ILLINOIS COMMERCE COMMISSION

DOCKET 09-0319

IAWC EXHIBIT 13.00R1

REBUTTAL TESTIMONY OF
J. ROWE MCKINLEY

ILLINOIS-AMERICAN WATER COMPANY

OCTOBER 21, 2009

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REBUTTAL TESTIMONY
OF
J. ROWE MCKINLEY

I. WITNESS INTRODUCTION

Q1. Please state your name and business address.

A. My name is Jennings Rowe McKinley II and my business address is 11401 Lamar Avenue, Overland Park, Kansas 66211.

Q2. Are you the same J. Rowe McKinley who previously filed testimony in this proceeding?

A. Yes I am.

II. PURPOSE OF REBUTTAL TESTIMONY

Q3. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to respond to Staff witness Lazare's testimony regarding IAWC's Exhibit 13.01 (Revised), the *Report on Capacity Factors by Customer Class for the Illinois-American Water Company*, or demand study ("Demand Study").

III. RESPONSE TO STAFF WITNESS LAZARE

Q4. Have you reviewed Mr. Lazare's testimony?

A. Yes. He provides background regarding the development of the Demand Study and raises certain concerns about the study.

Q5. On pages 14-15, Mr. Lazare states the Docket 08-0463 Joint Motion's proposal to the Commission to use an indirect approach to the Demand Study did not describe in detail the methodology to be used. Do you agree?

A. No. The Demand Study's methodology ("Methodology," provided as IAWC Exhibit 13.02) set forth in detail the steps to be taken in performing a demand study, making clear that the study was an "indirect" study and describing the types of data which would be used to complete the study. As I testified previously, the parties to Docket 08-0463 (the Company, the People of the State of Illinois represented by the Illinois Attorney General, the Illinois Industrial Water Consumers, the Cities of Champaign and Urbana and the Villages of St. Joseph and Savoy, and the Staff of the Illinois Commerce Commission (together, the "Parties")), convened a workshop ("Workshop") on September 23, 2008 to discuss a proposed approach for a demand study. At the Workshop, IAWC presented the Methodology, which described in detail a multi-year indirect demand study ("Multi-Year Study"). With respect to the Multi-Year Study, the Parties indicated that they did not object to the Methodology as proposed by the Company, provided that the Commission deemed it consistent with the directives in the Docket 08-0463 Initiating Order. The Parties therefore filed a Joint Motion for Clarification ("Joint Motion") on October 3, 2008 requesting that the Commission authorize IAWC's completion of the Multi-Year Study using the proposed Methodology. The Commission granted the Joint Motion and expressly approved the use of the Methodology presented in IAWC Exhibit 13.02

Q6. Mr. Lazare suggests on page 15 that the Joint Motion clearly left to a later date discussion of a specific plan for developing these demand factors. Is that your understanding?

A. No. As discussed above, in granting the Joint Motion, the Commission approved a detailed plan. The references to "additional adjustments to recognize potential variations in weekly water use" in estimating maximum day demands and indicating that to "the extent possible, actual demand data will be reviewed and used" simply indicated that the Company would use all available, relevant data in preparing the Demand Study. Thus I disagree with Mr. Lazare's conclusion that "there is no reason to assume that the Commission has approved in advance the specific approach that IAWC has presented in this rate proceeding." While it is correct that the Commission did not sign off on every individual item of data that would be used (and which data had not even been gathered at the time), the Commission did approve the specific approach that IAWC used in its Demand Study. Moreover, Mr. Lazare acknowledges (in data response IAWC-ICC 2.01), that he is not contending that data required for the approved Methodology was inadequate or unavailable.

Q7. Mr. Lazare later suggests that the Commission consider requiring the Company to perform a demand study utilizing direct measurement. Do you agree with his suggestion?

A. No. As IAWC witness Mr. Kaiser indicates, such a study would be costly, and would present possible operational concerns. I also question whether a direct measurement study has the advantage of "accuracy" as Mr. Lazare suggests.

Q8. Please comment further on Mr. Lazare's assertion that the advantage of direct measurement is accuracy.

A. Mr. Lazare argues that the indirect calculations of maximum day and maximum hour demand factors presented by the Company employ judgments about the behavior of customer classes within the maximum day and maximum hour that may or may not conform to reality. He believes the most accurate way to test the validity of these judgments would require some form of directly measuring ratepayer demands. However, such measurements are not commonly utilized in the water industry and are prone to potential adverse conditions or shortcomings including: (1) failure of metering equipment resulting in incomplete data as experienced for the R1 residential datasets created in 2007, (2) requirements that distribution systems be isolated from other mains to gather demand data from specific areas assumed representative of customer classes, which may provide inadequate fire protection for those areas; (3) the year sampled may be a wet year, so that the system peak for purposes of developing customer class capacity factors does not occur in that year; and (4) the metering process is very expensive and can only provide information for a relatively small sample of each customer class which may or may not be representative of the entire customer class. These shortcomings are very real with regards to a direct measurement analysis, and Mr. Lazare recognizes many of these potential problems in his own testimony. The overall results of the indirect demand study analysis presented in the Demand Study are not subject to these concerns. The Demand Study results are applicable and relevant for cost of service allocations, utilize actual system peak demand data over the past six years in total and by class (on a monthly basis and on a daily basis for sampled residential accounts in the Chicago Metro

area), and are provided at a small fraction of the cost for a demand study based on direct measurements, the latter of which may not even measure the actual peak demands of the various customer classes.

Q9. Does Mr. Lazare accept the results of the Demand Study?

A. No. He raises concerns about the Demand Study that appear to be based primarily on his assertion that the Demand Study's results are entirely derived from data gathered from four Chicago Metro districts. As I discuss below, his assertion is not correct.

Q10. Is Mr. Lazare's assertion (p. 18) that IAWC used "pumpage data for four Chicago Metro areas comprising 2,161 residential accounts to derive capacity factors for all Illinois districts" a correct interpretation of the Demand Study?

A. No. The Demand Study developed capacity factors based on system and customer billing data gathered from each IAWC district, so that capacity factors for each district were based on data from that district. As the Demand Study makes clear, the residential daily variation ("RDV") factors or ratios to which Mr. Lazare refers were first developed as estimates based on a number of considerations, including judgment supported by the reasonableness of the resulting system diversity factors, the relationship of prior and measured residential capacity factors to other customer classes, how resulting capacity factors compared with capacity factors previously used to design IAWC water rates in prior rate cases; and how resulting capacity factors compared with customer class capacity factors determined in other water rate studies. As

discussed in detail in the Demand Study (IAWC Ex. 13.01 (Revised), pp. 13-17) and in discovery responses, one factor (but not the only factor) considered in determining the RDV factor was actual daily pumpage records of 2,161 residential accounts within four Chicago Metro service areas that serve residential customers either exclusively or with very little influence from other customer classes. This type of residential data is not available for other districts operated by the Company (with the exception of Terra Cotta, discussed below). As discussed below, the ability to utilize such actual residential data was considered relevant and significant, as a goal of the demand study methodology was to use actual data where reasonably possible.

Five districts within the Chicago Metro rate area were identified as isolated systems that were primarily residential and had a master meter for the area that was connected to the SCADA system, and so were selected for analysis. One of the districts (Terra Cotta) was removed from consideration when it was discovered that several days of water usage was being met by a new water tank before being refilled, resulting in several days with no indicated pumpage data. Of the four remaining districts, the percentage of July 2005 water usage attributed to residential customers was as follows: Liberty Ridge – 99.1 percent; Arrowhead – 99.6 percent; Liberty Ridge East – 100 percent; and Alpine Heights – 100 percent. These four districts served 2,161 residential customers in 2005.

Maximum day and average day pumpage for these areas was used to determine a ratio of maximum day pumpage to average day pumpage in the maximum month (the “Residential MD/ADMM”). To determine the RDV factor for

each rate area, the Residential MD/ADMM was divided by the ratio of system maximum day to average daily pumpage in the year's maximum month (see IAWC Exhibit 13.01 (Revised), Table 2, Line 10) (the "System MD/ADMM").

The four Chicago Metro districts are primarily residential, and provide data regarding the Residential MD/ADMM. The Residential MD/ADMM is considered indicative of the ratio of residential maximum day to average day water usage in the Midwest. Therefore, the Residential MD/ADMM is considered representative of residential customers in IAWC service areas for the purpose of developing the RDV factor for each respective rate area, based on the ratio of Residential MD/ADMM to System MD/ADMM. As described in IAWC Exhibit 13.01 (Revised), the maximum day and maximum hour capacity factors for each IAWC rate area (see Table 19) were developed using rate-area specific system and billing data.

The RDV factor is one component in the calculation of maximum day and maximum hour capacity factors. Where Residential MD/ADMM data is not available, judgment considerations regarding the RDV factor are supported by the reasonableness of the resulting system diversity factors. As discussed on page 13 of IAWC Exhibit 13.01 (Revised), preliminary RDV factors were developed for each rate area based on a number of considerations.

As discussed above, however, measured Residential MD/ADMM data was available for the four Chicago Metro districts. In reviewing this data, it was determined that use of measured Residential MD/ADMM data in calculating an RDV factor for each rate area (based on the rate area's System MD/ADMM)

corroborated the preliminary RDV calculations. The calculated RDV factor for each rate area, with the exception of Chicago Metro, is consistent with the range of diversity factor ratios (1.1 to 1.4) identified as acceptable in AWWA Manual M1. Excluding the Chicago Metro rate area, which is primarily residential, the diversity ratios for IAWC's rate areas range from a low 1.20 in Lincoln to a high of 1.26 in SPSPSB (IAWC Ex. 13.01 (Revised), Table 17); the midpoint of the range considered acceptable to AWWA is 1.25. As explained in IAWC Exhibit 13.01 (Revised), page 13, the Chicago Metro area RDV factor is lower than that of other areas due to its primarily residential customer makeup. Because use of the calculated Residential MD/ADMM for the four Chicago Metro districts corroborated the preliminary RDV factors, it was determined that basing the proposed capacity factors on calculated Residential MD/ADMM was appropriate.

Q11. What is your response to Mr. Lazare's concern (p. 22) that the Company has failed to demonstrate that the pattern of demands for these customers accurately reflects the demands of IAWC customers on a statewide basis?

A. The Residential MD/ADMM relationship established by actual measurement of a large sample of residential customers in the Chicago Metro rate area is representative of such patterns on a statewide basis due to the resulting reasonableness of the system diversity factors determined for each rate area. In addition, this is the type of "actual" data that, in accordance with the Methodology, was to be used in the Demand Study to the extent it was available. Direct measurement data available from the demand study conducted in 2007 in Docket 07-0507 ("Docket 07-0507 Study") also supports the reasonableness of

the Residential MD/ADMM results determined from daily usage data of Chicago Metro residential customers. As indicated in the table below, actual daily measurements during June 2007 in the Docket 07-0507 Study identified the maximum day usage for two of the three residential customer subclasses in the Interurban service area. The 1.578 Residential MD/ADMM value determined for Chicago Metro residential customers falls between the MD/ADMM values determined for the low (R3) and medium (R2) residential customers in the Interurban service area and is very close to the weighted coincidental average of 1.533 for the two Interurban residential subclasses. The maximum day value for the R1 or high density residential customers occurred in July 2007 but daily data for this month and June 2007 was not complete (presumably due to problems with metering equipment). Therefore, R1 data could not be included in the above table. In comparing the Interurban data from the Docket 07-0507 Study with the Chicago Metro data, it should be noted that on a pure usage basis, the average daily volume for the Chicago Metro customers is over six times that of the data reported for the two Interurban residential subclasses which implies, assuming similar average usage per customer, that the sample size for the Chicago Metro customers is also over six times larger than the sample for the Interurban

Docket 07-0507 Demand Study Results for Medium and Low Density Residential Customers

	R2	R3	Coincidental R2 & R3
	cf/day	cf/day	cf/day
MD	9,577	22,754	30,989
ADMM	6,530	13,681	20,211
MD/ADMM	1.467	1.663	1.533
AD	5,454	6,542	11,996
MD/AD	1.76	3.48	2.58

cf/day - cubic feet/day
Source: IAWC Exhibit 11.01, Docket 07-0507

customers. Therefore, considering the relatively large sample size of the Chicago Metro data, and without knowing the percentage distribution of the three residential subclasses in the Interurban service area, greater weight should be given to the Residential MD/ADMM determined for the Chicago Metro area. For these reasons, the Chicago Metro data can be considered representative of residential usage in IAWC's service areas.

Q12. Do you agree with Mr. Lazare's assertion (p.22) that Chicago Metro is more weather sensitive than other IAWC service areas?

A. No. Mr. Lazare's asserted weather sensitivity cannot be demonstrated by simply averaging values in the Chicago Metro area and comparing them to other rate areas. The data used in Mr. Lazare's Schedule 1 is derived from Table 7 of the Demand Study, which shows the ratio of the average day usage during the maximum month for each customer class divided by the average annual usage of each customer class. This ratio represents the minimum possible ratio of maximum day to average day demand of each customer class without regard to local system demands. These residential demands can be influenced by weather conditions as Mr. Lazare asserts, but they can also be influenced by general economic conditions in the service area, relative efficiency on fixtures and toilets, availability of automatic irrigation systems, yard size, type of grass, relative mixture of single family versus multifamily units, or customer preferences and priorities for yard maintenance. The actual variance of average day usage during the maximum month to average annual usage for Chicago Metro, as shown in Table 7, ranges from 117% to 161%, with two of the six districts in the

Chicago Metro rate area being within the 110% to 135% range Mr. Lazare reports for the other districts. Thus, there is no basis to conclude that Chicago Metro is more "weather sensitive" than other districts.

Q13. Is Mr. Lazare correct is suggesting (p. 23) that the use of Chicago Metro data led to variations in residential usage over the maximum month that exceeded variation in system pumpage for the District as a whole?

A. No. The variations Mr. Lazare observed are based on inclusion of system delivery data for periods of more than 30 days in the determination of the average daily usage in the maximum month ("ADMM") in certain districts. The Chicago Metro data discussed above does not impact the MD/ADMM ratio of 1.014 indicated for the Pekin system in Tables 2 and 10 of IAWC Exhibit 13.01 (Revised). However, Mr. Lazare's observations did lead to the discovery that the 10.206 mgd ADMM value for the Pekin system, as shown in Table 2 of IAWC Exhibit 13.01 (Revised), was overstated. This value was derived from monthly system delivery information, which was initially assumed to be based on calendar months, but which was recently determined to actually represent more than 30 or 31 calendar days for the indicated maximum month. Therefore, adjustments were made to revise the maximum month system data for each district, except those in the Chicago Metro rate area, Interurban District and Pontiac District, for which different data sources (not affected by billing periods length of more than 30 days) were used. The different data sources were utilized for these districts because it was necessary to obtain usage detail for each district within the Chicago Metro rate area and to recognize that Interurban is served by two

treatment plants. The Pontiac District used different data because it was the only district that peaked in 2008 and the prior system delivery data was not available for 2008 when all peak data was reviewed and updated as required to reflect the availability of the 2008 data. Because the differences between residential usage over the maximum month and variations in system pumpage that Mr. Lazare referred to were not the result of application of the Chicago Metro data, Mr. Lazare's concern in this regard about the use of the Chicago Metro data are not warranted.

Q14. Have you incorporated the system operating data corrections described above, related to the system ADMM and the impact on the ratio of system MD/ADMM, into the Demand Study?

A. Yes. The corrected data results in changes to the ADMM in all districts except Interurban, Pontiac, and the districts within the Chicago Metro rate area. This results in changes to certain of the RDV values shown in Table 8 of the Demand Study. It also results in minor changes to the customer class capacity factors for the following districts: Alton, Cairo, Peoria, Streator, South Beloit, Champaign, Lincoln, Pekin, and Sterling. The changes are reflected in a revised Demand Study ("Revised Study") provided as IAWC Exhibit 13.01R1, along with certain other minor revisions. These capacity factor changes are not considered material and, as discussed by Mr. Herbert, do not require revisions to the Company's cost of service study. Furthermore, the use of the corrected data and the resulting ratios of MD/ADMM essentially eliminates Mr. Lazare's previous concern related to the very low system MD/ADMM, as compared to the

residential MD/ADMM, originally shown for Pekin and his resulting concerns about low levels of usage by nonresidential classes during the system maximum month.

Q15. Is Mr. Lazare correct in asserting that IAWC's data for Pekin shows that at the time of the residential peak, other classes are using significantly less water than average, and this could occur only on a weekend day?

A. Mr. Lazare is correct in his understanding that the prior indicated system pumpage for the ADMM in Pekin is not consistent with the usage patterns of the various customer classes. As discussed above, the prior data was based on pumpage periods of more than 30 days, and the Revised Study corrects this. In addition, Mr. Lazare's analysis assumes that the customer class peak demands are coincidental, but in fact they are non-coincidental and occur in different months. Therefore, he is overstating the demands of non-residential customers at the time when the residential customers are peaking. Mr. Lazare's illustration for Pekin assumes that the maximum month data shown in Table 6 is for the same month for all classes, but in fact, the customer classes' maximum month of water usage occurs in different months. For Pekin, residential customers had their monthly water usage peak in June, commercial users in May, industrial customers in March and other public authority customers in August. The system's maximum month occurred in June, so only the residential customer class had a peak month coincident with the system's peak month. However, as discussed above, the Pekin system's ADMM was revised to a lower level of 8.753 mgd, resulting in a revised MD/ADMM of 1.183 (Table 2 of IAWC Exhibit

13.01R1) instead of 1.014. This revised value decreases the RDV to 1.35 as shown in Table 8 of IAWC Exhibit 13.01R1. With these revisions, residential maximum day usage, per Mr. Lazare's analysis, would be 4,110 (1.35 x 3,044.2) Mg/day resulting in 1,066 Mg/day of residential usage above the ADMM. Maximum day usage for the system remains at 10,353 Mg/day per Table 2, which is 1,600 (10,353 – 8,753) Mg/day greater than the district's ADMM and is greater than the peak residential usage. These results are consistent with Pekin's system characteristics, as almost half of Pekin's total water usage is attributable to industrial customers that typically have the lowest customer class demand factors.

Q16. Is Mr. Lazare's concern about Pekin peak residential usage addressed by the revisions for the Pekin system's maximum month data that were discussed previously?

A. Yes. Because, as shown in the Revised Report, the system peak usage is greater than the residential peak, his concern that nonresidential usage would have to decline at the time of the residential peak is eliminated.

Q17. Is it nevertheless generally correct that, under IAWC's approach, the lower the daily system variation, the higher the assumed residential daily variation?

A. Yes. There is typically more system-wide customer class usage diversity within those rate areas with lower system MD/ADMM ratios, which is essentially "masking" or "diluting" the true contribution of the residential class's contribution to the system maximum day demand.

Q18. Is Mr. Lazare correct in asserting that measured data show that commercial demand varies more than residential demand, and this is inconsistent with the IAWC study assumptions?

A. No, the IAWC study assumptions and analyses, the results of which are presented in Tables 9 and 13 of IAWC Exhibit 13.01R1, apply to class differences in maximum day and hour demands relative to annual average day demands among the customer classes. Even though Demand Study data for Sterling shows that commercial customers have a higher ratio of ADMM to annual average day usage than indicated for residential customers, the variation of the daily demands within the maximum month are expected to be lower for commercial and industrial customers than for residential customers because their water usage is less influenced by weather conditions than residential customers. This conclusion is supported by the overall resulting capacity factors by class, the resulting diversity ratios, which are in the range of reasonableness, and the class capacity factors previously utilized by IAWC in its rate filings which have been accepted by the Illinois Commerce Commission in previous rate case dockets. Thus, it is my position that for IAWC's service districts, it is appropriate to utilize commercial class maximum day variation factors that are lower than the residential variation factors.

Q19. Is Mr. Lazare correct in suggesting (p. 29) that the AWWA Manual and the West Virginia data contradict the assumption that residential customers have a higher daily variation than other classes?

A. No, the discussion in the AWWA Manual is largely related to a hypothetical example included in the Manual that does not have the benefit of actual demand data, such as that used in the Revised Study from the Chicago Metro districts. As a case in point, the AWWA Manual M1 example's minimum maximum day capacity factor estimate of 179% for residential customers is significantly higher than the actual recorded results presented in the Revised Study. The Revised Study, by contrast, reflects the actual characteristics of IAWC's service areas. If the AWWA example had used a minimum maximum day value more consistent with the results of the Revised Study, say 135%, the weekly usage adjustment factor (or residential daily variation adjustment) required to get the same residential maximum day capacity factor of 250% with the same 1.34 system MD/ADMM ratio would have been 1.38 (2.50 / 1.35 / 1.34). This adjustment is very similar to those presented in Table 8 of the Revised Study.

It is difficult to comment on the applicability of the West Virginia data since I am not familiar with the customers that compose the various customer classes nor the study related to determining the indicated demand factors. However, if residential customers have small yards or do not irrigate their yards as much as residential customers in other regions, while the commercial or public customer class includes such high demand customers as golf courses or high schools and colleges with irrigated football or other playing surfaces, it is possible for such customers to exhibit higher demands than the residential customer class. In summary, I am not fully aware of the circumstances related to the variations in class demands for the West Virginia situation, but it is clear that the class

characteristics there are quite different from those experienced in the Demand Study performed for the Company's Illinois systems. However, as indicated by the capacity factors used by the Company in prior rate cases, the capacity factors assigned to the residential customers have exceeded those assigned to other customer classes.

Q20. Is Mr. Lazare's alternate demand ratio methodology as described at pages 32-33 reasonable?

A. No. As discussed above, Mr. Lazare's conclusion that an alternative method is needed is largely based on his observations of the Pekin system, which were found to be based on incorrect data that was corrected in the Revised Study. Thus, I do not believe there is a need for an alternative approach. Mr. Lazare also makes various assumptions that are not clearly supported by the data; he develops relatively low capacity factors that are inconsistent with capacity factors used in prior studies, and which, if adopted, would result in significant shifts of costs to the residential customers; he does not support his analyses with system data to show that the customer class demands are consistent with the system demands actually experienced; and the overall system diversity factors resulting from the application of his proposed demand factors to the test year 2010 annual usage by customer class for each of the rate areas provides system diversity factors for each rate area below 1.10, which is well below the range of 1.10-1.40 recommended by the AWWA Manual M1.

Q21. Please explain these concerns with Mr. Lazare's methodology.

A. One of his assumptions for using a weighting of 2/7 for the demand factors developed in the Demand Study and 5/7 based upon his alternative demand factors by class is based on his single analysis of the Pekin system that was discovered to be based on incorrect system average day usage for the maximum month, as discussed above. Thus, his basic premise of the need for a "hybrid allocator" methodology is flawed and unnecessary. He also indicates that no one knows what day of the week residential customers will exhibit peak usage, but then he uses the Chicago Metro data to assign a 2/7ths chance of the residential peak occurring within the weekend simply because he believed that this data indicated a coincidental day demand that occurred on a Saturday. However, a review of the supporting detail shows that the maximum day demand of only one of the four sampled Chicago Metro areas occurred on a Saturday. The maximum day demand for two of the sampled districts actually occurred on a Wednesday in the maximum month of July 2005, with the remaining district showing its maximum day demand occurring on a Monday in June 2005. He then further assumes that all non-residential classes use more water on the week days than on the weekend because "businesses and governmental agencies would be open" on those days, which ignores the fact that some business such as restaurants, retail stores, and entertainment related business are also open during the weekend and are just as likely to use more water on a daily basis during this time than the average daily water usage during the five day week period.

Concerning Mr. Lazare's calculation procedure, I find that he has made several errors and misuses the information from the Demand Study. I will use his first page of Schedule 3 developed for the Champaign rate area as an illustrative example for my comments, recognizing that similar comments could be made for the schedules developed for all of the other rate areas. First, the maximum day variation values taken from Table 9 of the Demand Study that he shows on Line 1 of Schedule 3 are meant to relate residential MD/AD ratios to other customer classes. They are not intended to be used to "factor down" actual customer class maximum month data. Table 9 factors are used in the Demand Study to adjust the indicated RDV for each rate area to be representative of the relative daily variations of each respective customer class based on prior customer class relationships identified in Table 7. Using the Table 9 factors without the corresponding RDV from Table 8 artificially reduces the actual experienced demands of each customer class. Therefore, Line 1 should only be used in conjunction with an RDV or, in this example, they should be multiplied by the 1.4 RDV indicated for Champaign in Table 8 of the Demand Study.

Second, the average day within each customer classes' maximum month data shown on Line 2 of Schedule 3 were <u>not</u> experienced in the same month as the maximum month for the system. This data, if divided by the average annual usage for each customer class, should represent the minimum maximum day usage of each customer class. Instead of factoring down this data by the use of the percentages derived in Table 9, it would have been more appropriate for Mr. Lazare to have actually "factored up" the average daily usage for each maximum

month to be more representative of each classes' non-coincidental maximum day demand. This could be done by applying the RDV as previously indicated, and multiplying by the system daily variation of 1.132 shown on Line 5 and, for this example, adjusting for the residential and commercial customers being billed on a bimonthly basis in the Champaign rate area. Had this been done, the sum of the estimated non-coincidental demands should have exceeded the maximum day demand experienced by the system as a whole. Instead, the total sum of factored down non-coincidental maximum day demands shown on Line 6 of Schedule 3 is only 79% (26,423 / 33,320) of the system's 33,320 Mg/day coincidental maximum day demand. Therefore, because there is not a relationship to actual system maximum day demand, the indicated system maximum day value reported on Line 6 of his Schedule 3 is not realistic.

Third, the hybrid extra capacity values shown on Line 14 for Other Water Utilities and Large Customers are incorrect because Mr. Lazare transposed the maximum day extra capacity factors from the Demand Study. The same transposition error occurs on Line 15 for average daily consumption.

Q22. What is the effect on Mr. Lazare's results of addressing the concerns above?

A. I do not agree with Mr. Lazare's alternative hybrid approach nor the need for the proposed use of his 5/7ths and 2/7ths allocation factors. This approach does not follow the Methodology that was agreed to be used (IAWC Exhibit 13.02). Accordingly, while we offer the following comments to modify Mr. Lazare's approach to be more consistent with the intended use of customer class variation

factors, tie-in better with actual system data, and produce capacity factors more consistent with those produced in the Demand Study, we do not endorse it. To illustrate the impact of suggested modifications to Mr. Lazare's alternative analysis for Champaign, a modified version of his Schedule 3 has been prepared and is presented herein as Schedule 1. Two additional lines are added to his analysis and subscripted with the letter "a" for identification purposes. Line 3 of the modified analysis recognizes the RDV (Line 1a) and the residential and commercial billing adjustments (Line 2a) as previously discussed. These two adjustments result in factoring up the average day within the maximum month usage or ADMM (Line 2) to more properly approach an estimate for non-coincidental maximum day demand by customer class. The next modification applies the system daily variation (Line 5) to the weighted share of maximum day demand shown on Line 3, which includes adjustments to actual customer class ADMM shown on Line 2, instead of applying it to only the unadjusted ADMM (Line 2) as proposed by Mr. Lazare. This revision produces a more reasonable non-coincidental maximum day demand for the system, since the resulting increased value of 34.58 mgd shown on Line 6 is now slightly greater than the actual coincidental system demand of 33.32 mgd and results in a more realistic excess of system maximum day demand over ADMM demand (Line 6 – Line 2) as shown on Line 7. The resulting revised capacity factors by customer class shown on Line 11 of Schedule 1 are much closer to those determined in the Demand Study. Therefore, if Mr. Lazare had properly applied the adjustment factors and made a few minor changes in his allocation procedure, he could have

produced higher customer class capacity factors that are more consistent with the system's maximum day demand.

Q23. Does Mr. Lazare's alternative approach produce diversity factors that are within the range of reasonableness set forth in AWWA Manual M1?

A. No. In order to test the alternative customer class capacity factors developed under Mr. Lazare's hybrid approach, the proposed hybrid capacity factors were applied to projected test year 2010 average day demands to estimate non-coincidental maximum day demands. The sum of these demands divided by the corresponding coincidental system demand produced system maximum day diversity factors that were generally well below the lower limit of the range considered reasonable by the AWWA Manual M1 as indicated in the adjoining table. Therefore, the alternative hybrid customer class capacity factors proposed by Mr. Lazare are not reasonable according to general industry standards. Tables used to develop the maximum day system diversity factors are attached as Schedule 2.

Indicated System Maximum Day Diversity Factors Using Alternative Hybrid Methodology

Rate Area	Diversity Factor
Champaign	1.01
Chicago Metro	1.07
Lincoln	1.07
Pekin	0.99
Zone 1 (SPSPSB & Sterling)	1.10
AWWA Allowable Range	1.10 - 1.40

Q24. Does this conclude this portion of your rebuttal testimony?

A. Yes, it does. I will file additional rebuttal to interveners in this case in accordance with the modified case schedule.

CHI-1722454

Modified Development of Maximum Day Capacity Factors for Champaign

Line No.	Description	Residential	Commercial	Industrial	Other Public Authority	Other Water Utilities	Large Customers	Total
1	Max Day Variations (Table 9)	100%	85%	80%	80%	80%	80%	
1a	Residential Daily Variation (Table 8)	1.4	1.4	1.4	1.4	1.4	1.4	
2	Ave. Max Month Use (Table 6)	10,975	4,352	1,916	759	912	4,428	23,342
2a	Bimonthly Billing Adjustment (Table 10)	1.05	1.05	1.00	1.00	1.00	1.00	
3	Weighted Share (Line 1 x 1a x 2 x 2a)	16,133	5,438	2,146	850	1,022	4,959	30,548
4	Share of Total (Line 3)	0.528	0.178	0.070	0.028	0.033	0.162	1.000
5	System Daily Variation (Table 2)							1.132
6	System Max Day (Line 3 x Line 5)	(Actual Coincidental System Max Day Demand is 33,320 Mg/day per Table 2)						34,580
7	Excess of System Max Day over Average Day Max Month (Line 6-Line 2)							11,238
8	Share of Excess (Line 4 x 7)	5,935	2,001	789	313	376	1,824	11,238
9	Max Day (Line 2 + 8)	16,910	6,353	2,705	1,071	1,288	6,252	34,580
10	Average Annual Use (Table 6)	8,434	3,246	1,797	581	626	3,374	18,058
11	Max Day Ratio (Line 9 / Line 10)	200%	196%	151%	184%	206%	185%	

Sources: Demand Study (IAWC Ex. 13.01(Revised))

Champaign
Test Year 2010 Units of Service with Hybrid Customer Class Demand Factors

Line No	Customer Class	(1) Water Usage Annual Ccf	(2) Water Usage Average Day Ccf/day (2) / 365	(3) Maximum Day Capacity Factor	(4) Maximum Day Total Capacity Ccf/day (2) x (3)	(5) Maximum Day Extra Capacity Ccf/day (4) - (2)
				Schedule 3		
1	Residential	4,270,658	11,700	168%	19,656	7,956
2	Commercial	1,595,751	4,372	162%	7,083	2,711
3	Industrial	730,576	2,002	124%	2,482	480
4	Large Industrial	0	0		0	0
5	Other Public Authority	378,425	1,037	151%	1,566	529
6	Large Other Pub. Auth.	1,691,276	4,634	152%	7,044	2,410
7	Other Water Utilities	415,430	1,138	169%	1,923	785
8	Total	9,082,116	24,883		39,754	14,871
9	Total noncoincidental demand				39,754	
10	Total coincidental demand [1.586 x 24,883 Ccf/day]				39,474	
11	Ratio non to coincidental demand (Diversity Factor)				1.01	
12	Diversity Factor Typical Range for Utilities				1.10 - 1.40	

Notes:

1. Capacity factor for Large Other Public Authorities was shown as 158% on Schedule 3 before correction of first transposition error.
2. Capacity factor for Other Water Utilities was shown as 163% on Schedule 3 before correction of first transposition error.
3. Average daily usage shown on Lines 6 and 7 were erroneously transposed on Mr. Lazare's Schedule 3.

Chicago Metro
Test Year 2010 Units of Service with Hybrid Customer Class Demand Factors

		(1)	(2)	(3)	(4)	(5)
		Water Usage		Maximum Day		
Line No	Customer Class	Annual	Average Day	Capacity Factor	Total Capacity	Extra Capacity
		Ccf	Ccf/day (2) / 365		Ccf/day (2) x (3)	Ccf/day (4) - (2)
				Schedule 3		
1	Residential	4,782,331	13,102	225%	29,480	16,378
2	Commercial	1,203,829	3,298	232%	7,651	4,353
3	Industrial	57,911	159	154%	245	86
4	Large Industrial	0	0		0	0
5	Other Public Authority	30,394	83	265%	220	137
6	Large Other Pub. Auth.	0	0		0	0
7	Other Water Utilities	56,935	156	199%	310	154
8	Total	6,131,400	16,798		37,906	21,108
9	Total noncoincidental demand				37,906	
10	Total coincidental demand [2.113 x 16,798 Ccf/day]				35,494	
11	Ratio non to coincidental demand (Diversity Factor)				1.07	
12	Diversity Factor Typical Range for Utilities				1.10 - 1.40	

Notes:

1 Water usage above reflects projected 2010 test year usage for the Chicago Metro rate area instead of the Champaign water usage presented in Mr. Lazare's Schedule 3 (Page 2 of 5).

Lincoln
Test Year 2010 Units of Service with Hybrid Customer Class Demand Factors

		(1)	(2)	(3)	(4)	(5)
		Water Usage		Maximum Day		
Line No	Customer Class	Annual	Average Day	Capacity Factor	Total Capacity	Extra Capacity
		Ccf	Ccf/day (2) / 365		Ccf/day (2) x (3)	Ccf/day (4) - (2)
				Schedule 3		
1	Residential	363,461	996	152%	1,514	518
2	Commercial	236,735	649	140%	909	260
3	Industrial	132,566	363	131%	476	113
4	Large Industrial	0	0		0	0
5	Other Public Authority	332,847	912	130%	1,186	274
6	Large Other Pub. Auth.	0	0		0	0
7	Other Water Utilities	0	0		0	0
8	Total	1,065,609	2,920		4,084	1,164
9	Total noncoincidental demand				4,084	
10	Total coincidental demand [1.312 x 2,920 Ccf/day]				3,832	
11	Ratio non to coincidental demand (Diversity Factor)				1.07	
12	Diversity Factor Typical Range for Utilities				1.10 - 1.40	

Pekin
Test Year 2010 Units of Service with Hybrid Customer Class Demand Factors

Line No	Customer Class	(1) Water Usage Annual Ccf	(2) Water Usage Average Day Ccf/day (2) / 365	(3) Maximum Day Capacity Factor	(4) Maximum Day Total Capacity Ccf/day (2) x (3)	(5) Maximum Day Extra Capacity Ccf/day (4) - (2)
				Schedule 3		
1	Residential	1,047,089	2,869	161%	4,619	1,750
2	Commercial	308,732	846	149%	1,261	415
3	Industrial	882,946	2,419	123%	2,975	556
4	Large Industrial	0	0		0	0
5	Other Public Authority	224,941	616	161%	992	376
6	Large Other Pub. Auth.	0	0		0	0
7	Other Water Utilities	0	0		0	0
8	Total	2,463,708	6,750		9,847	3,097
9	Total noncoincidental demand				9,847	
10	Total coincidental demand [1.467 x 6,750 Ccf/day]				9,905	
11	Ratio non to coincidental demand (Diversity Factor)				0.99	
12	Diversity Factor Typical Range for Utilities				1.10 - 1.40	

Zone 1 (SPSPSB & Sterling)
Test Year 2010 Units of Service with Hybrid Customer Class Demand Factors

		(1)	(2)	(3)	(4)	(5)
		Water Usage		Maximum Day		
Line No	Customer Class	Annual	Average Day	Capacity Factor	Total Capacity	Extra Capacity
		Ccf	Ccf/day (2) / 365		Ccf/day (2) x (3)	Ccf/day (4) - (2)
				Schedule 3		
1	Residential	11,653,050	31,926	166%	52,997	21,071
2	Commercial	5,447,762	14,925	156%	23,283	8,358
3	Industrial	3,426,045	9,386	147%	13,797	4,411
4	Large Industrial	1,473,379	4,037	147%	5,934	1,897
5	Other Public Authority	1,619,956	4,438	168%	7,456	3,018
6	Large Other Water Utilities	3,553,640	9,736	149%	14,507	4,771
7	Other Water Utilities	3,762,270	10,308	183%	18,864	8,556
8	Total	30,936,102	84,756		136,838	52,082
9	Total noncoincidental demand				136,838	
10	Total coincidental demand [1.466 x 84,756 Ccf/day]				124,252	
11	Ratio non to coincidental demand (Diversity Factor)				1.10	
12	Diversity Factor Typical Range for Utilities				1.10 - 1.40	