996	January	60.3	3.6	25.5	2.9	2.1	(0.8)
	February	61.5	3.9	25.2	3.1	2.2	(0.8)
	March	62.4	8.1	30.9	3.5	2.8	(0.7)
	April	70.7	4.0	33.3	3.1	4.3	1.2
	May	79.4	0.9	36.9	0.9	6.4	5.5
	June	81.6	4.9	37.2	3.4	6.9	3.6
	July	84.3	6.7	37.8	3.5	7.6	4.1
	August	83.5	7.1	35.4	3.5	7.0	3.5
	September	83.2	4.1	31.2	3.1	6.1	2.9
	October	75.7	3.6	28.8	2.9	4.5	1.5
	November	69.2	0.8	25.2	0.8	3.1	2.3
	December	63.8	4.4	24.6	3.2	2.4	(0.8)
1997	January	63.5	1.5	25.5	1.5	2.5	1.0
	February	68.4	0.4	25.2	0.4	3.0	2.6
	March	74.5	3.4	30.9	2.8	4.6	1.8
	April	71.7	4.9	33.3	3.4	4.5	1.1
	May	77.9	0.6	36.9	0.6	6.2	5.6
	June	82.3	8.8	37.2	3.5	7.1	3.6
	July	84.8	4.1	37.8	3.1	7.7	4.6
	August	84.2	5.1	35.4	3.4	7.1	3.7
	September	82.7	9.7	31.2	3.5	6.0	2.5
	October	74.9	5.5	28.8	3.5	4.4	0.9
	November	67.5	7.0	25.2	3.5	2.9	(0.6)
	December	61.7	15.6	24.6	3.5	2.2	(1.3)
1998	January	63.2	3.1	25.5	2.7	2.4	(0.2)
	February	62.5	10.9	25.2	3.5	2.3	(1.2)
	March	64.4	6.1	30.9	3.5	3.1	(0.4)
	April	71.7	0.2	33.3	0.2	4.5	4.3
	May	78.1	2.5	36.9	2.3	6.2	3.9
	June	84.1	0.7	37.2	0.7	7.4	6.7
	July	84.0	9.5	37.8	3.5	7.5	4.0
	August	83.8	6.7	35.4	3.5	7.0	3.5
	September	81.0	9.4	31.2	3.5	5.7	2.2
	October	76.9	2.6	28.8	2.3	4.7	2.3
	November	72.3	1.7	25.2	1.7	3.5	1.8
	December	68.2	0.7	24.6	0.7	2.9	2.2
1999	January	63.5	3.9	25.5	3.1	2.5	(0.6)
	February	63.8	0.3	25.2	0.3	2.5	2.2
	March	64.1	2.4	30.9	2.2	3.1	0.9
	April	73.2	1.3	33.3	1.3	4.8	3.5
	May	75.0	2.3	36.9	2.1	5.6	3.5
	June	78.5	10.0	37.2	3.5	6.3	2.8
	July	81.9	6.9	37.8	3.5	7.1	3.6
	August	84.1	6.2	35.4	3.5	7.1	3.6
	September	81.0	6.9	31.2	3.5	5.7	2.2
	October	75.7	3.4	28.8	2.8	4.5	1.6
	November	68.7	1.8	25.2	1.7	3.0	1.3
	December	64.2	1.2	24.6	1.2	2.5	1.3

MOISTURE DEFICIT VARIABLES

YEAR	MONTH	(a) AVG TEMP	(b) TOTAL RAINFALL	(c) MOISTURE DEFICIT VARIABLE FACTOR	(d) EFP= EFFECTIVE PRECIPITATION	(e) PET = POTENTIAL EVAPO-TRANSPIRATION	(f) = (e) - (d) MOISTURE DEFICIT VARIABLE
1996	January	60.3	3.6	25.5	2.9	2.1	(0.8)
	February	61.5	3.9	25.2	3.1	2.2	(0.8)
2000	January	61.9	1.3	25.5	1.3	2.3	1.0
	February	62.9	1.0	25.2	1.0	2.4	1.4
	March	70.9	0.6	30.9	0.6	4.1	3.5
	April	71.4	0.8	33.3	0.8	4.5	3.7
	May	77.3	0.0	36.9	0.0	6.0	6.0
	June	82.6	8.9	37.2	3.5	7.1	3.6
	July	82.9	12.7	37.8	3.5	7.3	3.8
	August	83.0	9.6	35.4	3.5	6.9	3.4
	September	81.5	9.5	31.2	3.5	5.8	2.3
	October	73.1	0.0	28.8	0.0	4.1	4.1
	November	65.9	2.3	25.2	2.1	2.7	0.6
	December	59.9	0.2	24.6	0.2	2.0	1.8
2001	January	54.8	1.0	25.5	1.0	1.6	0.6
	February	67.2	1.2	25.2	1.2	2.9	1.7
	March	66.6	4.8	30.9	3.4	3.4	0.1
	April	71.9	0.8	33.3	0.8	4.5	3.7
	May	76.0	0.0	36.9	0.0	5.8	5.8
	June	81.7	11.7	37.2	3.5	7.0	3.5
	July	81.9	12.9	37.8	3.5	7.1	3.6
	August	83.7	6.9	35.4	3.5	7.0	3.5
	September	81.9	7.9	31.2	3.5	5.9	2.4
	October	75.3	3.0	28.8	2.6	4.4	1.8
	November	68.7	2.7	25.2	2.4	3.0	0.6
	December	63.6	4.4	24.6	3.3	2.4	(0.9)

SOURCES: a), b) Data for the Tarpon Springs weather reporting station provided by the Southeast Regional Climate Center, South Carolina Water Resources Commission.

c) - f) John J. Boland and Roland W. Wentworth and Roland C. Steiner, "Forecasting Short-Term Revenues for Water and Sewer Utilities," Journal of the American Water Works Assn, Sept 1982.

d) EFFECTIVE PRECIPITATION (IN INCHES):

If AP <= 1":	EFP = AP
If 1" < AP < 6":	EFP = (-0.1 x (APxAP)) + (1.2 x AP) -0.1
If AP => 6":	EFP = 3.5
AP =	the actual precipitation for the month in inches.

e) POTENTIAL EVAPOTRANSPIRATION (IN INCHES):

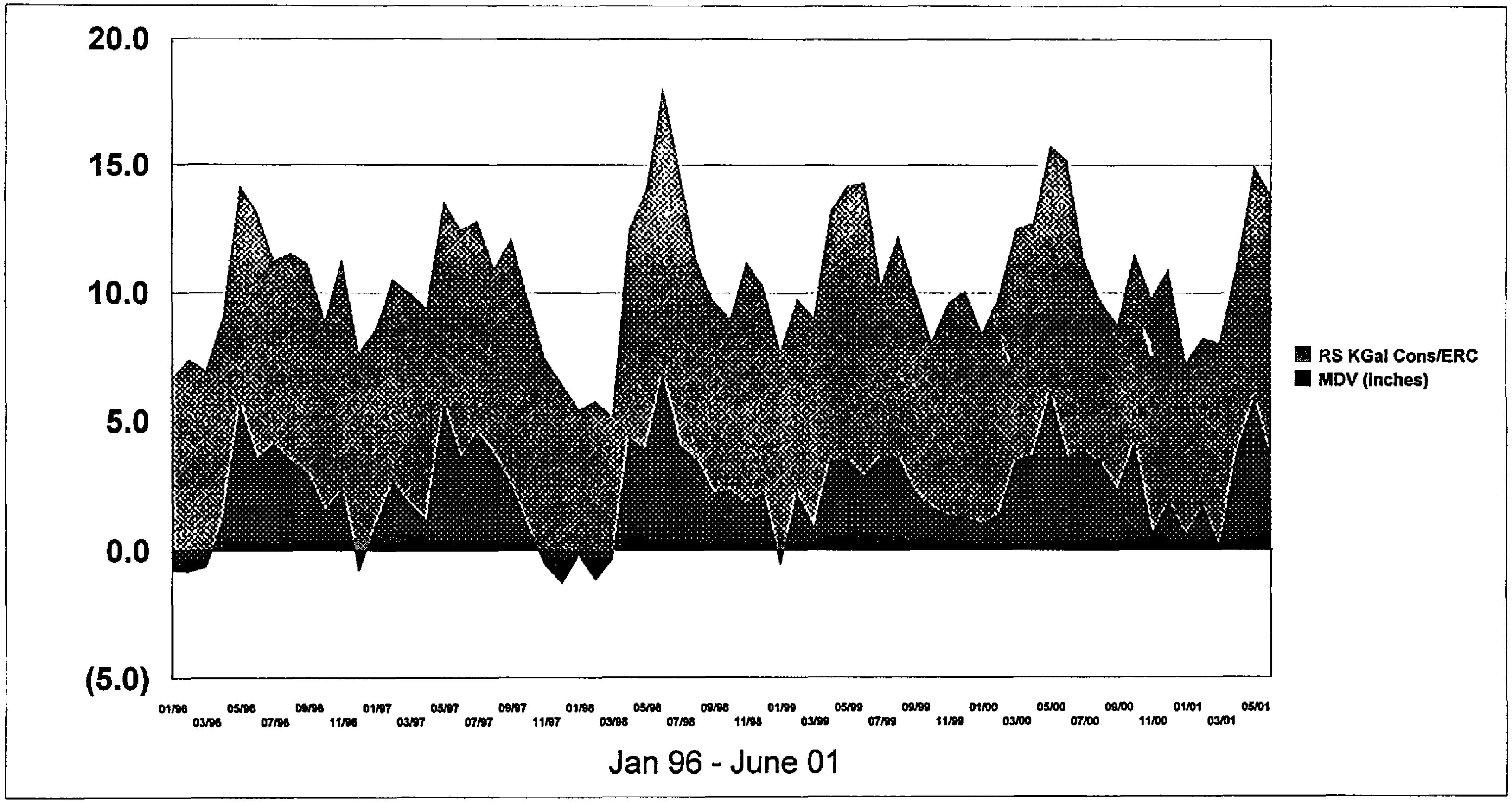
PET =	(0.0209974 x ((0.0918425 x (degrees F - 32))^1.44)) x (Fm)
degrees F =	average daily temperature for the month (see column (a) above).
Fm =	a factor specific to each calendar month (see column (c) above).

f) Moisture deficit is equal to potential evapotransipration (PET) minus effective precipitation (EFP). In order to calculate monthly moisture deficit, PET is calculated according to the method of Thornthwaite and Mather, and EFP is calculated according to the method of Linsley and Franzini.

WEATHER VARIABLES: CORRELATION TO AVERAGE MONTHLY RESIDENTIAL CONSUMPTION PER ERC

Weather Variable	r2 Score
Average Daily Temperature	13.25%
Average Temperature Over Past 48 Years	12.42%
Average Daily Precipitation	0.46%
Total Monthly Precipitation	0.86%
Average Precipitation Over Past 48 Years	0.00%
Effective Precipitation	2.88%
Moisture Deficit Variable	26.18%

MOISTURE DEFICIT VARIABLE: CORRELATION TO AVERAGE MONTHLY RESIDENTIAL CONSUMPTION PER ERC



Sources: Aloha's Responses to Citizens' First Set of Interrogatories, Nos. 47-48; Exhibit FJL-6

CONSUMPTION PROJECTIONS

RESIDENTIAL CLASS

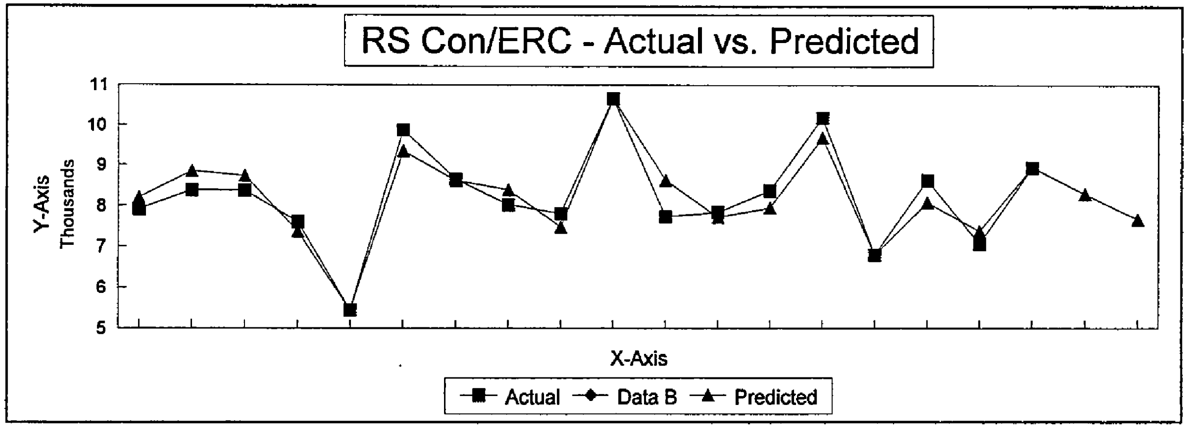
Regression Output:

Constant	5624.6457221929
Std Err of Y Est	491.68842510685
R Squared	0.8962466462894
No. of Observations	18
Degrees of Freedom	11

X Coefficient(s)	318.5303959	0.2314284483264	-271.76286532	-1533.44039	2145.628796	-1862.37142
Std Err of Coef.	133.7788868	0.1894878013909	192.26066883	629.607912	551.0542118	510.9953242
t-stat	2.381021426	1.2213369231562	-1.4135125347	-2.43554816	3.893680058	-3.64459581

Yr-Qtr	MDV	Instrument Lag Con/ERC	Dev MDV	1st Qtr 98	2nd Qtr 99	3rd Qtr 00	Cons/ERC	Y-Hat	Resid	Growth	Test Year Forecast
9601	-0.77			0	0	0	7,019				
9602	3.45			0	0	0	8,674				
9603	3.51			0	0	0	7,809				
9604	1.01			0	0	0	7,993				
9701	1.80	7,001	-1.41	0	0	0	7,912	8,200	(288)		
9702	3.42	8,695	-0.46	0	0	0	8,381	8,851	(470)		
9703	3.59	8,719	0.18	0	0	0	8,371	8,736	(365)		
9704	-0.34	7,714	-0.26	0	0	0	7,599	7,372	227		
9801	-0.59	8,032	1.16	1	0	0	5,448	5,448	0		
9802	4.99	8,683	-0.49	0	0	0	9,877	9,356	521		
9803	3.26	8,751	0.26	0	0	0	8,657	8,619	38		
9804	2.12	7,171	-1.61	0	0	0	8,034	8,397	(363)		
9901	0.82	5,448	-1.23	0	0	0	7,817	7,482	335		
9902	3.25	9,315	1.08	0	1	0	10,668	10,668	0		
9903	3.13	8,620	-0.07	0	0	0	7,734	8,637	(903)		
9904	1.41	8,160	0.85	0	0	0	7,850	7,731	118		
0001	1.95	7,639	0.18	0	0	0	8,385	7,964	421		
0002	4.44	10,668	-0.66	0	0	0	10,189	9,688	501		
0003	3.16	8,570	-0.19	0	0	1	6,805	6,805	0		
0004	2.16	7,875	0.14	0	0	0	8,646	8,098	548		
0101	0.77	8,091	1.30	0	0	0	7,077	7,387	(309)		7,077
0102	4.33	9,096	0.53	0	0	0	8,952	8,963	(10)		8,952
0103	3.33	6,805	-0.17	0	0	0		8,306		-656.70	8,296
0104	1.27	8,178	0.89	0	0	0		7,680		-625.97	7,670

CONSUMPTION PROJECTIONS



CONSUMPTION PROJECTIONS

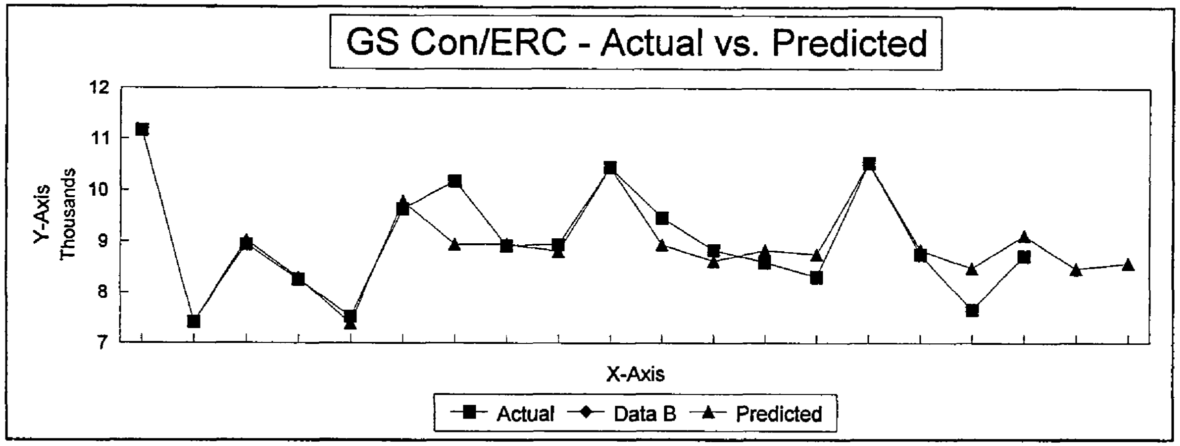
GENERAL SERVICE CLASS

Regression Output:	
Constant	10888.90614
Std Err of Y Est	523.7268
R Squared	0.841207245
No. of Observations	18
Degrees of Freedom	11

X Coefficient(s)	228.5883409	-0.30122302	2265.358065	-1569.55785	1602.89654	1586.641011
Std Err of Coef.	83.10285581	0.144300909	557.1152499	550.812124	553.2604898	547.1207645
	2.750667695	-2.08746448	4.066228784	-2.84953395	2.897182375	2.899983175

Yr-Qtr	MDV	Instrument 1 Yr Lagged Cons/ERC	1st Qtr 97	2nd Qtr 97	2rd Qtr 99	3rd Qtr 00	Cons/ERC	Y-Hat	Resid	Growth	Test Year Forecast
9601	-0.77		0	0	0	0	7,730				
9602	3.45		0	0	0	0	8,254				
9603	3.51		0	0	0	0	8,342				
9604	1.01		0	0	0	0	7,269				
9701	1.80	7,939	1	0	0	0	11,174	11,174	0		
9702	3.42	8,891	0	1	0	0	7,422	7,422	(0)		
9703	3.59	8,905	0	0	0	0	8,948	9,026	(78)		
9704	-0.34	8,340	0	0	0	0	8,266	8,299	(33)		
9801	-0.59	11,174	0	0	0	0	7,527	7,388	138		
9802	4.99	7,422	0	0	0	0	9,646	9,793	(147)		
9803	3.26	8,922	0	0	0	0	10,183	8,947	1,237		
9804	2.12	8,034	0	0	0	0	8,925	8,953	(28)		
9901	0.82	7,527	0	0	0	0	8,951	8,809	142		
9902	3.25	9,240	0	0	1	0	10,451	10,451	0		
9903	3.13	8,849	0	0	0	0	9,470	8,940	530		
9904	1.41	8,591	0	0	0	0	8,843	8,623	220		
0001	1.95	8,297	0	0	0	0	8,601	8,834	(233)		
0002	4.44	10,451	0	0	0	0	8,312	8,756	(444)		
0003	3.16	8,821	0	0	0	1	10,541	10,541	0		
0004	2.16	8,430	0	0	0	0	8,761	8,844	(83)		
0101	0.77	8,552	0	0	0	0	7,670	8,488	(818)		7,670
0102	4.33	9,116	0	0	0	0	8,729	9,132	(403)		8,729
0103	3.33	10,541	0	0	0	0		8,475		-657.08	8,072
0104	1.27	8,600	0	0	0	0		8,589		113.97	8,186

CONSUMPTION PROJECTIONS



ALOHA UTILITIES, INC.
DOCKET NO. 010503-WU
PROJECTED TEST PERIOD ENDING DECEMBER 31, 2001

CONSUMPTION PROJECTIONS SUMMARY

		(000) Projected Gallons
TOTAL PROJECTED GALLONS FOR 2001		
	Total Water Projected to be Sold in 2001	1,000,795
-	Total Water Sold in 2000	1,018,745
=	Projected Increase in Total Gallons Sold	
	Amount	(17,950)
	Percent	-2%

Sources: MFR Schedule No. E-13; Deposition of Robert Nixon, Late-Filed Exhibit No. 2; Aloha's Response to Citizens' First Set of Interrogatories, Nos. 47-48; Exhibit FJL-6.

ALOHA UTILITIES, INC.
DOCKET NO. 010503-WU
PROJECTED TEST PERIOD ENDING DECEMBER 31, 2001

EXH FJL-9

COMPARISON OF CONSUMPTION PROJECTIONS

		Aloha	OPC	Exhibit FJL-8	OPC Deviation from Aloha Amount	OPC Deviation from Aloha Percent	FJL-8 Deviation from Aloha Amount	FJL-8 Deviation from Aloha Percent
	Total Projected Gallons to be Sold in 2001	1,105,067,967	998,492,175	1,000,795,000	(106,575,792)	-10%	(104,272,967)	-9%
-	Actual Gallons Sold in 2000	1,018,745,467	1,018,745,467	1,018,745,467				
=	Projected Increase in Gallons Sold	86,322,500	(20,253,292)	(17,950,467)				

Sources: MFRs Schedule No. E-13; Exhibit (SS-1), Schedule 4; Exhibit FJL-8.

ALOHA UTILITIES, INC.
DOCKET NO. 010503-WU
PROJECTED TEST PERIOD ENDING DECEMBER 31, 2001

EXH FJL-10

ANALYSIS OF ALOHA'S REQUESTED RATE DESIGN

(000) Cons Ending	Price Current (1)	Price Requested (2)	Difference Amount	Difference Percent
0	$7.32	$9.23	$1.91	26.1%
1	7.32	11.47	4.15	56.7%
2	7.32	13.71	6.39	87.3%
3	7.32	15.95	8.63	117.9%
4	8.64	18.19	9.55	110.5%
5	9.96	20.43	10.47	105.1%
6	11.28	22.67	11.39	101.0%
7	12.60	24.91	12.31	97.7%
8	13.92	27.15	13.23	95.0%
9	15.24	29.39	14.15	92.8%
10	16.56	31.63	15.07	91.0%
15	23.16	45.68	22.52	97.2%
20	29.76	59.73	29.97	100.7%
25	36.36	73.78	37.42	102.9%
30	42.96	87.83	44.87	104.4%
50	69.36	144.03	74.67	107.7%
75	102.36	214.28	111.92	109.3%
100	135.36	284.53	149.17	110.2%
150	201.36	425.03	223.67	111.1%
200	267.36	565.53	298.17	111.5%
300	399.36	846.53	447.17	112.0%

(1) Current price = BFC of $7.32 (including first 3 kgal) + $1.32 per kgal in excess of 3 kgal.

(2) Requested price = BFC of $9.23 + ($2.24 per kgal for 0-10 kgal) + ($2.81 per kgal in excess of 10 kgal).

Source: MFR Schedule No. E-1.

ILLUSTRATIVE RATE DESIGNS BASED ON UTILITY'S REQUESTED REVENUES FROM RATES OF $3,702,822

Blocks: 0-10 Kgal
10+ Kgal

BFC = 31% Gal = 69%

--------- Percentage Price Increases at Varying Consumption Levels ---------------

(000) Cons Ending	------- Based on Illustrative Rate Factors (1) ------------			
	1.0/1.25	1.0/1.5	1.0/1.75	1.0/2.0
0	26%	26%	26%	26%
1	57%	54%	53%	51%
2	87%	83%	79%	76%
3	117%	111%	106%	101%
4	110%	103%	97%	91%
5	105%	97%	90%	84%
6	100%	92%	85%	79%
7	97%	88%	81%	74%
8	94%	85%	78%	71%
9	92%	83%	75%	68%
10	90%	81%	73%	66%
15	68%	68%	68%	68%
20	76%	81%	86%	89%
25	82%	90%	97%	103%
30	86%	96%	106%	114%
50	95%	110%	124%	136%
75	100%	118%	134%	148%
100	103%	122%	140%	155%
150	105%	126%	145%	162%
200	107%	128%	148%	165%
300	108%	131%	151%	169%

(1) Before a repression adjustment or reductions due to conservation programs.

ALOHA UTILITIES, INC.
DOCKET NO. 010503-WU
PROJECTED TEST PERIOD ENDING DECEMBER 31, 2001

ILLUSTRATIVE RATE DESIGNS BASED ON UTILITY'S REQUESTED REVENUES FROM RATES OF $3,702,822

Blocks:	0-10 Kgal
	10+ Kgal

BFC = 28% Gal = 72%

--------- Percentage Price Increases at Varying Consumption Levels ----------------

(000) Cons Ending	------- Based on Illustrative Rate Factors (1) -----------			
	1.0/1.25	1.0/1.5	1.0/1.75	1.0/2.0
0	14%	14%	14%	14%
1	45%	43%	41%	40%
2	77%	73%	69%	66%
3	109%	102%	97%	92%
4	104%	97%	90%	85%
5	100%	92%	85%	79%
6	98%	89%	82%	75%
7	95%	87%	79%	72%
8	94%	84%	76%	69%
9	92%	83%	74%	67%
10	91%	81%	73%	66%
15	70%	71%	71%	71%
20	80%	86%	90%	95%
25	87%	96%	103%	110%
30	92%	103%	112%	121%
50	102%	119%	133%	146%
75	108%	127%	144%	159%
100	111%	132%	150%	166%
150	114%	137%	156%	174%
200	116%	139%	159%	178%
300	117%	141%	163%	181%

(1) Before a repression adjustment or reductions due to conservation programs.

ILLUSTRATIVE RATE DESIGNS BASED ON UTILITY'S REQUESTED REVENUES FROM RATES OF $3,702,822

Blocks: 0-10 Kgal
10+ Kgal

BFC = 25% Gal = 75%

--------- Percentage Price Increases at Varying Consumption Levels ----------------

(000) Cons Ending	------- Based on Illustrative Rate Factors (1) ------------			
	1.0/1.25	1.0/1.5	1.0/1.75	1.0/2.0
0	1%	1%	1%	1%
1	34%	32%	30%	28%
2	67%	63%	59%	55%
3	100%	93%	88%	82%
4	98%	90%	84%	78%
5	96%	88%	81%	74%
6	95%	86%	78%	71%
7	94%	84%	76%	69%
8	93%	83%	75%	67%
9	92%	82%	74%	66%
10	91%	81%	73%	65%
15	73%	73%	74%	74%
20	84%	89%	95%	99%
25	92%	100%	109%	116%
30	97%	108%	119%	128%
50	109%	126%	141%	154%
75	115%	135%	154%	169%
100	119%	141%	160%	177%
150	123%	146%	167%	185%
200	124%	148%	170%	189%
300	126%	151%	174%	193%

(1) Before a repression adjustment or reductions due to conservation programs.

ILLUSTRATIVE RATE DESIGNS BASED ON UTILITY'S REQUESTED REVENUES FROM RATES OF $3,702,822

Blocks:	0-8 Kgal
	8-15 Kgal
	15+ Kgal

BFC = 31%. Gal = 69%

--------- Percentage Price Increases at Varying Consumption Levels ---------------

(000) Cons Ending	------- Based on Illustrative Rate Factors (1) ------------ 1/1.25/1.5	1/1.25/1.75	1/1.25/2.0	1/1.5/2.0
0	26%	26%	26%	26%
1	55%	54%	53%	52%
2	83%	81%	79%	77%
3	112%	108%	106%	102%
4	104%	100%	97%	93%
5	98%	94%	90%	86%
6	94%	89%	85%	81%
7	90%	85%	81%	77%
8	87%	82%	78%	73%
9	88%	83%	78%	77%
10	89%	83%	79%	79%
15	64%	58%	54%	61%
20	78%	79%	81%	85%
25	88%	94%	100%	100%
30	95%	104%	113%	112%
50	111%	126%	142%	137%
75	120%	139%	158%	151%
100	124%	145%	167%	158%
150	129%	152%	175%	166%
200	131%	156%	180%	170%
300	134%	159%	185%	174%

(1) Before a repression adjustment or reductions due to conservation programs.

ILLUSTRATIVE RATE DESIGNS BASED ON UTILITY'S REQUESTED REVENUES FROM RATES OF $3,702,822

Blocks:	
	0-8 Kgal
	8-15 Kgal
	15+ Kgal

BFC = 28% Gal = 72%

--------- Percentage Price Increases at Varying Consumption Levels ----------------

(000) Cons Ending	------- Based on Illustrative Rate Factors (1) ------------			
	1/1.25/1.5	1/1.25/1.75	1/1.25/2.0	1/1.5/2.0
0	14%	14%	14%	14%
1	43%	42%	41%	40%
2	73%	71%	69%	67%
3	103%	100%	96%	93%
4	98%	94%	90%	86%
5	93%	89%	85%	81%
6	90%	86%	81%	77%
7	88%	83%	78%	74%
8	86%	81%	76%	72%
9	87%	83%	77%	76%
10	89%	84%	78%	80%
15	66%	61%	55%	64%
20	82%	84%	85%	89%
25	93%	100%	105%	107%
30	101%	111%	119%	119%
50	118%	136%	150%	147%
75	128%	149%	168%	162%
100	133%	157%	177%	170%
150	138%	164%	186%	178%
200	141%	168%	191%	182%
300	143%	172%	196%	187%

(1) Staff's preliminary rate design, before a repression adjustment.

ILLUSTRATIVE RATE DESIGNS BASED ON UTILITY'S REQUESTED REVENUES FROM RATES OF $3,702,822

Blocks: 0-8 Kgal
8-15 Kgal
15+ Kgal

BFC = 25% Gal = 75%

--------- Percentage Price Increases at Varying Consumption Levels ---------------

(000) Cons Ending	------- Based on Illustrative Rate Factors (1) ------------			
	1/1.25/1.5	1/1.25/1.75	1/1.25/2.0	1/1.5/2.0
0	1%	1%	1%	1%
1	32%	31%	30%	29%
2	63%	61%	58%	56%
3	95%	91%	87%	84%
4	91%	87%	83%	79%
5	89%	85%	80%	76%
6	87%	82%	78%	73%
7	86%	81%	76%	71%
8	85%	79%	74%	70%
9	87%	82%	76%	75%
10	90%	84%	78%	79%
15	69%	63%	58%	66%
20	87%	88%	89%	93%
25	99%	105%	111%	112%
30	107%	117%	126%	126%
50	126%	144%	160%	155%
75	137%	159%	178%	171%
100	142%	167%	188%	180%
150	148%	175%	198%	189%
200	151%	179%	203%	193%
300	154%	183%	209%	198%

(1) Before a repression adjustment or reductions due to conservation programs.

Source: MFR Schedule No. E-1.