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Case No.: WR-2000-281
SR-2000-282
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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2000-281

CASE NO. SR-2000-282

REBUTTAL TESTIMONY

OF

JOHN S. YOUNG, JR.

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

JEFFERSON CITY, MISSOURI

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Missouri-American Water Company's tariff sheets designed to implement general rate increases for water and sewer service provided to customers in the Missouri service area of the Company.	)))))	Case No. WR-2000-281

County of Camden)
) ss
State of New Jersey)

AFFIDAVIT OF JOHN S. YOUNG, JR.

John S. Young, Jr., being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony entitled "Rebuttal Testimony of John S. Young, Jr."; that said testimony was prepared by him and/or under his direction and supervision; that if inquiries were made as to the facts in said testimony and schedules, he would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of his knowledge, information, and belief.

John S. Young, Jr.

Subscribed and sworn to before me this 2nd day of May, 2000.

Notary Public

My Commission expires:
Sept. 25, 2000

REBUTTAL TESTIMONY
JOHN S. YOUNG, JR.

MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR-2000-281
CASE NO. SR-2000-281

TABLE OF CONTENTS

INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John S. Young, Jr., 1025 Laurel Oak Road, Voorhees, New Jersey, 08043.

Q. HAVE YOU TESTIFIED PREVIOUSLY IN THIS CASE?

A. Yes, I provided direct testimony to the Missouri Public Service Commission (Commission) on behalf of Missouri-American Water Company (MAWC or Company) dated November 19, 1999.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY ?

A. This rebuttal testimony has been prepared to address issues presented in the April 3, 2000 direct testimonies of Ted L. Biddy on behalf of the Office of the Public Counsel (OPC) and Charles D. Morris on behalf of Ag Processing, Inc.,Wire Rope Corporation of America Inc., and Friskies Petcare, A Division of Nestle USA (the St. Joseph Industrials).

Q. IN THEIR DETERMINATIONS OF PRUDENCY, MR. BIDDY AND DR. MORRIS HAVE FOCUSED THEIR ATTENTION ON EVALUATIONS PERFORMED IN 1991. CAN YOU PROVIDE A TIMELINE OF MAWC'S ACTIVITY FROM IDENTIFICATION OF THE NEED FOR MAJOR IMPROVEMENTS AT THE EXISTING SURFACE WATER TREATMENT PLANT THROUGH PLACING THE GROUND WATER PROJECT INTO SERVICE ?

A. Yes, significant time, effort, resources and analysis were involved with selection of the implemented project. The timeline presented below shows critical planning, design, and construction activities from December, 1990 through April, 2000.

DATE	ACTION or ACTIVITY
December, 1990	Board approval for initiating study and design of filters, laboratory, and control room at the existing surface water treatment plant
January, 1991 through August, 1991	Identification and review of filter construction alternatives
September, 1991	MAWC Filter Report presented to PSC and MDNR
September, 1991 through May, 1991	Refinement of project scope with development of Design Concept
January, 1992	Initiated Comprehensive Planning Study for St. Joseph and Joplin
January, 1992	Conditional approval of Superpulsator clarifier pilot study by MDNR
May, 1992	Competitive proposals requested from consultants based on Design Concept
June, 1992	Receipt of design proposals for plant improvements
June, 1992 through August, 1992	Pilot testing of Superpulsator clarifier
September, 1992	Gannett Fleming issued report of clarification options
February, 1993	Awarded design of existing plant improvements to Gannett Fleming
May, 1993	Preliminary construction cost estimate received from Gannett Fleming
June, 1993	Revised project cost estimate of $44,100,000 developed
July, 1993	Treatment plant was flooded and water service interrupted

August, 1993	Stopped further detailed design of surface water treatment plant improvements at existing site
September, 1993 through January, 1994	Constructed interim flood improvements at existing site
December, 1993	Board approval for investigation of additional project alternatives
February, 1994	Initiation of hydrogeological investigation
April, 1994	Review treatment plant design criteria for both surface water and ground water facilities with MDNR
December, 1994	Issued Comprehensive Planning Study recommending ground water for St. Joseph
January, 1995	Initiated Feasibility Analysis
December, 1995	Initiated design of ground water treatment plant
August, 1996	Certificate case filed with PSC
December, 1997	Board approval of funding for construction
February, 1998	Awarded treatment plant construction contract (4/98 - notice to proceed)
April, 2000	Facilities placed into service

Q. CAN YOU GIVE A PRELIMINARY SUMMARY OF WHAT YOU WILL ATTEMPT TO DEMONSTRATE TO THE COMMISSION IN PRESENTING THIS REBUTTAL TESTIMONY?

A. The Office of the Public Counsel and the Intervenor St. Joseph Industrials are critical of the Company's judgment, and even the Company's motives, for building the new groundwater treatment plant instead of making modifications and improvements to the existing surface water plant. Their approach is generally to contend that the latter option would have been less expensive, that the Company either did not know this or chose to ignore it, and that therefore the

Company should be punished by exclusion of a significant part of its investment from its rate base.

The allegations are quite simply wrong and I will refute them in each aspect. They are based on the faulty use of data, disregard for facts and dangerously simplistic conclusions. But as troubling as this is, even more troubling is the approach these parties have taken in an attempt to seriously damage the Company. It is nothing less than unfair. This project was presented to the Commission and exposed to public debate and criticism before it was undertaken. What the St. Joseph Industrials and OPC seek now is to gain the benefits of the new and considerably more reliable plant, while attempting to avoid the responsibility to support it.

The evidence will show that necessary rehabilitation, expansion and floodproofing of the existing plant would have been at least as costly as the new plant. This is not one of those situations where the Company must defend its decision on the basis of the limited information it had at the time; the Company's decision stands the test of time, not the least of which is the relationship of actual to the estimated construction costs. In fact, the data indicates that rehabilitation, restoration, expansion and floodproofing at the existing site, given its costs and resulting uncertainties, could itself have been characterized as being imprudent in the face of the available option to build the new plant.

The Company was methodically committed to making the best possible decisions and the process was open to the Commission, the public and these Intervenors.

Q. HAS THE TECHNICAL MERIT OF ABANDONING THE EXISTING SURFACE WATER TREATMENT PLANT AND CONSTRUCTING THE GROUND WATER TREATMENT PLANT ALTERNATIVE BEEN PREVIOUSLY PRESENTED BEFORE THE COMMISSION ?

A. Yes, virtually all of the elements of the prudency issue were presented and reviewed in detail in Case No. WA-97-46 and Case No. WF-97-241 (the Certificate Case). There was extensive review of the Company's plans to pursue the ground water alternative and there was opportunity for all those who might have objections to the proposed new plant to make known their criticisms at that time.

In addition to testimony from the Company and the Commission Staff, testimony was presented by Gary M. Lee on behalf of OPC in that case. Mr. Lee is a professional engineer in the State of Missouri and president of Archer Engineers. In his testimony on behalf of OPC, Mr. Lee agreed with the Company's analysis of several important issues. Mr. Lee's rebuttal testimony is attached as Schedule JSY-1. I will compare Mr. Lee's conclusions to those of Mr. Biddy and Dr. Morris throughout my testimony.

REVIEW OF THE 1991 FILTER REPORT

Q. MR. BIDDY AND DR. MORRIS REFERENCE THE 1991 MAWC REPORT IN THEIR DIRECT TESTIMONY . ARE YOU FAMILIAR WITH THE REFERENCED REPORT ?

A. Yes, I am familiar with the subject document. The report was in the form of a memorandum dated August 14, 1991 and was titled " St. Joseph District Filter Plan Improvements - Evaluation of Alternatives" (1991 Filter Report). Mr. Ron Moon of the (Richmond, Indiana) Regional Office prepared and submitted the report to the Commission Staff. I was responsible for supervising the preparation of cost estimates and the general scope of the project.

Q. WAS THE 1991 FILTER REPORT GIVEN TO DR. MORRIS BY THE COMPANY DURING THE DISCOVERY PROCESS?

A. The supporting information for the 1991 Filter Report was given to Dr. Morris in response to Data Requests No. 37 and No. 38 and he has included it as Schedule CDM-1 in his testimony. The actual report was authored and presented to the Commission Staff by our Regional Office from Richmond, Indiana.

Q. WHAT WAS THE PURPOSE OF THE 1991 FILTER REPORT?

A. The 1991 Filter Report was the initial attempt to identify and compare filtration improvement alternatives at the existing St. Joseph Water Treatment Plant. The Report was also intended to get consensus on the need for coordination of filter

improvements with other treatment related improvements . The purpose of presenting the report to the Commission was to alert regulators that significant improvements and capital expenditures were going to be required at the St. Joseph Water Treatment Plant in the near future. A secondary purpose of the Report was to attempt to identify the magnitude of the capital investment required for this limited scope project.

Q. HOW DID THE 1991 FILTER REPORT FIT INTO THE PROCESS OF IMPLEMENTING IMPROVEMENTS AT THE EXISTING PLANT ?

A. The report successfully focused attention on the St. Joseph Water Treatment Plant and the need for major capital improvements. Subsequent efforts were made to refine the scope of the project. For example, an analysis of clarification alternatives was performed in 1992 by Gannett Fleming to help define project scope and costs. This report is attached as Schedule JSY-2. A Design Concept was prepared in May of 1992 that better defined the project scope. The 1992 Design Concept is attached as Schedule JSY-3.

The 1991 Filter Report was the initial vehicle to communicate internally and with the Commission about capital improvement plans. As the project moved forward, there were numerous subsequent opportunities for checks and balances on project scope and cost. These checks and balances included interim comparative cost estimates, the Design Concept for Plant Improvements used for

solicitation of design proposals, and the design consultant's preliminary cost estimates. There were also the typical additional checks on cost such as the design consultant's final cost estimate and of course the contractor's bid before construction is authorized.

In addition, the Company performs Comprehensive Planning Studies approximately every five years. The primary purpose of the planning study is to identify facility deficiencies and evaluate alternatives for addressing deficiencies. It is normal for major capital expenditures, such as the ground water project for St. Joseph, to receive additional analysis. The 1996 Feasibility Study evaluated a number of alternatives using a present worth analysis of revenue requirements.

Q. HOW WERE THE COSTS PREPARED IN THE 1991 FILTER REPORT?

A. The Report was a comparative analysis of alternatives, and a conceptual description of approximately 20 varied required improvements, such as filters, pump stations, and chemical buildings. A local contractor, who was familiar with the treatment plant, was hired to determine the construction cost of the identified items. No preliminary design work had been performed and the scope of the individual required improvements was not developed in detail. In the absence of site specific design documents, drawings from other projects showing concrete box filters were provided to the contractor. For the Superpulsator clarifiers, drawings and a schedule of values from the Davenport, Iowa project was provided

to the contractor to assist in definition of the construction cost. The scope of chemical improvements had not been identified, so the contractor was directed to price up duplication of the existing chemical building.

Q. WHY WAS A LOCAL CONTRACTOR USED TO COST UP ALTERNATIVES ?

A. A local contractor, who was familiar with the plant, was employed to assess the site impacts on construction costs and to better define regional cost impacts. In addition, it was thought that a contractor familiar with the plant would help provide third-party credibility to the magnitude of the investment required for treatment plant improvements.

Q. WAS THE LOCAL CONTRACTOR ABLE TO PROVIDE ACCURATE PRICING USING CONCEPTUAL INFORMATION?

A. No. The contractor's pricing was not very accurate because the project definition was inadequate at the time. The contractor's experience would have been best used in an advisory role rather than in a lead role since the project scope was not adequately defined. Unfortunately, this process validated the principle that contractors and subcontractors are typically only able to accurately estimate cost for well defined project scopes that are adequately defined by drawings and specifications.

IMPROVED DEFINITION OF PROJECT SCOPE

Q. IS THE TERM "RENOVATION" A CORRECT CHARACTERIZATION FOR THE TYPE OF IMPROVEMENTS NEEDED AT THE EXISTING SURFACE WATER TREATMENT PLANT AT ST. JOSEPH ?

A. No. Renovation implies modifying the existing facilities. By contrast, an extensive rebuilding project would be needed to construct the necessary improvements at the existing site. Construction of new filters, new clarification process, new piping, new chemical storage and feed systems, pump stations, electrical systems, and other facilities would be needed. These facilities would have to be built while keeping the existing treatment and pumping facilities in operation.

Q. WHAT WAS THE PROJECT ACTIVITY BETWEEN THE PREPARATION OF THE 1991 FILTER IMPROVEMENTS REPORT AND THE 1993 FLOODING OF THE TREATMENT PLANT ?

A. There was considerable effort towards better defining project scope between the 1991 Filter Report and cessation of design activity in August, 1993. A brief Preliminary Design Concept was prepared in September, 1992, followed by a more comprehensive Design Concept in May, 1993, after internal discussion and approval. A competitive Request for Proposal (Design) and Design Concept, was issued to prequalified design consultants in May, 1992 with receipt of proposals in June, 1992. Pilot testing of Superpulsator Clarifier and filter absorbers began in

June, 1992 and ran through August, 1992. Design was not begun until February, 1993 following conditional acceptance of the pilot testing report by MDNR, and internal consensus on clarification improvements.

Q. WHAT WAS THE STATUS OF THE DESIGN OF PLANT IMPROVEMENTS WHEN THE PLANT WAS FLOODED IN 1993 ?

A. Design was approximately 30% complete at the time of the flood. The August, 1993 Design Memorandum prepared by Gannett Fleming summarizes the scope of the improvements at the time the design effort stopped. The Design Memorandum is included as Schedule JSY-4.

Q. WHAT WAS THE REVISED PROJECT COST FOLLOWING THE CONSULTANT'S PRELIMINARY COST ESTIMATE ?

A. In May, 1993, the Consultant (Gannett Fleming) prepared construction cost estimates for the project which included Superpulsator clarifiers, Chemical Building, Filter Building/Clearwell, and Transfer/High Service Pump Station. The construction cost estimate for these facilities was $26,630,000. This cost estimate is included as Schedule JSY-5. This cost was in 1993 dollars and would need to be adjusted for inflation. This cost estimate also assumed that the project scope would be constructed in a single phase, and did not take into account the added costs of phasing construction if a phased project delivery was needed. It is important to note that this cost also did not include engineering costs, AFUDC, or

other project management costs. The revised project cost did not include any subsequent improvements.

Q. HOW AND WHY DID THE PROJECT SCOPE AND COST CHANGE BETWEEN 1991 AND 1993 ?

A. A tabular comparison of construction costs from August, 1991 and May, 1993 is presented below.

ITEM	1991 STUDY COST FOR ALTERNATIVE III-b	1993 COST ESTIMATE
Superpulsators and Chemical Building	$8,300,000	$7,962,000
12 mgd Filters; 800,000 gallon clearwell; transfer pump station	$4,900,000	
18 mgd Filters	$2,100,000	
Filter Building (30 mgd)		$4,493,000
Transfer/Distrib Pump Station		$1,569,000
2,000,000 Clearwell Tank		$1,940,000
Electrical		$2,425,000
HVAC		$776,000
Plumbing		$505,000
Instrumentation		$1,550,000
Site Work		$5,410,000
Construction Cost Totals	$15,300,000	$26,630,000

There were a number of reasons for the increased cost. First, facility requirements were better defined in 1993. Actual building sizes were larger than previously identified after requirements were better defined. For example, the 1991 Filter Study cost estimate was based on duplication of the existing Chemical Building

since the actual scope of chemical system improvements had not been previously defined. Actually, the needed space requirements for the chemical systems was three to four times greater.

A below-grade clearwell that would be located below the proposed filters in the 1991 Filter Study was not feasible at this site due to a high ground water table. Instead of the below ground clearwell, a separate above ground clearwell tank, sized at 2,000,000 gallons, was the Consultant's recommended approach in 1993.

Other reasons for the increase in cost were for items such as electrical work and instrumentation. This work was not defined in the 1991 Filter Report, but was estimated to be nearly $4,000,000 in the 1993 cost estimate. In addition, the cost of site work was higher in the 1993 cost estimate since the Consultant had a much better definition of yard piping, utilities, and other site work than was available for the 1991 Filter Report.

Q. PLEASE COMPARE THE CONSULTANT'S CONSTRUCTION COST ESTIMATE TO THE CONSTRUCTION COST ESTIMATE PRESENTED IN THE 1991 FILTER REPORT.

A. The Consultant identified a construction cost of $26,630,000 in mid-1993. The Consultant's estimate is more accurate since the Consultant had the benefit of a preliminary design which allowed quantities of concrete, length of pipe, etc. to be estimated. In addition, the scope of the project was much better defined in May,

1993 than in August, 1991. Another significant reason for the cost increase was the need for special foundation treatments to address poor soil conditions. In the Geotechnical Design Memorandum prepared by Gannett Fleming, dated April 1993, it was concluded that "shallow foundations would probably not be feasible for structures founded in or above the clay soils present at the site. It is anticipated that some form of deep foundation bearing on bedrock will be required for those structures." The Consultant included $2,910,000 in their estimate for building foundations to address the soils issue. The Geotechnical Design Memorandum is attached as Schedule JSY-6.

Q. DID THE COMPANY PROVIDE THE CONSULTANT'S 1993 COST ESTIMATE FOR IMPROVEMENTS AT THE EXISTING SITE TO DR. MORRIS?

A. Yes, the Company provided the Consultant's complete cost estimate to Dr. Morris in response to Morris's data requests. However, Dr. Morris did not use the higher, more accurate values, contained in the May, 1993 cost estimate, but instead used the lower 1991 Filter Study costs in his analysis.

Q. WHY WAS THE 1993 PROJECT SCOPE PROPOSED TO BE CONSTRUCTED IN TWO PHASES?

A. First, the nature of the construction activity required sequential construction activity to maintain facilities in operation during construction. It was recognized that additional work beyond the 1993 project scope was needed, but work like an

intake, low service pumps, and switchgear were considered necessary but with a lower priority and could be postponed since they were not integral to the higher priority plan for water quality improvements. Secondly, it was believed that a phased construction program would allow increased revenue requirements to be stepped which would minimize "rate shock" to customers. The cost of breaking the construction into separate phases was not quantified in 1993, but was specifically studied in the 1996 Feasibility Study. The 1996 Feasibility Study showed that phasing the surface water treatment plant improvements would increase project costs on both a present worth and a total revenue requirement basis.

Q. WAS A REVISED PROJECT COST ESTIMATE PREPARED FOLLOWING RECEIPT OF THE CONSULTANT'S CONSTRUCTION COST ESTIMATE ?

A. Yes, a new project cost estimate was prepared immediately following receipt of the Consultant's construction cost estimate. Enclosed is Schedule JSY-7 which shows a project cost estimate of $44,100,000 which accounts for the increased construction cost, phased construction, AFUDC, inflation, and other non-construction expenses. The cost estimate is dated June 4, 1993 which is prior to the flooding of the plant which occurred in July, 1993.

Q. WAS THE $44,100,000 COST ESTIMATE FOR IMPROVEMENTS TO THE EXISTING SURFACE WATER TREATMENT PLANT PRESENTED

TO LOCAL BUSINESS LEADERS?

A. Yes, the Company used a cost of $39,000,000 to $44,100,000 in discussions of the project magnitude in discussions with local business leaders prior to the Board of Directors meeting in July, 1993. It was believed that this magnitude of capital investment would be sufficient to address critical deficiencies for the next 10 years or so.

Q. WHAT FACILITIES WERE NOT INCLUDED IN THE $44,100,000 ESTIMATE AND WHY WERE ALL NEEDED FACILITIES NOT INCLUDED IN THE COST ESTIMATE?

A. The June, 1993 cost estimate did not include an intake and low service pumps, a third presedimentation clarifier, ozone facilities, any flood protection costs, replacement of the distributive pumps, or the switchgear for the distributive pumps. A third presedimentation clarifier would have been added to the project because of the hydraulic limitations of the existing clarifiers in meeting even average day flow with one unit out of service.

The need for intake and low service pump improvements were noted, specifically for increased traveling screen redundancy, but it was planned to postpone this work since it was not integral to the treatment process. Key elements of a distributive pump station were being incorporated into the improvements with planned gradual migration away from the existing pump station and existing electrical switchgear.

At that time, ozone facilities were considered to be a future consideration since a regulatory framework for disinfection and disinfection byproduct control was not yet established, but they were not included in the cost estimate. The need for future residuals handling was being anticipated by incorporation of separate piping systems for various types of treatment residuals. Of course, the 1993 design did not include flood protection improvements since the flood potential of the Missouri River was not then evident.

EVALUATION OF ALTERNATIVES FOLLOWING THE 1993 FLOOD

Q. WAS A STUDY PERFORMED THAT EVALUATED ALTERNATIVES FOLLOWING THE 1993 FLOOD ?

A. Yes, the Company evaluated alternatives in the Comprehensive Planning Study (CPS) which was issued in December, 1994. In the CPS, the alternatives listed below were evaluated.

Renovation of plant at existing site

New surface water treatment plant at remote site

New ground water treatment plant at remote site

Interconnection with Kansas City, Missouri water system

Q. AS INFERRED BY MR. BIDDY AND DR. MORRIS, DID THE WATER COMPANY DECIDE, WITHOUT EVALUATION, TO MOVE FROM THE EXISTING SITE FOLLOWING THE FLOOD ?

A. Absolutely not. The Company was determined to identify and evaluate all the

alternatives. One of the purposes of the 1994 Comprehensive Planning Study (CPS or Planning Study) was to present an evaluation of alternatives. Following the 1994 Planning Study , a more rigorous economical evaluation of alternatives was performed in the 1996 feasibility Study. The decision to move forward with the design of the ground water alternative at a remote site in late 1995 was made following the initial findings of the feasibility analyses which were formally presented in the 1996 Feasibility Study.

Q. DOES THE COMPANY HAVE A PREDISPOSITION TO CONSTRUCTING GROUND WATER TREATMENT FACILITIES AND ABANDONING SURFACE WATER TREATMENT PLANTS?

A. No. As at St. Joseph, the American Water System evaluates alternatives based on their merit and does not have a predisposition to new construction or to ground water source of supply. In the overwhelming number of cases, our evaluation shows that renovation of a treatment plant is the best solution. Listed below are some of the water treatment plants in the American Water System that were extensively renovated in the last 5 years.

1) Parkville, MO
2) Warrensburg, MO
3) Mexico, MO
4) Norristown, PA
5) San Koty Station/Peoria, IL
6) Davenport, IA

7) New Castle, PA

8) Ashtabula, OH

9) Hopewell, VA

10) Brownsville, PA

Q. WHAT ACTIONS DID THE COMPANY TAKE FOLLOWING THE FLOOD IN REGARD TO THE DESIGN OF FACILITIES ?

A. The impact of flooding on the current design became obvious as flood waters rose in July, 1993. The Company formally halted design in August, 1993 and focused on short-term methods of improving flood protection at the site. The immediate concern was to improve the flood protection at the plant and minimize the duration of an outage if the plant were to be flooded again.

Q. DR. MORRIS HAS FOCUSED HIS COST ANALYSIS ON THE COSTS PRESENTED IN THE 1994 CPS. WAS THE DECISION TO CONSTRUCT THE GROUND WATER TREATMENT ALTERNATIVE ULTIMATELY BASED ON THE COSTS PRESENTED IN THE 1994 CPS ?

A. No. Dr. Morris incorrectly focused on costs presented in the 1994 CPS. The 1994 CPS identified the deficiencies of the existing facilities, identified alternatives, and provided capital cost estimates. While the 1994 CPS recommended the ground water alternative, it was the conclusions of the 1996 Feasibility Study that prompted the Company to move forward with the ground water alternative. The 1996 Feasibility Study evaluated a number of alternatives based on revenue

requirements on a 20 year present worth basis. To demonstrate the Company's lack of bias, the 1996 Feasibility Study purposely did not include treatment residuals processing costs for the surface water treatment plant at the existing site alternative. However, treatment residuals costs were included for ground water alternatives and for off-site surface water treatment alternatives. Ozonation costs were included in the present worth analysis at a future date, consistent with the regulatory schedule.

Q. DR. MORRIS MAKES THE BLANKET STATEMENT ON PAGE 18, LINES 15 THROUGH 17, THAT "IN MY OPINION, ALL THE EXISTING INADEQUACIES [OF THE EXISTING PLANT] CAN BE FIXED BY REPLACING/REFURBISHING/REBUILDING THE SUBJECT UNITS." IS THIS OBSERVATION CORRECT?

A. No. Dr. Morris is minimizing the task of renovating a treatment plant that consists of structures that predate 1900 and filters that predate World War I, all on a site that is bounded by a railroad and a river valley bluff, the River, and flood protection levees. He also misstates the Company's prior plans for major plant improvements by stating on Page 18, Lines 12 through 15 : *"Continuing maintenance and refurbishment/replacement are needed for particular parts of the plant as is demonstrated by MAWC's apparent plans to carry out such activities before the 1993 flood occurred."* The Company determined that construction of new filters, and not renovation of the existing units, was needed

due to the physical limitations of the existing filters and associated piping. Major improvements with interrelated impacts would have been required at the existing plant, not just continuing maintenance or replacement of "subject" units.

Q. DR. MORRIS ASSERTS THAT THE COMPANY'S CONSIDERATIONS IN CONCLUDING A PREFERENCE FOR A GROUNDWATER SUPPLY WAS LIMITED TO BACTERIOLOGICAL QUALITY, TEMPERATURE CONSISTENCY AND HARDNESS. HE FURTHER ARGUES THAT ANY BENEFITS OF THESE CONSIDERATIONS COULD HAVE BEEN "OBTAINED BY ALTERNATIVE AND FAR LESS COSTLY MEANS." IS THIS CORRECT?

A. No. Benefits of a ground water source are clearly identified in my previous testimony filed in the Certificate Case. Similar finished water quality of a surface water supply could have been achieved with proper treatment facilities such as granular activated carbon, ozonation, and other improvements needed at the existing plant.

The following text is excerpted from my direct testimony presented in Case No. WA-97-46/Case No. WF-97-241 and explains the benefits of a ground water supply compared to continued use of the Missouri River for source of water supply.

"The superior quality of the ground water supply results in both operational

advantages and cost advantages compared to surface water supply from the Missouri River. A critical difference in the supplies is the absence of chlorine resistant pathogens like *Cryptosporidium* and *Giardia* in the ground water. Operation of surface water treatment plants and associated regulations are focusing on minimizing the passing of these organisms to the public through drinking water. Utilization of a source that does not contain *Cryptosporidium* or *Giardia* is the best means of protecting the public from these waterborne pathogens.

Treatment of the Missouri River is a two-step process involving pre-sedimentation followed by coagulation and clarification before filtration. This two-step process is required due to the high sediment load of the Missouri River and because of MDNR's design guidelines requiring primary and secondary rapid mix, flocculation, and sedimentation for surface water supplies. The superior microbiological quality and consistent quality of the proposed ground water supply does not require primary and secondary treatment so the capital and operation and maintenance costs associated with these facilities can be avoided with the ground water supply.

In addition to fewer treatment facilities being required, the consistent quality of the ground water allows automation to be used confidently in both pumping and treatment facilities. Projected labor costs are lower with a ground water source of supply and treatment because the treatment plant is designed to operate without

continuous on-site supervision and the source of supply facilities can be operated unattended.

The estimated annual chemical costs for the ground water supply are comparable to the existing chemical costs. However, since regulatory requirements for enhanced coagulation and ozone will not apply to the ground water supply, the future increase in chemical costs can be avoided with ground water supply and treatment.

The volume and variability of treatment residuals produced by the ground water facilities are considerably less than for a surface water treatment plant which reduces both capital and operational costs. "

COST ESTIMATION METHODOLOGY

Q. MR. BIDDY AND DR. MORRIS HAVE MADE EXTENSIVE USE OF THE COSTS PRESENTED IN THE 1991 FILTER REPORT. WHY WERE THE COST ESTIMATES PREPARED BY THE COMPANY AND CONSULTANTS IN 1993 CONSIDERED REASONABLE, BUT THE 1991 FILTER REPORT COSTS WERE TOO LOW ?

A. Definition of project scope is a difficult but necessary task in planning the renovation of a water treatment plant. It is important to first define the scope of the project, and then to develop cost estimates. A contingency factor commensurate with the detailed knowledge of the project must be applied. Scope

development is more straight forward for new facilities than for renovation projects.

The costs for the 1991 Filter Report were too low because the scope of the plant improvement project was inadequate. The project scope and cost for renovation of the existing plant increased significantly between 1991 and 1993 because of the complexity of the project. By 1993, the scope of the project at the existing site was much better defined as evidenced by the Design Concept issued as part of the Request for (Design) Proposals, and the Consultant's preliminary design cost estimate.

In the 1994 CPS and the 1996 Feasibility Study, the Consultant's cost estimates for facilities at the existing site were used to the extent possible in the evaluation of alternatives. The cost of additional scope items, such as ozonation and a river intake/pump station, were based on construction costs from other American Water System projects.

The accuracy of the cost estimates developed for the 1994 CPS and the 1996 Feasibility Study can be demonstrated by comparison of the estimated project costs to the actual project costs. The cost estimate in the CPS for the ground water treatment plant alternative presented a project cost of $73,500.000. The 1996 Feasibility Study estimated the project cost for the ground water alternative to be $82,300,000. The actual cost is expected to be approximately $70,000,000

which validates the cost estimation methods used in the 1994 and 1996 studies. In both cases, the project costs were higher than actual cost which further demonstrates that the Company did not purposely undervalue the groundwater project.

Q. DR. MORRIS SUGGESTS THAT COST ESTIMATES IN THE 1991 STUDY DIFFER FROM THOSE IN THE 1996 STUDY FOR COMPARABLE WORK, AND THAT THE DIFFERENCE CANNOT BE EXPLAINED BY INFLATIONARY INCREASES IN THE INTERVENING FIVE YEARS. HE FURTHER SUGGESTS THAT ONE SHOULD CONCLUDE FROM THIS THAT THE 1996 COSTS WERE PURPOSELY INFLATED BY YOU TO JUSTIFY YOUR PREFERENCE FOR A NEW PLANT LOCATION. OBVIOUSLY, THE 1991 STUDY WAS PERFORMED PRIOR TO THE 1993 FLOOD, BUT HOW DO YOU RESPOND TO THIS ALLEGATION THAT SIMILAR WORK IS REPRICED AND "INFLATED" IN THE 1996 STUDY?

A. Sufficient documentation has been presented to show the legitimacy of how the renovation project costs rose from the initial value of $26,600,000 in the 1991 Filter Study to the $44,000,000 project cost identified in 1993 prior to the flood. It is also clear that additional improvements would have been necessary at the existing surface water treatment plant such as a new intake, flood protection, ozonation facilities for disinfection and disinfection byproduct control.

The Company was correct in using the present worth method to compare revenue requirements for each of the alternatives as was done in the 1996 Feasibility Study. In an attempt to show a lack of bias against the renovation of the existing site, the capital cost and operation cost estimates for the 1996 Feasibility Study assumed that direct discharge of residuals would be allowed for the entire 20 year period of analysis at no cost. In a further attempt to show lack of bias, no costs were specifically identified for flood protection of the site or structures.

Mr. Biddy and Dr. Morris favor renovation of the surface water treatment plant at the existing site. This alternative, without phasing, was studied as Alternative I-A in the Feasibility Study, and would have required a present worth revenue requirement of $88,626,158 over the 20 year analysis period using a 7 percent discount rate. With phasing of the renovation of the existing treatment plant (Alternative I-C), the present worth revenue requirement escalated to $92,101,112. By contrast, the study indicated that the Ground Water Alternative at a remote location, identified as Alternative III-A, would require a 20 year present worth revenue requirement of $93,445,269.

The difference in present worth cost for the phased construction of improvements at the existing surface water treatment plant (Alternative 1-C) that is favored by Dr. Morris and Mr Biddy, and the ground water treatment plant alternative (Alternative 3-A) is one percent. This small difference indicates that the actual cost difference of the two projects cannot be distinguished because of the

limitations in estimating costs.

Mr. Biddy and Dr. Morris would have chosen to remain at the existing site where the facilities would have remained subject to both high and low river elevations, with a surface water source that is being targeted with regulations to protect customer health, and with a project that would have been much more complex to design, build, and operate. In addition, the existing surface water treatment plant would eventually be required to construct and operate residuals handling facilities when Federal and State regulations addressed the direct discharge issue. It is again emphasized that residuals handling facilities were not included in the Feasibility Study for the existing surface water treatment plant, but were included, and constructed, in the ground water alternative.

Q. IN ADDITION TO THE $30.1 MILLION AMOUNT DR. MORRIS DEVELOPS FOR RENOVATION OF THE TREATMENT PLANT, HE ALLOWS ONLY $10.2 MILLION FOR THE REMAINING WORK HE DEEMS NECESSARY AT THE RENOVATION SITE. DO YOU AGREE WITH HIS COST ESTIMATES FOR THE ITEMS LISTED BELOW FOR THE REMAINING WORK ?

$2.7 million for design and land acquisition
$3 million for a new river intake structure and associated pumps and piping
$2.5 million for grading the existing access road and flood proofing the plant
$2 million contingency allowance

A. No, Dr. Morris's estimates are undocumented and unreasonable. I will review the reasonableness of each item below and point out several substantial cost items that Dr. Morris failed to include in his analysis.

Dr. Morris includes $ 2.7 million for "design and land acquisition", yet inexplicably does not recognize any costs for project administration or construction supervision. Dr. Morris has neglected to include any expenses for shop drawing review, administration of construction contracts, inspection, material testing, and other costs. These items are fundamental and critical to the success of the project. For a complex multi-phase project such as proposed by Dr. Morris, these costs would be significantly higher than for a single phase project. In addition, Dr. Morris failed to recognize the cost impact of AFUDC on the project. Including AFUDC, a reasonable estimate for all non-construction related costs would be 30 to 35 percent of construction costs.

Secondly, Dr. Morris has determined that the construction cost for a new river intake, piping, and pumps would cost $3,000,000. The American Water System is currently constructing a river intake at Alton, Illinois at a new site on the bank of the Mississippi River. The intake is similar to the facility needed at St. Joseph, but has a lower capacity of 22 mgd compared to 30 mgd at St. Joseph. The contractor's cost to build the intake and pumping station is $5,962,657. The contractor's schedule of values supporting these costs is included as Schedule JSY-8.

The intake and pump station is an example where Dr. Morris's cost estimate is 50% of the actual cost for a lower capacity facility. The fact that Dr. Morris is unable to provide accurate cost estimates for a stand-alone facility such as an intake and pump station calls into question his alleged ability to accurately assess the construction costs for the lengthy and complex renovation of the existing St. Joseph water treatment plant.

Dr. Morris has identified a cost of $2,500,000 for "floodproofing" the plant and providing a reliable access road. It is not known whether this amount is correct, but it shows an attempt to recognize the scope of flood protection required at the existing site. The Company believed that a comprehensive detailed engineering analysis that evaluated the condition of the existing levee, underlying soils, levee crossing details, regulatory issues, and impact of additional structures would be required to accurately assess the scope and cost of improving flood protection at the existing site. It should be emphasized that the Company's estimate included a $700,000 construction cost for access road improvements, but did not include any improved flood protection at the existing site. The Company did not include the cost of "floodproofing" the site since the 1994 Planning Study and evaluation of alternatives indicated that renovation of the existing site was not desirable compared to the ground water alternative and that the expense of a detailed engineering study was unwarranted to just increase the cost of an undesirable alternative.

The contingency allowance of $2,000,000 identified by Dr. Morris, which equates to roughly five percent of Dr. Morris's construction cost, is very low for this type of estimate. Typically, a five percent contingency allowance is appropriate only after bids have been received to address interpretation of construction documents. A more realistic contingency allowance is twenty percent for a preliminary cost estimate. A twenty percent contingency is four times the amount proposed by Dr. Morris and would result in a contingency amount of $8,000,000 instead of $2,000,000.

Q. DR. MORRIS CRITICIZES YOUR USE OF THE "HIGH END OF THE RANGE OF RENOVATION." IS THIS CRITICISM JUSTIFIED?

A. The American Water System has extensive experience in renovating water treatment plants with sizes up to 60 mgd. I can say with certainty that the conditions at St. Joseph warrant costs estimates at the "high end of the range of renovation." First, the plant site is constrained with little space for the contractor to store equipment and material. Second, with portions of the plant over 100 years old, unforeseen existing conditions would tend to increase construction costs. Third, the geotechnical conditions at the existing treatment plant site require special consideration to control settlement. Fourth, the site is vulnerable to high ground water table and flooding which can increase construction costs. Lastly, the difficulty in constructing facilities while keeping the existing facilities operable and reliable contributes to additional costs. I am certain that renovation of the St. Joseph surface water treatment plant would have been a difficult and

costly endeavor.

REVIEW OF FLOOD PROTECTION ISSUES

Q. WOULD THE FACILITIES BEING DESIGNED IN 1993 HAVE WITHSTOOD THE 1993 FLOOD ?

A. No, the facilities being designed by Gannett Fleming would have been outside the existing levee system and would have been subject to flooding based on the 1993 flood elevations. If the design had been continued at the existing site, then either a major extension of the levee system, or raising the elevation of the proposed structures, or both would have been necessary.

Q. MR. BIDDY STATES THAT THE EXISTING PLANT COULD HAVE BEEN "FLOOD PROOFED AT A RELATIVELY SMALL COST." DO YOU AGREE WITH MR. BIDDY'S ANALYSIS THAT THE PLANT COULD HAVE BEEN FLOODPROOFED FOR $128,111 AND VEHICULAR ACCESS PROVIDED FOR A COST OF $125,000 OR LESS ?

A. No. Mr. Biddy has attempted to trivialize solving the flood protection issue at the St. Joseph Water Treatment Plant by recommending an extension of the levee near the railroad tracks at a cost of $128,111. Mr. Biddy has not performed a reasonable evaluation in making such a recommendation.

An excerpt from the Federal Emergency Management Agency's (FEMA) publication titled "Floodproofing Non-Residential Structures" is attached as

Schedule JSY-9 and shows an outline of the factors that influence the feasibility of providing flood protection. The outline shows that regulatory, hydroglogic, site, functional, and structural conditions must be evaluated. Mr. Biddy's analysis of flood protection was not comprehensive and, in fact, was misleading.

For example, the flood elevation was essentially at the top of the levee in many locations, yet Mr. Biddy did not recommend raising the levee elevation around the site to provide freeboard. Freeboard is needed to account for wave action, effects of water velocity, and other uncertainties in analysis, design, and construction of the levee. MDNR's requirement for flood protection elevation of four feet above the flood of record is a regulatory criterion for freeboard. Another example of Mr. Biddy's failing to recognize known hazards was his failure to address the structural and hydraulic consequences of water penetrating the pump station walls at multiple locations, especially around piping. This concern had been previously presented in the direct testimony of Bernard Meyer in the Certificate Case. The water pressure on the brick walls of the pump station was severe enough to cause bricks in the wall to become dislodged, yet Mr. Biddy failed to address these problems or their solutions in his analysis.

The hazards presented by flooding are difficult to visualize now. Photographs and a videotape are attached as schedules to help identify the vulnerability of the site. Schedule JSY-10 is an aerial photograph showing the location of the treatment plant in relation to the flood water. From left to right, is I-229 located on top of

the river bluff, the railroad located at the toe of the bluff, the treatment plant, and the River. Note the levee protecting the Air National Guard Base at the top far right. Note also that this picture was taken prior to failure of that levee.

Schedule JSY-11 shows the flooding of the site immediately south of the treatment plant. Schedule JSY-12 shows an operator manually operating the blowdown valve on the pre-sedimentation clarifiers which are not protected by a levee. Schedule JSY-13 shows the flood waters continuing to rise against the existing levee at the plant. Finally, the videotape enclosed as Schedule JSY-14, shows the difficulty in reaching the plant, the severity of flooding on structures adjacent to the treatment plant site, and the extent of flooding within the treatment plant and pumping station.

Q. ARE MR. BIDDY'S ALLEGATIONS CORRECT THAT THE ACCESS ROAD PROBLEM COULD BE EASILY SOLVED BY THE INSTALLATION OF CULVERTS?

A. No. Mr. Biddy has underestimated the magnitude of the improvements required to provide access to the treatment plant during severe flooding events. Portions of the access road (Water Works Road and County Line Road) proposed by Mr. Biddy were inundated during the 1993 flood preventing access via this road so more extensive improvements than recommended by Mr. Biddy would be required. The entire 2.1 mile length of the access road would have to be improved to allow access by chemical delivery trucks. The improvements would include

establishing a roadbed sufficient to support truck loads, elevating portions of the roadway, installation of culverts to address storm water and runoff, and widening the roadway at turns. Furthermore, the Company would incur the expense of maintaining the roadway.

Q. DR. MORRIS SIMPLIFIES THE FLOODING CONCERNS OF THE OLD PLANT BY STATING ON PAGE 21, LINES 14 THROUGH 21, "FLOOD PROTECTION COULD BE REINFORCED GENERALLY BY ADDITIONAL LEVEE AND FLOOD WALL CONSTRUCTION COMPLETELY AROUND THE PERIMETER OF THE EXISTING PLANT AND RAISING THE ELEVATION OF THE ENTRANCE ROAD." WAS THE COMPANY PREPARED TO "REINFORCE" FLOOD PROTECTION AT THE EXISTING SITE ?

A. Yes. If the existing site had been retained and improved water treatment facilities constructed, then it would have been necessary to evaluate flood protection alternatives, design improvements, permit the improvements with regulatory agencies and adjacent land owners, construct the necessary facilities, and then maintain the flood control facilities. In all likelihood, the resulting facilities would have been a combination of levees and flood walls extending around the perimeter of the site. Seepage controls would have been required for each of the pipe crossings of the existing levees. The flood protection elevation criteria would have been 4 feet above the flood of record in accordance with Missouri DNR Design Guide and Ten State Standards.

After all of the flood protection features were in place, however, the site would still not be as reliable as a treatment site that is located out of the flood plain. This is the basis of the State of Missouri's requirement that treatment plants not be located in flood plain areas where it is practicable. Levees are not foolproof, and in Missouri alone, hundreds of levees failed during the 1993 flooding. However, if the evaluation of alternatives had shown a definite economic and operational benefit to remain at the existing treatment plant site, then the Company was prepared to implement improved flood protection measures at the existing site and accept a lesser degree of reliability than afforded by the ground water plant out of the flood plain.

DIRECT DISCHARGE OF TREATMENT RESIDUALS

Q. MR. BIDDY DOES NOT INCLUDE ANY RESIDUALS HANDLING FACILITIES IN HIS CAPITAL COST ESTIMATE FOR RENOVATING THE EXISTING TREATMENT PLANT ON PAGE 22, LINE 8. SHOULD THE COSTS OF FUTURE RESIDUALS PROCESSING HAVE BEEN INCLUDED IN THE ANALYSIS OF ALTERNATIVES ?

A. Yes. The prospect for major capital and operational expense for building and operating facilities to separate, dewater, and dispose of treatment residuals at the existing treatment plant should be considered. Costs for residuals processing were included in the 1994 Comprehensive Planning Study. However, to demonstrate a lack of bias against remaining at the existing site, the Company assumed continued direct discharge of residuals in the 1996 Feasibility Study

when in fact, it is likely that residuals processing modifications will be required sometime within the 20 year present worth analysis. Residuals handling and disposal was addressed in the other alternatives, including the ground water treatment plant.

In his argument to not consider the cost of residuals facilities, Mr. Biddy does not recognize the regulatory pressure from U. S. EPA to improve the quality of the nation's waterways. Water utilities that directly discharge large masses of wastes treatment residuals without treatment to the streams will continue to be pressured to modify their waste handling practices. The St. Joseph Treatment Plant directly discharged several thousand tons of treatment residuals annually to the Missouri River.

While the plant has been able to continue operation without a renewed NPDES permit, a revised NPDES permit would have been required if major modifications were made to the existing treatment plant. Since EPA and DNR were at odds over discharge regulations, it was not certain that continued direct discharge of all treatment residuals could have been continued. Capital and operating costs would have been incurred for residuals handling facilities and residuals disposal if continued direct discharge of treatment wastes were not allowed.

Q. DO YOU AGREE WITH MR. BIDDY THAT WASTE HANDLING FACILITIES WILL NOT BE REQUIRED AT ST. JOSEPH FOR THE

FORESEEABLE FUTURE?

A. No. The fact that the plant has been operating without a renewed NPDES permit does not guarantee that it can continue operation without a permit. The future of continued direct discharge of all waste streams to the Missouri and Mississippi rivers remains a contested issue between EPA , MDNR, and water purveyors. It is likely that the existing plant could continue to operate without a renewal of the NPDES permit if no modifications were made to the plant or treatment processes.

However, when significant plant improvements are made that affect the quality or quantity of residuals being discharged to the Missouri River, a new NPDES permit is required. Major improvements were needed to pretreatment and filter systems that would impact the waste discharges to the River. Given the uncertain state of NPDES permitting, it was expected to be difficult to obtain a revised NPDES permit for large scale treatment plant renovations that include continuing direct discharge of all residuals. Residuals processing may have been required, at least for the treatment residuals with inorganic coagulant, and piping was being designed in the pre-flood surface water plant design to accommodate future residuals handling improvements.

Q. HOW DOES MR. LEE'S CHARACTERIZATION OF THE RESIDUALS ISSUE IN THE CERTIFICATE CASE CONTRAST WITH MR. BIDDY'S ANALYSIS ?

A. While Mr. Biddy does not include any costs for treatment residuals processing in

his cost analysis, Mr. Lee believed that the residuals disposal issue would impact the existing treatment plant. Quoting from his rebuttal testimony beginning on Page 6, Line 20:

> "The residual disposal issue is likely to evolve into a major capital expense for this existing facility once the State and U.S. EPA finally settle on permit terms. The use of enhanced coagulant and powdered activated carbon to meet SDWA rules will only serve to aggravate this situation."

FUTURE IMPACT OF REGULATIONS

Q. DR. MORRIS CONTESTS THE INCLUSION OF RESIDUAL HANDLING AND OZONE FACILITIES IN RENOVATION ESTIMATES. HE SUGGESTS IT IS NOT YET KNOWN WHETHER THOSE WILL EVER BE REQUIRED. IN THE ECONOMIC FEASIBILITY STUDY, WERE BOTH OZONATION AND RESIDUAL HANDLING COSTS INCLUDED IN THE ALTERNATIVE OF RENOVATING THE EXISTING TREATMENT PLANT AT THE EXISTING SITE ?

A. No. To avoid overstating capital costs of rebuilding the existing plant, residuals handling was specifically excluded in the $63,300,000 project cost identified for ALT I-A (Surface Water at Existing Site - Non Phased) or the $70,500,000 project cost identified for ALT I-C (Surface Water at Existing Site - Phased). (Note that these project costs do not include AFUDC)

Ozonation and residuals handling were included in the $78,000,000 capital cost

estimate presented in the CPS for the alternative of renovating the surface water treatment plant at the existing site. However, the basis for the decision to construct the Project was the Feasibility Study.

It is appropriate to include ozonation at a future date for surface water treatment plant alternatives. The future need for ozone is based on the quality of the Missouri River and the regulatory agenda to improve the quality of the treated water with respect to health related contaminants such as disinfection byproducts and disinfection resistant microbes. In 1994, the U.S. EPA proposed a draft Disinfection/Disinfection Byproduct Rule to be implemented in two stages. Stage I of that rule is now in effect, and the St. Joseph Water Treatment Plant would have been required to reduce the running quarterly average of total trihalomethanes to below 0.080 mg/L In addition to trihalomethanes, another group of disinfection byproducts known as haloacetic acids are also being regulated with a limit of 0.060 mg/L.

Schedule JSY-15 is a listing of the trihalomethane results for the St. Joseph treatment plant dating to 1991 which shows that over the last five years (20 quarters) that the running average trihalomethane concentration has been above 0.080 mg/L limit for six of 20 quarters, which equates to 30% non-compliance. The Company believes that optimization of enhanced coagulation, with increased coagulant dosage, at the existing plant, might have allowed the plant to reduce the trihalomethane concentrations to remain in compliance with Stage I limits

without the benefit of ozone facilities.

For a source like the Missouri River, there are a number of health related quality concerns such as *Cryptosporidium*, disinfection byproducts, and pesticides. Ozone is attractive because it can help reduce disinfection byproducts and also improve disinfection. It is likely that ozonation facilities would have been needed to meet the Stage II DBP regulations and to also improve the removal and inactivation of Cryptosporidium for the surface water treatment plant. A number of water systems have already installed ozonation facilities to address either disinfection byproducts or *Cryptosporidium*, or both contaminants. The Company was appropriate in making the assumption that ozonation facilities would be installed in the future at St. Joseph.

While future water quality regulations will target surface water supplies, it is highly unlikely that ozonation facilities will be required for the ground water treatment plant. The nature of the alluvial aquifer will tend to naturally reduce both the running average and peak disinfection byproduct values. The high quality of the ground water with respect to microbes will not require the use of potent disinfectants such as ozone.

SUMMARY OF ALTERNATIVE SELECTION ISSUES

Q. DR. MORRIS STATES ON PAGE 10, LINE 7 THROUGH 12, THAT "IT APPEARS TO ME THAT IN REACTION TO THIS FLOOD, MAWC

MADE A CORPORATE DECISION TO CONSTRUCT A NEW WATER PLANT OUTSIDE THE FLOOD PLAIN ... EVEN THOUGH THE RISK OF FUTURE FLOODING AT THE EXISTING PLANT COULD HAVE BEEN FULLY ADDRESSED ALONG WITH OTHER PHASED RENOVATIONS." DID THE COMPANY DECIDE THAT FLOODING COULD NOT BE ADDRESSED AT THE EXISTING SITE ?

A. No, the Company was prepared to address flood protection at the existing site if the evaluation of alternatives indicated that reasonable alternatives were not available. The Company operates a number of facilities that are subject to flooding and so is familiar with methods of flood protection. As stated previously, the Company recognized that flood protection could have been constructed at the existing St. Joseph treatment plant site at some cost. The issue is not whether flood protection could have been provided, but rather, whether it was in the customer's best interest to invest in a site that is subject to flooding when superior alternatives of similar cost were available. Given the advantages of source quality, improved operations, and lessened vulnerability to flooding, the Company made the correct choice in identifying alternatives, evaluating them, and implementing the best alternative.

Q. IN THE FEASIBILITY STUDY, ALT I-A AND ALT I-C WERE DEEMED "NOT FEASIBLE" DUE TO THE STATE OF MISSOURI REQUIREMENT THAT , TO THE EXTENT PRACTICABLE, EXPANDED WATER SYSTEMS MUST NOT BE LOCATED ON A SITE SUBJECT TO

SIGNIFICANT RISK FROM... FLOODS." MR. BIDDY STATES THAT ALL NECESSARY IMPROVEMENTS COULD HAVE BEEN CONSTRUCTED AT THE EXISTING SITE FOR $36.3M. THEN MR. BIDDY HAS QUOTED MDNR OFFICIALS THAT IF THE PLANT HAD BEEN "FLOODPROOFED", CONSTRUCTION OF IMPROVEMENTS COULD HAVE BEEN PERMITTED AT THE EXISTING SITE. CAN YOU EXPLAIN WHY THESE ALTERNATIVES WERE NOT FEASIBLE ?

A. Alternatives I-A and I-C required renovation of the existing water treatment plant at the existing site. The Company has demonstrated that these alternatives had capital costs and present worth costs approximately equal to the selected ground water alternative. With the large capital investment required to build a water treatment plant, or thoroughly renovate an existing one, the Company is compelled to ensure the investment is prudent for the benefit of the customers and the Company.

The State of Missouri Code of State Regulations 10 CSR 60-10.020 forbids locating public water systems in areas subject to flooding, where practicable alternatives are available. Alternatives I-A and I-C were deemed "infeasible" because a "practicable" alternative had been identified out of the flood plain.

Mr. Biddy has significantly underestimated the cost of improvements needed at the existing site. If the Company believed that the plant could have been

renovated for the amount identified by Mr. Biddy, it would certainly have continued with it's original plan.

Q. DR. MORRIS DISMISSES THE DNR RECOMMENDATION THAT PLANTS NOT BE LOCATED IN FLOOD PLAIN BY SEIZING ON THE "TO THE EXTENT PRACTICABLE AND ECONOMICAL" LANGUAGE IN THE DNR PRONOUNCEMENT. HE THEN ARGUES THAT "THE SAME QUALITY AND QUANTITY OF DRINKING WATER" COULD BE PRODUCED "RELIABLY" FOR A "COST SAVING OF APPROXIMATELY 50%" BY REFURBISHING THE EXISTING PLANT. IS HIS OBSERVATION CORRECT?

A. No, Dr. Morris's argument is inconsistent. First, a major plant renovation of the existing water treatment plant was required that impacted nearly every component of the plant, not the "refurbishment" or in-kind replacement approach offered by Dr. Morris. As I previously discussed, Dr. Morris's cost estimates are not realistic.

If the ground water alternative had not been available, then the Company would have continued on the original path of renovating the existing plant at the same site since the surface water plant at a remote site alternative was significantly more costly. Improved flood protection would have been required, and additional facilities such as a new intake and pumps would also have been needed to provide a more reliable water supply. Drinking water regulations targeted at the health

risks posed by disinfection byproducts and *Cryptosporidium* from surface supplies would have resulted in ozone facilities being constructed at St. Joseph. These necessary improvements would have been costly, and the resulting facilities would have depended on levees and floodwalls for flood protection. The Company is fully aware that technology is available to provide adequate treatment of the Missouri River, but the Company also recognizes the cost of implementing such improvements.

Q. MR. BIDDY AND DR. MORRIS HAVE DEVELOPED COST ESTIMATES OF $30,000,000 TO $40,000,000 FOR ALL THE IMPROVEMENTS NEEDED AT THE EXISTING WATER TREATMENT PLANT. DO YOU AGREE THAT THESE COST ESTIMATES ARE CORRECT ?

A. No, their estimates are insufficient to construct the needed improvements at the existing surface water treatment plant. First, the scope of their improvements is insufficient. Second, they have underestimated construction costs. Third, they have underestimated non-construction costs. In addition, Mr. Biddy and Dr. Morris have not performed present worth analysis that considers the difference in operating costs between continued operation of the surface water treatment plant and the ground water plant.

Q. DR. MORRIS CONTENDS THAT HIS ARGUMENT AGAINST RELOCATING TO THE NEW SITE IS "MOST IMPORTANTLY" BASED ON HIS CONCLUSION THAT "THE EXISTING SITE CAN BE

ECONOMICALLY PROTECTED AGAINST FLOODING." DO YOU AGREE THAT THIS IS THE "MOST IMPORTANT" CONSIDERATION, AND DO YOU BELIEVE THAT FLOOD PROTECTION COULD HAVE BEEN ACCOMPLISHED ECONOMICALLY?

A. The Company recognized that flood protection of the existing site could be improved, yet dependence upon levees and flood walls is not foolproof. The most important consideration is the high cost of renovating the existing facilities to reliably treat water from the Missouri River and distribute it to customers. In his analysis, Dr. Morris underestimates the costs of upgrading the existing facilities to continue treating water reliably and distributing water to the customers.

Q. DR. MORRIS ALSO ARGUES THAT REFURBISHING COULD HAVE PRODUCED A "PHASE-IN" OF COSTS, AND THAT THIS IS AN ADDITIONAL CONSIDERATION THAT SHOULD HAVE MADE THE REFURBISHING OPTION MORE ATTRACTIVE. HOW DO YOU RESPOND TO THIS?

A. The phased approach to renovating the existing surface water treatment plant was evaluated in the 1996 Feasibility Study. The benefit of step increases in revenue requirement was identified in the 1991 Filter Study. However, the Feasibility Study analysis reflected increased total costs in recognition of the inefficiencies that typically accrue during multiple phases of construction. Considering the benefits of the ground water alternative, it would have been illogical to select the

renovation of the surface water treatment plant alternative with a higher cost only because of the ability to phase recovery of costs.

Q. MR. BIDDY STATES THAT ONCE FLOOD CONCERNS AND ACCESS ARE ADDRESSED, AND ABSENT REGULATORY OBJECTIONS, THE "OVERRIDING CONSIDERATION" THEN BECOMES A MATTER OF COST COMPARISONS. IS THIS CORRECT?

A. Cost comparisons are critical, but Mr. Biddy's characterization is too simplistic. Given projects of equal technical, operational, and reliability concerns, a purely economic analysis of alternatives may be performed. The Company recognized the importance of economic analysis by conducting the 1996 Feasibility Study.

Mr. Biddy has attempted to oversimplify the content of the alternatives. It is necessary to evaluate economics in addition to a number of other factors when considering project alternatives. For example, the risk for escalation of costs, project reliability, compliance with regulations and potential for additional investment to meet future regulations must be considered.

Q. IN THE CERTIFICATE CASE, DID THE OFFICE OF PUBLIC COUNSEL'S CONSULTANT DETERMINE THAT THE COMPANY SHOULD REMAIN AT THE EXISTING SITE AND IMPROVE THE EXISTING SURFACE WATER TREATMENT PLANT ?

A. No, Mr. Lee testified on Page 11 and page 14 of his rebuttal testimony, that he

agreed that the Company should construct the ground water treatment plant, but with an initial capacity of 17 mgd, and then expand it to 30 mgd. He testified that the initial well field sizing and transmission piping should be for 30 mgd. The existing surface water treatment plant would then be decommissioned in a two step process.

Q. WHY WERE THE RECOMMENDATIONS FOR PHASING OF THE GROUND WATER PROJECT NOT IMPLEMENTED?

A. The concept of phasing the construction of the ground water plant was deficient in several areas including cost and reliability. Improvements would have been required at the existing surface water treatment plant to control disinfection byproducts, remove Cryptosporidium, and other quality related issues. Flood protection would still be needed at the existing plant. The cost of improving the existing water treatment plant, and then decommissioning it as Mr. Lee recommended would have resulted in higher capital costs including premature retirement of the improvements made at the existing plant, and the inefficiencies of constructing the ground water treatment plant in two steps. Operating costs would have been higher also since it would have been necessary to operate two treatment plants simultaneously with Mr. Lee's alternative.

PLANT CAPACITY AND ECONOMY OF SCALE

Q. MR. BIDDY HAS PROPOSED A ONE TO TWO YEAR PLANNING HORIZON, AND HAS CALCULATED A PLANT CAPACITY OF 24.135

MGD. THE DESIGN YEAR OF 2009 AND THE PROJECTED PEAK DEMAND OF 27.7 MGD FOR THE DESIGN YEAR WERE PRESENTED IN THE CERTIFICATE CASE IN 1997. DID THE OFFICE OF PUBLIC COUNSEL'S CONSULTANT EVALUATE THESE DESIGN CRITERIA IN THAT CASE?

A. Yes. Mr. Lee did not challenge the Company's selection of 2009 as the design year, and in fact used 2009 in his analysis of demands. Mr. Lee agreed with the maximum to average day demand value used by the Company in projecting future demands. Beginning on Page 3, Line 19 of his rebuttal testimony, Mr. Lee testified that:

> " Based on this information, the use of a 1.60 maximum to average day demand ration when applied to future projections appears reasonable and prudent."

On Page 4, Line 4 of his testimony, Mr. Lee projected a maximum day demand of 27.74 for 2009, which is in complete agreement with the Company's demand projections. The demand projection chapter from the 1994 CPS is attached as Schedule JSY-16.

Q. ARE THERE ERRORS THAT MR. BIDDY HAS MADE IN HIS CALCULATION OF EXCESS CAPACITY, ON PAGE 24 OF HIS TESTIMONY, FROM THE USED AND USEFUL PERCENTAGE AND HIS RESULTING RATE BASE ADJUSTMENT FOR MAWC'S WATER TREATMENT PLANT?

A. Yes. Mr. Biddy made a number of serious errors in his calculation of excess

Schedule JSY-17.

Q. HOW DID MR. BIDDY IGNORE ACCEPTED STANDARDS REGARDING THE APPROPRIATE MARGIN OF SAFETY?

A. Accepted practice in the water utility industry recognizes that a certain margin of safety between projected demands and plant capacity is necessary and appropriate. Otherwise, if a system's demand projections, raw water quality and/or performance of equipment changed slightly, there would not be a sufficient supply of safe, potable water. A water utility's first objective must be that when a customer turns on a tap, adequate water suitable for human consumption is delivered. This objective would be severely jeopardized if a regulatory commission did not recognize a margin of safety with respect to treatment capacity in rate base.

The Commonwealth of Virginia Waterworks Regulations (Section 5.08), attached as Schedule JSY-18, state that a water utility should initiate expansion plans when demand reaches 80 percent of rated capacity (i.e., the margin of safety falls below 20 percent).

The American Water Works Association Journal article by Mr. Peter Macy, attached as Schedule JSY-19, discusses the concept of appropriate margin of safety. The recommended and appropriate basis for planning is to maintain at least a 10% margin of safety between supply and demand at all times (Ref. Figure

is projected to be fairly low as evidenced by the 1.2 mgd (4.5%) increase in maximum day demand from 2004 to 2009.

Q. HOW DID MR. BIDDY FAIL TO CONSIDER A REASONABLE PLANNING HORIZON?

A. Mr. Biddy makes his proposed rate base adjustments from his calculation of used and useful percentage based on year 2002 demands, or a two year growth period. He claims that a public utility commission will usually "allow an overbuild such as a one to two-year additional capacity in recognition of the utility's need to be prepared to serve additional customers. Then, a commission will typically structure the utility's tariff to allow the utility to collect an amount from each future customer to pay the utility for the cost of the overbuild." Mr. Biddy then states that "the amount of overbuild or sizing of the plant for future capacity is a business decision which a utility must make at the time of design and construction. The savings ... in constructing larger capacity facilities must be weighed by the utility in relation to the fact that some portion of these costs (the overbuild) will not be included in the current rates."

The two year period is a ridiculously short planning horizon, especially considering the timeframe needed for the budgeting, design, permitting and construction of a substantial project such as a filter plant. It can take two years or more to plan, design and build a filter plant, so clearly two years is far too short a planning horizon. It does not make sense to be doing a construction expansion

every year or two. Such a short-sighted approach is inefficient and potentially disruptive to customer service (remember that MAWC must still continuously provide safe, adequate and reliable service to its customers even during a construction project). Moreover, as explained further in the following answer, Mr. Biddy's short-sighted approach to capacity planning would be more costly due to constant duplication of effort, loss of economies of scale, and constant remobilization and demobilization.

Regulatory support for an appropriate planning horizon is clear. Schedule JSY-20 contains an excerpt from the Connecticut Department of Utility Control (DPUC) regulations discussing the appropriate planning horizon. This regulation states at Section 16-11-79: "Design and Construction of Plant":

> The design and construction of the utility's water plant shall conform to good standard engineering practice, including the minimum standards of the American Water Works Association. ***It shall be designed to make reasonable provisions for the company's water supply requirements for a period of at least fifteen years*** and operated so as to provide reasonably adequate and safe service to its customers and shall conform to the requirements of the state department of health with reference to sanitation and potability of water. ***(emphasis added)***

The Commonwealth of Virginia Waterworks Regulations cited previously state in Section 7.01:

> "Ordinarily, waterworks shall be designed to provide for estimated population ten to thirty years hence under predicted growth conditions."

This same type of short-sighted approach was rejected in the Order of the Indiana Utility Regulatory Commission in Indiana-American's rate case in 1997:

> "...utilities need to pursue cost effective additions of capacity reflective

Q. DOES MR. BIDDY DISPLAY AN UNDERSTANDING OF CONSTRUCTION COSTS, INCREMENTAL COSTS, AND ECONOMIES OF SCALE IN HIS CALCULATIONS OF PROPOSED ALLOWANCES?

A. No. Mr. Biddy displays a fundamental lack of understanding of these issues. Let me first stress that this fundamental error is rendered irrelevant because his calculation of excess capacity from the used and useful percentage is incorrect. Mr. Biddy calculated the used and useful percentage to be 80.45%, which is incorrect as a result of his numerous fundamental errors of not considering in-plant usage, margin of safety and a reasonable planning horizon. Having made these mistaken conclusions, Mr. Biddy compounds his mistakes when he attempts to calculate the effect of his proposed disallowances using a straight-line calculation. He concludes that there is 19.55% excess capacity (100% - 80.45%), and thus reduces the cost of the capital addition by 19.55%.

Q. IS THERE A STRAIGHT LINE RELATIONSHIP BETWEEN AN EXCESS CAPACITY ARGUMENT AND THE PERCENTAGE OF PLANT RATE BASE SUBJECT TO DISALLOWANCE ?

A. Of course not. This same type of straight-line calculation was rejected in the Order of the Indiana Utility Regulatory Commission in Indiana-American's rate case in 1997:

> "The OUCC then assumed that the cost of plant varies directly with the amount of its capacity. This assumption is unsupported..."

This Order also cited Laclede Gas Light Company versus Public Service

Commission of Missouri, 8 F. Supp. 806, 6 PUR (NS) 10 (W.D MO. 1934):

> "... The theory ... is utterly illogical, ... By reason of its being applied generally, that is, to each and every item making up the total of the plant... Furthermore, the application of this theory seems to us to be illogical in view of the fact that the cost per unit of much of the company's property does not vary in the same ratio as does the capacity. For example, a 6-inch main does not cost six eighths nor nine sixteenths as much as an 8-inch main, and so on through many of the items comprising the company's property..."

Construction of a new or expanded water treatment facility consists of many cost components. Some of these items vary directly with plant capacity, many will vary only marginally, and many others will not vary at all. Here is an example. Consider two new treatment plants - one at 25 mgd, and one at 30 mgd. The construction cost of certain items such as buildings and filters could change as capacity increases. However, many items such as chemical feed pumps and piping, pumping equipment, waste handling facilities, HVAC equipment, valves, etc. would have only marginal difference in cost as capacity increases. Moreover, many items would have virtually no difference in cost, such as piping, electrical controls, structural and architectural work, laboratory facilities, operator facilities, maintenance facilities, construction mobilization costs, site work, engineering costs, temporary facilities, etc.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY ?

A. Yes.