Exhibit No.: _____

Issue(s): Prudence of the St. Joseph Water Treatment Plant; Used and Useful Capacity Adjustment
Witness/Type of Exhibit: Biddy/Surrebuttal
Sponsoring Party: Public Counsel
Case Nos.: WR-2000-281 and SR-2000-282

SURREBUTTAL TESTIMONY

OF

TED L. BIDDY

Submitted on Behalf of
the Office of the Public Counsel

MISSOURI-AMERICAN WATER COMPANY

Case Nos. WR-2000-281 and SR-2000-282

May 25, 2000

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MISSOURI-AMERICAN WATER COMPANY

Case Nos. WR-2000-281 and SR-2000-282

May 25, 2000

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, et al.**

AFFIDAVIT OF TED L. BIDDY

STATE OF FLORIDA)
) **ss**
COUNTY OF LEON)

Ted L. Biddy, of lawful age and being first duly sworn, deposes and states:

1. My name is Ted L. Biddy. I am a consultant retained by the Missouri Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my surrebuttal testimony consisting of pages 1 through 26 and Schedules TLB-14 through TLB-18.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Ted L. Biddy FL DL# B300 812 38 0060

Subscribed and sworn to me this 24 day of MAY, 2000.

Dudney Allen Harris, Jr.
MY COMMISSION # CC579054 EXPIRES
August 22, 2000
BONDED THRU TROY FAIN INSURANCE, INC.

Notary Public

My commission expires Aug 22, 2000

SURREBUTTAL TESTIMONY

OF

TED L. BIDDY

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SURREBUTTAL TESTIMONY

OF

TED L. BIDDY

MISSOURI-AMERICAN WATER COMPANY

CASE NOS. WR-2000-281 AND SR-2000-282

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Ted L. Biddy. My business address is 2308 Clara Kee Boulevard, Tallahassee, Florida 32303.

Q. ARE YOU THE SAME TED L. BIDDY WHO SUBMITTED DIRECT TESTIMONY IN THIS CASE?

A. Yes, I am.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

A. The purpose of my surrebuttal testimony is to respond to the rebuttal testimonies filed in this case by Missouri Public Service Commission Staff witness Mr. James A. Merciel, Jr. and Missouri American Water Company witness Mr. John S. Young, Jr.

Q. CAN YOU DISCUSS ON A POINT BY POINT BASIS THE AREAS WHERE YOU DISAGREE WITH MR. MERCIEL'S REBUTTAL TESTIMONY AND THE BASIS FOR YOUR DISAGREEMENT?

A. Yes, I can. The first point with which I disagree with Mr. Merciel is on page 2 of his rebuttal testimony where he asserts on lines 5 through 15 that I was wrong in using estimated plant upgrade costs based upon evaluation of MAWC's 1991 report for upgrading the old plant as compared to

the new plant costs. Mr. Merciel seems to base this opinion on his statement on lines 9 and 10 that, "the 1991 (MAWC) evaluation only contemplated replacement of certain Old Plant components."

What Mr. Merciel failed to mention was that I included additional and very costly additions to the facilities proposed by MAWC in their 1991 report in order to bring the Old Plant up to and equal in every way to the New Plant so that cost comparisons would not only be fair but also accurate. Mr. Merciel chose to ignore the five additions which I made to the 1991 report facilities including new raw water intake, new low service pumping, new ozone facilities, new flood-proofing levee work around the plant, alternative access road improvements and adding an amount for cost increases from 1991 to 1998, all at about a $14,000,000 additional cost over and above the costs shown by MAWC in their 1991 report. Mr. Merciel's comments on this point are simply without merit because he completely ignored the fact that these important additional items were included in my evaluation.

Q. WHAT IS YOUR NEXT POINT OF DISAGREEMENT WITH MR. MERCIEL'S REBUTTAL?

A. The second point where I disagree with Mr. Merciel is found on page 2 of his rebuttal testimony at lines 16 through 18 where he states, "Another reason the 1991 evaluation costs should not be used, in my opinion, is that the proposal did not meet the standards of the Missouri Department of Natural Resources (DNR)." He goes on to say on page 3 at lines 1 through 4 that, "....DNR only approved a loading rate of 3 GPM per square foot, meaning that DNR would not approve the clarifiers as proposed by the Company for the proposed treatment capacity of 30 million gallons per day (MGD)."

Mr. Merciel has apparently not read the DNR's opinion of the pilot tests run by MAWC and reported to DNR. The truth is that DNR was so impressed with the results of the pilot tests of the Superpulsator Clarifers that they approved the proposed water treatment plant improvements as a full scale demonstration plant for a period of at least one year with the final construction approval to be given after one year of adequate operation. (See DNR letters of 11/19/92 and 1/27/93 which are a part of Schedule TLB-10 to my direct testimony.)

Q. WHAT IS YOUR NEXT POINT OF DISAGREEMENT WITH MR. MERCIEL'S REBUTTAL?

A. The third point where I disagree with Mr. Merciel concerns his discussion of what would constitute flood-proofing around the old plant from line 16 on page 3 through line 4 of page 6 of his testimony. Mr. Merciel seems to be saying that any facilities located in the Old Plant would have to be reconstructed above record flood levels in order to flood-proof the plant site. Such a statement or opinion flies in the face of many years of history throughout the Missouri River and Mississippi River Basins where millions of acres of land have been flood-proofed by levees for many years. Indeed, the existing plant site was protected by its existing levee in the 500 year frequency flood of 1993. The existing levee around the treatment plant was not overtopped or breached in any way but the site flooded from the unprotected east side when flood waters ran through the railroad ballast. If the site had been protected in 1993 by a new east side levee as I proposed and accounted for in my direct testimony, then it is almost certain that the existing plant would have continued operations uninterrupted through the 1993 flood. Simple engineering design can assure that protecting levees will not overtop or breach during flood events.

I don't know how much protection Mr. Merciel would have to have for him to consider this site flood-proof, but I find one of his statements to be incredible. Mr. Merciel states from line 23 on page 5 to line 4 on page 6 as follows,

> "However, since none of this investment was made prior to the 1993 flood, and a need to improve or replace essentially the entire Old Plant has been identified, I think it was reasonable and prudent for the Company to take advantage of the situation and construct the New Plant in a location where operation and access during flooding is not an issue."

First of all, Mr. Merciel is incorrect when he says that, "a need to improve or replace essentially the entire Old Plant has been identified." The entire plant was not to be improved or replaced under the MAWC 1991 report, only additions to the filters and replacing the secondary stage sedimentation basins with superpulsator clarifiers in phases 1 and 2; and adding new filters, new clearwell, transfer pump station and laboratory/support building in phases 3 and 4. These improvements would not have constituted "essentially the entire old plant" since the raw water intake facilities, the primary sedimentation facilities, the residuals disposal facilities, the finished water pipeline and other facilities were to remain in service. It was only during my comparison of the upgrade of the old plant to the construction of the new plant that new raw water intake structure was included in my calculations along with ozone facilities, flood-proofing around the plant, access road improvements and new low service pumping facilities. Mr. Merciel is mistaken when he says that essentially all of the Old Plant was to be improved or replaced under the recommendations of the 1991 report.

Secondly, and by far the most astounding statement by Mr. Merciel is his conclusion where he states, "I think it was reasonable and prudent for the Company to take advantage of the situation

and construct the New Plant in a location where operation and access during flooding is not an issue" (Emphasis supplied). Here, Mr. Merciel is obviously applauding MAWC's decision to abandon the old plant and build a new, far more costly plant by taking advantage of the situation. This statement is amazing, considering that construction of this new plant costs almost three times the price of refurbishing the old plant. It is not reasonable and prudent for a utility to take advantage of the situation, and in so doing cause the rate base of the St. Joseph District to triple.

Q. IS THERE ANOTHER AREA OF MR. MERCIEL'S REBUTTAL TESTIMONY WITH WHICH YOU TAKE ISSUE, AND IF SO, PLEASE EXPLAIN?

A. Yes, I take issue with Mr. Merciel's discussion of the usability of the graded roadway and County Line Road that extends north and east from the existing plant site. Concerning the usability of the alternative access road extending north and east from the Old plant site, it is obvious from the MAWC feasibility report of 1996 (Schedule TLB-3) that MAWC used this roadway for access to the plant during the 1993 flood, although the roadway is described as "barely passable" because two creeks had to be forded. Therefore, if any portion of this roadway is private, MAWC was obviously still able to get permission to use the roadway during the 1993 flood.

Moreover, I included the amount of $100,000 in my estimate for installing culverts at the two creek crossings in order to improve the roadway to a better than "barely passable" access. I consider this improvement adequate for emergency use during the rare 100 to 500 year frequency flood events. I simply don't understand or agree with the rationale of Mr. Merciel and MAWC for pricing the construction of another access route to the east at a cost of over two million dollars. There is no

conscionable way to justify such an expenditure for a roadway improvement that would be seldom if ever used.

Q. HAVE YOU REVIEWED MR. MERCIEL'S REBUTTAL TESTIMONY ADDRESSING THE EXCESS CAPACITY ISSUE?

Yes, and I do not agree with Mr. Merciel's methodology in determining an adjustment for excess plant capacity.

Mr. Merciel proposes a method, which only reduces the plant cost of the specifically overbuilt major items while ignoring all the cost of the ancillary facilities. I believe it more appropriate to reduce the cost of all facilities in the plant in order to arrive at a fair and equitable rate base for a plant with excess capacity.

Mr. Merciel takes issue with my methodology of determining excess capacity for a plant in order to compute a used and useful percentage for the plant. I compared the maximum daily flow for a growth period of two years to the design maximum daily flow capacity as has been done in other jurisdictions. This method yields a percentage used and usefulness of the total plant which has been viewed by some as a true yardstick for adjusting the cost of a plant for excess capacity. I believe that this method is particularly appropriate for the MAWC's St. Joseph District since the maximum daily flow seems to have basically stagnated over the last few years and it appears that future growth will be slow at best.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY IN RESPONSE TO MR. MERCIEL'S REBUTTAL TESTIMONY?

A. Yes it does.

Q. WILL YOU NOW PROCEED WITH YOUR SURREBUTTAL TESTIMONY TO THE REBUTTAL TESTIMONY OF MAWC WITNESS, JOHN S. YOUNG, JR. AND IN SO DOING, WILL YOU ALSO DISCUSS ON A POINT BY POINT BASIS THE AREAS WHERE YOU DISAGREE WITH MR. YOUNG'S REBUTTAL TESTIMONY AND THE BASIS FOR YOUR DISAGREEMENT?

A. Yes I will. The first area of Mr. Young's testimony on which I want to comment consists of the timeline which Mr. Young presents on pages 2 & 3 of his rebuttal testimony. Mr. Young states that the timeline he presents shows critical planning, design, and construction activities. I find serious problems with items left out of the timeline and some items included in this chart.

First of all, Mr. Young leaves out of the timeline any recognition that MAWC was still working with Missouri DNR to receive approval of the construction of the Superpulsator Clarifers and other upgrades to the existing plant as late as January 27, 1993 as evidenced by the DNR letter approval of the project as a full scale demonstration plant with final construction approval of the project to be given after one year of adequate operation. (See Schedule TLB-10 to direct testimony). This project was of course the same $22,600,000 proposed upgrade to the existing plant which MAWC submitted for approval in 1991.

It is little wonder that Mr. Young chose to leave this DNR approval out of his timeline since he finds it necessary to spend much of his additional rebuttal testimony trying to explain away MAWC's original low estimates for upgrading the existing plant with a myriad of excuses such as

the needed "scope of work not being fully defined" or the construction company that MAWC hired to assist them with the cost estimates not being accurate. Mr. Young seeks in his testimony to downgrade MAWC's original report on this project, which was formally submitted to DNR for approval, by calling the report a "memorandum," a "filter report," and an initial attempt to identify and compare filtration improvement alternatives.

The Missouri DNR, however, in their response letter of February 11, 1991 begins as follows, "An engineering report for a multi-phase water treatment plant improvements for the American Water Company in St. Joseph, Missouri has been reviewed." Obviously, the report and submittal by MAWC to the DNR was a full engineering report seeking approval of major upgrading and refurbishment of the existing treatment plant. Mr. Young simply cannot make the 1991 engineering report go away by calling it another name.

The timeline chart states that the firm of Gannett Fleming had been awarded the design contract for the improvements to the existing plant in February, 1993 and that the Gannett firm had produced a preliminary construction cost estimate in May, 1993. Mr. Young attaches the estimate as Schedule JSY-5, but he fails to include the cover letter to MAWC which transmits and comments on the estimate. However, I obtained by data request from MAWC the Gannett Fleming estimate with cover letter attached which I attach hereto as Schedule TLB-14. The cost estimate shows a total cost of $26,630,000 and includes new Superpulsator Clarifiers; new filters; new chemical building; new clearwell; new filter building; new transfer/H.S. pump station; all electrical work; all process related equipment, pumps and piping; HVAC systems: plumbing; instrumentation; and complete site work down to every minute item. This estimate is very detailed and includes all construction

necessary to upgrade the existing plant to 30 MGD capacity and state of the art condition. The Gannett Fleming cost estimate cover letter states that they have "estimated the project conservatively so that a large contingency factor need not be added."

The Gannett Fleming cost estimate is the only cost estimate produced by MAWC, either in reports or through data requests responses, which gives the normally detailed information that an engineering cost estimate should always contain. All other MAWC so-called "estimates" simply state a total cost for major items, usually with no detail at all. After adjustment for time difference of costs, the Gannett Fleming estimate would be very close to the original 1991 report total estimate of $22,600,000 for all upgrade facilities proposed at the existing plant.

The very next item in Mr. Young's timeline chart shows that, a month later in June, 1993, MAWC developed a revised project cost estimate in the amount of $44,100,000. This revised estimate had never been produced by MAWC before and adds $17,500,000 (66%) to the Gannett Fleming construction cost estimate to arrive at a total project cost estimate of $44,100,000. Here again, MAWC's so-called estimate only lists lump sum amounts for major costs with no detail. I have major disagreement with these added costs that MAWC lists for time updates of construction costs, contingencies, engineering and other items and adds to the project costs. I include my detailed analysis of these added costs in Schedule TLB-15, which shows that MAWC overstated the costs for most items.

Q. IS THERE ANYTHING ELSE ABOUT MR YOUNG'S TIMELINE CHART WHICH SHOULD CAUSE CONCERN?

A. Yes, the date given for the initiation of the Feasibility Analysis and the initiation of the design of the new ground water source and treatment plant. The chart shows the feasibility analysis being initiated in January, 1995 and the design of the ground water source and treatment plant being initiated in December, 1995. The feasibility study, which is described by Mr. Young throughout his testimony as the decision making document was not completed until November, 1996, yet MAWC chose to begin the design of the new ground water source and treatment plant in December, 1995, almost a year before the feasibility study was completed. This action by MAWC clearly shows that MAWC was not interested in making a meaningful comparison between the alternatives but had already made the decision to go forward with the new groundwater source and treatment plant almost a full year before the feasibility study was completed.

Q. PLEASE CONTINUE WITH YOUR POINT BY POINT DISCUSSION OF AREAS OF DISAGREEMENT WITH MR. YOUNG'S REBUTTAL TESTIMONY.

A. I take issue with Mr. Young's accusations on page 4 of his testimony that OPC through its consultant wants to "punish" MAWC by exclusion of a significant part of its rate base and that OPC seeks now to gain the benefit of the new treatment plant without supporting it. The truth is that OPC and its consultant have been extremely fair to MAWC in the evaluation of this case to the extent of giving the utility every benefit of the doubt on many issues. The fact that MAWC stands to lose a substantial amount of its requested rate base due to having constructed an imprudent and costly new treatment plant as compared to a prudent and cost effective upgrade and refurbishment which could have been accomplished at the existing site is simply the result of a prudence review of MAWC's actions. Certainly, the ratepayers should not be the ones who suffer due to MAWC's imprudent decisions.

Q. WHAT IS YOUR NEXT POINT WIITH REGARD TO MR. YOUNG'S REBUTTAL TESTIMONY?

A. The next point where I take issue with Mr. Young is his stated intention on page 5 of his rebuttal testimony to compare my and Dr. Morris' testimony to the previous testimony of Mr. Gary M. Lee in case Nos. WA-97-46 and WF-07-241 during the certificate case. Mr. Lee did not testify in any way in connection with prudence issues and, in fact, stated that he was not qualified to do so. Therefore, in this present prudence review case, any reference to Mr. Lee's testimony by Mr. Young must be disregarded.

Q. WHAT CONCERNS DO YOU HAVE ABOUT MR. YOUNG'S COST ESTIMATES?

Concerning Mr. Young's efforts through his testimony on pages 6 through 10 to down grade the 1991 multi-phase water treatment plant improvements report, I find it interesting that on page 6 at lines 9 and 10 that Mr. Young admits that, "I was responsible for supervising the preparation of cost estimates and the general scope of the project." If this is true and the report was so incomplete in scope and inaccurate in cost estimating, as Mr. Young states in his testimony, can we give any credence to any other scopes or cost estimates which he later is "responsible for supervising the preparation of"? I believe not.

Furthermore, I believe that the estimates for the continual scope additions presented by MAWC in this case are the most incompetent that I have seen in 37 years of engineering practice. Obviously, Mr. Young is trying to persuade the reviewer of these documents that the calculations regarding the upgrading and refurbishment of the existing plant which was sent to DNR was not to be seriously considered. It is obvious from an engineering review of this entire case that MAWC made an early

and hasty decision to construct the new treatment plant--long before the feasibility study was completed and that the cost estimates were skewed to try to justify their decision. How else could any reasonable person, much less a professional engineer, start with a complete estimate of $22,600,000 including engineering, construction supervision, community relations, interest and other soft costs for a project in 1991 and wind up with basically the same project with a few additions in 1994 with an estimated cost of $78,000,000?

Q. HAVE YOU NOTICED ANY INCONSISTENCIES IN MR. YOUNG'S COST ANALYSIS?

A. Yes. Mr. Young in his discussion of what items were included in costs presented in various reports and studies states on page 20 of his testimony at line 2 that, " the 1996 Feasibility Study purposely did not include treatment residuals processing costs for the surface water treatment plant at the existing site alternative." However, in response to my data request for the detailed cost estimate for the $78,000,000 cost estimate as stated in the text of the feasibility report, MAWC furnished a summary sheet with little backup documentation which clearly includes an amount of $8,000,000 for residuals processing. Mr. Young also stated on page 20 of his testimony that the, "Ozonation costs were included in the present worth analysis at a future date, consistent with the regulatory schedule." This statement leaves the impression that this $5,500,000 cost was not included in the $78,000,000 cost estimate. However, this impression is not true since the cost estimate sheet furnished to me by MAWC, in response to my data request for the detailed cost estimate of the $78,000,000, contains the Ozonation price.

I attach hereto as Schedule TLB-16 the cost estimate which was furnished to me by MAWC, which in combination with Schedule TLB-14 (the Gannett Fleming estimate) constitutes the full cost estimate calculations MAWC sent in response to OPC Data Request 4005. The cost sheet is labeled "Surface Supply and Treatment, Plant Improvements at Existing Site" and dated December, 1994. The document is not an engineering cost estimate but simply a listing of costs with no backup documentation for many major items. How these huge costs were obtained for many items over and above the 1993 Gannett Fleming Estimate of $26,630,000 and over and above the 1993 MAWC estimate of $44,100,000 is not detailed or explained. I believe that much of the additional costs which bring the total up to $78,000,000 are either not required or are greatly overstated as I have explained elsewhere in my testimony or have furnished to MAWC in response to their data requests of me.

The engineering cost estimates of alternatives being considered in any feasibility study or prudence review are the very essence of such studies and reviews. MAWC has done a very poor job in demonstrating these estimates or even that they performed the detailed estimates. With such sloppy and unprofessional work, no reviewing engineer or regulatory agency can put any faith in the lump sum estimates quoted by MAWC.

Q. WHAT OTHER INCONSISTENCIES HAVE YOU NOTICED IN MR. YOUNG'S REBUTTAL?

A. Mr. Young states on page 18 at lines 2 and 3 that, "Following the 1994 Planning Study, a more rigorous economical evaluation of alternatives was performed in the 1996 feasibility study." He further stated that, "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 analysis which was formally presented in the 1996 Feasibility Study." Here Mr.Young, in a paper thin attempt, tries to justify the one year ahead of time start of the design of the ground water source treatment plant--which was started nearly a full year before the feasibility report was completed. The truth is that "a more rigorous economical evaluation of alternatives" was not performed. The exact same so-called cost estimate of $78,000,000 was used for the upgrading of the existing plant as was prepared in 1994 and furnished to me in response to Data Request 4005. The only new cost estimate was that presented for the proposed groundwater source treatment plant of $75,445,000 which had been developed over the past year of design of this proposed new facility. This is just further proof that MAWC did not include a true comparison of upgrading the existing plant in their feasibility analysis but had already made the decision to construct the new ground water source treatment plant.

Despite the statement in his rebuttal testimony discussed above, Mr. Young amazingly states on page 19 at lines 18 through 20 that, "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." This statement is incredible when Mr. Young has just finished testifying that MAWC made the decision in late 1995 to move forward with the design of the ground water alternative.

Q. WHAT COMMENTS DO YOU HAVE REGARDING MR. YOUNG'S TESTIONY REGARDING EXISTING PLANT COST ESTIMATES?

A. On pages 23 through 27, of his rebuttal testimony, Mr. Young seeks to explain MAWC's cost estimation methodology. The main theme of his explanation is that the scope of improvements at the existing plant in the 1991 estimate was inadequate but that MAWC's (so-called) estimates in 1994 and 1996 were accurate. He then states that the fact that the 1994 estimate of $73,500,000 for the new treatment plant, the 1996 estimate of $82,300,000 for the new treatment plant compared to the actual cost of $70,000,000 "demonstrates that the Company did not purposely undervalue the groundwater project." In this explanation, Mr. Young completely misses the point of my testimony. The fact that the cost estimates for the new plant were above the actual cost of the new plant has nothing to do with MAWC's so-called cost estimates of upgrading and refurbishing the existing plant which I have testified are overstated and contain substantial items which are not needed.

Q. ARE THERE SPECIFIC ERRORS IN MR. YOUNG'S COST ESTIMATES OF UPGRADING THE EXISTING PLANT?

A. Yes, on pages 25 and 26, Mr. Young makes a number of misstatements. He first states that the initial value of the 1991 report renovation project was $26,600,000 when in fact it was $22,600,000.

He then states that new intake facilities and ozonation facilities were necessary--which I dispute.

He then repeats the disproved statement that the cost of residual handling facilities were not included in the 1996 feasibility study, "in an attempt to show a lack of bias against the renovation of the existing site." As I stated above, the $78,000,000 cost estimate for renovation of the existing plant which was sited in the feasibility study and as furnished to me by data request contained an

$8,000,000 lump sum amount, without any detail or explanation, for residual facilities. See Schedule TLB-16.

Q. HOW DO YOU RESPOND TO MR. YOUNG'S COMMENTS REGARDING THE USE OF THE PRESENT WORTH METHOD IN THE 1996 STUDY?

A. Mr. Young's statement on page 26 that, "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," is curious. Of course, the present worth method is a good way to compare alternatives, if and only if an accurate engineering estimate has been made to define the costs of the project. In this case, while MAWC may have made a reasonable cost estimate for the proposed new ground water source and treatment plant, no such accurate estimate was prepared for the upgrading and refurbishing of the existing plant. After the 1993 Gannett Fleming $26,630,000 estimate for the existing plant, no estimates worthy of the title "Engineering Estimates" were made by MAWC for the existing plant. The so-called estimates by MAWC were overstated and unreasonable lump sum wild guesses prepared without any competent engineering documentation. As such, these so-called estimates by MAWC were nothing more than self-serving numbers in order to justify a decision already made by MAWC to construct the new groundwater facility.

Mr. Young criticizes both Dr. Morris' and my cost estimates throughout his testimony by saying that our estimates have underestimated construction costs, that the scope of improvements is insufficient and that non-construction costs are underestimated. He also states that neither Dr. Morris or I performed present worth analyses. I will not attempt to answer for Dr. Morris except to note that he started from the 1991 report estimate by MAWC as did I and that the 1991 cost

estimate to update and refurbish the existing plant also includes engineering design; engineering supervision during construction; interest during construction; community relations costs; and a 10% contingency amount. My estimate simply updated these costs to the year 1998 by use of authoritative industry standards for cost increases. To this updated cost estimate, I added the costs of ozone facilities, new raw water intake, and new low service pumping, all as taken from MAWC's 1996 feasibility report. Additionally, I then added the costs of plant flood-proofing around the existing plant and the cost of improving the alternative access road to a passable condition during flood events. When I totaled these amounts to only $36,307,591, I saw no need to go further with a present worth analysis because I believed I had already conclusively proved by my estimate that the upgrading and refurbishing of the existing plant was by far the most cost effective alternative and that the construction of the new ground water facilities by MAWC was very imprudent.

Q. IS THERE ANYTHING IN MR. YOUNG'S TESTIMONY AND CRITICISM OF YOUR COST ESTIMATES THAT WOULD CAUSE YOU TO INCREASE YOUR COST ESTIMATE?

A. Yes. In deference to the concern about the hazards of flooding, I would increase my flood protection cost estimate due to MDNR's requirement that the flood protection elevation be four feet above the record flood level. When I inspected the existing plant in the presence of MAWC District Manager, Mr. Bob Amman, I was told by Mr. Amman that the flood waters did not overtop the levee but the plant site flooded from water flowing through the railroad ballast on the east side of the plant. Since the 1993 flood level was equivalent to a 500 year frequency flood, I only

accounted for further protection of the unprotected east side, because at the time I prepared my direct testimony, I did not know of the MDNR's requirement for four feet above the record flood elevation. All jurisdictions where I have worked on flood protection require only that facilities be protected from the 100 year frequency flood.

I would now revise my cost estimate to include the raising of the existing levee and my proposed new levee along the east side to a level that is four feet above the record flood level of elevation 826.39 feet. This would place the top of all levees at an elevation of 830.39 feet. I have computed the earthwork required to make this revision from maps received from MAWC and have obtained the quantity of 33,353 cubic yards of material which would need to be added to the levees to obtain the required MDNR flood protection elevation. At an estimated cost of $15.00 per cubic yard of in-place construction, the cost of the flood protection levee would now be increased to $500,295 which is an increase of $372,184 over my previous estimate for this work. Therefore, my previous estimate of $36,307,591 for the upgrading and expanding of the existing treatment plant should be increased to $36,679,775 to reflect this addition to the flood-proofing cost.

The above described flood-proofing includes levees with a top elevation of 830.39 feet along (1) A new levee extending the length of the east side from the existing levee at the north to the entrance drive at Water Works Road on the south; (2) A new levee along the entrance road all along the south and west sides for about 1400 feet to the intersection with the existing levee near the center of the plant area; and (3) Raising the existing north side levee for its full length to its intersection with the new east side levee.

The above described levee includes a densely compacted earthen structure with an impervious clay core, a gravel surface topping and seepage collars for all pipelines which cross the levees. This very conservatively designed levee would assuredly render the existing treatment plant site flood-proof.

Q. WHILE WE ARE DISCUSSING FLOOD-PROOFING, HAVE YOU STUDIED THE ELEMENTS OF THE NEW GROUND WATER SOURCE AND TREATMENT PLANT AND DO YOU HAVE AN OPINION AS TO WHETHER THESE NEW FACILITIES CONSTRUCTED BY MAWC WILL BE FLOOD-PROOF?

A. I have studied the new plant and made an inspection at these facilities on February 15, 2000. I found that the actual new treatment plant and electrical facilities were located on high ground, well above any danger of flooding. However, when I inspected the seven new vertical wells and the one horizontal collector well, I was surprised to see that all of these raw water source wells were located inside the Missouri River levee system within a relatively short distance of the river bank (perhaps 100 yards). The ground area at each of these new wells is at a level essentially equal to the elevation of the river bank and is certain to be flooded during even minor floods of the Missouri River.

The first three pictures that I obtained during by inspection of these wells and which I included in my direct in Schedule TLB-2 show these wells with the unprotected discharging piping. Picture No. 4 shows the horizontal collector well in its unfinished condition which would also have unprotected discharge piping. Although the pumps and electrical systems for the vertical wells are located on platforms which are above flood level, the discharge piping from the well heads at each

of these vertical well platforms extends a short distance horizontally and then turns down vertically to the ground where it then extends underground to piping leading to the treatment plant. The exposed vertical discharge piping at each of these wells is located a short distance away from the platform and is completely unprotected from floating debris such as large trees during flood events. One collision from even a small log or tree with the vertical discharge piping could break the pipe and put the well out of service. All seven of the vertical wells are identical in construction and have the same susceptibility to being put out of service during even minor floods. It is not unreasonable to envision that several of these vertical wells and the horizontal collector wells may be put out of service in every flood event. Furthermore, floating trees that have been washed off river banks during a flood many times have large limbs which extend many feet above the trunk. These limbs could easily reach the vertical well pumps and electrical switch gear and wreak havoc with these facilities.

My career experience has included extensive work on the Mississippi River and on the very "flashy" Arkansas River which is similar to the Missouri River. A flashy river in engineering terms means a river which rises in a relatively short period of time and usually has a very swift current with the swift waters laden with debris such as large logs and trees. These types of streams are very dangerous to unprotected structures located adjacent to the river and I have seen extensive damage and even loss of life in adjacent flood plains to such flashy rivers. Therefore, I believe that MAWC has made a fundamental error in locating their raw water supply wells in areas subject to frequent flooding and have rendered their source of supply much more unreliable than they had at their existing plant. The MAWC source of raw water supply at the new facility is much less flood-proof than the intake structure at the old plant.

Q. PLEASE COMMENT ON MR. YOUNG'S TESTIMONY ON PAGE 33 WHERE HE STATES THAT YOU HAVE " UNDERESTIMATED THE MAGNITUDE OF THE IMPROVEMENTS REQUIRED TO PROVIDE ACCESS TO THE TREATMENT PLANT DURING SEVERE FLOODING EVENTS."

A. Yes. As I explained in my surrebuttal testimony to Mr. Jim Merciel's rebuttal testimony, I included an amount of $100,000 in my estimate to make the alternative access road to the north more than just "barely passable" by fording two creeks with a four wheel drive truck as described by MAWC in their feasibility study. I did not intend to provide more than a culvert at each creek crossing because I do not consider further expenditure for this emergency access, which will be seldom if ever used, justified. There is some confusion in the estimated cost of what others propose for improvements to this alternative access route. One time an amount of over two million dollars is discussed. The cost summary sheet furnished to me by MAWC which was prepared in 1994 shows an amount of $700,000 for this item. As with most such so-called estimates furnished by MAWC, no detail or engineering documentation is furnished for this lump sum listing of $700,000 for access road work. In either case, I would consider anything over minor improvements to this road and the creek crossings to be funds that need not be spent so long as this seldom used road is passable in flood events.

Q. DO YOU HAVE ANY COMMENTS CONCERNING MR. YOUNG'S CRITICISM OF YOUR LACK OF INCLUSION OF RESIDUAL HANDLING FACILITIES IN YOUR COST ESTIMATE FOR RENOVATING THE EXISTING TREATMENT PLANT?

A. Yes. As I stated in my prior testimony in this case, I performed a lengthy interview with MDNR officials concerning this exact point. Also, in response to MAWC's data request, I furnished a listing of questions which I asked these officials along with their answers. I include this list of questions and answers as Schedule TLB-17. As explained previously in my testimony, four separate MDNR officials agreed that MAWC could have continued returning residuals to the Missouri for the foreseeable future. Therefore, I obviously did not include such unneeded facilities in my cost estimate.

Even if, in the future, residual handling facilities were mandated for the existing plant, only about 5,000,000 pounds or 2,500 tons annually of residuals consisting of coagulation residuals and spent filter backwash water would be required to be processed. The remaining 49,000,000 pounds annually which represents raw water solids from the river water are specifically allowed by The Clean Water Act to be returned to the river. Therefore, if residual handling facilities were mandated in the future, the most residuals involved would be 2,500 tons per year.

Dewatering, drying and hauling 2500 tons of residuals to a land fill would amount to 125 trips per year for a 20 ton loaded truck or about 2.4 truck loads per week. I have made no estimate for the cost of these facilities but it is obvious that the $8,000,000 lump sum amount shown by MAWC in their cost summary sheet is a ridiculous amount and further demonstrates the fuzzy thinking and loose manner in which MAWC prepared estimates for the upgrading of the existing plant. Dewatering and drying beds for 2500 tons/yr of residuals could not cost over $1,000,000 even if you had to purchase the land. The cost per truck load of haul might cost $100 per trip if you contracted the haul to a landfill 10 miles away. Hauling under this contract basis would then cost

about $12,500 per year. These rough order of magnitude estimates are not precise but demonstrate the difference between MAWC's estimating and the real world.

Q. DO YOU HAVE ANY COMMENTS TO MR. YOUNG'S DISCUSSION OF PLANT CAPACITY AND ECONOMY OF SCALE WHERE HE ALLEGES ERRORS IN YOUR CALCULATIONS AND CITES OTHER DIFFERENCES OF OPINION?

A. Yes. On pages 47 through 56, Mr. Young takes issue with my testimony on a number of points. I will reply to his comments on a point by point basis. First, concerning alleged errors which I made in calculation of excess capacity, Mr. Young asserts that I failed to consider in-plant water usage, ignores accepted standards regarding margin of safety, failed to consider a reasonable planning horizon and have a lack of understanding of construction costs, incremental costs and economies of scale. Dealing with the alleged errors in calculation of excess capacity by failing to include in-plant usage which Mr. Young tries to demonstrate in his Schedule JSY-17, I would point him and the Commission to my Schedule TLB-18 which is my response to a prior data request from MAWC as to the specific calculation I made for the projected Maximum Daily Flow (MDF) at the year 2002. In this calculation, the first maximum daily flow for the year 2002 was found to be 22.3 MGD based on actual flow records of 1999 as compared to projected flows. I could have left this MDF at 22.3 MG, but still giving the Utility every benefit of the doubt, I averaged the 22.3 MG with the theoretical value of 25.97 MG to obtain an average value for MDF of 24.135MG. Mr. Young would have me add 5% of demand to my computed number to allow for in-plant water use. I refuse to add this 5% because I have already added 1.835MG or 8.23% to my first projection through the averaging discussed above. Mr. Young starts at the projected 26.25 MG for the year 2002, then

ignores any reduction for historic actual flows and simply adds 5% or 1.31 MG to obtain his total of 27.56 MG. In his ignoring of historic actual flows, Mr. Young refuses to acknowledge that flows have not come up to his company's projections due to loss of industrial customers in recent years. For example, actual MDF for 1999 was only 21.888 MG or 84.8 % of the MAWC projected MDF of 25.81 MG for 1999.

Mr. Young then states that I ignored accepted standards regarding appropriate margin of safety. Quite to the contrary, I have included a 2 year growth margin of safety as some jurisdictions would add and I have also averaged MDF computed values based on actual recent historic flows with the theoretical MDF which adds a greater margin of safety. Mr. Young's accusation that I failed to consider a reasonable planning horizon is just his opinion. He cites Virginia regulations as having a utility initiate expansion plans when demand reaches 80% of rated capacity and tries to equate this rule to a 20% margin of safety. This interpretation is not true. The rule simply means that a utility should start its planning, permitting, plans and specifications when the demand reaches this level. The same meaning can be understood from the American Water Works Journal cited by Mr.Young which would have a maintained 10% margin of safety. Looking at the MAWC MDF flows which I computed for the year 2002 reveals that I have used a value of 24.135 MG as compared to 22.3 MG computed based on actual recent flows. This amounts to an 8.23% increase over the actual MDF of 22.3 MGD that will probably be experienced. Based on the 8.23%, MAWC would need to begin expansion planning if the Utility was growing. However, since the growth has basically stagnated, no future expansion plans would probably be warranted for several years to come. Each utility's supply and demand is directly determined by the particular location and demographics of the area served. The utility must continuously be aware of future demands by keeping accurate records of

past flows and accurately project future flows. Such is the nature of the business. I take great exception to Mr. Young's accusation that I have a fundamental lack of understanding concerning construction costs, incremental costs and economies of scale in my calculations of used and useful percentages for a treatment plant. There were no fundamental errors made in computing the flows at the year 2002 despite what the calculations of Mr. Young would have shown to be erroneous.

The margin of safety and the planning horizon were also reasonable and proper. The used and useful percentage was computed based on the MDF at the growth period compared to the MDF of the design. This calculation resulted in a used and useful percentage of 80.45% which is viewed by many as a true yardstick for determining the amount of cost of the facilities which should be included in the utility's rate base. While it is true that some components in a treatment plant do not bear a straight line relationship in cost to the capacity of the component, the fact remains that many components do bear such a relationship. Rate making is not an exact science but some jurisdictions have determined that it is proper and a good yardstick to multiply the computed used and useful percentage by the capital cost of the facilities to obtain the amount of cost which should be included in a utility's rate base when the utility has overbuilt facilities.

Q. DO YOU HAVE ANYTHING ELSE TO ADD TO YOUR TESTIMONY?

A. I have just one further comment. Throughout the studies, reports and testimony by MAWC we are told that the new ground water source and treatment plant would have a higher quality source water and would result in higher quality of finished water for the customers of MAWC. However, judging from the complaints which I read in the St. Joseph News Press, it appears that the water quality from the new groundwater source and treatment Plant is anything but high in quality.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. Yes, it does.

LIST OF SCHEDULES

Schedule No.	Description
TLB –14	The Gannett Fleming $26,630,000 cost estimate with cover letter.
TLB – 15	Ted Biddy's analysis of added costs in MAWC's $44,100,000 estimate.
TLB – 16	The MAWC $78,000,000 cost estimate which was furnished to Ted Biddy by MAWC through data request.
TLB – 17	Listing of questions to and answers received from MDNR officials during interview by Ted Biddy as previously furnished to MAWC through data request.
TLB – 18	Ted Biddy's calculation of MDF for year 2002 that was furnished to MAWC in response to data request.

Gannett Fleming
ENGINEERS AND PLANNERS

GANNETT FLEMING, INC.
P.O. Box 67100
Harrisburg, PA 17106-7100
Location:
207 Senate Avenue
Camp Hill, PA 17011
Fax: (717) 763-1808
Office: (717) 763-7211

May 27, 1993

Mr. Steve Creel
American Water Works Service Company
1025 Laurel Oak Road
Voorhees, NJ 08043

Re: Project No. 28512 - Construction of Water Treatment Plant Improvements for Missouri-American Water Company, St. Joseph District, St. Joseph, MO

Dear Steve:

As a follow-up to our conversation of May 26, 1993, I am providing you with a cost breakdown for the various facilities proposed for this project. As previously noted to you, these summated values reflect a construction cost projected for bidding this project in December of 1993. The costs do not include contingencies, however, we feel that we have estimated this project conservatively so that a large contingency factor need not be added at this time. Should you require additional cost breakdowns for process related equipment, please feel free to contact me.

Very truly yours,

GANNETT FLEMING, INC.
Water Resources and Geotechnical Division

LAURENCE S. ZIMMERMANN
Project Manager, Water Supply Section

cc: File 28512

[illegible]

Schedule TLB-14

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT Mo-American St. Joe's WTP
Prel. Est. Breakdown

BY DATE CHKD. BY DATE

SHEET NO. 1 OF 3
JOB NO. 2.8512

Electrical -	$ 2,425,000
HVAC -	776,000
Plumbing -	505,000
Instrumentation	1,550,000

Site Work:

Tank & Fdn.	1,940,000
Bldg. Fdns.	2,910,000
Raw Water main & Meters	190,000
Settled Water	285,000
Transfer Pipe/H.S. Section	402,000
H.S. Discharge	52,000
Waste water Line	102,000
Overflow	37,000
Sanitary Facilities	24,000
Pulsator Drain lines/valves	122,000
Pre Sed Basin Mods.	58,000
Chem feed lines to intake	92,000
Spill Containment System	15,000
Storm Water System	48,000
Soil Erosion & Control	19,000
Utility Relocations	48,000
Paving	37,000
Curbs	10,000
Sidewalks	7,000
Structural Excavation/Backfill	182,000
Demolition - Basin #1,2,3 - Filter Bldg	493,000
Topsoil Seeding	10,000
Landscaping	48,000
Site Dewatering - well pts	194,000
Puls. temp flume	25,000
	7,350,000

Total This Page $ 12,606,000

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT MO - American St Joe's WTP
Prel. Est Breakdown
SHEET NO. 2 OF 3
JOB NO.
BY DATE CHKD. BY DATE

1. Pulsators

Concrete	1,273,000
Superstructure	754,000
Process	1,600,000
	* 3,627,000

2. Chemical Bldg

Concrete	836,000
Superstructure	1,051,000
Process	2,448,000
	* 4,335,000

3. Filter Bldg / Clearwell

Concrete	1,288,000
Superstructure	665,000
Process	2,540,000
	* 4,493,000

4. Transfer / H.S Pump Station

Concrete	305,000
Superstructure	365,000
Process	899,000
	* 1,569,000

Total This Page: $ 14,024,000

GRAND TOTAL * 26,630,000

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ENGINEERS AND PLANNERS

SUBJECT Mo-American St Joe's WTP
Prel. Est. Breakdown
SHEET NO. 3 OF 3
JOB NO.
BY DEM DATE 5/93 CHKD. BY DATE

Summary of Unit Prices

Concrete	CY	450.-
D.I F. Hings	LB	2.00
48" DIP	LF	200.
42" DIP	LF	175
36" DIP	LF	137
Bit. Paving	SY	25.-
Conc. Curbs	LF	20
Conc. Sidewalks	SY	25
Structural Excavation	CY	10
Structural Back Fill	CY	15
Superstructure - Pulsators	SF	60
- Filters	SF	60
- Chem. Bldg	SF	80
- Pump Sta	SF	80

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ENGINEERS AND PLANNERS

SUBJECT

BY DATE CHKD. BY DATE

SHEET NO. 1 OF 1
JOB NO.

Process Breakdown By 1st sheet #

sheet #	(1) Pulsators	(2) Chem	(3) Filters	(4) Pump Sh	I Instrum.	pg total
1	—	9,000	—	456,000	—	465,000
2	—	—	—	—	316,000	316,000
3	—	115,000	—	—	—	115,000
4	1,360,000	110,000	4,000	—	—	1,474,000
5.	—	401,000	—	—	—	401,000
6	—	549,000	—	—	—	549,000
7	—	105,000	1,698,000	—	—	1,803,000
8	—	373,000	—	32,000	—	405,000
9	74,000	99,000	554,000	320,000	—	1,047,000
10	74,000	—	—	—	—	74,000
11	27,000	400,000	210,000	78,000	—	715,000
12	—	—	—	—	657,000	657,000
13	—	—	—	—	280,000	280,000
14	—	—	—	—	345,000	345,000
15	44,000	30,000	94,000	5,000	—	173,000
16	7,000	162,000	4,000	—	—	173,000 *
17	54,000	46,000	—	—	—	100,000
18	—	25,000	—	—	—	25,000
19	10,000	100,000	54,000	36,000	—	200,000
	1,650,000	2,524,000	2,618,000	927,000	1,598,000	9,317,000
X.97 =	1,600,000	2,448,000	2,540,000	899,000	1,550,000	

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SUBJECT St. Joseph
Preliminary Estimate

SHEET NO. 1 OF
JOB NO. 28512

BY DATE CHKD. BY DATE

Division 11000

11160 Dock Leveler & Bumpers

H. 5488 x 1.38 = 7573 x 1.15 = 8700
B. 7000 x 1.265 = 8855
F 10,350 x 1.3225 = 14,200

use $9,000 -(2)

~~11202 Sluice Gates~~ see worksheet

11214 Vertical Turbine Pumps

5.0 MGD Transfer Pump	@	75HP	$33,000
10.0 " " "	@	125HP	$50,000
15.0 " " "	@	200HP	$65,000
15.0 " " "	@	200HP	$65,000

6 MGD VFD High Service Pumps.

Con Pump		600HP	$70,000
VFD			$43,000

3,24 000
x 1.4
$ 456,800 (4)

$465,000

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ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 2 OF

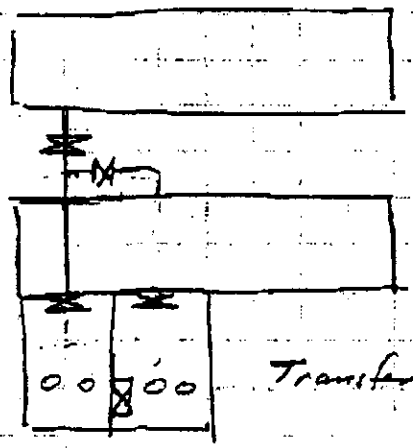
JOB NO.

BY DATE CHKD. BY DATE

Sluice Gates

Assume

6 Filter Influent Gates w/ Motor Open	3'x3'	@ $15,000	= 90,000
6 Filter Waste Gates w/ Motor Open	2'x3'	@ 14,000	= 84,000
2 Clearwell Gates w/ Floor Stand	4'x4'	@ 20,000	= 40,000
1 Clearwell Gate w/ Floor Stand	3'x3'	@ 15,000	= 12,000
			226,000
			x 1.4
			316,400



316,000

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ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 3 OF

JOB NO.

BY DATE CHKD. BY DATE

11214 Vertical Turbine Pumps

Transfer Pumps

5 MGD

10 "

15 "

15 "

High Service Pumps w/VFD

6 MGD

See first sheet

112 Chemical Transfer Pumps

2 C.S.

2 F

2 A

2 CA

2 Waste Water

10 Pumps @ $11,500 = $115,000

F 7 900 00 x 1.3225 = 10,450

13 41,000 (Y) x 1.265 = 13,000 use 11,500

$115,000 (2)

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ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 4C OF

JOB NO.

BY DATE CHKD. BY DATE

12 $18,000

11218 Sample Pumps

Pre Seal Basin Effluent
Mixed Water
Filter Influent
Filter Effluent 4 @ 1000 = 4000 4K (1) 4K (3)

11223 Fiberglass Stop Gate and Weir Plate

Slow Mix Basin
3 @ 5' x 3'
2 @ 5' x 5'
Pulsator Effluent
3 @ 7' x 2'
3 @ 7' x 4'
11 @ $2,000 w/ frame $22,000 10K (2) 12K (1)

11224 Pulsator Units
3 @ 960,000 x 1.4 = 1,344,000 (1)

11225 Mixer Equipment

	Mixer	+ VFD	
1 Rapid Mixer @	$33,600	+ 9,500 =	43,100
1 Slow Mixer @	$24,300	+ 4,500 =	28,800
			$71,900
			x1.4
			$100,660 (2)

1,474,000

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SUBJECT

SHEET NO. 5 OF

JOB NO.

BY DATE CHKD. BY DATE

11241 Polymer Feed Pumps

4 @ $8000 ea. 4 = $45,000

11242 Chemical Feed Pumps

4 Series 43 @ 7,000 = 28,000

16 Series 44 @ 5000 = 65,000

1 Series 45 @ 2000 = 2000

85,000 x 1.4 = 120,000

11244 Chlorination Feed System 13 49000

2 Pre Cl$_2$

2 Pos Cl$_2$

2 Evaporators

Say $140,000

11245 Cross Linked High Density Polyethylene Tanks w/ Site Gauges

4 –	10,000 Gal	Alum	$44,000
1 –	6,000 Gal	Fluoride	6,000
1 –	6,000 Gal	Coagulant Aid	6600
1 –	6,000 Gal	Spare Tank	6600
1 –	400 Gal	Alum Tank	440
1	Gal	Coag Aid	440
2	Gal	$KMnO_4$	880
2	Gal	Filter Aid	880
2	800 Gal	Polymer Batch Tanks	1760
1	400 Gal	Lab Wastewater Tank	440

68,640 x 1.4 = 96000

= 100,000

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SUBJECT

SHEET NO. 6 OF

JOB NO.

BY DATE CHKD. BY DATE

11246 Batch Tank Mixer

P 2.5hp 3,100

2 KMnO4

2 Polymer Tanks

4 @ 3100 2 $12,000

11247 Bulk Chemical Feed System

Lime Silo & Feeders 3 172,000

Belt Weight Transmitter H 23,000 33,000

180,000 x 1.4 = 252,000

Carbon Silo & Feeders

Belt Weight Transmitter 130,000 x 1.4 = 182,000

11248 Steel Tanks w/ Site Gage & Heat System

@ 34000

6000 Gal Caustic Soda Tank 15,000 +

400 Gal Caustic Soda Day Tank

w/ Heat Syst + Insul. H (706+1000) 4.15 = 14,600

say 25,000

11250 Chemical Feed System Accessories

~~4 Cl2 Scales~~

2 Cl2 Gas Detectors x 1500 3,000

1 Fluoride Scale x 4000

1 SBP Scale 4000

1 Alum Scale 4000

1 C.A. Scale 4000

1 KH Scale 4000

2 KMnO4 Scales 8,000

Misc. Equip say 25,000

56,000 x 1.4 = $78,000

54,000 (2)

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ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 7 OF

JOB NO.

BY DATE CHKD. BY DATE

11311 Air Compressor & Related Equipment
B 27,250 × 1.265 = 34,471
F 23,650 × 1.3225 = 31,277 434 33,000 (2)

11323 Centrifugal Blower B 20,800 (2)
40,000 × 1.4 56,000 (3)

11450 Kotogas Unit H 6200 × 800 10,000 (2)

13410 Spill Containment Tank F 31,250 × 1,000 ×
B 42,000 $54000 (2)

Spill Containment Tank

Spill Containment Valve Manhole 8000 (2)

13521 (a) Filter Underdrain System

13522 (b) Filter Manifold $\frac{384}{12}$ 5.33 × 34 × 12 × 30 #/CF 1.0" 1.25 742,000 (3)

13524 (c) Fiberglass Washwater Troughs

(d) Air Lateral & Distribution System

q × d = $\frac{835,00-}{10 \times 34 \times 17}$ = $144.44/SF × 12 × 15.33 × 34 = 903,562

say $900,000 (3)

$1,803,000

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 8 OF

JOB NO.

BY DATE CHKD. BY DATE

Elevator IS 20,000 x 1.265 = $101,000 (2)

14300 Hoists & Cranes

2 - 2 Ton Chlorine Cylinder Hoist

LC 6000 = $12,000 (2)

1 - 7½ Ton Pneumatic Crane $32000 (4)

H 18,000 x 1.15 x 20,700 x 1.38 x 28,566

= x 1.15

Jammer Unit = 32,850

14510 Trucks & Lifts

1 - Fork Lift

1 - High Lift Pallet Truck

1 - Drum Handler 10,000 (2)

IS 6000 x 1.265

H 8500

12600 Laboratory IS 70,000 x 1.265 = 88,500

H 65,000 x 1.15 x 1.38 = 103,000

use $105,000 (2)

Scrubber System IS 105,000 x 1.14 $145,000 (2)

$405,000

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 3 OF

JOB NO.

BY DATE CHKD. BY DATE

15100 Process Piping

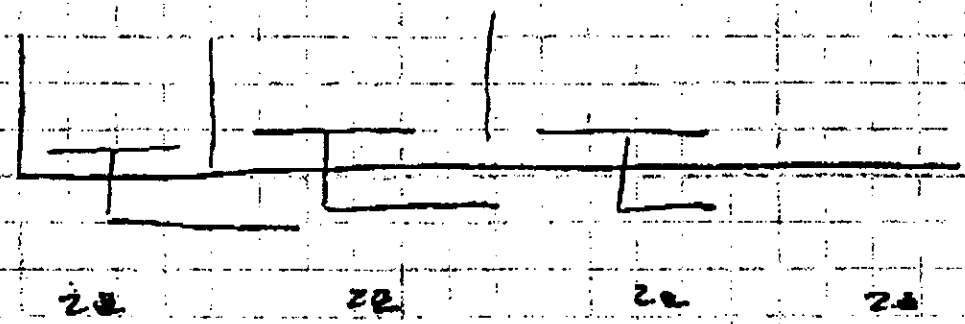
Presedimentation Basin Effluent	D		
Pulsator Influent Piping	D		
Process to Filter Piping & Valves	L		
Raw Water Vault Pipe?		5000	(2)
Pulsator Blow-off Piping	L	14,000	(1)
Raw Water Main in Plant	37,721 @ 2.50	94,300	(2)
Pulsator Drain Piping	D		
Filter Air Wash Piping	say 50 ft x 100	$15,000	(3)
Filter Rack Piping	74,173 @ 4.00	305,000	(3)
Washwater Piping	39,823 @ 3.00 +	120,000	(3)
	+ 2828 @ 3.00	8,500	(3)
Clearwell Interconnection Piping			
	1 48 BFV = 24,500		
	1 36 BFV 11,200		
Rehab Piping	say 27,995 x 2.50 = 69,988	105,700	(3)
Transfer Pump Discharge Piping		93,925 @ 2.50 = 235,000	(4)
High Service Suction Piping			
High Service Discharge Piping			
Valves		8500	(4)
		1047,500	

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT
BY DATE CHKD. BY DATE

SHEET NO. 20 OF
JOB NO.

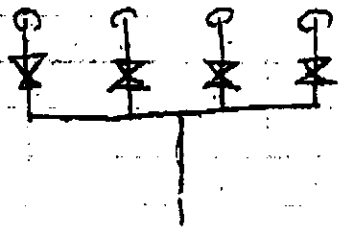
Pulsator Blow-off Piping



4 Valve / Pulsator
x 3

12 - 6" ϕ Plug Valve @ 3,800 = $42,000
x 1.4

58,800 (1)



6 6'-90° @ 65 = 390
3 6" Tee @ 95 = 285

20' 6" ϕ x 22#/' = 440
8 6" ϕ Flg x 17#/Flg = 136

1251 x 3 = 3753# @ $4/# = $15,012 (1)

74,000

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 11 OF

JOB NO.

BY DATE CHKD. BY DATE

Plant Service Piping 10,430# @ 4.2 - $42,000
Valves 18,100
$60,000 (2)

Carbon Removal System Piping
250' @ $40/. $10,000 (3)

Chemical Feed Piping &
Chemical Feed Connection 200,000 (2)

Pipe Supports & Hangers say 100,000 (2) 70K (3) 50K (4) 20K

Piping Insulation
Both 212,000 + 1,265 = 265,000 say $250,000 (2) 75 (3) 125 (4) 50

Modular Seals 50,000 (2) 9 (3) 15 (4) 20 (5) 4

Pipe Trays 10,000 (2) SR (3) UR

Pressure Gauges say 20 @ 400 8000 (2) SK (3) 1 (4) 2

Truck Hose Adapter & Vault @ 11 @ $200 $2200 (2)

Water Spray Piping System for Pulsator Floors

3 @ say $6000 18,000 (1)

5 II
1 CH
1 CS
1 Sc
1 SP
1 Wash
1 F

$214,800

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 12 OF

JOB NO.

BY DATE CHKD. BY DATE

Instrumentation

1.	~~1 - 36" ϕ Magmeter~~				
2.	6 - 18" ϕ	Filter Effluent Flow Tubes @ 55-25			33,150
3.	1 - 24" ϕ	Washwater Flow Tube			18,250
4.	1 - 42" ϕ	Transfer Pump Discharge			30,960
5.	1 - 48" ϕ	High Service Pump Suction			33,000
6.	1 - 12"	Pitot Tube			2000
7.	2	6" Plant Service Turbine Meter	3000		6000
8.	1	2" Batch Tank Meter	5000		5000
9.	16	Differential Pressure Transmitter	2000		32,000
10.	3	Pulsator Conductive Level Probes	1000		3000
11.	6	Filter Conductive Level Probes	2000		12000
12.	2	Clearwell Conductive Level Probes	1000		2000
13.	1	Rapid Mix Level Probe			1000
14.	1	Filter Influent Level Transmitter	4000		4000
15.	2	Pump Suction & Discharge Pressure Transmitter	2000		4000
16.	8	Tank Capacitance Level Transmitters	4000		32,000
17.	4	Batch Tank Capacitance Level Probes	1500		6000
18.	4	Day Tank Capacitance Level Probes	1500		6000
19.	10	Spill Containment Probes	1500		15000
20.	1	Sump Alarm			1000
21.	2	High Range Turb.	2000		4000
22.	7	Low Range Turb	4000		28,000
23.	6	Backwash Turb @	2500		15000
24.	3	pH Meters @	3000		9000
25.	1	SCD			10,000
26.	3	Chlorine Residual Analyzer	8500		25,500
27.	6	Dual FCC w/ DPC	@ 45,000 -		270,000
28.	1	Chemical Storage Room DPC	@		10,000
29.	1	Chemical Feed Room DPC			10,000
30.	1	Pump Room DPC			10,000
31.	1	RLW/HS Pump Room DPC			10,000
32.	1	UPS system			8,000
33.	5	Pump Pressure Switches			3000
34.	12	Solenoid Valves	500		6000
35.	7	2" Motor Operated Ball Valves	1000		7000
36.	1	Temp Transmitter	① 658,860		3000

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 13 OF

JOB NO.

BY DATE CHKD. BY DATE

Main Control Console			15,000
Unloading Dock Panel (Highland			10,000
Computers	2 @	5000	10,000
Printers	2 @	2000	4,000
CRT	2 @	5000	10,000
			49,000
Labor	3900 hours @	$45/hr	195,000
	50 days field @	1000	30,000
	6 Trips @	1000	6000
			231,000

$280,000 (I)

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 14 OF

JOB NO.

BY DATE CHKD. BY DATE

Butterfly Valves

2 - 36" ϕ	Raw Water Control Valves	@ 15,000	=	30,000
12 - 18"	Filter Effluent Valves	@ 4,600	=	55,200
12 - 12"	Blower Valves	@ 4,000	=	48,000
6 - 24"	Wash Valves	@ 6500	=	39,000
6 - 18"	Filter Effluent Flow Control Valves	@ 5600	=	33,600
6 - 16"	Filter Rinse Flow Control Valves	@ 5400	=	32,400
1 - 24"	Wash Water Flow Control Valve	@ 8000	=	8000

246,200

x 1.4

$344,680 (I)

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT | SHEET NO. 15 OF
JOB NO.
BY DATE CHKD. BY DATE

Acorn Hotels

1	Rapid Mix			
1	Slow Mix			
4	Split Box			
6	Pulsator			
3	Vacuum Box			
1	Pipe Gallery			
2	Clearwell			
1	Pump Pipe Gallery			22K ① 15K ② 1K ③ 3K ④
19	@ $3000	=	$57,000	

Manways to Pulsator

2 @ end of Rooms 1-3-6 × $3000 = 9,000 ③

100'-c-c 10 × 3 = 30 slab in Roof Floor @ 2000 = $60,000 ③

4 into clearwell sections @ 3000 = 12,000 ③

Ladders @ $65/LF

1	Rapid Mix	22
1	Slow Mix	22
4	Split Boxes	88
12	Pulsators	192
1	Pump room	15
2	Clearwell	40
2	Roof	30

409 × 65 = 26,585
Add for safety climb
say $35,000 ③

173,000

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT
BY DATE CHKD. BY DATE

SHEET NO. 16 OF
JOB NO.

M. Grating

2'x7' for 3 pc/station = 42 SF @ $48/SF
2 x 1.5 HT for Slaughter Room 45
87 x 48 = 4176

Mixer Stands 4 @ 2000 Ea $6000 3K (1) 3K (2)
$2000 (2)

FRP Grating
Cl2 60 SF
SBP/A - 360 SF
CA 360 SF
IC 225 SF
RA 225 SF
F 150 SF
CS 150 SF

1530 SF @ $72/SF = 110,160 110,000 (2)

FRP Stair
Flourid Room Ea $5,000 (2)

Al. Stair & Platforms
CS 3Y 4000 (2)
Polymer 4000 (2)
Polymer Mix System 8000 (2)
Chemical/Aeration Bldg 2 Towers 23R x 2 $270/R = 12420 (2)
East of Filter Bldg 1 Tower 14R x 270 = 4000 (1)
East of Process Bldg 1 Tower 14R x 270 = 4000 (1)
Scrubber Room 4000 4000 (2)
Unloading Dock 4000 4000 (2)

$157,000 AC

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

BY DATE CHKD. BY DATE

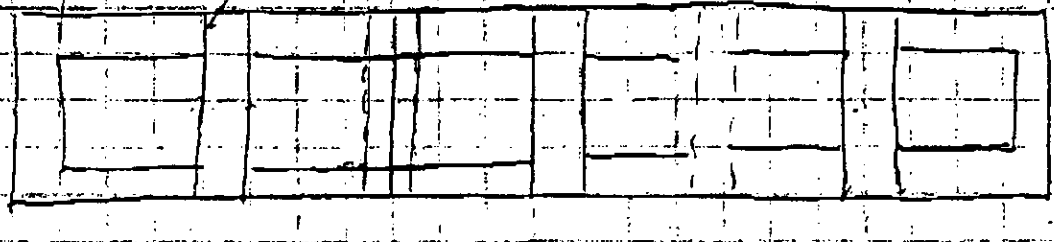
SHEET NO. 17 OF
JOB NO.

Aluminum Handrail

Process Room

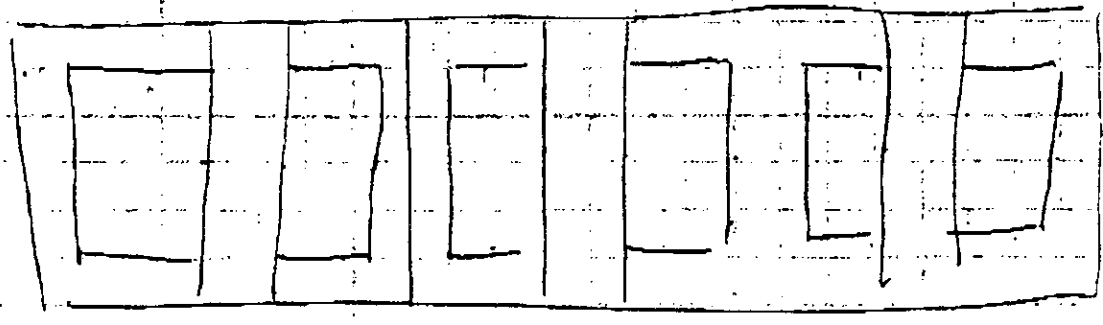
40'

82'



6 × 87 = 522
2 × 120 = 240

Filter



2 × 12 × 26 = 624
2 × 12 × 12 = 288

1674 l.f. @ $60 = $100,000

46 (2)
54 (1)

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 18 OF

JOB NO.

BY DATE CHKD. BY DATE

Containment Area Liners

Roof Area

A -	18 x 20 =	360
CA	18 x 20 =	360
K	13 x 15 =	195
FA	13 x 15 =	195
Fab.	10 x 15 =	150

Sump Area

A	67 x 20	1340
F	19 x 19	361
CS	18 x 18	342
Sump	19 x 25	475
Sp	18 x 19	342
Lobby	10 x 8	80

4200 SF x $10 = $42,000

say $42,000

Mats

A	67 x 8 =	536
F	19 x 8 =	152
CS	19 x 8 =	152
Sump	19 x 8 =	152
Sp	19 x 8 =	152
Lobby	10 x 8 =	80

1224 x $6.00 = $7344 say $8000 =

$25,000 (2)

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT

SHEET NO. 16 OF

JOB NO.

BY DATE CHKD. BY DATE

Structural steel say part of unit price per sq foot of superstructure

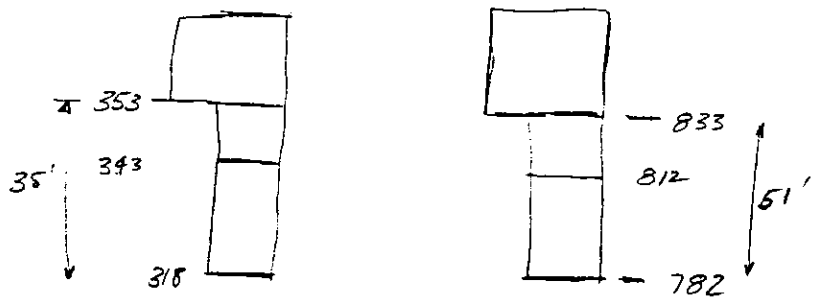
Painting ... say ... 200,000 ... 10 (1) 100 (2) 54 (3) 36 (4)

AMERICAN WATER WORKS SERVICE COMPANY, INC.
P.O. BOX 1770, VOORHEES, NJ 08043
SYSTEM ENGINEERING

WATER COMPANY MAWC DIVISION/DISTRICT ST JOE SHEET ____ OF ____
PROJECT NAME ____ DATE 10/19/24
____ B.P. ____ BY ____
____ W.O. ____ CHECKED BY ____

RIVER INTAKE

USE HERSHEY AS MODEL



HERSHEY ST JOE

HERSHEY
$1,036,100 2 pumps
533 300 PS equip.
538,800 pump E.
2 108 000
x 1.04
$2,192,000

+ REQ DEEPER, LARGER COFFERDAM
SUSTAIN VS MO RIVER

1990 HERSHEY

427,000
+ 23 000 O&C
450,000
696,000
45,000
741 00 0

$1,191,000 x (1.04)^4 = $1,393,000

$2,192,000 $\left(\frac{30}{9}\right)^{.75}$ = $5,407,000

add for pumps slow speed due to solids 500,000

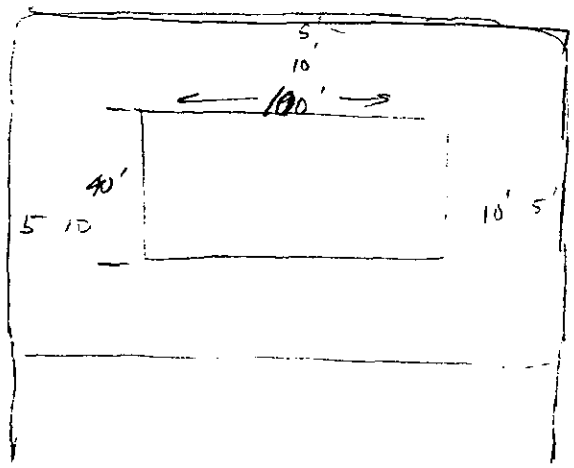
$5,907,000

110%

see next page

AMERICAN WATER WORKS SERVICE COMPANY, INC.
P.O. BOX 1770, VOORHEES, NJ 08043
SYSTEM ENGINEERING

WATER COMPANY _____ DIVISION/DISTRICT _____ SHEET ____ OF ____
PROJECT NAME _____ DATE _____
INTAKE B.P. _____ BY _____
W.O. _____ CHECKED BY _____



Dewatering
Sheeting
$\ell(130) + 2(100) = 330$ lf
wellpts 460'
wellpts on 2' ctrs
SAY 10 mos

Means p886 8 x example
32,500(8) 125,000 mos
22 73,000(8) mos
$782,000

SHEETING

810
−783
27' use 70' sheeting

$\frac{39\#}{SF} \frac{27(2.5)\,460'}{2000\#} \frac{\$510}{ton} = \$300,600$ $350,000

difficult install add 50K

UPLIFT RESISTANCE

$\frac{4000\ SF\ (0.5\ KSF)}{150K\ anchor} = 14$ if use 14 @ 3500 = 50,000 → 75

1,207,000
+ 5907,000
7114,000

SBM 7.2N

AMERICAN WATER WORKS SERVICE COMPANY, INC.
P.O. BOX 1770, VOORHEES, NJ 08043

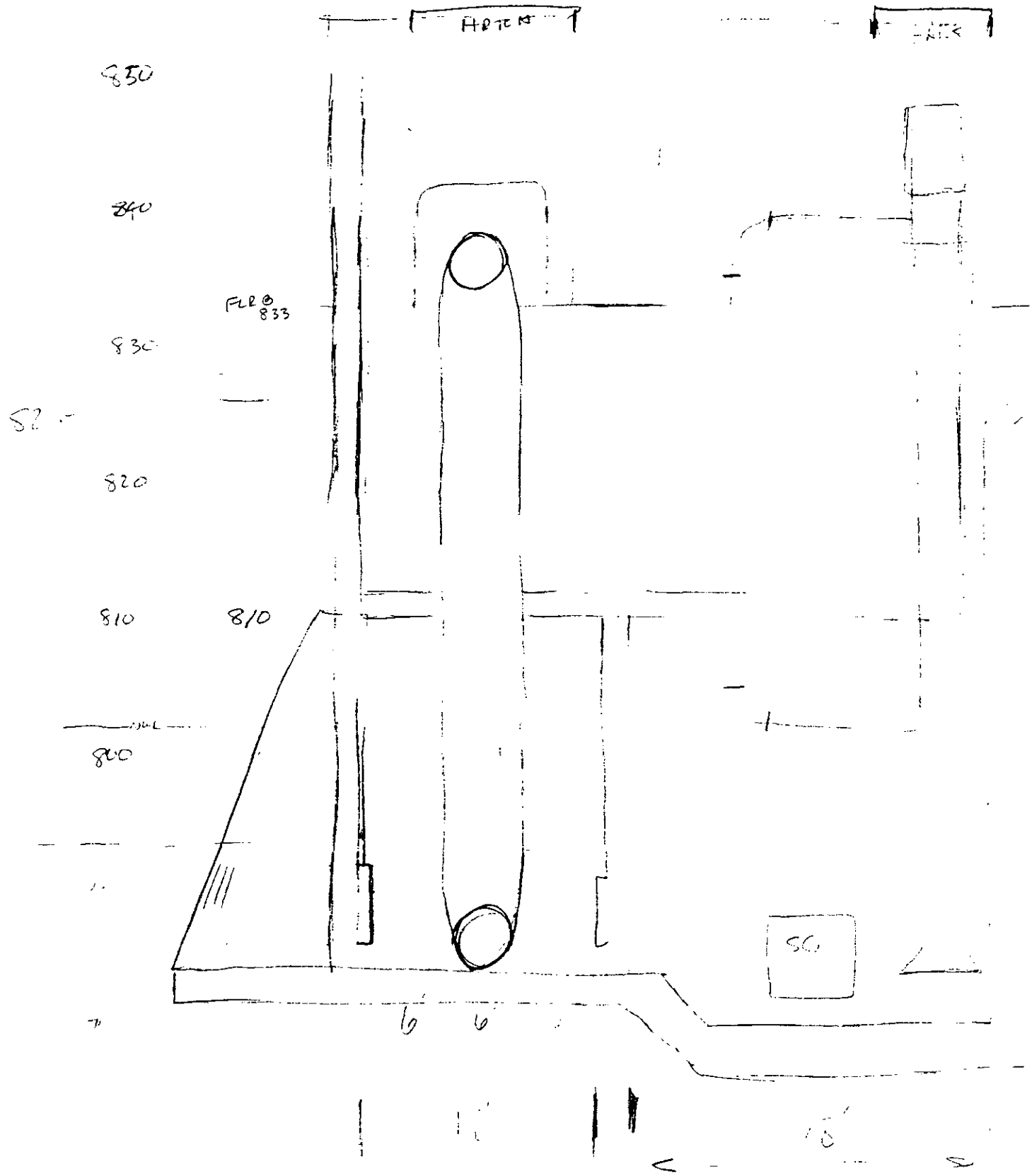
SYSTEM ENGINEERING

WATER COMPANY _____ **DIVISION/DISTRICT** _____ **SHEET** _____ **OF** _____

PROJECT NAME _____ **DATE** _____

_____ **B.P.** _____ **BY** _____

_____ **W.O.** _____ **CHECKED BY** _____



AMERICAN WATER WORKS SERVICE COMPANY, INC.
P.O. BOX 1770, VOORHEES, NJ 08043

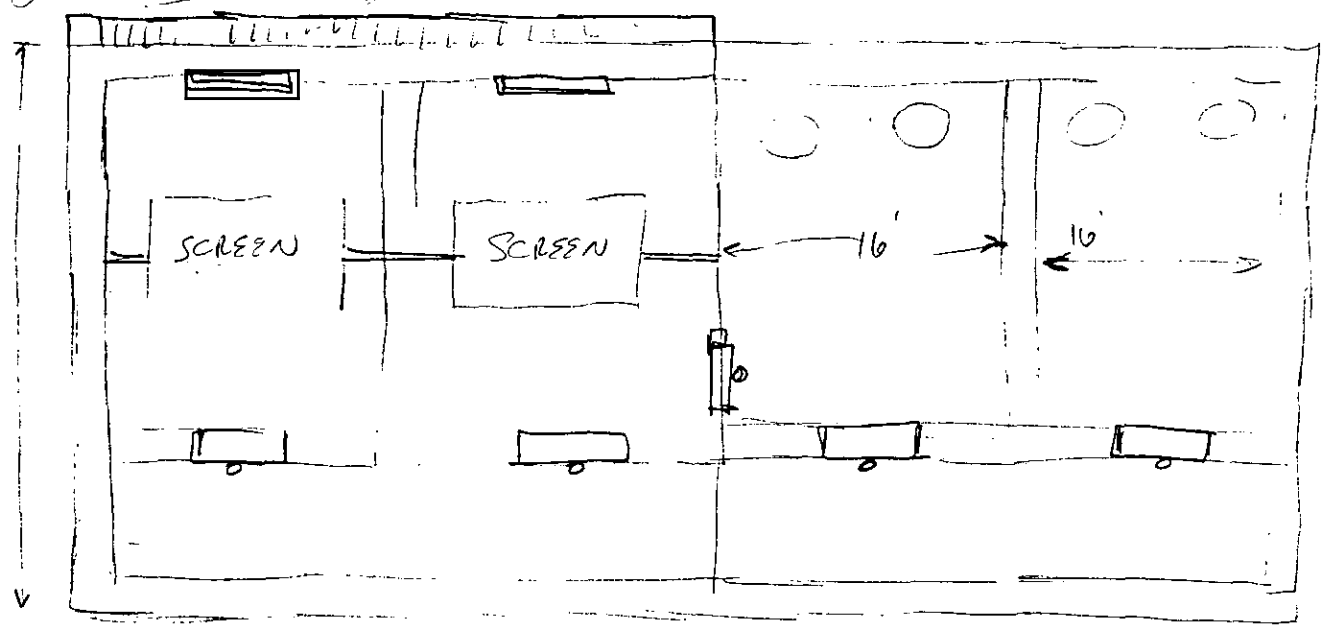
SYSTEM ENGINEERING

WATER COMPANY _____ **DIVISION/DISTRICT** _____ **SHEET** _____ **OF** _____

PROJECT NAME _____ **DATE** _____

_____ **B.P.** _____ **BY** _____

_____ **W.O.** _____ **CHECKED BY** _____



MISSOURI-AMERICAN WATER COMPANY
ST. JOSEPH DISTRICT
ANALYSIS OF GANNETT FLEMING 5/93 PRELIMINARY ESTIMATE
JUNE 1993

SUPERPULSATOR CLARIFIERS

SITEWORK, FOUND	$1,385,000
CONCRETE	$1,273,000
SUPERSTRUCTURE	$754,000
YARD PIPING	$819,000
PROCESS	$1,600,000
PLUMBING	$125,000
HVAC	$100,000
INSTRUMENTATION	$37,000
ELECTRICAL	$250,000
TOTAL	$6,343,000

SP SITEWORK

$902,000	FOUNDATION
$91,000	STRUCT EXCAV
$165,000	DEMOLITION BASIN 3
$19,000	SOIL EROSION/CTRL
$48,000	UTILITY RELOC
$37,000	PAVING
$10,000	SEEDING
$16,000	LANDSCAPING
$97,000	DEWATER
$1,385,000	

SP YARD PIPING

$190,000	RAW WATER/METERS
$285,000	SETTLED WATER
$102,000	WASTE LINE
$37,000	OVERFLOW
$122,000	PULSATOR DRAIN/VALVES
$58,000	PRE-SED MODS
$25,000	TEMP FLUME
$819,000	

CHEMICAL BUILDING/LABORATORY

SITEWORK,FOUND	$796,000
CONCRETE	$836,000
SUPERSTRUCTURE	$1,051,000
YARD PIPING	$92,000
PROCESS	$2,448,000
PLUMBING	$150,000
HVAC	$200,000
INSTRUMENTATION	$175,000
ELECTRICAL	$400,000
TOTAL	$6,148,000

SITEWORK DETAIL

$757,000	FOUND
$15,000	SPILL CONT
$24,000	SEPTIC
$796,000	

YARD PIPING DETAIL

$92,000	CHEM TO INTAKE

FILTER BUILDING/WETWELL

SITEWORK	$1,515,000
CONCRETE	$1,288,000
SUPERSTRUCTURE	$665,000
YARD PIPING	$160,000
PROCESS	$3,181,000
PLUMBING	$125,000
HVAC	$250,000
INSTRUMENTATION	$580,000
ELECTRICAL	$450,000
TOTAL	$8,214,000

SITEWORK DETAIL

$902,000	FOUND
$48,000	STORM
$10,000	CURBS
$7,000	SIDEWALKS
$91,000	EXCAV
$328,000	DEMOL
$32,000	LANDSCAP
$97,000	DEWATER
$1,515,000	

YARD PIPING DETAIL

$160,000	XFR PIPING
$160,000	

TRANSFER/HS PUMP STATION

SITEWORK	$349,000
CONCRETE	$305,000
SUPERSTRUCTURE	$365,000
YARD PIPING	$294,000
PROCESS	$899,000
PLUMBING	$105,000
HVAC	$226,000
INSTRUMENTATION	$117,000
ELECTRICAL	$1,325,000
TOTAL	$3,985,000

SITEWORK DETAIL

$349,000	FOUND
$349,000	

YARD PIPING DETAIL

242000	HS SUCTION
52000	HS DISCH
$294,000	

CLEARWELL TANK

SITEWORK	$500,000
CONCRETE	$1,440,000
SUPERSTRUCTURE	$0
YARD PIPING	$0
PROCESS	$0
PLUMBING	$0
HVAC	$0
INSTRUMENTATION	$0
ELECTRICAL	$0
TOTAL	$1,940,000

ANALYSIS OF ADDED COSTS CONTAINED IN MAWC's JUNE 4, 1993 PROJECT COST ESTIMATE OF $44,100,000 TO UPGRADE AND REFURBISH EXISTING PLANT

1. MAWC starts with the May 27, 1993 Gannett Fleming Construction Cost Estimate of $26,630,000
   - MAWC divides work into two phases with phase 1 at $12,300,000 and phase 2 at $14,800,000
     - MAWC's total for both phases is $27,100,000
     - No explanation given for increase of $470,000 over the Gannett Fleming construction cost estimate of just 8 days previous.

MAWC OVERSTATED CONSTRUCTION COST ESTIMATE BY $470,000

2. MAWC escalates phase 1 estimate of $12,300,000 to February, 1995 dollars for a total phase 1 cost of $12,900,000
   - Escalation is 4.88% for 15 months or 1.25 years
   - Effective annual escalation used by MAWC was 3.90%
   - *Engineering-News Record* construction cost indexes for that period shows an annual average 3.07% increase which would be 3.8375% for the 15 month (1.25 yr.) period.
     - MAWC escalated construction cost at 2/95 = $12,900,000
     - Construction cost increase at 2/95 based on *Engineering-News Record* indexes = $12,772,012
       Difference = $ 127,987

MAWC OVERSTATED CONSTRUCTION COST ESTIMATE BY $127,987

3. MAWC escalates phase 2 estimate of $14,800,000 to February, 1998 dollars for a total phase 2 cost of $17,500,000
   - Escalation is 18.24% for a 51 month (4yrs-3mo.) period
   - Effective annual escalation used by MAWC was 4.2918%
   - *Engineering-News Record* construction cost indexes for that period shows an Annual average 3.07% increase which would be 13.0475% for the 4 yr.-3 Mo. Period.
     - MAWC escalated construction cost at 2/98 = $17,500,000
     - Construction cost increase at 2/98 based on *Engineering-News* indexes = $16,731,030
       Difference = $ 768,970

MAWC OVERSTATED CONSTRUCTION COST ESTIMATE BY $768,970

4. MAWC next adds 10 percent to both phase 1 and phase 2 construction costs for "Omissions and Contingencies" although a footnote acknowledges that the

construction cost is assumed to already include15 % for Omissions and Contingencies as previously stated by consultant Gannett Fleming in their transmittal of the detailed cost estimates to MAWC.

The additional 10% addition for omissions and contingencies is totally unreasonable since the original estimate performed by the consultant who is designing the project already contained a 15% omissions and contingencies factor.

MAWC addition of 10% omissions & contingencies for phase 1	=	$1,289,000
MAWC addition of 10% omissions & contingencies for phase 2	=	$1,748,000
Total	=	$3,037,000

MAWC OVERSTATED CONSTRUCTION COSTS BY $3,037,000

5. MAWC next lists without explanation a series of costs under the broad category of Engineering Services. Two basic entities are identified as receiving the costs related to this item, one being MAWC's design consultant and the second being the water company itself through services to be presumably performed by its affiliate company AWWSC.
   - Consultant's Fees
     - Phase 1 design — $504,000 (3.91% of phase 1 const. Cost)
     - Phase 2 design — $856,000 (4.89% of phase 2 const. Cost)
     - Const. Tech Review Of Phase 1 — $314,000 (2.43% of phase 1 const. Cost0
     - Const. Tech Review Of Phase 2 — $443,000 (2.53% of phase 2 const. Cost)
     - Field Inspection of Phase 1 — $198,000 (1.53% of phase 1 const. Cost)
     - Field Inspection of Phase 2 — $223,000 (1.27% of phase 2 const. Cost.)

   Total Consultant Fee = $2,538,000 (8.35% of Total const. Cost)

   The proposed fees to be paid to the engineering consultant for the work as tabulated above falls well within industry standards of 7 to 10 percent for this type professional services and no overstatement of costs by MAWC is alleged.

   - Utility Company's Fees
     - Design overview, Liaison, Bidding, Phase 1 = $250,000
     - Design overview, Liaison, Bidding, Phase2 = $ 59,000
     - Pilot plant Study, Phase 1 = $ 60,000
     - Pilot Plant Study, Phase 2 = $ 18,000
     - Construction Administration, Phase 1 = $129,000
     - Construction Administration, Phase 2 = $145,000

     Total = $661,000

   These proposed fees to be paid to itself by the utility amounts to 2.17% of the construction cost and are grossly overstated. Since the utility has employed a full service consultant who will perform most of these professional services itself, it is very difficult to see how the utility could have any substantial expenditure

except in administering the consultant's contract itself. The industry standard for such administration is 0.5% and therefore the maximum cost for the utility should be $152,000 leaving a difference of $509,000.

MAWC OVERSTATED THE ENGINEERING COSTS TO ITSELF BY $509,000

6. MAWC next lists a group of seven costs without rationale or explanation to which they assign a value. I will evaluate these costs on an individual basis as follows:
    - MAWC list a total amount for permits for the plant improvements of $109,000. No explanation is given as to whom this amount will be paid but it is assumed that the cost will be to the local and state regulatory agencies issuing the plant construction permits and MAWC's consultant for furnishing the necessary engineering documentation required by these agencies. If these assumption are correct and these cost are not included in other items, then these costs would appear valid.

    - MAWC next lists a total amount of $63,000 for what is called "CPS Charges." The nature of these charges or to whom the expense are to be paid is not explained or identified. Unidentified charges are always suspect and without full justification and explanation will be considered as invalid.

    - MAWC next lists a total amount of $1,698,000 for an expense which is identified as Water Company expenses. No further explanation is given for this very large charge. The amount of the charge would appear to be unreasonable for any expense the water company would have while the construction is proceeding. Temporary power and water that is wasted are the only items which come to mind and these costs could not be more than a small amount. Until full justification and explanation of the charges are made, this total charge will be considered invalid.

    - MAWC next lists a total estimated amount of $1,020,000 for community relations. This charge is preposterous and will be in total considered invalid. Normal budget for community relations should have been sufficient for simple announcements that the existing water plant was being upgraded.

    - MAWC next lists a total estimated cost of $250,000 for attorney's fees. It is difficult to see why the utility's attorney would be involved at all in the project except in perhaps a cursory manner in examining construction contracts. All of this charge is considered invalid.

    - The next item of cost listed by MAWC is a total amount of $91,000 for Builder's risk insurance. This type of insurance is always carried by the contractor as part of his contract and not by the owner. The utility's normal insurance would be sufficient for the construction period. All of this item is considered invalid.

    - The last item of cost listed by MAWC is a total of $164,000 for Water Company supplied material. This cost is also listed without explanation or identification. There is no reason that the utility should be furnishing any

materials for the construction. Without further justification, this item will be considered invalid.

MAWC OVERSTATED COST IN THESE SEVEN ITEMS BY $3,286,000

7. MAWC has overstated the costs in this "Project Cost Estimate" by a total estimated amount of $8,198,957. Revising the subtotal of $40,031,000 by the overstated amount would give a new subtotal of $31,832,043.

   Now, adding a reasonable allowance for AFUDC of 6% (MAWC used 10%) would yield a revised total project cost of $33,741,965. This amount of total project cost is 26.71% more than the estimated construction cost of $26,630,000 as compared to the 65.6% as originally proposed by MAWC.

8 SUMMARY

   The above analysis of the added costs which MAWC proposed to the 1993 Engineering Cost Estimate by its consultant demonstrates the reckless and wanton manner in which MAWC added costs to the estimates for upgrading and refurbishing the existing treatment plant in their attempt to justify their decision to construct the new groundwater source and treatment plant.

Missouri-American Water Company
St. Joseph
Source of Supply and Treatment Alternatives
December, 1994

Surface Supply and Treatment

	Plant Improvements at Existing Site	
UNIT PROCESS	DESIGN BASIS	COST
Raw Water Intake and Pump Station	Construct 30 mgd intake with bar rack, traveling screens, and vertical turbine raw water pumps	$7,200,000
Presedimentation Clarifier No. 3		$700,000
Low Lift Pump Station and Wet Well	Not applicable	$0
Raw Water Transmission Piping	Not applicable	$0
Clarification Superpulsator clarifers Enclosed in building	3 gpm/sf	$4,000,000
Filtration Filter adsorbers, 4 gpm/sf, 10 min EBCT		$6,000,000
Transfer Pump /Finished Pump Station		$4,800,000
Clearwell	baffle existing 1 MG tank	$200,000
Finished Water Pumping	Included with transfer pump station	$0
Finished Water Piping	30 inch Transmission line to Huntoon Tanks	$350,000
Chemical Systems/ Operation Bldg		$6,250,000
Ozonation Contactor, Equipment		$5,500,000
Residuals	Remote Lagoons and Drying Beds	$8,000,000
Access Road to River Site		$700,000
Foundation Treatment		$2,200,000
Mobilization and General Conditions	Five percent	$2,295,000
Site Work Excavation, yard piping, fencing, etc.	Ten percent	$4,590,000
	Subtotal	$52,785,000
Other Costs		
Design and Permitting		$3,500,000
Construction Services		$2,000,000
Community Relations, Other		$1,500,000
Omissions and Contingencies 15%		$7,917,750
Granular Activated Carbon		$585,000
Demolition		$500,000
Land		$0
	Subtotal	$68,787,750
AFUDC		$9,200,000
	SAY	$78,000,000

Schedule TLB-16

AMERICAN WATER WORKS SERVICE COMPANY, INC.
P.O. BOX 1770, VOORHEES, NJ 08043
SYSTEM ENGINEERING

WATER COMPANY MAWC DIVISION/DISTRICT STROE SHEET ____ OF ____
PROJECT NAME PLANT IMPR DATE ____
____ B.P. ____ BY ____
____ W.O. ____ CHECKED BY ____

PROPOSED CLARIFIER

MATCH EXISTING

75' DIA 19' 630,000 gallons

— STEEL TANK
Means(90) 215,000 $(1.04)^4$ = $252,000

— COVER $\frac{\pi 65^2}{4} \frac{\$25}{SF}$ = $111,000

— Internal WEIR 236' × $\frac{\$75}{ft}$ = 17,700

— SLUDGE RAKE
75,000 × 1.4 = 105,000

— LIGHTING/ELECT 25,000
— STAIRS, CATWALK 40,000
— PIPE CONN 25,000
— FOUND/EXCAV 75,000
650,700 SAY $700,000

TED L. BIDDY, P.E., P.L.S.

2308 Clara Kee Boulevard
Tallahassee, Florida 32303
Phone: (850)536-0928
Mobile: (850)508-2738
Fax: (850)536-0938
E-mailTedBiddy@msn.com

CIVIL, STRUCTURAL and FORENSIC ENGINEERING, INVESTIGATIONS, STUDIES, REPORTS

February 11, 2000

QUESTIONS FOR MISSOURI DEPARTMENT OF NATURAL RESOURCES POTABLE WATER PERMITTING STAFF

(Bold answers are from Teleconference held March 1, 2000 with DNR officials Jerry Lane, Breck Summerford, & Rolando Bernabe in DNR's Jefferson City, Mo. office with John Coffman of OPC present and with DNR's Bill Hills of DNR's Kansas City office also on line.)

1. Did the DNR have violations or pending enforcement actions against MAWC for any issues at the existing water treatment plant?
   Answer: no

2. What has been the history of violations or enforcement actions over the last 5 years at the existing plant ?
   Answer: none
3. From DNR's standpoint, could MAWC have upgraded their existing treatment plant and continued operations at the existing site? If not, what were the items at the existing plant that the DNR considered un-curable?
   Answer: Yes, with flood-proofing of plant site
4. Please furnish copy of construction permits issued to MAWC for the new water treatment plant and water wells?
   Answer: Will be furnished to OPC office
5. What is the permitted capacity in Average Daily Flow and Maximum Daily Flow for all components in the new treatment Plant?
   Answer: MDF is 30MGD
6. What is the permitted design year for the new treatment plant?
   Answer: Probably 20 years, should say in report.
7. What is the number of equivalent residential connections (ERC's) that MAWC permitted the new treatment plant to serve?
   Answer: Unknown, should be in report.
8. What is the permitted average daily and maximum daily flows per ERC for the new treatment plant?
   Answer: Unknown, should be in report
9. What is total volume of storage in the MAWC system?
   Answer: Unknown, should be in report.
10. Was fire flow included in the permitted maximum daily flow?
    Answer: Unknown, should be in report
11. What is the permitted capacity of each new ground water supply well?
    Answer: 7 wells @ 3MGD, 1 @ 18 MGD, total = 39 MGD
12. What is the firm reliable capacity of the supply wells with the largest well out of service?

Answer: Unknown, don't use firm reliable capacity

13. Were there any items that are for future service at the new treatment plant that were permitted?

Answer: Unknown, would be in report

14. Did MAWC furnish the number of ERC's in the water systems of other water companies to whom they sell water? If so, please furnish a listing of the ERC's for each of these water companies and the permitted average daily and maximum daily flows for each of these companies.

Answer: No

15. What date did DNR give approval to new plant design?

Answer: September 11, or August 11, 1998 based on MAWC's September, 1996 Engineer's Report.

16. Could MAWC have continued to return treatment plant residuals to the Missouri River?

Answer: Yes. MAWC applied for renewal of their discharge permit on September 4, 1990 but the renewal was not completely processed due to an objection from EPA district office. MAWC has been operating under their former discharge permit for all the years since and could have continued to do so.

THE FOLLOWING ARE ADDITIONAL QUESTIONS WHICH WERE OVER AND BEYOND THE QUESTIONS I HAD PREPARED FOR THE INTERVIEW.

17. I then asked each DNR official individually the following question: Assuming that MAWC had demonstrated to DNR that they were going to flood proof the existing surface water supply and treatment plant at the present location on the Missouri River, was there anything that would have prevented MAWC from expanding and upgrading their existing water treatment plant?

Answer by Jerry Lane: No
Answer by Breck Summerford: No
Answer by Rolando Bernabe: No
Answer by Bill Hills: No

18. Was MAWC under any pressure from DNR to abandon their existing source of supply and treatment plant and to construct new ground water source of supply and treatment plant facilities elsewhere out of the flood plain?

Answer: No

MISSOURI AMERICAN WATER COMPANY
DATA INFORMATION REQUEST OF MISSOURI AMERICAN WATER COMPANY

Case No. WR-2000-281, et al.
Data Request No. 4-8

Requested From: Office of the Public Counsel

Requested By: Mr. Dean L. Cooper

Date Requested: April 19, 2000

Information Requested: Please provide the specific calculation or reference for the projected maximum daily water usage at the year 2002 of 24.135 mgd. (Reference page 25, line 1) (The derivation of this number is not supported anywhere in TLB-11, 12 or 13).

Information Provided: First, notice from OPC's Data Request to No. 4010 to MAWC (Schedule TLB-12) that the actual maximum day flow (MDF) for the year ending September 30, 1999 was 21.888 million gallons (MG) as compared to MAWC's projected MDF for 1999 of 25.81 MG as contained in MAWC's Water Use Analysis, Table 3-3 (Schedule TLB-11). The actual MDF as compared to the projected MDF amounts to 84.8%, probably due to loss of industrial customers in the St. Joseph area.

Next, determine from Table 3-3 and Exhibit 3-2 of the MAWC's Water Use Analysis that the projected MDF for 2002 amounts to 26.3 MG. If actual MDF is only 84.8% of the projected MDF as 1999 revealed, then a good estimate of actual MDF for 2002 would be 84.8% times 26.3 MG, or 22.3 MG.

Next, consider that the historical MDF should be 1.6 times the average daily flow (ADF) based on Table 3-3 and Exhibit 3-2 and that a projected ADF of 16.23 MG for

2002 can be determined from Table 3-3 and Exhibit 3-2. Therefore, MDF should equal 1.6 times 16.23 MG or 25.97 MG.

Now if you average the values of MDF obtained by the two methods, you get:

(22.3 MG + 25.97 MG) / 2 = 24.135 MG

Notice that I did not adjust the project ADF to the actual 15.865 MG since the actual ADF was within a few percent of the projected ADF. Again, this gives every benefit of the doubt to the utility company.

Date Response Received:_____ Signed By: Ted L. Biddy

Date: 5/8/00