BEFORE THE
STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES
OFFICE OF ADMINISTRATIVE LAW

In the Matter of:

THE PETITION OF UNITED WATER NEW JERSEY INC. FOR APPROVAL OF AN INCREASE IN RATES FOR WATER SERVICE AND OTHER TARIFF CHANGES	**BPU Docket No. WR09120987** **OAL Docket No. PUC 01200-2010N**

DIRECT TESTIMONY AND EXHIBITS OF

HOWARD J. WOODS, JR., P.E.

ON BEHALF OF THE
NEW JERSEY
DEPARTMENT OF THE PUBLIC ADVOCATE
DIVISION OF RATE COUNSEL

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United Water New Jersey, Inc.
BPU Docket No. WR09120987
Direct Testimony of Howard J. Woods, Jr., P.E.

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I. STATEMENT OF QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND ADDRESS.

A. My name is Howard J. Woods, Jr. and my address is 138 Liberty Drive, Newtown, Pennsylvania 18940-1111.

Q. BY WHOM ARE YOU EMPLOYED?

A. I am an independent consultant and the Department of the Public Advocate, Division of Rate Counsel has engaged me in this matter.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL QUALIFICATIONS.

A. I hold a Bachelor of Civil Engineering Degree from Villanova University (1977) and a Master of Civil Engineering Degree with a concentration in water resources engineering also from Villanova University (1985). I am a registered professional engineer in New Jersey, New York, Maryland, Pennsylvania, Delaware and New Mexico. I am also licensed to perform RAM-W^{SM} security assessments of public water systems. I am an active member of the American Society of Civil Engineers, the National Ground Water Association, the American Water Works Association, the Water Environment Federation and the International Water Association.

Q. HAVE YOU PROVIDED TESTIMONY IN UTILITY MATTERS ON PRIOR OCCASIONS?

A. Yes. I have testified in numerous rate setting proceedings and quality of service evaluations in matters before the Public Utility Commissions in New Jersey, New York, Connecticut, Delaware and Kentucky. The focus of my testimonies is on matters involving utility operations, planning and engineering.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.

A. A detailed description of my professional experience is provided in Appendix A of this Testimony. In summary, I have over 32 years experience in the planning, design, construction and operation of water and wastewater utility systems. I have worked for a Federal regulatory agency, a large investor-owned water and wastewater utility, a firm engaged in contract operations of municipally-owned water and wastewater utilities, and in engineering and operational consulting for the water and wastewater industry. During my career, I have been responsible for all operations functions including regulatory compliance, water production, distribution and maintenance services as well as wastewater collection and treatment.

II. SCOPE AND PURPOSE OF TESTIMONY

Q. MR. WOODS, PLEASE DESCRIBE YOUR AREA OF RESPONSIBILITY IN THIS MATTER.

A. I have been engaged by Department of the Public Advocate, Division of Rate Counsel to review the proposal by United Water New Jersey, Inc. to increase its rates with specific attention to the following areas:

1. The Company's pro forma chemical and waste disposal expenses;
2. The scope and nature of the Company's capital spending program;
3. The Company's continuing efforts to address non-revenue water; and
4. The company's proposal to implement a Distribution System Improvement Charge ("DSIC").

Q. WHAT MATERIALS HAVE YOU REVIEWED IN DISCHARGING THIS ASSIGNMENT?

A. I have reviewed the Company's filing and responses to discovery requests in this matter. In addition, I have also reviewed various New Jersey Department of Environmental Protection and New Jersey Board of Public Utilities rules applicable to specific aspects of the Company's proposals.

III. SUMMARY OF FINDINGS AND CONCLUSIONS

Q. HAVE YOU REVIEWED UNITED WATER NEW JERSEY'S FILING FOR A RATE ADJUSTMENT?

A. Yes, I have.

Q. WHAT DOES THE COMPANY'S FILING AND THEIR PRE-FILED TESTIMONY REQUEST?

A. The Company's filing proposes to increase operating revenues by $37,819,306 or roughly 21.3% more than adjusted post test year period revenues at current rates.[1] The Company has proposed a Test Year ending January 31, 2010.[2] The Company initially requested a post test year adjustment to plant in service amounting to $52,385,200 for construction anticipated to be completed by July 31, 2010, a date six months beyond the close of the Test Year.[3] Subsequently, the Company revised this claim to $22,061,000 in an update to its Exhibit P-5 provided in response to discovery request RCR-A-10. A further reduction in this claim to $18,319,800 was made in response to RCR-E-66.

Q. DO YOU BELIEVE THAT THIS RATE INCREASE SHOULD BE GRANTED?

[1] Petition, para. 3A.
[2] Petition, para. 7.
[3] Company Exhibit P-5 as filed.

A. No. The Company's estimate of pro forma chemical expense is high and should be adjusted to reflect unit prices known at the close of the Test Year. In addition, the method used by the Company to establish the quantities of each chemical required should be revised to individually forecast chemical needs at each distinct treatment facility. In addition, the ongoing waste disposal cost is overstated and should be reduced to levels reflective of recent actual experience.

While the Company has implemented a significant capital construction program, the filing was based on projected construction costs that did not benefit from actual bids or reflect final completed construct costs. A significant correction to the Post Test Year construction cost for the Haworth Water Treatment Project was made by the Company in its updated schedules. This change alone reduced the projected Post Test Year Construction cost from $32,000,000 to $4,000,000, a reduction of $28,000,000.[4] While this is a positive development, the utility plant in service balance for the Post Test Year period remains an estimate and includes projects that are not major in nature and consequence. Rates established in this proceeding should be based on actual plant in service costs at the close of the Test Year with adjustments made only for projects that are major in nature in consequence. The actual final cost of properly qualified projects not already closed to plant in service should be certified by the Company and only those items of plant actually in service at the end of the Post Test Year period should be reflected in rates.

[4] Company response to RCR-A-10, p. 3 of 5.

Q. HAVE YOU REVIEWED THE COMPANY'S EFFORTS TO REDUCE NON-REVENUE WATER?

A. Yes. The Company is continuing to make progress to address the historically unacceptable levels of non-revenue water in its system. Recent data indicates that the Company's efforts have produced a definitive reduction in the Infrastructure Leakage Index ("ILI") and they have established a strong improving trend that dates to late 2007 and the early part of 2008. While non-revenue water as a percentage of system delivery remains unacceptably high at 23.83%,[5] the improvement in ILI must be duly noted.

Q. WHAT IS YOUR RECOMMENDATION CONCERNING NON-REVENUE WATER?

A. The Company should continue to provide quarterly reports to the Board regarding its efforts to control non-revenue water. In addition, the increased efforts to identify real losses from the system, including the use of external forces to locate system leaks and the use of fixed leak detection equipment, should continue. Furthermore, the Company's efforts to more completely account for water usage in its system should also continue.

Q. HAVE YOU REVIEWED THE COMPANY'S REQUEST TO IMPLEMENT A DSIC?

A. Yes. The DSIC program proposed by the Company should not be implemented.

[5] Response to RCR-E-13.

IV. PRO FORMA CHEMICAL EXPENSES

Q. HAVE YOU REVIEWED THE COMPANY'S WORKPAPERS THAT SUPPORT THE PROPOSED PRO FORMA LEVEL OF CHEMICAL EXPENSE?

A. Yes. I believe the method of averaging past chemical use overstates the requirements for the pro forma period. In addition, the chemical budget for the Haworth Water Treatment Plant does not fully reflect the process changes made through 2009. The Company's workpapers and discovery responses also do not reflect the chemical pricing available to the Company as of the end of the Test Year.

Q. HAVE YOU PREPARED YOUR OWN ESTIMATE OF THE CHEMICAL EXPENSE?

A. Yes. I began with the actual quantities of chemicals used in 2009. While it may be desirable to identify the average chemical dose rates used at each particular location over a period of years, such an approach is not proper for the Haworth Treatment Plant. In this specific case, the facility was undergoing a major renovation and upgrade that also resulted in the implementation of a very different treatment strategy. During the course of the renovation project, different chemicals were utilized to treat the water at this location. Thus, an averaging technique that attempts to establish a typical use pattern over, say a three year period, would not be appropriate because chemicals used at the beginning of the period were

discontinued or the feed rate for those chemicals changed as the plant renovations were completed. The usage for 2009 appears to be stable and reflective of the treatment strategy the Company intends to move forward with. While the Company has apparently minimized the application of the coagulant polyaluminum chloride in 2009, some upward adjustments are necessary to account for the requirement to reduce the amount of Total Organic Carbon (TOC) in the treated water. This will result in dose rates higher than what was experienced in 2009. In addition, the completion of the last phase of the Haworth Plant Improvement project will allow the Company to reduce the amount of sodium hypochlorite used in treatment at this location while the amount of oxygen used in the ozone generation process will increase. To be consistent with my approach to the calculation of the Haworth Water Treatment Plant chemical needs, my analysis of the chemical requirements at Lambertville, Arlington Hills, Vernon Hills and Hampton utilized the actual use for 2009.

Q. DID YOU REVIEW THE QUANTITIES OF CHEMICALS USED AT EACH SEPARATE SYSTEM (e.g., HAWORTH, LAMBERTVILLE, ARLINGTON HILLS, ETC.)?

A. Yes. It is important to track production rates and chemical use at each facility to get an accurate assessment of the quantities of chemicals and the cost for those chemicals at each location. The quantities of chemicals used to treat water at Lambertville, for example, are being used to treat only the volume of water produced at Lambertville. It is inappropriate to construct an averaging model that

compares chemicals used at a discrete location with the volumes of water treated company-wide. Because of the wide variation in the magnitude of the values used in such a calculation, the necessary precision is lost due to rounding and it is not possible to accurately estimate the quantities of chemicals needed in the pro forma period. For example, the Company's method of calculation produces an erroneously low result for the quantity of soda ash needed at Lambertville. In Exhibit P-4, Schedule 2-D, the Company is claiming an annual expense for soda ash of only $15 (Fifteen Dollars). This is one of the principal chemicals used to treat water at Lambertville and the proper budget amount for this chemical at this location should be $14,406.

Q. HAVE YOU SUMMARIZED THE QUANTITIES OF CHEMICALS USED BY THE COMPANY IN 2009?

A. Yes. You will find this summary in Schedule HJW-1 in Appendix B. In addition, I have also shown the volume of water treated at each location in 2009 along with the Company's projection of the volume of water that will be subject to treatment at each location in the Post Test Year period in Schedule HJW-2. Because 2009 was an unusually low year for water consumption, I have also calculated the 3-Year Average and 5-Year Average values for production volumes at each location.

Q. WHAT PRODUCTION VOLUMES SHOULD BE USED IN ESTIMATING PRO FORMA CHEMICAL USE?

A. I believe the 5-Year Average volumes are most representative of the production requirements likely to be seen when rates resulting from this proceeding are in effect. In addition, the Company has used a technique to forecast water sales volumes that is based on a 5-Year Average, so the use of a 5-Year Average to determine production volumes and chemical expense would be consistent.

Q. GIVEN THE ACTUAL CHEMICAL USE AND WATER VOLUMES SUBJECT TO TREATMENT AT EACH LOCATION, DID YOU THEN CALCULATE A DOSE RATE FOR EACH CHEMICAL USED BY THE COMPANY?

A. Yes. The results of this calculation are presented in Schedule HJW-3. All units are in pounds of chemical used per thousand gallons of water treated unless different units are specifically noted in Schedule HJW-3. For example, sodium hypochlorite is purchased and applied in a liquid form, so the results for this chemical are presented in gallons of chemical per thousand gallons of water treated.

Q. DO THE DOSE RATES SHOWN IN SCHEDULE HJW-3 INCLUDE ANY ADJUSTMENTS FOR CHANGES IN THE AMOUNT OF POLYALUMINUM CHLORIDE, SODIUM HYPOCHLORITE AND LIQUID OXYGEN THAT WILL BE NEEDED TO PROPERLY TREAT THE WATER AT THE HAWORTH WATER TREATMENT PLANT?

A. Yes. I have summarized the dose rate adjustments in Schedule HJW-4. The average dose rate for polyaluminum chloride in the first four months of 2010 was

higher than that actually seen in 2009. In addition, the Company will need to increase the use of this chemical to optimize TOC removal in accordance with current surface water treatment rules. I adjusted the actual dose rate for the first four months of 2010 to account for the TOC treatment requirements and I used this adjusted feed rate to calculate pro forma chemical expense. The use of sodium hypochlorite was reduced significantly as the Company completed Phase 3 of the Haworth Treatment Plant Improvements. I calculated an average dose rate for the first quarter of 2010 and used this does rate to develop the pro forma chemical expense. Finally, the use of liquid oxygen increased after the end of the first quarter in 2009 when the new ozone system was placed in service. I calculated a normalized oxygen use rate for 2009. Approximately one-third less oxygen was consumed in the first quarter per unit volume of water treated than the amount of oxygen used after the advent of the new ozone system. I calculated an oxygen use rate representative of the new system operations and used this feed rate rather than the unweighted average use rate for the full year.

Q. HAVE YOU REVIEWED THE UNIT PRICES PAID BY THE COMPANY FOR EACH CHEMICAL THEY ARE USING?

A. Yes. The unit prices for each chemical are presented in Schedule HJW-5. The first column to the right of the chemical name shows the unit price used by the Company in calculating the pro forma chemical expense on Exhibit P-4, Schedule 2-D in their original filing. The columns to the right of this show the actual unit prices paid by the Company at various points in time. The column headed "Unit

Cost 1/31/2010" shows the unit prices at the end of the Test Year. The next two columns headed "Variance" and "Variance (%)" show the change in unit prices between the time of the filing and used by the Company in Exhibit P-4, Schedule 2-D and the end of the Test Year. The prices for some chemicals increased dramatically over this period. Caustic, for example increased in price by 64%. Conversely, the cost of Sodium Chlorite went down by 67% over this same period.

Q. WHAT PRICES DO YOU BELIEVE SHOULD BE USED IN COMPUTING THE PRO FORMA CHEMICAL COST?

A. The prices available to the Company at the end of the Test Year should be used.

Q. GIVEN THESE UNIT PRICES, WHERE YOU ABLE TO CALCULATE THE LEVEL OF CHEMICAL EXPENSE FOR EACH COMPANY SYSTEM?

A. Yes. The results of this calculation are shown in Schedule HJW-6. These values are derived by multiplying the 5-Year Average volume of water subject to treatment presented in Schedule HJW-2 by the dose rate for each chemical used at that location and shown in Schedule HJW-3 by the unit price at the end of the Test Year and shown in Schedule HJW-5.

Q. WHAT IS THE TOTAL CHEMICAL EXPENSE THAT YOU HAVE PROJECTED USING THIS METHOD?

A. As shown in Schedule HJW-6, the total chemical expense recommended by Rate Counsel is $4,504,500. This is $228,586 less than the level of chemical expense projected by the Company.

IV. PRO FORMA WASTE DISPOSAL EXPENSES

Q. HAVE YOU REVIEWED THE COMPANY'S ESTIMATE OF PRO FORMA WASTE DISPOSAL EXPENSE?

A. Yes. I believe the amount is overstated.

Q. WHAT ARE THE COMPONENTS OF WASTE DISPOSAL EXPENSE?

A. Waste Disposal Expense includes three distinct items: 1) the cost of removing treatment residuals stored in the former residuals management lagoons; 2) the ongoing cost of treating new residuals produced in the course of normal operations; and 3) the cost of disposing of a limited portion of the liquid waste stream that cannot be recycled to the water treatment process. The last item results in a treatment charge from the Bergen County Utilities Authority (BCUA).

Q. WHAT WAS THE COMPANY'S ORIGINAL CLAIM FOR THE COST OF REMOVING RESIDUALS FROM THE LAGOONS?

A. The Company's workpapers presented in SIR-26 estimated the cost to properly dispose of this material at $1,056,000 and the Company proposed to amortize this amount over three years. The annual expense was calculated to be $352,000.

Q. DID THE COMPANY MODIFY THIS ESTIMATE DURING THIS PROCEEDING?

A. Yes. The response to RCR-A-89(b) reduced the estimated cost to $975,613. The annual amount of the amortization over three years is $325,204.

Q. IS IT YOUR UNDERSTANDING THAT THIS IS THE FINAL ESTIMATED COST OF CLEANING THE LAGOONS?

A. The Company has advised me that the latest estimate of the cost of cleaning the lagoons may be higher than the estimate originally offered in SIR-26 and the modified cost estimate presented in RCR-A-89(b). Once this amount is fully documented, I would be willing to adjust my calculations of pro forma waste disposal expense to reflect a fixed, known and measureable expense. However, at this time, the most complete information available for the Company is the calculation presented in RCR-A-89(b) and I have relied on this in my estimate of pro forma waste disposal expense.

Q. WHAT IS THE COMPANY'S ESTIMATE OF THE ONGOING WASTE DISPOSAL COSTS FOR THE HAWORTH WATER TREATMENT PLANT?

A. The Company claimed an expense of $2,485,319 for the Post Test Year Period Ending July 31, 2010. This amount is shown on Exhibit P-4, Schedule 2-E.

Q. HAVE YOU INDEPENDENTLY CALCULATED THIS COST?

A. Yes. I prepared two distinct calculations of the cost of this expense. First, I calculated the average unit cost of waste disposal incurred in 2009 by dividing the

total cost of waste disposal by the volume of water treated at the Haworth Water Treatment Plant. The results of this calculation are shown in Schedule HJW-7 along with the historical values for the total weight of chemicals applied, the total volume of water treated and the actual residuals disposal cost for the years 2005 through 2009.

Q. IN THIS CALCULATION, WHY DID YOU USE THE UNIT COST INCURRED IN 2009 RATHER THAN AN AVERAGE OF THE HISTORICAL VALUES?

A. The Haworth Plant has undergone significant renovations that included major changes to the treatment process and the method of handling the residuals produced from that process. A simple averaging of the unit costs would not properly reflect the changes in cost incurred over time or the changes in chemical application rates made as the treatment plant was modified as a result of the plant improvement project.

Q. WHAT WAS THE RESULT OF YOUR CALCULATION?

A. Using this method, the pro forma level of expense would be $1,669,816.

Q. PLEASE EXPLAIN THE ADDITIONAL METHOD OF CALCULATING THE PRO FORMA WASTE DISPOSAL EXPENSE THAT YOU CONSIDERED.

A. The amount of residuals generated in a water treatment process will be related to the quantities of chemicals added to the water and the volume of water treated. In addition, the cost of residuals disposal will also vary with time as the unit cost of land disposal charges changes with inflation. These factors can be addressed in a multivariate linear regression analysis. Using the data in Schedule HJW-7 for 2005 through 2009, I calculated the regression coefficients for a straight line that would approximate the relationship between annual residuals disposal expense and the variables of time, amount of chemicals applied and the quantity of water treated. The numerical value of the year (e.g., 2005, 2006, etc.) is used to represent time, the total quantity of chemicals applied in pounds and the volume of water treated in thousand gallons per year represent the variables. The results of this analysis are shown in Schedule HJW-9. The relationship between the variables and the annual cost of residuals disposal expense is very strong. This is reflected in the value of the correlation coefficient, which is 0.9314. A perfect straight line relationship would have a coefficient of 1.000.

Q. WHAT IS THE RESULT OF THIS ANALYSIS?

A. Using this method, I calculated a pro forma expense of $1,677,193. This amount is $7,377 per year higher than the amount calculated by using the actual 2009 unit cost and the 5-Year Average volume of water treated as shown in Schedule HJW-7. This is a difference of only 0.44%.

Q. WHAT LEVEL OF EXPENSE DID THE COMPANY CLAIM FOR DISPOSAL CHARGES LEVIED BY THE BCUA?

A. In its filing in Exhibit P-4, Schedule 2-E, the Company claimed an expense of $855,273 for the Post Test Year Period.

Q. DID THE COMPANY MODIFY THIS CLAIM DURING THIS PROCEEDING?

A. Yes. The response to RCR-A-128(a) reduced this amount to $360,000.

Q. PLEASE SUMMARIZE YOUR ESTIMATE OF TOTAL WASTE DISPOSAL EXPENSE AND YOUR ADJUSTMENT TO THE COMPANY'S INITIAL CLAIM.

A. A summary of my estimate of pro forma residuals disposal expense is shown in Schedule HJW-10. The estimated expense amount is $2,362,397 and this represents a reduction in the Company's claim of $1,330,195.

Q. HAS THIS EXPENSE ITEM BEEN ADDRESSED BY ANY OTHER WITNESS FOR RATE COUNSEL?

A. Yes. Rate Counsel Witness Robert Henkes has included a slightly higher level of expense in his estimate of waste disposal costs. He has related the pro forma level of expense to the history of actual expense incurred by the Company and included a modest factor of safety in his estimate. I support his recommendation regarding this expense item.

V. CAPITAL CONSTRUCTION PROGRAM

Q. PLEASE SUMMARIZE THE COMPANY'S POST TEST YEAR CAPITAL CONSTRUCTION PROGRAM.

A. The Company's capital construction program is presented in Company Exhibit P-5. This exhibit was modified in the Company's response to discovery request RCR-A-10 and was subsequently modified further in response to RCR-E-65. In the Company's filing, the Post Test Year construction program suggested that a total of $52,205,800 in plant would be placed in service by July 31, 2010. The largest single addition contained in this amount was $32,000,000 for the Haworth Plant Upgrade Project Phase 2. In its RCR-A-10 update, the Company reduced this amount to $4,000,000 and it further reduced the amount to $1,600,000 in response to RCR-E-65. While the project was completed ahead of schedule and under budget, the reason for the large initial adjustment was the correction of an arithmetic error in which capital expenses incurred for this project within the Test Year were also counted in the Post Test Year period.

Q. HAS THE BOARD PERMITTED THE INCLUSION OF POST TEST YEAR CAPITAL ADDITIONS IN THE PAST?

A. In the past, the Board has recognized inclusion of post-test-year adjustments to rate base when they are known and measurable and of major consequence. In *In re Elizabethtown Water Company Rate Case*, Docket No. WR85040330 (May 23, 1985), the Board stated that the test year to be used in a base rate proceeding must

be fully historical prior to the close of record in the proceeding, but that such historical test year data may be adjusted for "known and measurable" changes. Known and measurable changes to the test year must be (1) prudent and major in nature and consequence, (2) carefully quantified through proofs which (3) manifest convincingly reliable data.

In fully litigated proceedings, such as the September 13, 2006 decision in Parkway Water Company (Docket No. WR05070634), the Board has continued to maintain the standard established in *In re Elizabethtown Water Company Rate Case*.

Q. DO YOU BELIEVE THAT POST TEST YEAR CAPITAL ADDITIONS SHOULD BE BARRED IN THIS MATTER?

A. It is my testimony that the Haworth Water Treatment Plant improvement project, as detailed on Schedule HJW-11, should be permitted as a post test-year adjustment in this matter. This project has been a significant undertaking and portions of this project have been placed in service and recognized in rates in the two previous rate adjustment Petitions filed by the Company. The project is certainly major in nature and consequence and has actually been completed and placed in service at this point in time. As a result, the costs are known.

Q. ARE ALL ELEMENTS OF THE HAWORTH PROJECT INCLUDED UNDER A SINGLE PROJECT HEADING ON COMPANY EXHIBIT P-5 AND ON SCHEDULE HJW-11?

A. No. There are several items that make up this project or are otherwise closely related to this effort. I believe these projects should be treated as a whole and recognized in the rates resulting from this proceeding. I have identified the Haworth related projects in Schedule HJW-11. The post test year additions to plant in service represented by these projects have a total value of $5,305,200.

Q. IN YOUR OPINION, ARE THERE ANY OTHER PROJECTS THAT SATISFY THE QUALIFICATIONS OF THE BOARD'S *ELIZABETHTOWN* DECISION?

A. Yes. I have also identified these on Schedule HJW-11. These projects include the improvements to the Monksville Dam, the Tappan Bascule Gates, the Saddle River Booster Hypo System and the Rivervale Pump Upgrade. The total value for these additional qualified projects, which will be in service by July 31, 2010, is $886,400.

Q. WHAT IS YOUR OPINION CONCERNING THE OTHER PROJECTS CLAIMED AS POST TEST YEAR ADDITIONS ON EXHIBIT P-5 AND ON YOUR SCHEDULE HJW-11?

A. The remaining work is a collection of routine and recurring construction projects that should not be included in rate base at this time. These items individually are not major in nature and consequence and the actual cost to complete most of these works is not fixed. From the initial filing and through the various updates, we have seen the scheduled completion dates for some of these projects slip

while the estimated cost to complete others has changed to reflect new conditions.

Q. WHAT IS YOUR RECOMMENDATION REGARDING POST TEST YEAR ADDITIONS TO RATE BASE?

A. The value of the qualified Post Test Year Additions is $6,191,600 and this amount should be included with the total utility plant in service at the close of the Test Year in establishing the rate base value in this proceeding. These additions are reflected in Schedule RJH-4 in testimony offered by Mr. Robert Henkes.

VI. NON-REVENUE WATER

Q. PLEASE DEFINE THE TERM "NON-REVENUE WATER."

A. Non-revenue water is simply that volume of water represented by the difference between the amount of treated water delivered by a water utility to its water distribution system and the amount of water recorded and billed as consumption on customer meters. Non-revenue water includes a number of authorized but unbilled uses like fire protection or distribution system flushing as well as improperly metered use (e.g., meter reading and billing inaccuracies) and leakage from the system. Non-revenue water is often referred to as a percentage of the amount of water delivered to the distribution system.

Q. DOES THE AMOUNT OF WATER DELIVERED TO THE DISTRIBUTION SYSTEM INCLUDE TREATED WATER THAT MAY BE PURCHASED FROM ANOTHER WATER UTILITY?

A. Yes. This amount of water is often called system delivery and it includes water produced in the Company's own treatment facilities as well as treated water that may be purchased from another utility for resale.

Q. DOES THE AMOUNT OF BILLED CONSUMPTION INCLUDE SALES OF TREATED WATER TO OTHER WATER UTILITIES?

A. Yes. All billed, metered and un-metered consumption is included in billed consumption. If the water is used by a customer of any nature and a bill is rendered for that volume of water, it is recorded as billed consumption.

Q. IS IT CUSTOMARY TO EXPRESS NON-REVENUE WATER AS AN ANNUAL VOLUME OF WATER IN UNITS OF MILLION GALLONS PER YEAR (MGY)?

A. Yes. Although it is possible to calculate non-revenue water on a shorter time basis, say a month or a quarter, non-revenue water is typically reported as a quantity of unbilled use and leakage over the course of a year. Shorter time periods are often influenced by timing differences between the delivery of the water to the distribution system and customer meter reading cycles that may not record the volume consumed during the same calendar period. The use of annual periods is employed as a technique to minimize the effect of timing differences on the data.

Q. ARE THERE ANY STANDARDS FOR NON-REVENUE WATER?

A. Yes. The NJDEP enforces a series of water allocation rules that include standards for non-revenue water. These rules can be found in the Water Supply Management Act Rules at N.J.A.C. 7:19-6.4. NJDEP defines “unaccounted-for water” as the amount of water “withdrawn by a purveyor from a source and not

accounted for as being delivered to customers in measured amounts."[6] This definition is more stringent than the typical industry definition of non-revenue water in that it includes water used within a treatment plant in the course of treatment operations and water lost in residuals processing and disposal operations. The less stringent industry definition calculates non-revenue water starting with the volume of treated water delivered to the water distribution system, so any losses within the treatment process are ignored.

Q. WHAT IS NJDEP'S STANDARD FOR "UNACCOUNTED-FOR WATER"?

A. NJDEP's standard for "unaccounted-for water" is 15% of the amount of water withdrawn from sources.[7]

Q. HOW LONG HAVE THESE RULES BEEN IN EFFECT?

A. The Water Supply Management Act Rules were adopted in 1985, so these rules have been in effect for 25 years.[8]

Q. USING THE INDUSTRY DEFINITION FOR NON-REVENUE WATER, HOW HAS THE COMPANY PERFORMED WITH RESPECT TO THE NJDEP STANDARD FOR UNACCOUNTED-FOR WATER?

[6] N.J.A.C. 7:19-6.1
[7] N.J.A.C. 7:19-6.4(a).
[8] Subchapter 6, Water Supply Management Act Rules, was adopted as R.1985 d.133, effective March 18, 1985. See: 16 N.J.R. 2399(a), 17 N.J.R. 687(c).

A. Even if one uses the less stringent industry definition of non-revenue water, as opposed to the NJDEP definition of unaccounted-for water, the Company has had a history of poor performance with regard to the NJDEP standard. The report titled "A Comprehensive Management Audit of United Water New Jersey, Final Report" prepared by Vista Consulting Group, Inc. and dated January 3, 1997 indicated that the Company was experiencing unaccounted-for water percentages of 17.9% in 1994 and 1995.[9] However, the calculation used in this report represents the difference between system delivery and sales after making an allowance for Company uses. If the same data in the report were recast to be consistent with the industry definition for non-revenue water, the volume of non-revenue water for 1994 would be 8,170 MGY or 21% of system delivery. Similarly, the data for 1995 indicate a non-revenue water volume of 7,485 MGY or 19%. Neither these restatements of the values presented in the report nor the actual calculations in the 1997 Management Audit report use the more stringent NJDEP definition which is based on the amount of water diverted from sources, not the smaller amount of water that would actually be delivered to the distribution system. Performance at these levels has persisted. For the years 2001 through 2009, the level of non-revenue water has ranged from 20.9% to 25.0% with a median value of 23.2%. The value for the latest quarterly report provided in response to RCR-E-13 shows a level of 23.8% for the twelve months ending September 30, 2009.

[9] RCR-E-2 in BPU Docket No. WR07020135; A Comprehensive Management Audit of United Water New Jersey, Final Report; New Jersey Board of Public Utilities; Vista Consulting Group, Inc.; McLean, Virginia; January 3, 1997; BPU Docket No. WA95080388; p. III-11.

Q. AS A RESULT OF THIS PERFORMANCE RECORD, HAS THE NEW JERSEY BOARD OF PUBLIC UTILITIES TAKEN ANY ACTION ON THIS ISSUE?

A. Yes. In BPU Docket No. WR07020135, the Board Ordered the Company to begin reporting on a quarterly basis its efforts to control non-revenue water and reaffirmed this decision in its Order in BPU Docket No. WR08090710 where it directed the Company to "continue to address its level of non-revenue water" and "to continue to provide Board Staff and Rate Counsel with quarterly data on non-revenue water."[10]

Q. HAVE YOU REVIEWED THE QUARTERLY REPORTS FILED BY THE COMPANY?

A. Yes. In response to RCR-E-13, the Company provided the most recent quarterly reports which cover the reporting periods from January 1, 2008 through September 30, 2009.

Q. DO THESE REPORTS SHOW THAT THE COMPANY HAS MADE ANY PROGRESS IN IMPROVING PERFORMANCE?

A. Yes. While the percentage of non-revenue water relative to the amount of water delivered to the system remains high at 23.83%, a more important measure of

[10] In The Matter of the Petition of United Water New Jersey Inc. for Approval of an Increase in Rates for Water Service and Other Tariff Changes; Order Adopting Initial Decision/Stipulation; BPU Docket No. WR08090710; OAL Dockect No. PUC 11730-2008N; April 3, 2009; p. 3; para. b.

performance, the "Infrastructure Leakage Index" or "ILI," shows a dramatic decline since the Board's initial Order in Docket WR07020135.

Q. WHAT IS THE INFRASTRUCTURE LEAKAGE INDEX?

A. The Infrastructure Leakage Index, or ILI, is a ratio adopted by the American Water Works Association and the International Water Association to serve as a benchmark of performance for system leakage. It is the ratio of the actual real losses from a water system per service connection to the theoretical minimum loss rate that could be obtained given the physical characteristics of the system. Every water system will have some level of unavoidable losses from the system and this unavoidable average real loss rate is a function of the size of the system, the number of services and the pressure under which the system operates. A water system with an ILI value of 1.0 would experience leakage at a rate equal to the unavoidable rate. As the actual real losses form a particular system increase above the unavoidable average real losses, the ILI increases. The magnitude of the ILI above a value of 1.0 indicates the severity of the leakage problem from any particular system. The index can be compared form one system to another to see how any particular system performs relative to its peers.

Q. WHAT IS THE CURRENT VALUE OF THE ILI FOR UNITED WATER NEW JERSEY?

A. The report for 12 months ending September 20, 2009 shows an ILI value of 4.14.

Q. HOW DOES THIS VALUE FOR ILI COMPARE TO OTHER NEW JERSEY WATER SYSTEMS?

A. Schedule HJW-12 shows a summary of recent ILI data for New Jersey Board regulated water utilities. United Water New Jersey's performance is better than some other regulated utilities in New Jersey while it is much worse than others. The data in Schedule HJW-12 show that the Company's performance is improving over time. This seems to be a direct result of the Board's Order in Docket No. WR07020135. If we look at a wider history of ILI for the Company, we can see that the ILI was actually increasing up to the point that the Board ordered the Company to address this issue and begin quarterly reporting. Following that Order, the value of ILI has been on a steady decline. This can be seen in the graph in Exhibit HJW-1. Prior to the Board's Order, ILI had been trending upward and there was some variability in the data from year to year. After the Board's Order, ILI is consistently moving downward in a strong linear trend.

Q. IN YOUR OPINION, WHAT ACTIONS HAVE PRODUCED THIS CHANGE?

A. The Company's non-revenue water control programs have been described in detail in testimony offered by Company Witness Glozzy.[11] This is a comprehensive program that addresses key elements of accounting for the disposition of all water produced. The Company has put in place a number of

[11] Direct Testimony of James A. Glozzy; Exhibit PT-1; pp. 20 – 29.

ongoing efforts to make sure that all customers are accounted for in the Company billing database and that any potential theft of service through unauthorized connections is minimized. In addition, the meter replacement program should produce improvements in the accuracy of the meter readings and the minimization of lost revenue tied to poor, missed or inaccurate readings. The Company has also made some significant changes in its approach to the way it assesses the condition of its distribution system. For example, the Company has identified an issue with ductile iron water mains installed in the early 1960's and it is using this information to guide its main repair and replacement strategies. This has allowed the Company to recognize that older cast iron mains may have a significant remaining service life if these mains are cleaned and lined. The Company has clearly moved away from an approach that erroneously assumes that age is the only determining factor in a decision to replace a water main to an approach that focuses on ongoing condition assessment and actions that allow the service life of structurally sound mains to be extended. This means that the Company, and its customers, will get a bigger bang for its distribution system maintenance and renovation buck. In addition to these activities, the Company has also increased its efforts in service renewals. It is certain that a significant portion of the real losses from this system are the result of leaks on service lines. As of the close of the Test Year, the Company had completed service renewals worth $796,600.[12] This additional investment should be recognized in rates resulting from this proceeding.

[12] Response to RCR-A-9, Exhibit P-5, Page 1 of 5, lines 73 and 74.

Q. WHAT IS YOUR RECOMMENDATION WITH REGARD TO THE ISSUE OF NON-REVENUE WATER?

A. The Board should continue its requirement that the Company address the issue of non-revenue water and the Order to provide quarterly progress reports to the Board and Rate Counsel should be reaffirmed in this proceeding.

Q. WHY IS IT IMPORTANT THAT THE COMPANY CONTINUE ITS EFFORTS TO ADDRESS NON-REVENUE WATER?

A. Real losses from the system represent an actual expense that could be avoided. If we look only at power and chemical costs, the Company is using energy and chemicals to treat water that is not reaching any customer. For the 12 months ending September 2009, the value of real losses from the system amounted to $3,164,127 per year. If the ILI could be reduced from its current level of 4.14 to 3.10, a 25% reduction, the cost of power and chemicals used to treat water would be reduced by $791,000. In addition, because real losses represent leakage from the system, this amount of improvement in the ILI would represent a savings of nearly 5 million gallons per day that could be used to service new retail or wholesale customers or offset purchased water expense.

VII. DISTRIBUTION SYSTEM IMPROVEMENT CHARGE

Q. WHAT IS A DISTRIBUTION SYSTEM IMPROVEMENT CHARGE?

A. As it is proposed by the Company, a Distribution System Improvement Charge ("DSIC") is a surcharge applied to customer bills between rate cases. The purpose of the surcharge is to begin recovering the cost of capital and depreciation on certain investments in utility plant. Investments in utility plant made by a water utility after a rate case is concluded will not earn a rate of return and depreciation expense will not be recovered by the utility until a new rate adjustment petition is filed and acted upon by the Board. The delay in recovering the cost of capital and depreciation for these investments is referred to as regulatory lag and the purpose of the DSIC mechanism is to shorten the regulatory lag for a specific class of investments.

Q. HOW DOES THE COMPANY PROPOSE TO SET THE DSIC RATE?

A. The Company has proposed a calculation that defines the DSIC rate as the ratio of the pre-tax rate of return requirement and depreciation expense associated with eligible plant investments to the total revenues received from metered sales and fire protection.[13]

Q. HOW FREQUENTLY DOES THE COMPANY PROPOSE TO ADJUST THE DSIC RATE?

[13] Direct Testimony of James C. Cagle; Exhibit PT-6; p. 7.

A. The Company proposes semi-annual adjustments[14] to the DSIC rate as new investments are made in qualified utility plant projects. As a result, if the Board approves this mechanism, customers can expect a rate increase every six months.

Q. HAS THE COMPANY PROPOSED A CAP ON THE AMOUNT OF THE DSIC RATE?

A. Yes. The Company has proposed to limit the DSIC surcharge rate to 5%.[15]

Q. WHAT WOULD HAPPEN TO THE DSIC RATE WHEN THE COMPANY FILES A NEW BASE RATE PROCEEDING?

A. The DSIC surcharge rate would be reset to zero and the Company would continue to recover a rate of return on its investments and the related depreciation expense through base rate charges resulting from the new rate case.

Q. UNDER THE COMPANY'S PROPOSAL, WHAT PROJECTS WOULD BE ELIGIBLE FOR DSIC RATE RECOVERY?

A. The Company's proposed DSIC mechanism is intended to recover the capital cost and depreciation expense associated with distribution system improvements projects that "renew or replace water mains, valves, services and meters."[16]

[14] Direct Testimony of James C. Cagle; Exhibit PT-6; p. 10, line 15.
[15] Ibid; p.10, line 5.
[16] Ibid; p. 8, line 20.

Q. DO YOU BELIEVE SUCH A MECHANISM SHOULD BE APPROVED BY THIS BOARD?

A. No.

Q. WHY ARE YOU OPPOSED TO THE ADOPTION OF THIS PROPOSAL?

A. The proposed mechanism would allow the Company to begin earning a rate of return and recovering depreciation expense on a select class of plant investments almost immediately after the projects are complete. I believe this would create a preferential incentive for investments in DSIC eligible plant over other categories of plant that could be more important in providing reliable service or controlling operating costs. Essentially, a mechanism that allows for the recovery of capital investments for a select type of plant between rate cases is a distortion to an otherwise neutral capital investment planning process. If the Company has a mechanism to immediately recover the capital cost of projects that renew or replace water mains, valves, services and meters, they will be more likely to invest their finite capital dollars in these projects as opposed to projects that might increase energy efficiency or result in improved water quality.

Q. DO YOU BELIEVE THAT A MECHANISM TO ALLOW IMMEDIATE RECOVERY OF THE CAPITAL COST OF PROJECTS THAT RENEW OR REPLACE WATER MAINS, VALVES, SERVICES AND METERS IS NECESSARY?

A. No, I do not.

Q. THE COMPANY TESTIFIED THAT THERE IS AN IMPENDING INFRASTRUCTURE CRISIS. ISN'T THIS A COMPELLING REASON TO IMPLEMENT A DSIC?

A. No. The Company has testified in very general terms about an impending infrastructure crisis on a national level and the aging of distribution plant.[17] By contrast, the information provided in the discovery portion of this proceeding demonstrates that the Company does not have a crisis of any kind on its hands. The Company is well aware of the age of the various components of its distribution system and has even identified a specific set of mains installed in the early 1960's that may be problematic.[18] In addition, the Company has identified specific causes of isolated high main failure rates that may be linked to the operation of nearby booster stations.[19] These are not problems that should be solved by an accelerated main replacement program targeting the entire 2,200 miles of mains the Company has in service. Furthermore, the general main failure rate in the Company's distribution network is lower than the industry average[20] and less than 25 to 30 breaks per 100 miles of main generally regarded as a benchmark performance standard in the industry. The Company's average main failure rate over nearly the last decade has been 15.9 breaks per 100 miles and in some years the failure rate has been as low as 4.7 breaks per 100 miles.[21]

[17] Ibid; p. 4 line 20 through p. 5, line 9; and Direct Testimony of Emad Sidhom, P.E.; Exhibit PT-5; p.12, lines 3-15.
[18] Response to RCR-E-14; p.2.
[19] Ibid.
[20] Ibid.
[21] Response to RCR-E-64.

Q. HAS THE PETITIONER EVER BEEN DENIED RATE RELIEF FOR A DISTRIBUTION IMPROVEMENT PROJECT?

A. To the best of my knowledge, which was confirmed in the Petitioner's Discovery responses[22] in this matter, the Petitioner has never been denied rate relief for a timely completed distribution improvement project.

Q. EARLIER, YOU INDICATED THAT THE PURPOSE OF DSIC WAS TO REDUCE THE REGULATORY LAG BETWEEN THE TIME THE COMPANY INVESTS IN A DSIC ELIGIBLE PROJECT AND THE TIME IT BEGINS RECOVERING THE COST OF CAPITAL AND DEPRECIATION FROM ITS CUSTOMERS. HAS THE COMPANY ESTIMATED THE REGULATORY LAG IMPACTING ITS INVESTMENT PROGRAM?

A. Yes. The response to RCR-E-52 shows a calculation of the regulatory lag. Over the past several years the average lag has been 23 months. However, this calculation is influenced by the extended period of time during which the Company refrained from filing rate adjustment applications. When the Company filed its rate adjustment application in February 2007, it was requesting an adjustment in rates put into effect by this Board in 1996. All projects undertaken by the Company, regardless of the nature of those projects, over this ten year period were impacted by some degree of regulatory lag. If we look at the more recent period when the Company was filing regular rate adjustment petitions, we can see that the regulatory

[22] Response to RCR-E-51.

lag is only about 9 months. This is the average lag for the last three periods shown in first table in the response to RCR-E-52.

Q. WOULD YOU EXPECT THIS AMOUNT OF REGULATORY LAG TO PERSIST GOING FORWARD?

A. The time between rate filings for any utility will be driven by the total magnitude of its investment program and changes in operating expenses. If, for example, the Company were to increase the level of investments in utility plant for any reason, the frequency of rate filings will increase and the regulatory lag will become shorter. If the Company were to settle on a filing frequency of once every two years, the average lag between investments and rate recognition would be about 12 months. If the filing frequency were extended to once every three years, the lag would grow to about 18 months.

Q. IS THE RATE CASE FILING SCHEDULE UNDER THE COMPANY'S CONTROL?

A. Yes, it is.

Q. SO, IF THE COMPANY WERE TO ACCELERATE THE RATE AT WHICH IT INVESTS IN DISTRIBUTION SYSTEM IMPROVEMENTS, WOULD IT BE ABLE TO FILE TIMELY RATE ADJUSTMENT PROCEEDINGS TO RECOVER THE COST OF THOSE INVESTMENTS IN RATES CHARGED TO ITS CUSTOMERS?

A. Yes, that is correct. If the company followed its recent filing schedule, the regulatory lag would be an average of 9 months and possibly less.

Q. HAS THE COMPANY CALCULATED THE REGULATORY LAG THAT WOULD EXIST IF ITS DSIC PROPOSAL WERE ADOPTED?

A. Yes. This calculation is also shown in the response to RCR-E-52. The regulatory lag for only DSIC eligible plant investments would be reduced to about 106 days or 3.5 months. The non-DSIC eligible plant investments would not be reflected in rates until a new base rate case were concluded.

Q. WOULD THE EXISTENCE OF A DSIC MECHANISM LENGTHEN THE TIME BETWEEN BASE RATE ADJUSTMENTS?

A. The Company's proposal dose not commit to any stay-out periods between base rate filings if a DSIC is adopted. Because the DSIC mechanism proposed covers only a limited class of plant investments, it is unlikely that the DSIC mechanism would significantly influence the Company's base rate adjustment filing schedule.

Q. IS THE RATE AT WHICH THE COMPANY INVESTS IN THE RENEWAL AND REPLACEMENT OF MAINS, VALVES, SERVICES AND METERS UNDER MANAGEMENT'S CONTROL?

A. Yes. Unlike some water quality related mandates imposed by USEPA or NJDEP in recent years, these types of investments can be scheduled at the discretion of the Company's management. While one may argue that failure related replacements

are not entirely predictable, it is important to recognize that the number of main and service failures repaired by the Company is very consistent from year to year. So even though the scope of any specific main repair project may not be known, the aggregate budget level of expenses incurred is consistent from year to year. It is also important to remember that main breaks do not always result in a capital replacement that would be covered by the DSIC proposal. Many main breaks are simply repaired as an operating expense and these maintenance activities are not part of the Company's DSIC proposal.

Q. SO, IS IT YOUR OPINION THAT ANY INCREASE IN MAIN RENEWAL ACTIVITY IS SOMETHING THAT WOULD BE DONE ONLY AT THE DISCRETION OF COMPANY MANAGEMENT?

A. Yes; and I would hope that Management would be able to make a logical business case for the elements of its overall strategy. For example, given the engineering evaluations that the Company has already completed, I would expect to see a continued emphasis on cleaning and relining of unlined cast iron water mains, the implementation of a cathodic protection strategy as recommended in the Company's engineering assessments, a further evaluation of the relationship between booster station operations and local main failures and, where absolutely necessary, the replacement of mains that are no longer serviceable.

Q. ARE THERE ANY OTHER ISSUES THAT SPEAK AGAINST THE IMPLEMENTATION OF THE COMPANY'S DSIC PROPOSAL?

A. Yes. As described in detail in testimony offered by Rate Counsel Witness Robert Henkes, DSIC represents single issue rate making. While the DSIC proposal gives the Company the opportunity to earn a rate of return and recover depreciation on a specific class of projects, there is no part of this mechanism that addresses increases in revenues that may result from meter replacement programs or lowered operating costs resulting from an improved main break frequency or lower real losses for the distribution network. This DSIC proposal is a plus to the Company in that it could result in a minor improvement in regulatory lag but if requires customers to wait for the next base rate proceeding to begin enjoying the benefits of lower operating expenses in their rates.

Q. DOES THIS COMPLETE YOUR TESTIMONY AT THIS TIME?

A. Yes it does.

APPENDIX A - Qualifications

Of

Howard J. Woods, Jr., P.E.

HOWARD J. WOODS, JR., P.E.

KEY EXPERIENCE

Mr. Woods has spent over 32 years in water and wastewater utility engineering and operations. In his career he has worked for US EPA, engineering consultants and in numerous senior engineering and operational roles at a large investor-owned utility. His experience is well rounded, covering all aspects of public water and wastewater operations and management including outsourcing, acquisitions, maintenance, water production, filtration, distribution, water quality, wastewater collection and treatment, regulatory compliance and safety.

Mr. Woods managed numerous water and wastewater management contracts. He has assisted clients in outsourcing management activities and transferring ownership of complete utility systems. He has advised clients on alternative contracting approaches and reduced operating costs by renegotiating plant operations contracts. He has helped clients reduce operating expenses and he has provided expert testimony in construction arbitrations, contamination incidents and utility rate and service proceedings.

EDUCATION

Masters of Civil Engineering, Water Resources – Villanova University
Bachelor of Civil Engineering (cum laude) – Villanova University

ACCOMPLISHMENTS

- Directed and managed the procurement process leading to the sale of a municipal wastewater system in Southeastern Pennsylvania. The sale of the Upper Dublin Township Sanitary Sewer System will yield $20,000,000 for a system serving approximately 8,000 connections and having annual revenues of $3,000,000. Advised the Township on alternative outsourcing and contracting approaches, reduced interim operating expenses by 30% prior to the sale by renegotiating the plant operations contract.
- Prepared an analysis of ownership alternatives for Lower Makefield Township's sanitary sewer collection system. Managed a procurement process that lead to the receipt of a $17 million bid for the potential sale of a system serving 10,700 residential and commercial customers.
- Assessed an existing public private partnership contract and future contracting alternatives for the Jersey City Municipal Utilities Authority (JCMUA). Recommended alternative contract terms and assisted JCMUA in negotiating a new ten-year operations agreement saving approximately $3,000,000 per year.
- Completed and independent assessment of ownership and operating alternatives for the Township of Sparta water utility. The study evaluated current operating and financial conditions of the utility and considered two alternative service delivery approaches: contract operation and a sale of the system to an investor-owned utility.

ACCOMPLISHMENTS (Continued)

- Completed an assessment of the financial and operating impacts of a proposal by a Pennsylvania municipality to dissolve its municipal water and sewer authority. The authority served multiple political subdivisions and dissolution would have resulted in regulation by the Pennsylvania Public Utility Commission. The additional regulatory burdens identified and limitations on municipal financing capacity resulted in a recommendation to retain authority ownership and operations.
- Completed an independent assessment of the planning and engineering decision making for a major water treatment plant renovation project undertaken by Aquarion Water Company of Connecticut in Stamford Connecticut. Evaluated process selection decisions, project sizing and regulatory compliance issues and testified before the Connecticut Department of Public Utility Control on the findings of the evaluation.
- Completed audits of water production operations and water quality management functions at Aquarion Water Company of Connecticut and Aquarion Water Company of Massachusetts. Assessed operational procedures and staffing levels, reviewed risk management plans including emergency response plans and dam safety programs, evaluated programmed and preventative maintenance systems and developed recommendations to assist the Company in lowering the cost of service while reducing risk and improving reliability.
- Completed a Vulnerability Assessment for a municipally-owned public water system in northern New Jersey. Organized, planned and conducted the assessment using the RAM-W^{SM} methodology. Evaluated existing physical protection systems at utility facilities, developed threat assessments and adversary sequence analyses, prepared recommendations to reduce risk.
- Completed an energy management evaluation for the Elmira (NY) Water Board and provided operator training on energy management strategies. Recommendations from the study allowed the client to reduce energy expenses by 30% through a series of operational modifications.
- Completed an energy management audit of the Pittsburgh Water and Sewer Authority and identified strategies for reducing power consumption. The results of this investigation provided the foundation for the Authority and its contract manager (U.S. Water L.L.C.) to develop and implement more effective maintenance and operations procedures to reduce energy costs.
- Served as an expert witness in a matter involving the diversion of service by a large commercial customer of Atlantic City Municipal Utilities Authority (ACMUA). Statistically analyzed customer water use and billing records by relating water use variables (e.g. weather, occupancy rates, and restaurant output) to recorded consumption. Identified periods of service diversion and assisted ACMUA in the collection of revenues and penalties due.
- Served as an expert witness in a matter involving excess billing of a large commercial customer of a New Jersey public utility. Statistically analyzed usage patterns over a ten year period and identified periods of excess billing. Assisted the customer in negotiating a $50,000 settlement of the dispute.
- Developed a model of the major water resources facilities in the Passaic, Pompton, Ramapo and Hackensack River Basins that allows the calculation of the safe and

ACCOMPLISHMENTS (Continued)

dependable yield of the Wanaque/Monksville, Point View and Oradell Reservoir systems under varying drought conditions. The model is being used by Passaic Valley Water Commission to evaluate long term water supply management strategies and to plan for future water supply needs.

- Prepared a long-range water supply needs forecast for the Passaic Valley Water Commission. Analyzed water use patterns within the Commission's retail service area and for over two dozen large contract customers. Produced population forecasts for the service area and individual water demand forecasts for each contract sale-for-resale customer using statistical and numeric forecasting techniques. The forecast projects total annual demand, average day, maximum month and maximum day demands and forms the basis for other ongoing facility and operations planning efforts. Current efforts involve the preparation and support of a renewed surface water diversion permit for the Commission which will support more flexible operations and more efficient source utilization. The Commission serves a retail service population of 325,000 and effectively serves an additional 260,000 people through sale-for-resale connections.

- Prepared a cost of service allocation study for Passaic Valley Water Commission, a regional water system that serves a large urban retail service population and a significant outlying area through direct retail and wholesale water sales. Allocated costs based on standard methodologies to Owner Cities, External Cities Retail and Wholesale classes of service. The Commission has annual revenues in excess of $71 million.

- Prepared a cost of service allocation study for three Pennsylvania Municipal Utilities Authorities considering a joint water supply expansion project. Evaluated and allocated anticipated construction and operating costs for the plant expansion and assigned costs of existing facilities using a commodity-demand allocation method. Developed a recommended tariff design to allow for the fair recovery of prospective costs associated with the expanded facilities.

- Assisted the Banco Gubernamental de Fomento para Puerto Rico, Autoridad para el Financiamiento de la Infrastructura de Puerto Rico and PricewaterhouseCoopers in developing a new operating contract for the Puerto Rico Aqueduct and Sewer Authority (PRASA). The contract was developed, bid and awarded in less than six months, cutting the normal procurement time by nearly two-thirds. The value of the contract was $300 million per year.

- Served as an expert witness in an arbitration involving a dispute between a New Jersey municipal water department and A.C. Schultes, Inc., a well contractor. Assisted A.C. Schultes in supporting its claim for a contract modification and the recovery of unanticipated expenses. The arbitrator awarded the contractor 100% of its cost claim.

- Served as an expert witness in a matter involving the alleged contamination of a New Jersey municipal water system with heavy metals and organic chemicals. Reviewed over 38,000 discrete water quality sample results, analyzed the operational records of the system and developed a computer model (EPANET2) depicting water flow and water quality changes over a period spanning two decades. Assisted the client in successfully defeating a threatened class action lawsuit at the certification level.

ACCOMPLISHMENTS (Continued)

- Served as a mediator involving a dispute between the Long Beach Township Water Department and Don Siegel Construction Co., Inc., a pipeline installation contractor. Assisted the parties in resolving various construction cost claims and in interpreting the contract construction documents. Litigation over the disputes was avoided.

- Reviewed engineering plans and operational practices in numerous water and wastewater rate adjustment proceedings and quality of service proceedings for the New Jersey Division of Rate Counsel. Assessed utility engineering design and construction plans, developed alternatives to utility proposed projects, and evaluated the utility companies' ability to render safe, adequate and proper water or wastewater service. Provides expert testimony in the following utility rate and service quality proceedings:
    - Acacia Lumberton Manor Fire Service Complaint
      BPU Docket No. WC01080495
    - Applied Waste Water Management Rates
      BPU Docket No. WR03030222
    - Applied Waste Water Management Base Rates
      BPU Docket No. WR08080550
    - Applied Waste Water Management Franchise
      BPU Docket No. WE03070530
    - Applied Waste Water Management Andover Franchise
      BPU Docket No. WE04111466
    - Applied Waste Water Management Hillsborough Franchise
      BPU Docket No. WE04101349
    - Applied Waste Water Management Oakland Franchise
      BPU Docket No. WE04111467
    - Applied Waste Water Management Union Twp Franchise
      BPU Docket No. WE050414
    - Applied Waste Water Management Tewksbury Franchise
      BPU Docket No. WR08100908
    - Aqua NJ Pine Hill Franchise
      BPU Docket No. WE05070581
    - Aqua NJ Upper Freehold Franchise
      BPU Docket No. WE05100822
    - Aqua NJ Readington Wastewater Franchise
      BPU Docket No. WE07030224
    - Aqua New Jersey Base Rate Case
      BPU Docket No. WR07120955
    - Aqua New Jersey Acquisition of Bloomsbury Water
      BPU Docket WE09050360
    - Aqua New Jersey Acquisition of Harkers Hollow Water
      BPU Docket WM09020119
    - Aqua NJ Upper Freehold Franchise Extension
      BPU Docket No. WE09120965
    - Atlantic City Sewerage Company Rates
      BPU Docket WR09110940
    - Bayview Water Company Rates
      BPU Docket No. WR01120818

ACCOMPLISHMENTS (Continued)

- Borough of Haledon Rates
  BPU Docket No. WR01080532
- City of Orange Privatization Review
  BPU Docket No. WO03080614
- Crestwood Village Loan Approval
  BPU Docket No. WF04091042
- Crestwood Village Water Co Base Rates
  BPU Docket No. WR07090706
- Elizabethtown Water Co. v. Clinton Board of Adjustment
  BPU Docket No. WE02050289
- Elizabethtown Water Company Rates
  BPU Docket No. WR03070510
- Elizabethtown Water Company Franklin Franchise
  BPU Docket No. WE05020125
- Elizabethtown Water Company Purchased Water Adjustment Clause
  BPU Docket No. WR04070683
- Environmental Disposal Corporation Main Extension Agreement
  BPU Docket No. WO04091030
- Environmental Disposal Corporation Rates
  BPU Docket No. WR04080760
- Environmental Disposal Corporation Rates
  BPU Docket No. WR07090715
- Fayson Lake Water Company Rates
  BPU Docket No. WR03040278
- Fayson Lake Water Company Base Rates
  BPU Docket No. WR07010027
- Gordon's Corner Water Company Rates
  BPU Docket No. WR03090714
- Lake Valley Water Company Rates
  BPU Docket No. WR04070722
- Middlesex Water Company Rates
  BPU Docket No. WR03110900
- Middlesex Water Company Rates
  BPU Docket No. WR05050451
- Middlesex Water Company Base Rates
  BPU Docket No. WR07040275
- Middlesex Water Co Transmission Main Prudency Review
  BPU Docket No. WO08020098
- Middlesex Water Company Base Rates
  BPU Docket No. WR09080666
- Montague Water Company Rates
  BPU Docket No. WR03121034
- Montague Sewer Company Rates
  BPU Docket No. WR03121035
- Montague Sewer Company Rates
  BPU Docket No WR05121056
- Mount Holly Water Company Rates
  BPU Docket No. WR03070509

ACCOMPLISHMENTS (Continued)

- Mount Olive Villages Water & Sewer Franchise
  BPU Docket No. WE03120970
- New Jersey American Water Company Rates
  BPU Docket No. WR03070511
- New Jersey American Water Company Rates
  BPU Docket No. WR06030257
- New Jersey American Water Acquisition of Mt. Ephraim and Approval of Municipal Consent
  BPU Docket No. WE06060431
- New Jersey American Water Purchased Water Adjustment Clause
  BPU Docket No. WR05110976
- New Jersey American Water Company – Mantua Franchise
  BPU Docket No. WE07060372
- New Jersey American Water Co – Rocky Hill Franchise
  BPU Docket No. WE07020103
- New Jersey American Water Company Rates
  BPU Docket No. WR08010020
- New Jersey American Hopewell Township Franchise
  BPU Docket No. WE07120981
- New Jersey American Water Co/City of Trenton
  Joint Petition for Approval of the Sale of Water System
  BPU Docket No. WE08010063
- New Jersey American Water Company Petition for Approval of a Distribution System Improvement Charge (DSIC)
  BPU Docket No. WO08050358
- New Jersey Natural Gas Rates
  BPU Docket No. GR07110889
- Oakwood Village Sewer Change in Control
  BPU Docket No. WM07070535
- Parkway Water Company Rates
  BPU Docket No. WR05070634
- Pinelands Water Company Rates
  BPU Docket No. WR03121016
- Pinelands Wastewater Company Rates
  BPU Docket No. WR03121017
- Pinelands Water Company Rates
  BPU Docket No. WR08040282
- Pinelands Wastewater Company Rates
  BPU Docket No. WR08040283
- Rock GW, LLC Determination of Applicability of Board Regulation
  BPU Docket No. WO08030188
- Roxbury Water Company Rates
  BPU Docket No. WR09010090
- Seabrook Water Company Franchise
  BPU Docket No. WC02060340
- Shorelands Water Company Rates
  BPU Docket No. WR04040295

ACCOMPLISHMENTS (Continued)

- Shore Water Company Rates
  BPU Docket No. WR09070575
- South Jersey Water Supply Change in Control
  BPU Docket No. WM07020076
- United Water Acquisitions Evaluation
  BPU Docket No. WM02060354
- United Water Arlington Hills Franchise
  BPU Docket No. WE07020084
- United Water Arlington Hills Sewerage Base Rates
  BPU Docket No. WR08100929
- United Water New Jersey Base Rates
  BPU Docket No. WR07020135
- United Water New Jersey Base Rates
  BPU Docket No. WR08090710
- United Water New Jersey Management Audit
  BPU Docket: WA05060550
- United Water New Jersey Mount Arlington Franchise
  BPU Docket No. WE09121006
- United Water Toms River Base Rates
  BPU Docket No. WR080830139
- United Water West Milford Sewerage Base Rates
  BPU Docket No. WR08100928

- Assisted the New Jersey Division of Rate Counsel in assessing drought conditions effecting water utilities in New Jersey during the 2002 drought. Analyzed proposals for water supply interconnections to mitigate drought impacts, developed position statements regarding pricing alternatives, and provided a critique of State water supply management initiatives prior to and during drought conditions.

- Assisted the Delaware Public Advocate in assessing drought conditions effecting water utilities in northern New Castle County during the 2002 drought (PSC Docket No. 323-02). Reviewed water utility operations prior to and during the drought emergency, assessed the effectiveness of use curtailments, developed recommendations to assure proper, cost-effective resources management for future drought conditions.

- Assisted the Delaware Public Service Commission in a determination of rate base for Artesian Water Company in PUC Docket 08-96. Evaluated selected plant facilities and proposed projects to determine the need to impute revenues for under-utilized facilities in establishing new base rates.

- Prepared an assessment of the water supply capacity certification and water conservation plan submitted by United Water Delaware in PUC Docket 09-282 on behalf of the Delaware Public Service Commission. Evaluated the capacity of the sources of supply available to the Company with respect to projected demands and the requirements of the Delaware Water Supply Self-Sufficiency Act of 2003. Assessed the effectiveness of water conservation activities and developed recommendations to improve the efficiency and effectiveness of Company conservation programs.

ACCOMPLISHMENTS (Continued)

- Provided expert testimony on behalf of the Delaware Public Advocate in the matter of Inland Bays Preservation Company's request for an increase in wastewater rates before the Delaware Public Service Commission (PUC Docket No. 09-327-WW). Evaluated plant facilities, proposed projects and the allocation of developer contributions in aid of construction to determine rate base. Assessed the level of operating expenses claimed in the filing and recommended adjustments to substantially lower the requested rate increase.

- Managed 175 municipal and commercial water and wastewater contracts located in seven states for American Water Services/AmericanAnglian Environmental Technologies. Through these contracts, cost effective water and wastewater service was provided to over one million people. Contracts included the 160 MGD City of Buffalo, NY water system and the 30 MGD Scranton Sewer Authority wastewater operations. Directed an operations staff of 700 employees. Eliminated financial losses while improving safety and quality.

- Directed a marketing and business development staff for AmericanAnglian Environmental Technologies that secured the largest operations and maintenance contract awarded in the US in 1999 and the second best overall performance in the US market. Increased revenues by 28%. Evaluated potential contract operations and design/build projects to identify operating and capital savings on hundreds of potential contracts throughout the United States. Evaluations included Atlanta, Georgia, Scranton, Pennsylvania and Springfield, Massachusetts.

- Managed the operations of 16 water systems for New Jersey-American Water Company, a regulated investor-owned utility serving one million people throughout NJ. Coordinated the activities of a decentralized operations staff of 440 to provide reliable water service, ensure environmental compliance, control costs, manage and maintain system assets, reduce liability, provide site security and maintain a safe work place, and meet financial objectives. Responsible for the maintenance and operation of all source of supply, treatment, filtration and storage facilities, producing and distributing between 100 MGD and 220 MGD, as well as over 4,000 miles of water transmission and distribution facilities.

- Directed a team of engineering, legal, public relations and financial professionals that planned, designed, permitted and constructed a $192,000,000 water treatment plant and pipeline system for New Jersey-American Water Company. The intake, constructed in environmentally sensitive areas and the state of the art water filtration plant can be expanded to produce 100 MGD. The project is the principal source of surface water for nearly one million people in southern New Jersey and it was built to allow new regulatory controls on ground water use to go into effect. The project was completed within budget and on schedule.

- Developed the financial model and contract language that allowed water lines to be extended to over 3,000 homes with contaminated private wells in Atlantic County, New Jersey. This program provided the financial assurances needed to construct several miles of water mains, eliminate federal tax liability and reduce costs by 34%.

- Initiated and directed the first study of desalination for public water supply purposes in NJ for the City of Cape May. This project evaluated two desalination technologies and demonstrated that reverse osmosis could be used effectively to treat brackish water at a competitive cost. A full-scale plant has since been placed in service.

ACCOMPLISHMENTS (Continued)

- Developed long-range regional water supply plan for Monmouth County, New Jersey, a county that was adding as many as 1,000 water utility customers per year and seriously stressing the water supply. The plan evaluated alternative sources of water, conservation and regional reservoir development. The recommendations avoided $30,000,000 in capital construction while ensuring a safe supply of water for a 15-year planning period. Negotiated supply sharing operating agreements with the New Jersey Water Supply Authority to implement the plan.

- Directed a staff of engineers and consultants in preparing comprehensive plans for 60 water systems located throughout the United States. Communities served by these systems include Pittsburgh, Pennsylvania and its surrounding suburbs, Charleston, West Virginia, Richmond, Indiana, E. Saint Louis, Illinois and Monterey, California. Evaluated alternatives and identified the least costly means of providing safe water service for each system. Assessed operations strategies to identify external threats to the reliability and efficiency of these systems. Identified specific capital facility needs and operations strategies for five, ten and fifteen year planning horizons, defined the long term role of each system in prompting regional water supply development, and assessed the impact of future State and Federal water quality regulations on system operations and needs.

- Developed a formula for allocating ground water to 30 water suppliers in southern New Jersey for the New Jersey Department of Environmental Protection and negotiated an implementation agreement with effected suppliers. The New Jersey Legislature adopted the formula in the Water Supply Management Act Amendments of 1992. The allocation formula protects a regional aquifer from over-pumping.

- Developed a plan to convey storm water through a sixty-foot high railroad embankment in Prince Georges County, Maryland. Evaluated alternative methods and selected one that allowed an existing culvert to be modified to carry higher flow rates. Saved over $500,000 in construction costs. The Washington Suburban Sanitary Commission and Prince Georges County adopted the design as a standard in their storm water design manual.

- Negotiated Lakewood, New Jersey's first three-year water and wastewater labor agreement in the face of an impending strike, departing from prior history of year-to-year contract agreements.

- Provided expert testimony in judicial proceedings involving utility rate adjustments before the New Jersey Board of Public Utilities, the Connecticut Department of Public Utility Control and the New York Public Service Commission. Testified on environmental and operations topics including: rate setting strategies, source of supply improvements, water resources management, treatment to mitigate contamination, staffing levels and operating practices. Evaluated alternative operating practices and testified as to the least costly means of operating and maintaining water and wastewater facilities in these jurisdictions.

- Served as a gubernatorial appointee to the New Jersey Water Supply Advisory Council under Governors Florio and Whitman. Advised the NJ Department of Environmental Protection on a variety of water resources management issues.

- Coordinated the response to an outbreak of giardiasis for the US Environmental Protection Agency. The outbreak affected 20% of the people served by a municipal water system in north-central Pennsylvania. Specified immediate control measures,

ACCOMPLISHMENTS (Continued)

short-term treatment techniques and long-term treatment improvements to resolve the immediate problem and prevent a recurrence.

REPRESENTATIVE CLIENTS

- A.C. Schultes, Inc.
- Aquarion Water Company of Connecticut
- Aquarion Water Company of Massachusetts
- Atlantic City Municipal Utilities Authority
- Bethlehem Water Authority
- BOC Gases
- Bucks County Water & Sewer Authority
- Camco Management
- Cedar Grove Township
- Consumers New Jersey Water Company
- Delaware Public Advocate
- Delaware Public Service Commission
- D. R. Horton – New Jersey
- Elmira Water Board
- Greater Ouachita Water Company
- Harris Defense Group
- Jersey City Municipal Utilities Authority
- Lower Makefield Township
- New Jersey-American Water Company
- New Jersey Public Advocate, Division of Rate Counsel
- New Jersey Water Supply Authority
- North Penn Water Authority
- North Wales Water Authority
- Passaic Valley Water Commission
- Perkasie Borough
- Perkasie Borough Authority
- Pricewaterhouse Coopers, LLP
- Sussex Shores Water Company
- Township of Sparta (NJ)
- U.S. Water, LLC
- Upper Dublin Township

PROFESSIONAL QUALIFICATIONS

Registered Professional Engineer in Delaware (2004), Maryland (1982), New Jersey (1984), New Mexico (1987), New York (1984) and Pennsylvania (1983).

Licensed to complete RAM-W vulnerability assessments (2002).

PROFESSIONAL ASSOCIATIONS

American Society of Civil Engineers, American Water Works Association, International Water Association, National Ground Water Association, National Fire Protection Association, Water Environment Federation, Tau Beta Pi.

PROFESSIONAL HISTORY

HOWARD J. WOODS, JR. & ASSOCIATES, LLC **2000 - Present**
General Manager

AMERICAN WATER WORKS COMPANY **1983 - 2000**

American Water Services, Inc.	
Senior Vice President - Operations	1999 - 2000
American Anglian Environmental Tech., L.P.	
Senior Vice President - Business Development	1998 - 1999
American Water Works Service Co.	
Vice President - Special Projects	1997 - 1998
New Jersey-American Water Co., Inc.	
Vice President - Operations	1989 - 1997
American Water Works Service Co.	
Engineering Manager	1988 - 1989
System Director of Planning	1986 - 1988
Division Manager of Operations	1984 - 1986
Division Director of Engineering	1983 - 1984

JOHNSON, MIRMIRAN & THOMPSON **1981 - 1983**
Project Engineer

U.S. ENVIRONMENTAL PROTECTION AGENCY **1977 - 1981**
Environmental Engineer

APPENDIX B - Schedules

HJW-1: Actual Chemical Utilization; Chemicals Used in 2009

HJW-2: Raw Water Subject to Treatment

HJW-3: Adjusted Average Utilization Rate 2009

HJW-4: Summary of Dose rate Adjustments

HJW-5: Chemical Unit Price Comparison

HJW-6: Annual Chemical Cost

HJW-7: Calculation of Annual Disposal Expense Using 2009 Unit Cost and 5-Year Average Production

HJW-8: Chemical Application Rates and Total Pro Forma Quantities

HJW-9: Schedule HJW-9: Result of Multiple Liner Regression Analysis of Relationship of Residuals Disposal Expense to Time (Year), Chemical Application (lbs/yr), and Quantity of Water Treated (ThGal/Yr)

HJW-10: Residuals Disposal Expense

HJW-11: Adjustment to Post Test Year Additions

HJW-12: Comparative Infrastructure Leakage Index Data

Schedule HJW-1: Actual Chemical Utilization
Chemicals Used in 2009
All units in pounds unless othewise noted.

Chemical	NJ	Lambertville	Arlington Hills	Vernon Hills	Hampton	TOTAL
Amonia	354,509					354,509
Carbon	109,394					109,394
Polymer	749,870					749,870
Polyphosphate	3,584		434	100		4,118
Caustic	596,374		39,615	2,669		638,658
Alum	-					-
PACl	7,360,159	95,190				7,455,349
Sulfuric Acid	1,018,183					1,018,183
Copper Sulfate	10,400	1,250				11,650
Soda Ash	-	48,600				48,600
Sodium Chlorite	-	7,470				7,470
Chlorine Gas	-	1,350				1,350
Sodium Hypochlorite (gals)	1,594,047	1,500	473	360	146	1,596,526
Liquid Oxygen	684,937					684,937
Aluminum Chlorohydrate	-					-
Aluminum Sulfate	-					-
Copper (Other) (gals)	2,200					2,200
Sodium Permanganate	-	1,602				1,602

Notes:

(1) Sodium Permanganate use for pilot testing only as indicated in RCR-E-43 and not used in subsequent cost calculations.
(2) Use for Lambertville, Vernon Hills, Arlington Hills and Hampton from RCR-E-43.
(3) Use for United Water NJ (Haworth) from RCR-E-65 Updated.
(4) Liquid oxygen converted from cubic feet to pounds at 9.522 lbs/cuft.

Schedule HJW-2: Raw Water Subject to Treatment (Thousand Gallons per Year)

	Year	NJ	Lambertville	Arlington Hills	Vernon Hills	Hampton	TOTAL
1	**2009 Actual**	37,245,241	142,152	41,387	27,503	13,231	37,469,514
2	**Post Test Year**	36,409,555	120,877	51,281	32,966	14,652	36,629,331
3	**3 Year Average**	38,729,707	136,234	50,923	33,706	13,938	38,964,508
4	**5 Year Average**	38,700,177	135,922	51,725	34,991	14,425	38,937,240

Notes:
(1) United Water NJ 2009 treatment volume from RCR-E-65 Updated.
(2) Production volumes for Lambertville, Arlington Hills, Vernon Hills and Hampton for 2009 from RCR-E-42.
(3) Post Test Year Volumes from RCR-E-45 and RCR-E-46

Schedule HJW-3: Adjusted Average Utilization Rate 2009					
All units in lbs/thousand gallons unless otherwise noted					
	UWNJ	**Lambertville**	**Arlington Hills**	**Vernon Hills**	**Hampton**
Amonia	0.0095	-	-	-	-
Carbon	0.0029	-	-	-	-
Polymer	0.0201	-	-	-	-
Polyphosphate	0.0001	-	0.0105	0.0036	-
Caustic	0.0160	-	0.9572	0.0970	-
Alum	-	-	-	-	-
PACl	0.2863	0.6696	-	-	-
Sulfuric Acid	0.0273	-	-	-	-
Copper Sulfate	0.0003	0.0088	-	-	-
Soda Ash	-	0.3419	-	-	-
Sodium Chlorite	-	0.0525	-	-	-
Chlorine Gas	-	0.0095	-	-	-
Sodium Hypochlorite (gals/ThGal)	0.0291	0.0106	0.0114	0.0131	0.0110
Liquid Oxygen	0.0194	-	-	-	-
Aluminum Chlorohydrate	-	-	-	-	-
Aluminum Sulfate	-	-	-	-	-
Copper (Other) (gals/ThGal)	0.0001	-	-	-	-
Sodium Permanganate	-	0.0113	-	-	-
Notes: PACl, Sodium Hypochlorite and Liquid Oxygen use rates adjusted to actual experience for 1Q 2010 and the last nine months of 2009					

Schedule HJW-4: Summary of Dose Rate Adjustments	
PACl Adjustments	
Jan-April 2010 Production (MG)	11,980.04
PACL Use (lbs)	2,848,518
Application Rate (lbs/ThGal)	0.2378
Plan Production (MG)	41,245.38
Additional PACl (lbs) for TOC	2,000,000
Added Feed rate for TOC (lbs/ThGal)	0.0485
Adjusted Feed Rate	0.2863
Hypochlorite Adjustment	
1Q 2010 Use (Gal)	258,727
1Q Production (MG)	8,905.94
Application Rate (gal/ThGal)	0.0291
LOX Adjustment	
1Q 2009 Volume	9,151,270
2Q - 4Q 2009 Volume	29,225,280
Total 2009	38,376,550
LOX Used (lbs)	684,937
1Q Dose Rate Relative to 2Q-4Q	0.67
Normalized Dose (lbs/ThGal)	0.0194
Unweighted Dose Rate 2009	0.0184
Increase in Dose Rate	5.43%

Schedule HJW-5: Chemical Unit Price Comparison							
Unit Costs	Unit Price Exhibit P-4, Schedule 2-D	Unit Cost 2007	Unit Cost 2008	Unit Cost 2009	Unit Cost 1/31/2010	Variance	Variance (%)
All units in $/lb except Sodium Hypochlorite in $/gal							
Amonia ($/lb)	$ 0.60000	$ 0.4000	$ 0.6000	$ 0.6000	$ 0.6000	$ -	0%
Carbon ($/lb)	$ 0.76000	$ 0.6100	$ 0.6700	$ 0.7700	$ 0.7700	$ 0.01	1%
Polymer ($/lb)	$ 0.90000	$ 0.4100	$ 0.5200	$ 0.8300	$ 0.8900	$ (0.01)	-1%
Polyphosphate ($/lb)	$ 1.91000	$ -	$ 1.9100	$ 2.6900	$ 2.5000	$ 0.59	31%
Caustic ($/lb)	$ 0.18800	$ 0.1694	$ 0.4945	$ 0.3092	$ 0.3092	$ 0.12	64%
Alum ($/lb)	$ 0.19750	$ 0.1219	$ 0.1310	$ 0.1975	$ 0.1975	$ -	0%
PACl ($/lb)	$ 0.15900	$ 0.1350	$ 0.1400	$ 0.1600	$ 0.1600	$ 0.00	1%
Sulfuric Acid ($/lb)	$ 0.09900	$ 0.0465	$ 0.1850	$ 0.0825	$ 0.0825	$ (0.02)	-17%
Copper Sulfate ($/lb)	$ 1.25500	$ 1.2900	$ 1.2500	$ 1.1700	$ 1.1700	$ (0.09)	-7%
Soda Ash ($/lb)	$ 0.34000	$ 0.2600	$ 0.2400	$ 0.3100	$ 0.3100	$ (0.03)	-9%
Sodium Chlorite ($/lb)	$ 1.51000	$ 1.0500	$ 1.0500	$ 0.5000	$ 0.5000	$ (1.01)	-67%
Chlorine Gas ($/lb)	$ 1.04000	$ 0.8095	$ 1.3300	$ 0.8300	$ 0.8300	$ (0.21)	-20%
Sodium Hypochlorite ($/gal)	$ 0.89100	$ 0.7500	$ 0.8200	$ 0.9200	$ 0.9200	$ 0.03	3%
Liquid Oxygen ($/lb)	$ 0.48300	$ -	$ -	$ 0.3400	$ 0.4130	$ (0.07)	-14%
Aluminum Chlorohydrate ($/lb)	$ 0.32000	$ -	$ -	$ 0.3200	$ 0.2700	$ (0.05)	-16%
Aluminum Sulfate	$ 0.13100	$ -	$ -	$ 0.1310	$ 0.1310	$ -	0%
Copper (Other) ($/gals)	$12.88061	$ -	$ -	$ 12.8806	$ 12.8806	$ -	0%
Notes:							
(1) Unit prices for 2007 from Exhibit P-4, Schedule 2-D, Adjusted Test Year Docket WR08090710							
(2) Units prices for 2008 through 2010 from RCR-A-90 in this Docket.							

Schedule HJW-6: Annual Chemical Cost								
System / Chemical	**NJ**	**Lambertville**	**Arlington Hills**	**Vernon Hills**	**Hampton**	**RC TOTAL**	**RC Adjustment**	**Company Estimate Exhibit P-4, Sch 2-D**
Amonia	$ 221,014	$ -	$ -	$ -	$ -	$ 221,014	$ 24,855	$ 196,159
Carbon	$ 87,524	$ -	$ -	$ -	$ -	$ 87,524	$ (55,228)	$ 142,752
Polymer	$ 693,455	$ -	$ -	$ -	$ -	$ 693,455	$ 162,712	$ 530,743
Polyphosphate	$ 9,310	$ -	$ 1,355	$ 318	$ -	$ 10,983	$ 3,800	$ 7,183
Caustic	$ 191,580	$ -	$ 15,307	$ 1,050	$ -	$ 207,937	$ 85,989	$ 121,948
Alum	$ -	$ -	$ -	$ -	$ -	$ -	$ (8)	$ 8
PACl	$ 1,772,544	$ 14,563	$ -	$ -	$ -	$ 1,787,107	$ 338,931	$ 1,448,176
Sulfuric Acid	$ 87,281	$ -	$ -	$ -	$ -	$ 87,281	$ (1,109)	$ 88,390
Copper Sulfate	$ 12,643	$ 1,398	$ -	$ -	$ -	$ 14,041	$ (25,069)	$ 39,110
Soda Ash	$ -	$ 14,406	$ -	$ -	$ -	$ 14,406	$ 14,391	$ 15
Sodium Chlorite	$ -	$ 3,571	$ -	$ -	$ -	$ 3,571	$ 3,559	$ 12
Chlorine Gas	$ -	$ 1,071	$ -	$ -	$ -	$ 1,071	$ 1,068	$ 3
Sodium Hypochlorite	$ 1,034,338	$ 1,320	$ 544	$ 421	$ 146	$ 1,036,769	$ (418,016)	$ 1,454,785
Liquid Oxygen	$ 309,897	$ -	$ -	$ -	$ -	$ 309,897	$ (43,888)	$ 353,785
Aluminum Chlorohydrate	$ -	$ -	$ -	$ -	$ -	$ -	$ (350,017)	$ 350,017
Aluminum Sulfate	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Copper (Other) (gals)	$ 29,444	$ -	$ -	$ -	$ -	$ 29,444	$ 29,444	$ -
TOTAL	$ 4,449,030	$ 36,329	$ 17,206	$ 1,789	$ 146	$ 4,504,500	$ (228,586)	$ 4,733,086

Schedule HJW-7: Calculation of Residuals Disposal Expense Using 2009 Unit Cost and 5-Year Average Production

Year	Pounds of Chemicals Applied	Volume Treated (ThGal)	Residuals Disposal Cost		Residual Disposal Unit Cost ($/ThGal)
2005	22,969,861	38,136,870	$ 943,777		$ 0.0247
2006	23,946,817	39,174,896	$ 1,010,176		$ 0.0258
2007	28,034,700	40,100,477	$ 869,728		$ 0.0217
2008	26,772,731	38,843,413	$ 1,407,653		$ 0.0362
2009	24,200,109	37,245,231	$ 1,607,039		$ 0.0431
Pro Forma Using 2009 and 5-Year Treatment Volume		**38,700,177**			**$ 1,669,816**

Schedule HJW-8: Chemical Application Rates and Total Pro Forma Quantities		
	Application Rate (lbs/ThGal except Hypo and Copper in gal/ThGal)	Pro Forma Quantity (lbs except Hypo and Copper in gal)
Amonia	0.0095	368,357
Carbon	0.0029	113,667
Polymer	0.0201	779,163
Polyphosphate	0.0001	3,724
Caustic	0.0160	619,671
Alum	-	-
PACl	0.2863	11,078,399
Sulfuric Acid	0.0273	1,057,957
Copper Sulfate	0.0003	10,806
Soda Ash	-	-
Sodium Chlorite	-	-
Chlorine Gas	-	-
Sodium Hypochlorite (gals/ThGal)	0.0291	1,124,281
Liquid Oxygen	0.0194	750,356
Aluminum Chlorohydrate	-	-
Aluminum Sulfate	-	-
Copper (Other) (gals/ThGal)	0.0001	2,286
Sodium Permanganate	-	-
2009 Adjusted - Lbs Chem Applied		24,177,668
Notes: PACl, Sodium Hypochlorite and Liquid Oxygen use rates adjusted to actual experience for 1Q 2010 and the last nine months of 2009		

Schedule HJW-9: Result of Multiple Liner Regression Analysis of Relationship of Residuals Disposal Expense to Time (Year), Chemical Application (lbs/yr), and Quantity of Water Treated (ThGal/Yr)

m_3	m_2	m_1	b
-0.104498046	-0.022604122	162250.7288	-319856164
0.222087475	0.116435857	119196.782	244172535.5
0.931369599	168630.484	#N/A	#N/A
4.523600719	1	#N/A	#N/A
3.85903E+11	28436240141	#N/A	#N/A
x_1	x_2	x_3	**Result**
2010	24,177,667.57	38,700,177	$ 1,677,193

Schedule HJW-10: Residuals Disposal Expense	
Amortization of A-89(b) Estimate Lagoons	$ 325,204
5-Yr Production Plus Adjusted Chemical Application	$ 1,677,193
BCUA per RCR-A-128a	$ 360,000
Total	**$ 2,362,397**
Company As-Filed	$ 3,692,592
RC Adjustment	**$ (1,330,195)**

Schedule HJW-11: Adjustment to Post Test Year Additions

Line No.	Description	As-Filed Amount	Revised Amount	Filed In-Service Date	Revised In-Service Date	Project Beyond Post Test Year Period	RC Qualified Post Test Year Additions	Haworth Projects	Other Qualified Projects
A. Source of Supply									
1	MONKSVILLE DAM	$ 100.00	$ 100.00	7/31/2010	**4/15/2008**		X		X
2	TAPPAN BASCAULE GATE IMPROVEMENTS	$ 325.00	$ 401.10	7/31/2010	12/31/2010	X			
3	REPLACE TAPPAN BASCAULE GATES HYDRAULIC RETURN PIP	$ 250.00	$ 226.70	7/31/2010	7/31/2010		X		X
4	TAPPAN SLUICE GATE AND OPERATOR REPLACEMENT	$ 222.70	$ 168.40	7/31/2010	12/31/2010	X			
5	GAUGING STATIONS UPGRADE	$ 43.90	$ 43.80	7/31/2010	7/31/2010				
6	INSTALLATION OF STORMWATER MANAGEMENT DEVICES	$ 27.80	$ 28.30	7/31/2010	8/31/2010	X			
7	DEBRIS BOOMS AT RESERVOIR INLETS	$ 78.00	$ 76.40	7/31/2010	6/30/2010				
8	**Total Source of Supply**	**$ 1,047.40**	**$ 1,044.70**						
B. Treatment									
9	HAWORTH PLANT UPGRADE PROJECTS PHASE 2	$ 32,000.00	$ 1,600.00	7/31/2010	**1/15/2010**		X	X	
10	SADDLE RIVER BOOSTER HYPO SYSTEM	$ 178.20	$ 179.80	7/31/2010	7/31/2010		X		X
11	PLANT IMPS (SUNSET RIDGE) - UWMA	$ 43.50	$ 43.80	7/31/2010	7/31/2010				
12	REPL CLARIFIER VALVES - LV	$ 61.30	$ 61.30	7/31/2010	7/31/2010				
13	REP. FILTER VALVE LIMITORQUE CONTROLLERS	$ 155.90	$ 158.40	7/31/2010	7/31/2010		X	X	
14	BL DISTRIBUTION SYSTEM IMPS - UWMA	$ 5.60	$ 8.70	7/31/2010	5/15/2010				
15	**Total Treatment**	**$ 32,444.50**	**$ 2,052.00**						
C. Pumping									
16	WELL PUMP REPLACEMENT (UWNJ)	$55.70	$ 10.00	7/31/2010	7/31/2010				
17	RIVERVALE PUMP UPGRADE	$ 379.90	$ 379.90	7/31/2010	7/31/2010		X		X
18	ELECTRICAL NEW STANDBY POWER /CAM-LOCKS & TRANSFE	$ 222.70	$ 257.80	7/31/2010	7/31/2010		X	X	
19	TRANS SWITCH RELOC (HAMPTON) - UWMA	$ 17.40	$ 17.40	7/31/2010	7/31/2010				
20	NEW PORT GENERATORS - UWMA	$ 33.40	$ 63.50	7/31/2010	7/31/2010				
21	REPLACE RAW WATER FLOW CONTROL VALVE (LV)	$ 55.70	$ 55.70	7/31/2010	7/31/2010				
22	REP. PUMPING EQUIPMENT -WELLS (UWNJ ONLY)	$ 44.50	$ 10.00	7/31/2010	7/31/2010				
23	REP. PUMPS UWMA	$ 11.10	$ 5.00	7/31/2010	7/31/2010				
24	REPLACE MCC MISC LOCATIONS	$ 89.10	$ 25.00	7/31/2010	7/31/2010				
25	**Total Pumping**	**$ 909.50**	**$ 824.30**						
D. Transmission & Distribution									
1	PERMANENT RAW WATER INTAKE LINE - LV	$ 350.20	$ 341.50	7/31/2010	6/30/2010				
2	PERMANANET RAW WATER INTAKE LINE (A&C) - LV	$ (179.30)	$ (145.30)	7/31/2010	6/30/2010				
3	8 " POTABLE WATER ACROSS HIGHWAY NEAR RAW WATER	$ 222.70	$ 222.70	7/31/2010	11/30/2010	X			
4	INTERCONNECTION IMPVTS	$ 15.20	$ -	7/31/2010	7/31/2010				
5	REDUNDANT MAIN FROM HAWORTH	$ 2,698.60	$ 2,932.30	7/31/2010	5/15/2010		X	X	
6	DEAD END ENCLOSURES	$ 278.40	$ 134.30	7/31/2010	5/15/2010				
7	MAIN EXTENSION TO SERVE EXISTING HOMES	$ 222.70	$ 20.00	7/31/2010	7/31/2010				
8	VALVE REP PROGRAM	$ 167.00	$ 456.00	7/31/2010	3/15/2010				
9	PRV REPL(VV)-UWMA	$ 87.00	$ -	7/31/2010					
10	REPL DIST SYSTEM - UWMA	$ 261.00	$ 50.00	7/31/2010	7/31/2010				
11	REP.MAINS - COMPANY FUNDED	$ 1,000.00	$ 728.80	7/31/2010	7/31/2010				
12	CLEAN/LINE	$ 1,200.00	$ 1,037.30	7/31/2010	7/31/2010				
13	REPLACE CLINTON AVENUE REGULATOR	$ 27.80	$ 24.70	7/31/2010	5/15/2010				
14	REPLACE MARIE MAJOR REGULATOR	$ 22.30	$ 21.90	7/31/2010	5/15/2010				
15	NEW FIRE HYDRANTS	$ 78.00	$ 10.00	7/31/2010	7/31/2010				
16	NEW SHORT MAINS & VALVES	$ 84.50	$ 88.70	7/31/2010	7/31/2010				
17	REPLACEMENT FIRE HYDRANTS	$ 753.60	$ 833.40	7/31/2010	7/31/2010				
18	REPLACEMENAT SHORT MAINS & VALVES	$ 974.40	$ 1,170.50	7/31/2010	7/31/2010				
19	**Total Transmission and Distribution**	**$ 8,264.10**	**$ 7,926.80**	7/31/2010	7/31/2010				

Schedule HJW-11: Adjustment to Post Test Year Additions (cont.)

Line No.	Description	As-Filed Amount	Revised Amount	Filed In-Service Date	Revised In-Service Date	Project Beyond Post Test Year Period	RC Qualified Post Test Year Additions	Haworth Projects	Other Qualified Projects
F. Services				7/31/2010	7/31/2010				
20	NEW DOMESTIC SERVICES (COMPANY ONLY)	$ 409.30	$ 557.50	7/31/2010	7/31/2010				
21	NEW FIRE SERVICES (COMPANY ONLY)	$ 454.70	$ 430.90	7/31/2010	7/31/2010				
22	REPLACEMENT DOMESTIC SERVICES	$ 2,403.60	$ 2,295.10	7/31/2010	7/31/2010				
23	REPLACEMENT FIRE SERVICES	$ 29.20	$ 25.50	7/31/2010	7/31/2010				
24	**Total Services**	**$ 3,296.80**	**$ 3,309.00**	7/31/2010	7/31/2010				
G. Meters				7/31/2010	7/31/2010				
25	NEW CUSTOMER METERS	$ 97.40	$ 169.54	7/31/2010	7/31/2010				
26	NEW RF UNITS	$ 103.90	$ 123.76	7/31/2010	7/31/2010				
27	RELACEMENT CUSTOMER METERS	$ 2,403.60	$ 2,235.57	7/31/2010	7/31/2010				
28	REPLACE METERS - V.VALLEY /W.MILFORD	$ 15.50	$ 10.00	7/31/2010	7/31/2010				
29	**Total Meters**	**$ 2,620.40**	**$ 2,538.87**						
K. General Plant									
1	DC IMPS (VH) - UWMA (CARRY OVER)	$ 235.90	$ 500.00	7/31/2010	8/31/2010	**X**			
2	DEVOE ROOF STRUCT IMPVTS	$ 150.00	$ 300.00	7/31/2010	12/31/2010	**X**			
3	HP OFFICE IMPVTS	$ 111.40	$ 110.60	7/31/2010	5/15/2010				
4	NEW SECURTIY INSTALLATION (INCLUDES HAWORTH FENCE	$ 300.70	$ 150.00	7/31/2010	6/30/2010		**X**	**X**	
5	BUILDING / FACIITIES IMPROVEMENST (LAMBERT)	$ 11.10	$ 18.10	7/31/2010	7/31/2010				
6	NJ FACILITIES IMPVTS (MASTER PLAN RECOMMENDATIONS)	$ 1,113.60	$ 324.00	7/31/2010	7/31/2010				
7	PLANT EXT IMPS (SUSSEX HILLS) - UWMA	$ 26.10	$ 26.10	7/31/2010	6/30/2010				
8	VERNON VALLEY - TREATMENT BOOSTER BLDG IMP	$ 21.70	$ 21.70	7/31/2010	6/30/2010				
9	REP. HAW.OFFICES & BLDG(AUDITORIUM, ATRIUM & NEW O	$ 501.10	$ 206.70	7/31/2010	12/31/2010	**X**	**X**	**X**	
10	REP. HACKEN SACK YARD OFFICES	$ 111.40	$ 58.70	7/31/2010	6/30/2010				
11	REP METER SHOP OFFICES / REPLACE TEST BENCHES - RECI	$ 334.10	$ -	7/31/2010					
12	REP. ORADELL OFFICES	$ 22.30	$ 12.60	7/31/2010	4/15/2010				
13	GARAGE IMPVTS	$ 30.00	$ 22.50	7/31/2010	4/15/2010				
14	UWNJ GIS IMPLEMENTATION	$ 55.70	$ 22.00	7/31/2010	6/30/2010				
15	CALL CTR FORCASTEING TOOLS	$ 89.10	$ 91.10	7/31/2010	7/31/2010				
16	REPLACE IT HARDWARE & SOFTWARE	$ 22.30	$ 24.70	7/31/2010	7/31/2010				
17	COMPUTER REFRESH (3 YR CYCLE)	$ 111.40	$ 99.80	7/31/2010	7/31/2010				
18	REP. MISC OFFICE EQUIPMENT	$ 11.10	$ 11.10	7/31/2010	7/31/2010				
19	REP. TOOLS / EQUIP, TRANSPORTATION	$ 22.30	$ 20.70	7/31/2010	7/31/2010				
20	NEW TOOLS AND WORK EQUIPMENT	$ 55.70	$ 173.60	7/31/2010	5/15/2010				
21	REP TOOLS AND WORK EQUIPMENT	$ 222.70	$ 91.40	7/31/2010	6/30/2010				
22	REP. LAB EQUIPMENT	$ 30.00	$ 30.00	7/31/2010	12/31/2010	**X**			
23	SECURITY IMPROVEMENTS	$ 33.40	$ 16.90	7/31/2010	12/31/2010	**X**			
24	**Total General Plant**	**$ 3,623.10**	**$ 2,332.30**						

Schedule HJW-11: Adjustment to Post Test Year Additions (Cont.)

Line No.	Description	As-Filed Amount	Revised Amount	Filed In-Service Date	Revised In-Service Date	Project Beyond Post Test Year Period	RC Qualified Post Test Year Additions	Haworth Projects	Other Qualified Projects
25	**Gross Plant in Service (Additions to Plant in Service)**	**$ 52,205.80**	**$ 20,027.97**						
	Qualified Post Test Year Period End Date	**7/31/2010**							
	Haworth Post Test Year Additions	$ 5,305.20							
	Other Qualified Post Test Year Additions	$ 886.40							
	Major in Nature & Consequence Complete By July 31, 2010	**$ 6,191.60**							
	Qualified Post Test Year Additions		**$ 6,191.60**						
	Rate Counsel Adjustment		**$ (13,836.37)**						

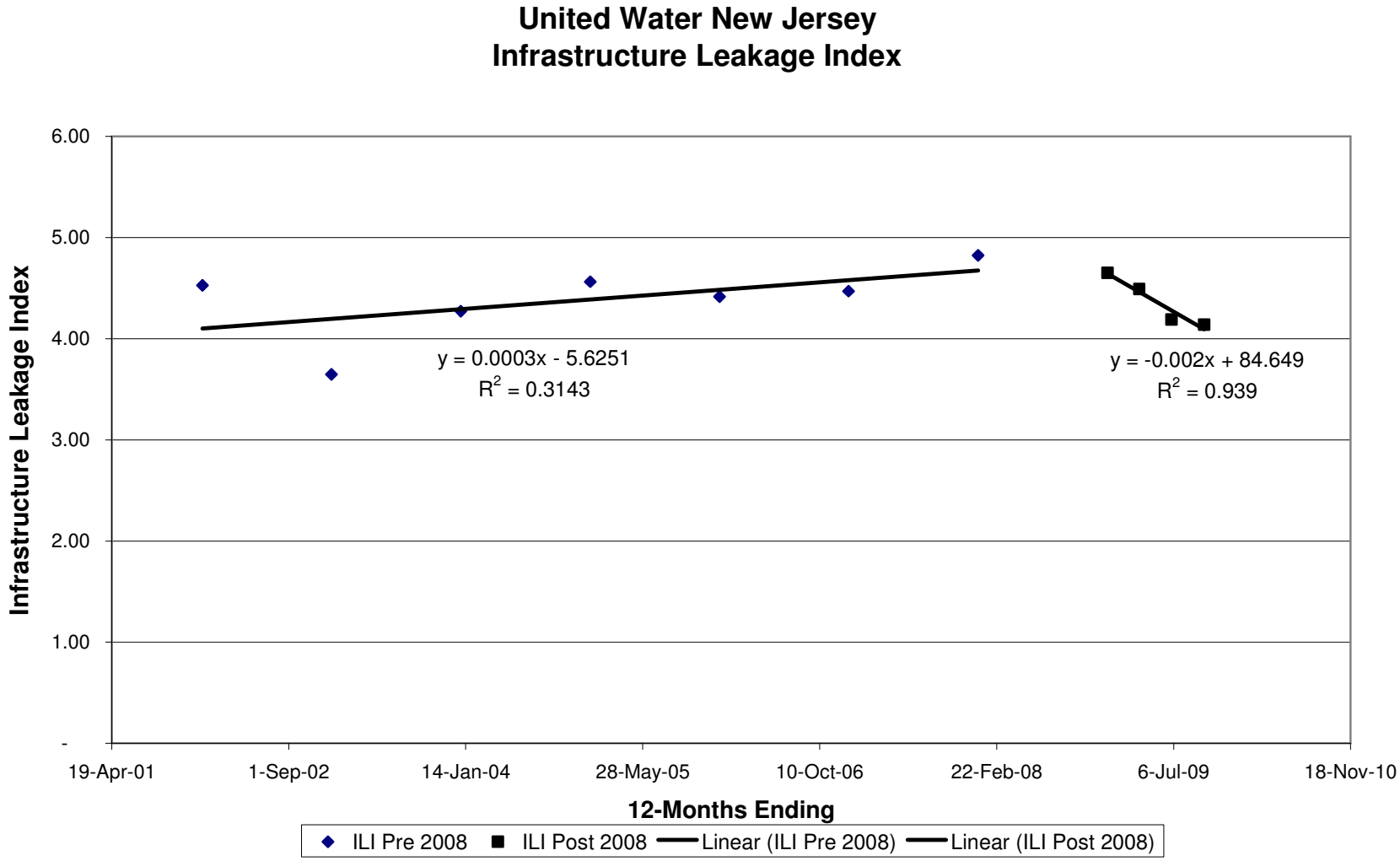
Notes:
(1) The source of the As-Filed Amounts and the Filed In-Service Dates is the Company response to RCR-A-10.
(2) The source of the Revised Amounts and Revised In-Service Date is the Company response to RCR-E-65.
(3) Projects added to RCR-A-10 by the response to RCR-E-65 have not been subject to review and have been treated as routine and recurring construction.

Schedule HJW-12: Comparative Infrastructure Leakage Index Data

Company	Data Date	Infrastructure Leakage Index	Non-Revenue %
NJAWC - Raritan System	2007	7.05	17%
NJAWC - Passaic Basin	2007	6.58	23%
Middlesex Water Co	2008	5.55	14%
United Water NJ	2006	4.98	24%
United Water NJ	2007	4.94	25%
United Water NJ	2008	4.65	25%
Middlesex Water Co	2006	4.48	13%
United Water NJ	**2009**	**4.14**	**24%**
Aqua NJ - Northern	2007	3.75	23%
Fayson Lake Water Co.	2006	3.53	32%
Aqua NJ - Northern	2009	3.28	28%
Aqua NJ - Central	2008	3.04	19%
Aqua NJ - Northern	2008	2.95	24%
Aqua NJ - Central	2007	2.33	13%
Aqua NJ - Southern	2008	2.14	12%
Aqua NJ - Central	2009	1.45	12%
Aqua NJ - Southern	2007	1.31	7%
United Water Toms River	2007	1.12	13%
Aqua NJ - Southern	2009	1.11	8%
Crestwood Village Water Co	2007	0.75	14%
Aqua NJ - Eastern	2007	0.73	7%
Aqua NJ - Eastern	2009	0.71	8%
Aqua NJ - Eastern	2008	0.40	5%

APPENDIX C – Exhibits

Exhibit HJW-1: United Water New Jersey Infrastructure Leakage Index


United Water New Jersey
Infrastructure Leakage Index
Infrastructure Leakage Index
6.00
5.00
4.00
3.00
2.00
1.00
-
y = 0.0003x - 5.6251
R2 = 0.3143
y = -0.002x + 84.649
R2 = 0.939
19-Apr-01
1-Sep-02
14-Jan-04
28-May-05
10-Oct-06
22-Feb-08
6-Jul-09
18-Nov-10
12-Months Ending
ILI Pre 2008
ILI Post 2008
Linear (ILI Pre 2008)
Linear (ILI Post 2008)