

PROGRAM MANAGEMENT

The District is responsible for monitoring consultant performance.

To a considerable extent, the question of how well the District has managed the Water Pollution Abatement Program is a question of how well the District has negotiated its contract with, and monitored the performance of, the Program Management Office. The Program Management Office, under a contractual arrangement which appears to be unique in the nation, is responsible for providing extensive management services to the District. Nevertheless, it is the District which remains ultimately responsible to the public for the efficient implementation of the Pollution Abatement program and the expenditure of public funds. Consequently, while the District has chosen to contract for the majority of the management services needed to accomplish the program, the District's primary responsibility has been to monitor the performance of the Office to ensure high management standards and cost-effective use of public funds.

Critics of the District have raised questions about the cost of the engineering and management services which the Program Management Office provides, particularly since as engineering costs have increased, so have profits to the Office. We, therefore, examined: 1) engineering and management costs, or non-construction costs, associated with the Pollution Abatement program; and 2) the District's efforts to monitor the activities and performance of the Program Management Office.

Program Management and Engineering Costs

Contracted costs for engineering and management services have increased significantly.

There have been substantial increases in program management and engineering costs associated with the Water Pollution Abatement Program. Since the program began, over 240 program management and engineering contracts have been awarded and 695 changes have been made to the contracts, 364 of which included cost adjustments.

There are two ways the increase in engineering costs can be viewed: 1) as an increase over the amounts originally contracted, and 2) as a net change between estimates made in 1983 and the current estimates of the cost to program completion. The increase in the contracted amount is 25 percent and can be attributed to several factors, including changes in program scope, planned or phased extensions to contracts, and unplanned increases. Existing data do not contain sufficient detail to definitively determine how much of the increase is due to each of these factors.

The second method of viewing the increase in engineering costs is to consider the net change from 1983 to the current estimate, which is approximately 5 percent. However, viewing only the net change in engineering costs from

the early 1983 estimates to current estimates does not recognize significant project scope reductions, thereby understating the magnitude of cost increases in other areas of the Pollution Abatement program.

In addition to \$470.8 million in contracted engineering and management services, the District has incurred substantial costs in its own operating budget to administer the program. For example, district staff in several divisions perform general program management activities as well as project-specific technical activities. In addition, the District receives grant reimbursement for some of its overhead costs related to the program. The District also contracts directly with engineering and other professional services firms to provide program management services.

As of December 1990, the District had spent \$104.8 million and is expected to spend an additional \$72.6 million by the end of the program, for non-construction costs related to the Pollution Abatement program. In addition, the District expects to award an additional \$16.1 million in contracts through the Program Management Office, bringing the total estimated cost for non-construction services, to \$664.3 million.

Determining the appropriateness of management and engineering costs is difficult because there are no definitive industry standards to provide guidance. In addition, there are few projects of similar size to compare to the Pollution Abatement program, and those that do exist are transportation, not environmental, projects.

In 1983, the Program Management Office conducted a study in an attempt to compare the District's non-construction costs to those of four other projects nationally. The study found the District's costs were second highest. Despite this finding, the District did not make a systematic effort to monitor engineering costs. We believe the District should have continuously updated the study to monitor costs. The study is now out of date and, while the District's costs have risen since 1983, current costs for the other projects cannot be determined.

While there are few industry guidelines on level of costs, we observed that district staff did not use negotiating methods which are commonly used by state Department of Transportation (DOT) engineers when they negotiate with consulting engineers. For example, DOT engineers formally develop a range of cost estimates before beginning negotiations; district staff typically do not for negotiations with the Program Management Office, but have for the limited number of contracts with engineering firms outside the Office.

One way in which DOT engineers estimate a project's cost is to compare the consultant's proposal to the cost of doing the project with in-house staff. Further, DOT estimates are determined independently, whereas district staff estimates are made in conjunction with Program Management Office staff. Finally, the most significant negotiating tool of an owner is competition. However, only 5.4 percent of the program design and construction supervision work was awarded through a competitive process that involved firms outside of the Office.

Consultant Profit

Critics have also raised questions about the level of profit earned by the Program Management Office. These questions have been prompted, in part, because as the Program Management Office recommended engineering cost increases, engineering profits also rose.

The District paid the Program Management Office \$413 million for management and engineering services.

As of December 1990, the District has paid the Program Management Office \$413 million for management and engineering services associated with the Pollution Abatement program. The Office's lead consultant received about one-half of this amount, or \$200.2 million.

The profit guidelines which the District follows are specified in the District's administrative policies and are based on several existing standards, including EPA and DNR guidelines and federal procurement regulations. The District pays the lead engineering consultant for all work which the Program Management Office performs. The level of profit is negotiated separately for each segment of consultant costs, and the District has guidelines establishing maximum levels. For example, the profit maximum is:

- 19 percent for the lead consultant's direct labor;
- 11 percent for overhead; and
- 4 percent for other direct costs.

The construction industry negotiates separately the maximum level of profit for each segment; however, interest has been expressed in determining overall profit. When expenses associated with these three categories are combined, the lead consultant's total costs have been \$162.8 million. The total profit paid for these costs was \$26 million, reflecting an overall profit of 16 percent of total costs.

Of \$413 million paid to the lead consultant and subconsultants, \$61.2 million was profit.

In addition, the lead consultant earns a 4 to 6 percent fee for all work performed by its subconsultants. This has amounted to \$11.4 million. Therefore, the District paid the lead consultant a profit of \$37.4 million. In addition, \$23.8 million was passed through the lead consultant to the subconsultants as the subconsultants' profit. Of the total \$413 million paid to the Program Management Office, \$61.2 million, was paid in profit.

The staff of the lead consultant do not dispute the amount of profit paid to the lead consultant and subconsultants. However, they believe that the \$23.8 million profit paid to the subconsultants should be considered a cost of the lead consultant and, therefore, only the \$37.4 million profit should be recognized.

Finally, it should be recognized that federal government regulations on how profit is depicted differ from private sector practice, because certain contractor costs, such as interest paid on borrowed capital and bad debts, are not allowed. For these reasons, profit level comparisons between public and private sector contracts are difficult.

As with the overall level of non-construction costs, there are no definitive industry standards on the appropriate level of profit. Typically, level of profit and the manner in which it is calculated are matters of negotiation between the owner and the consulting firm. While EPA and DNR do not set profit standards, DNR does establish a maximum level of profit for grant purposes, and the profits paid to the Program Management Office have been below these maximum levels. Nevertheless, critics of the District contend that, while profits have not exceeded maximum levels, the District has not been vigorous enough in its negotiations, and some profits have been unnecessarily high.

Cost Control Mechanisms

There has been little independent oversight of engineering services.

Some have suggested that the level of profit was the result of the District negotiating an agreement with the lead consultant that offers little incentive to control costs. There are two problems with the agreement: 1) the lead consultant is responsible for both engineering services and program management, thereby removing independent oversight of engineering services; and 2) the lead consultant earns a profit on all management and engineering contracts, even those which are subcontracted to other firms, creating a potential disincentive to control the costs of other firms.

Contracting Method

District staff indicate that at the onset of the Pollution Abatement program, the District had only 12 engineers and, therefore, lacked the resources and expertise to provide the broad range of engineering and management services which program implementation required. By comparison, the Chicago Water Reclamation District, which during this time was administering several deep tunnel sewerage projects, had approximately 500 engineers on staff.

Therefore, district officials considered a number of contracting methods in an attempt to determine how best to accomplish the program's objectives within the time frame to which DNR and the District had agreed. These methods included:

- competitive negotiation, by which the District would select or at least solicit proposals from different engineering firms for engineering services at each step of a project (planning, design, and construction), and management services for the entire project, to ensure the District received the best possible services for the cost; and
- negotiation with a single firm to provide virtually all engineering and management services for all phases of the project, from planning through construction and start up, to ensure continuity of services and timely completion of the program.

After several months of study and discussion with EPA and DNR, district officials selected the second method, which had been recommended by a special task force of the Milwaukee County Executive in 1976, citing the

unique circumstances of the program in support of their decision. First, because of liability problems the District had encountered on some previous projects, district officials believed it was important to contract with one consultant for all engineering services and, thereby, avoid potentially time-consuming disputes regarding project liability. Second, given the scope and overlapping phases of the program, district officials believed that contracting with a single firm to manage the program would best provide the degree of organization necessary to complete the program within the program time frame. Finally, they believed the continuity gained by having one firm responsible for both management and engineering would result in the best quality work product.

EPA and DNR approved the contracting arrangement.

To accomplish this contracting method, the District solicited proposals from engineering firms interested in providing both engineering and management services. With EPA's and DNR's approval, the District selected the proposal which offered to provide services in an arrangement which became the Program Management Office.

Many sewerage districts around the country conducting large capital improvement projects contract with consulting engineers for planning, design, and construction management services. However, we have not been able to identify another large municipal sewerage project that has contracted with one engineering firm for the extensive range of services performed by the Program Management Office for the District.

A single consultant provides continuity but limits competition.

Hiring one firm to manage virtually all engineering aspects of a project, as well as management services, may have provided the security, continuity, and degree of organization district officials desired. However, relying so extensively on a single firm raises important public policy questions and has significant management drawbacks. For example:

- the same firm is responsible for providing program management and engineering services, thereby managing itself;
- the firm earns a profit on all services it provides or procures, creating a disincentive to control costs; and
- the loss of virtually all competition results in the loss of the most effective cost control mechanism.

The District's practice to award essentially all engineering contracts to the Program Management Office was not legally required by the original Master Agreement between the District and the lead consultant but was an independent district decision. This decision, however, has not been entirely without controversy. In 1982, the Commission considered a resolution which would have required district staff to adopt a more competitive procurement process, but the resolution was strongly resisted by staff at the time and was never adopted. Beginning in 1983, the District instituted a more competitive procurement process, but only for a limited number of design contracts. Even for these contracts, the contractors became subcontractors for the Program Management Office and, therefore, the Office received a profit on these contracts, limiting the cost-effectiveness of this process.

Because the arrangement the District chose significantly limited competition and independent review of decisions, we would have expected district staff to have monitored aggressively the Program Management Office to provide a measure of cost control sufficient to ensure funds were effectively spent. We found, however, that while the District has taken some steps to monitor costs, in some cases these efforts have been inadequate, undermining their effectiveness.

Monitoring

District officials point to a number of initiatives they have taken to maintain control over costs, including:

- retaining final approval authority for all contracts and contract modifications;
- reclaiming from the Program Management Office several management responsibilities, such as records management;
- implementing a method to review consultant activity;
- instituting a management structure parallel to the structure of the Program Management Office; and
- amending the Master Agreement.

Each of these initiatives has provided some level of oversight and cost control. For example, to provide day-to-day district oversight of the Program Management Office work effort, the District created several staff positions early in the program to accomplish what some have called a parallel management structure; the district positions matched upper-level positions in the Program Management Office. As part of this effort, in the program's planning and early design stage, the District assigned five project administrators to review the work of Program Management Office project managers.

While these efforts have been important, external reviews and audits of the Pollution Abatement program found the District's efforts needed improvement. Between 1979 and 1983, when the majority of planning and design work was performed, audits and reviews conducted by the U.S. Army Corps of Engineers, EPA, and private accounting firms consistently noted weaknesses in district oversight and control of the Program Management Office. For example, previous audits and reviews recommended that:

- the District expand its control duties over construction management so as to do more than monitor the Program Management Office;
- the District acquire a greater knowledge of what all Program Management Office personnel are doing;

- the District establish more formal procedures for evaluating the performance of the Office;
- the District require a greater degree of office accountability; and
- the District increase the number of project administrators supervising the Office and continue to do so if required to properly supervise the activities of the Office.

The District implemented, at least partially, some of the recommendations. However, in other cases, subsequent audits had similar findings.

As another attempt to control costs, the District has drafted changes to the Master Agreement, which describes Program Management Office responsibilities as well as billing and payment requirements on all contracts negotiated between the lead engineering consultant and the District. The proposed changes include:

- renegotiating a lower fee in the event costs are lower than expected due to a change in project scope;
- introducing a grant indemnification clause that allows the District the opportunity to recover costs in the event the Program Management Office does not follow grant guidelines;
- formalizing the credit received by the District for some of the overhead costs charged by the lead engineering consultant and subconsultants;
- standardizing the cost and pricing principles to be consistent with federal regulation;
- clarifying the liability of the Program Management Office for construction supervision as well as the required professional liability insurance; and
- updating all program requirements to be consistent with new EPA guidelines.

It appears, however, that other initiatives have not been used to their fullest extent or have not been effective in controlling costs. For example, although the District approves all funds spent, this approval does not always rest on thorough and complete monitoring and oversight practices. We found that as of December 1990, the District had a backlog of 159 management and engineering contracts, representing \$336 million, which had not received a cost/price review. EPA requires reviews for agreements which are negotiated rather than competitively bid.

Costs increased 12.7 percent for contracts which were reviewed and 40.7 percent for those which were not reviewed.

We also found that final contract amounts for management and engineering contracts which received review were 12.7 percent greater than original contract amounts, while the final costs of contracts which received no review were 40.7 percent greater than original contract amounts. For locally funded management and engineering contracts, the increase in those not reviewed has been 102 percent over original contract amounts, compared to a 3 percent increase for those that did receive a cost/price review.

It is not known what the level of unallowable costs would have been in the management and engineering contracts which did not receive cost/price reviews; however, we believe the District could have improved oversight of management and engineering costs by completing the reviews promptly to determine whether costs were reasonable and allowed by federal and state regulations. We believe further diligence in reviewing costs could result in additional cost efficiencies.

District Oversight

While the District has taken steps over the course of the Pollution Abatement program to exercise some management oversight, it appears that the degree of independence and control granted to the Program Management Office is unusual in public works projects nationally. A number of external audits conducted during the past decade have recommended that the District increase its level of control and oversight of the Program Management Office. During our evaluation, we noted several areas where increased district control would have allowed greater oversight and, conceivably, improved the District's ability to control costs. For example, the District could have:

- changed the contract type to provide an incentive to control costs;
- required additional independent review of engineering design, called value engineering, by outside firms; and
- performed formal evaluations of the lead consultant's performance and evaluated subconsultant performance rather than relying on evaluations performed by the lead consultant.

Contract Type

Two typical types of contracts for engineering services are: 1) lump-sum contracts, which set the total price to be paid without regard to the costs actually incurred by the firm; and 2) cost-plus-fixed-fee contracts, which pay the cost actually incurred plus a specific profit. A third contract type, used primarily by federal agencies, especially since 1984, is cost-plus-award-fee contracts, which pay the cost actually incurred plus an amount based on the municipality's evaluation of the contractor's performance.

The current contracting method does not contain cost control incentives.

A municipality's goal in selecting the contract type is to ensure incentives for consultants to perform quality work and control costs. The appropriate contract type depends on the risks and level of uncertainty associated with a project. A lump-sum contract provides the most incentive to control costs since the contractor assumes full responsibility for all costs above the agreed upon limit. However, the consultant also has an incentive to negotiate the lump sum as high as possible. Lump-sum contracts are most appropriate when risks are minimal and the scope of the project can be clearly defined.

Projects with increased risks or of uncertain scope require either a cost-plus-fixed-fee or a cost-plus-award-fee contract to ensure contractors recover their project costs. However, a fixed-fee contract offers only minimum incentive for the firm to control costs because the profit is guaranteed, and the municipality assumes the risk for cost increases.

On the other hand, an award-fee contract guarantees the contractor a minimum profit level; additional profit is then awarded based on performance. Although the District has guidelines for negotiating award-fee contracts which include detailed evaluation criteria, such as timeliness, quality, initiative, and effectiveness of cost control, the District has never used such a performance-based contracting method.

Until 1983, the lead consultant completed all work for the District on a cost-plus-fixed-fee basis. Therefore, the level of profit did not provide consultants with an incentive to control costs. In 1983, in response to an audit recommendation, the District began using lump-sum contracts for project design work, which provided some measure of cost control. However, to better ensure quality work at a reasonable price, we believe the District could have adopted an award-fee contracting method on the remaining fixed-fee program management and engineering contracts.

Incentive contracts are widely used by EPA and the U.S. Army Corps of Engineers on complex projects.

Award-fee contracts have been used in federal contracting for more than 20 years and are widely used by many federal agencies, including EPA, the U.S. Army Corps of Engineers, and the National Aeronautics and Space Administration. For example, EPA contracts with the lead consultant for both management and engineering services, in an arrangement similar to the Program Management Office, for Superfund activities, a federal toxic waste cleanup program. EPA requires a consultant to complete work on an award-fee basis; the lead consultant receives the costs it incurs plus a percentage of costs which reflects EPA's evaluation of the consultant's performance on a project.

Although contracts based on award fees provide incentives to control costs, they require municipalities to conduct a careful and thorough administrative review to document and evaluate the consultant's performance. Because most municipalities solicit proposals from several firms at each step of the project to ensure competitive cost and quality work, some municipalities believe award-fee contracts are unnecessary and not worth the additional administration they require.

However, the relationship between the firms which comprise the Program Management Office is noncompetitive and, therefore, a contracting method which includes incentives to control costs could have provided several benefits, without limiting the quality of contractor performance, including:

- awarding profit based on performance and, therefore, providing a stronger incentive for consultants to meet or better budgets and schedules; and
- saving negotiating time when there are changes to the initial contract since the District would evaluate all cost increases at the end of the payment cycle, awarding a fee based on the reasonableness of cost increases.

In addition, an award-fee contract could have given the District greater leverage in negotiating payment provisions. Under the current fixed-fee contracting method, the District has been unsuccessful in changing several provisions that have had significant cost implications. For instance, the District has tried to negotiate lower consultant overhead costs, lower profit percentages, reduced use of subconsultants, and reduced expenses, but with limited success.

It is unlikely the District, or any other municipality, will participate in another construction program of the size and complexity of the Pollution Abatement program, and with a similar consultant arrangement. However, in the event it does, the District may want to explore the option of an award-fee contract, to allow it to determine levels of profit based, in part, on how well the consultant controls costs and the use of subconsultants.

Engineering Design Review

As another means of ensuring funds were spent effectively and costs remained within limits, the District could have made greater use of an engineering design review process called value engineering. The goal of this process is to identify cost savings without compromising the quality of the proposed construction project.

More value engineering could have saved an additional \$50 to \$125 million.

In 1981, EPA began a mandatory value engineering program for waste water treatment projects. EPA studies indicated that municipalities could expect to save at least 5 percent and as much as 10 percent of the construction cost of waste water treatment projects as a result of value engineering. Therefore, based on the \$1.5 billion in construction contracts awarded as of December 1990, value engineering could have been expected to produce savings of \$75 to \$150 million. However, the Program Management Office value engineering program resulted in \$25.2 million savings, substantially less than the expected savings based on EPA's review of waste water treatment programs nationwide.

EPA regulations require value engineering on most EPA-funded projects with estimated construction costs of \$10 million or greater, excluding interceptor and collector systems. The EPA regulations also recommend, but do not mandate, value engineering on all projects and also suggest that value

engineering be performed at two stages, when 15 percent of design work has been completed and again at 50 percent completion. In its initial proposal to the District, the lead consultant stated its intention to perform value engineering on all design projects and at two stages of completion. However, we found:

- 36 percent of the program's total construction cost received no value engineering and only 21 percent received value engineering review at two stages;
- at least one of the projects was not reviewed until it was 90 percent complete, too late for a value engineering review to result in cost savings;
- EPA studies comparing value engineering on district projects with other projects in the Midwest show lower than average savings for district projects.

A 1981 audit recommended that the District require more value engineering on design projects; the District agreed and several more value engineering studies were performed. However, in 1986, DNR noted in a letter to the District that cost savings on recent studies were very small and encouraged the District to perform value engineering at two stages of design completion, as suggested by EPA.

The District implemented the required level of value engineering, not EPA's recommended level.

District and office staff note that EPA value engineering requirements were met and that some non-EPA funded projects were also reviewed. In addition, they argue that Program Management Office and district design plan review resulted in cost savings before value engineering was done. However, EPA value engineering manuals stress that design review has a different focus than value engineering and is not a substitute.

District staff add that many of the projects, particularly on Jones Island, were rehabilitation projects, with little potential for costs savings through value engineering. District staff believe that the costs of additional staff and administration required to perform value engineering on all design projects at two stages may not have resulted in overall savings.

However, for the value engineering that was performed, the Program Management Office estimates \$43 was saved for every dollar spent. Given the relatively low cost of value engineering, the District could have made better use of value engineering as a cost control measure by requiring value engineering on all projects and at an early and mid-stage of completion.

Evaluations

The District has done little formal evaluation of the lead consultant's performance.

While it appears the District has made limited efforts to monitor the program management arrangement, we believe the District could have conducted more formal evaluations of the lead engineering consultant's performance, incorporating performance measures and criteria. The District had been advised to conduct such formal evaluations in recommendations contained in a performance audit of the Pollution Abatement program conducted by a

management consultant in 1983. While the District agreed with the recommendations in its response to the audit, it does not appear that any specific methodology was implemented to conduct systematic, formal performance reviews. Instead, district staff state they evaluate Program Management Office performance continuously.

The District points out that, during the annual negotiations for the program management contract, district staff review the previous year's performance and staffing levels when determining the contract amounts. However, this review is not conducted using formal criteria for assessing performance, and the final contract is the result of discussions and negotiations about the resources needed for future performance, not an assessment of past performance.

Criteria could have been established to assist the District and the Commission in assessing the lead engineering consultant's performance in project planning, technical competence, innovation, scheduling, controlling costs, reporting, resource utilization, and effort. For example, the District is very concerned about the timeliness of completing the Pollution Abatement program. Criteria could have been established to assess the overall timeliness of the completion of design and construction work: for example, 80 percent of all design projects completed within deadline, or 80 percent of construction contracts completed on schedule. Similarly, criteria could have been established to assess the ability to complete design and construction work within specified ranges of cost.

In addition to the failure to evaluate the lead consultant's performance, it also appears that the District did not conduct its own formal evaluations of subconsultant performance. Instead, the District relied on justifications from the Program Management Office for continuing specific subconsultants. District staff state the lead consultant is responsible for evaluating the performance of subconsultants.

Although the Pollution Abatement program is nearing completion, we believe it would be prudent for the District to develop criteria with which to evaluate consultant performance and to conduct these evaluations for remaining program activities. Establishing criteria now would also be useful for future contracting arrangements.

Master Agreement

As the program approaches completion, opportunities to control costs diminish. It is too late to control costs through value engineering, for example, because most design work has been completed. However, district staff have identified several provisions of the current Master Agreement which may lead to future cost savings and greater district oversight.

The District's legal staff has begun redrafting the current Master Agreement, in large part to reflect the changing nature of the relationship between the Program Management Office and the District. In anticipation of the eventual

closing of the Program Management Office by the end of 1996, and the District assuming total responsibility for the facilities built in the Pollution Abatement program, district staff have considered the following major changes to the Master Agreement:

- clarify the role of the Program Management Office and the District as the Office continues to phase out and the Pollution Abatement program nears completion;
- strengthen the provisions specifying the liability of the lead engineering consultant after 1996, when the Pollution Abatement program is scheduled to be completed;
- strengthen payment and schedule provisions;
- broaden the grant indemnification clause; and
- update the agreement to reflect current EPA regulations.

The District has not yet begun negotiations with the Program Management Office regarding these changes. However, given the opportunity to control costs which these changes may represent, we suggest the District begin negotiations with the Program Management Office as soon as possible.

ADDITIONAL MANAGEMENT CONCERNS

Oversight can be accomplished most effectively when entities have in place policies which ensure adequate review and controls. During our review of district management of the Water Pollution Abatement Program, however, a number of issues were brought to our attention which raised concerns about management policies governing district financial activities. While we did not attempt to assess district management of all day-to-day responsibilities in operating the sewage treatment system, we did review certain aspects of purchasing, budgeting, and financial management, as well as the District's use of management consultants. We found that improvements can be made in several areas.

Ineffective Use of Consultant Contracts

In addition to relying heavily on engineering consultants to manage the Pollution Abatement program, in recent years the District has entered into an increasing number of consultant contracts for activities outside of the Pollution Abatement program. For example, in 1990, the Commission approved a request from district staff for a \$1 million fund to allow the District to contract with outside consultants for risk and claims management work and to perform contractor evaluations and other tasks. While \$1 million for consultants is not excessive in light of the District's overall budget, and the consultants were paid for entirely with local funds, we noted the fund was used for several contracts for work not originally specified.

Some consultant work products were not useful and consultant performance was not reviewed.

Our review of some of the consultants' work raises a number of district management questions. First, at the time of our review, it did not appear that the District had an effective mechanism for monitoring or assessing the quality of all consultant work products to determine whether the District should continue business with a particular firm. The majority of contracts from this fund were given to one firm. It does not appear that all of the work products provided significant new information, useful analysis, or recommendations for improvement which were adopted by the District or the Program Management Office.

In and of itself, the failure to receive valuable information from any single contracted study may not be unusual. In this case, however, a large number of studies, ten of which we reviewed, were contracted to the same firm and subcontractor, despite the failure of the early studies to provide useful information. It is not clear why the same consultant was continued, without bidding, on additional projects, rather than soliciting proposals from other consultants through a request for proposal process.

Failure to Document Noncompetitive Negotiations

Good business practice dictates that contracts for services be competitively bid, through sealed bids, requests for proposals, or other mechanisms, whenever possible. When competitive procedures are not followed, the reasons for those decisions need to be documented in order to ensure accountability and allow for management oversight.

The rationale for issuing some contracts noncompetitively is not available.

During our review of the procurement of 18 professional services contracts the District let during 1989 and 1990, primarily from the special \$1 million fund previously noted, we could not find documentation which would demonstrate that the 18 contracts were publicly advertised. Nor could we find documentation to suggest that, in these cases, sole source contracting was appropriate or in the best interests of the District.

District staff have suggested that, in the early 1980s, a request for proposal was publicly issued for claims management work and that the contracts from the \$1 million fund can be considered to have been let under this original request. We believe, however, the work on many of these contracts did not relate to claims management and, therefore, cannot be considered to fall under the provisions of the original request.

District staff have indicated they believe the actions followed were allowed by district policies. However, we believe that, because of the significant potential for abuse, these management policies are not appropriate for any government agency. If the Commission is interested in ensuring competitive procurement practices, the Commission could institute competitive bidding requirements similar to those found in state procurement guidelines for professional services contracts.

Apparent Serial Purchasing

Serial purchasing is inappropriate because it bypasses the Commission's oversight.

A relatively common oversight practice for a governing board is to limit staff expenditure or contracting authority to a set amount for any single item or contract, without specific board review and approval. The purpose of such limits is to, on the one hand, give staff discretion over relatively small purchases and, on the other hand, ensure board participation in decisions on major expenditures. A method which is used to inappropriately bypass such board oversight is for staff to serial purchase, or issue a series of contracts just at or below the limited amount to the same firm.

At the time of our review, the Commission had limited the Executive Director's independent purchasing authority for professional service contracts to \$25,000. In our review, we noted five contracts at amounts at or just below this limit, which were let with no competition or advertising, to the same contractor within a four-month period. We believe the Commission needs to maintain policies prohibiting serial purchasing, which undermines necessary commission oversight, and establish an internal monitoring procedure to prevent such practices. Such monitoring could be provided by the District's internal auditor. Since these issues arose, district staff proposed, and the Commission approved, policies to address these concerns.

Questionable Purchasing Practices

In our review, we noted additional questionable purchasing practices which are prohibited under state purchasing guidelines for state agencies. However, while the District is required to follow state agency purchasing guidelines when using state grant funds, it is not subject to these guidelines when using local funds. We believe that the state guidelines provide greater accountability, regardless of the source of funds.

For example, we could not find documentation that commission approval was obtained in the letting of two \$50,000 public relations contracts by the Executive Director. In response to questions raised by district accounting staff that such action was in apparent violation of district administrative policy, the District's Legal Services department issued an opinion stating that, as long as services that do not require competitive bidding are provided for in the operating budget, the Executive Director's authority to let such contracts is only limited by the operating budget.

If the Legal Services opinion is accepted, it would suggest that the Executive Director's authority to independently let noncompetitive contracts is limited only by the annual operating budget. Such a position raises the question of why the Commission would choose to limit the Executive Director's authority to independently contract from the capital budget to \$25,000 but not the operating budget. Further, it raises the question of why the Commission would limit the staff's authority to procure competitively bid contracts but not limit authority to procure noncompetitively bid contracts.

Limits are necessary for staff contracting authority.

We believe good management practices require that limits be placed by a governing board on the independent contracting authority of staff. If there exists ambiguity in the District's current policy, we believe that staff need to prepare for the Commission's consideration draft policies which establish independent contracting limits on district staff for both the capital and operating budgets and for both competitively and noncompetitively bid contracts.

We note that Legal Services staff submitted a proposal to the Commission in June 1990 which would limit the Executive Director's authority in approving professional services contracts to \$10,000 and would require the Executive Director to report to the Commission whenever a contractor received more than one contract. The proposal was approved by the full Commission in January 1991.

Contracting Without Sufficient Funds

Based on our review of contracts, it appears that commission and administrative policies on budgeting and transferring of funds have not always been followed. District administrative policies state that staff must identify the need for an expenditure and confirm that budgeted funds are available prior to contracts being signed. However, we found eight instances, five from the capital budget and three from the operating budget, in which the Executive Director's office entered into contracts without identifying whether budgeted funds were available. Further, we found seven contracts which were signed

before funds had been budgeted, and one contract which was substantially complete but had not yet had budgeted funds identified at the time of our review.

Commission policy states that budget overruns in one cost center may not be offset with underruns in other cost centers without commission approval. In two cases, we found contracts that were committed by the Executive Director's cost center without identifying whether funds were available within the operating budget. When staff determined funds were not available in the Executive Director's operating budget, the invoices were charged to the Legal Services cost center.

Funds were shifted to cover contract costs.

We also noted that three of the five contracts charged to the capital budget required funds to be transferred between budget line items within major projects due to a shortage of funds in those project budgets. We could find no documentation that any of these transfers were presented to the Commission for approval. This action appears to violate commission policy on transfer of funds, which states transfers between capital budget line items within a major project require commission approval.

In addition to commission and administrative policies, prudent management practices require that staff budget for expenditures whenever possible. Without this planning and control mechanism, the District cannot ensure the efficient allocation of public funds. We believe the Commission needs to adopt appropriate policies to allow contracting only when sufficient funds are budgeted. District staff have proposed draft administrative policies to establish such limits, but the Commission has not yet approved the policies.

Failure to Follow Contract Terms

During our review of several professional services contracts managed by the District, we identified one contract which appears to have been terminated by the District in a fashion not provided for in the contract. In fact, in spite of nonperformance by the contractor, the District paid an amount greater than the original contract amount.

The District engaged a consultant for \$14,000 to provide a range of services, including writing job descriptions, conducting recruitment and interviewing activities, and identifying qualified candidates, for 20 district positions. The contractor provided a staff person who worked at district offices to perform these tasks. Payment arrangements described in the contract were based upon a fee of \$700 per position, with \$7,000 (\$350 per position) to be paid in advance and the remaining \$7,000 to be paid upon completion of the assignment.

One consultant did not complete the work but was paid more than the contracted amount.

The initial payment of \$7,000 was made to the firm in February 1990. Based upon our discussions with district staff and review of contract documents, it appears that the contractor completed work on only 2 of the 20 positions. Due to the failure of the contractor to complete the required work, staff in the District's personnel department took action to terminate the contract. However, the contractor requested additional payment and, as a result of negotiations conducted between the District and the contractor, the District

made a final payment of \$10,983 to the contractor. Therefore, the District paid a total of \$17,983 for uncompleted work on a contract which originally called for only \$14,000 for all work.

District staff argue that while there was no dispute that the work called for in the contract was not completed, the higher payment was justified based on the number of hours which the contractor worked. We question the propriety of changing the contractually agreed upon basis of payment, particularly since this resulted in payments greater than the total amount called for in the contract for less work than was contracted. Further, it did not provide an opportunity for commission review and approval.

Unnecessary Use of Contracted Consultants

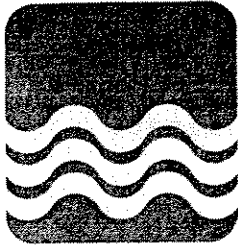
We also noted one instance in which the amount the District spent for consultants could be considered excessive in relationship to the problem the consultants were hired to address. In one case, the District spent \$96,000 contracting separately with an engineering consulting firm and two accounting firms to study a series of inappropriate financial transactions on one Pollution Abatement program construction contract which totaled \$68,600. While the \$68,600 was spent on district projects, the payments were not made according to required procedures.

The District spent \$96,000 to study a \$68,600 issue that had been resolved.

It is not clear that any of these three studies identified any information which was not already known to the District. The Program Management Office had identified the inappropriate financial transactions during their routine review. In response to the finding, the Program Management Office notified district management, DNR, and EPA, terminated the resident engineer responsible for the inappropriate transactions, and conducted an assessment of whether such activities could be occurring elsewhere in the project.

District staff have suggested the additional contracted studies were necessary to independently determine the extent of the problem and determine whether the Program Management Office had acted correctly. As noted, district monitoring of the Office is important. However, such vigorous examination of a modest issue that had already been studied and resolved, while other major monitoring had not been conducted, suggests confused priorities.

In summary, improvements to the District's internal operating policies, especially in the area of fiscal oversight and contract administration, are necessary. Improvements in these areas will, we believe, contribute to more effective oversight of the Pollution Abatement program and the Program Management Office, in addition to other consultants the District may engage in the future.



Milwaukee Metropolitan Sewerage District
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 Milwaukee, Wisconsin 53201-3049
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July 10, 1991

Mr. Dale Cattanach
 Legislative Audit Bureau
 State of Wisconsin
 131 West Wilson Street
 Madison, Wisconsin 53703

Dear Mr. Cattanach:

Thank you for the time and effort your staff has committed to its evaluation of the Milwaukee Metropolitan Sewerage District's implementation of the Water Pollution Abatement Program.

The District's primary objectives in managing the Water Pollution Abatement Program (WPAP) were to construct a waste water treatment system which would protect human health and the environment at the lowest possible cost to the taxpayer.

These objectives are being accomplished with:

1. A Program Management Office (PMO) to coordinate and manage all projects;
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The Legislative Audit Bureau has reviewed some of these management techniques and the results they produced.

We appreciate the Legislative Audit Bureau's recommendations for improvements in the program. Our comments which follow address several of the recommendations; all of them will be reviewed thoroughly and appropriate action taken. Our response regarding specific issues raised in your review of the program follows.

THE PROGRAM MANAGEMENT APPROACH WAS SELECTED AS THE MOST COST EFFECTIVE MEANS TO ACCOMPLISH THE MILWAUKEE PROJECT.

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The Commission, drawing on the experience of other major projects using the program management approach and the recommendations of the County Executive's Task force, developed a unique program management approach which fit Milwaukee's special circumstances. The nearly completed WPAP is viewed nationally as one of the most successful large public works in recent history.

The general program management approach used in Milwaukee is not unusual. It is the mode of many public agencies in the U.S. when they undertake large, complex, deadline-oriented capital improvement programs. These include \$1 billion plus transit projects in Washington, Baltimore, San Francisco, Atlanta, Miami, and Los Angeles, as well as very large sewerage

projects in St. Louis, San Francisco, Columbus (Ohio), San Antonio, Sacramento, Seattle, and Los Angeles.

The advantages of the PMO approach include quick staffing, access to specialists on short notice, maximum owner control and single source technical responsibility and legal liability.

Thus, there are self-evident advantages to the owner to place most, if not all, direct management and coordination responsibility with the PMO instead of many individual firms: the owner has more control over the project in such critical areas as schedule, cost, design criteria, facility performance, and overall policy. The owner can exercise this control with far fewer people than it would need under any other method, thus saving taxpayers short and long range costs.

THE DEEP TUNNEL STORAGE FACILITY REMAINS THE BEST, MOST COST-EFFECTIVE SOLUTION

The Lab report states that an alternative to the present deep tunnel storage system was separation of storm sewers from sanitary sewers and treatment of the two waste streams separately. There was considerable controversy regarding this matter that focused on such issues as significant home owner and commercial disruption from torn up streets and yards if separation were to occur, the construction of deep tunnels excluding opportunities for local construction contractors to participate in that work, and the contention that the deep tunnel system was constructed only to solve the combined sewer problem that existed for the most part in the City of Milwaukee.

The controversy, which has been extensively reported in the local media, however, is not founded on the real facts of the need for the deep tunnel system. It was needed to solve, in the most cost-effective way, the collection, storage, and transport of the flows from clear water entry to the separated systems that existed throughout the entire Sewerage District's flows from all communities that contribute flow to the MMSD. The real alternatives to the deep tunnel were either significantly increasing the treatment plant sizes or trying to keep nearly all clear water from ever entering the separated system.

The MMSD studied alternatives extensively and found both to be much more costly, inefficient to operate, and totally disruptive to the community during construction. These non-cost-effective alternatives would never have received EPA and DNR approval for any grant fund participation. The added cost to the community, if it had undertaken one of the alternatives, is conservatively estimated at over \$1 billion.

Thus the MMSD selected the deep tunnel system as the most cost effective way to deal with the massive storm related flows from leaks in sewers in the separated sewer areas. It then became obvious that - when not needed for clear water from the separate sewer systems - it could receive the flows from the combined sewer system, thus eliminating any need to separate the combined system. In the end, EPA funded the segments of the deep tunnel receiving separated flows; DNR funded the balance. The WPAP did employ many local contractors, and minimized surface disruption.

Some have suggested that difficulties with one segment of the deep tunnel system, the North Shore Tunnel, should be construed as a reason why the other alternatives might have been a better approach. Nothing could be further from the truth. The cost-effectiveness of the selected approach even with changed condition costs is beyond question. The increased cost involved with solving the North Shore Tunnel problem is estimated at \$140 million, compared to the one billion dollar cost savings as against the other two alternatives.

**THE "COST INCREASE" ON THE NORTH SHORE TUNNEL
DEMONSTRATES THE "COST SAVINGS" OF THE RISK
SHARING CONTRACT PHILOSOPHY**

The MMSD realizes that there are, as stated by the LAB, still unanswered questions about the costs for the North Shore Tunnel differing site condition. Further studies by impartial people were scheduled over a year to be undertaken as soon as the project is complete. This differing site condition may have cost the MMSD some added funds for the North Shore Tunnel beyond what it may have spent if the difficulties of boring the tunnel had been known by the contractor when it bid the work. However, most, if not all, of the \$140 million cost would have been added by the contractor if he had known of the "changed conditions" at the time of the bid.

In reality, the process of the MMSD paying the costs of the North Shore Tunnel differing site condition is an excellent example of the effectiveness of the MMSD risk sharing program. The extremely difficult tunneling conditions encountered in this very limited area of the entire deep tunnel system were not predictable. The MMSD's risk sharing program, applicable to all contracts, told all tunnel contract bidders that the MMSD would pay for such risk if the conditions should occur. Thus, contractors could bid without including massive risk contingencies for just such incidents in each contract. To its credit, the LAB has recognized the goal of risk sharing. Absent the MMSD risk sharing program, such bids, which were fixed price, would have produced massive increased costs to the MMSD. For example, Milwaukee's deep tunnel costs averaged \$3,045/ft. (including the North Shore Tunnel changed condition costs). Comparable projects outside of Milwaukee without risk sharing \$4,500-\$5,000/foot. Based on the number of feet in the Milwaukee project this represents a \$160 million savings.

**PRELIMINARY JONES ISLAND DEWATERING AND DRYING FACILITY
COST ESTIMATES, NOT COSTS, HAVE INCREASED FOR SOUND REASONS**

LAB states that the costs for the facility increased from an estimate of \$36.4 million to a bid of \$194.6 million. This conclusion rests on the assumption that the first planning stage estimate for this project is comparable to a contractor's bid estimate. It is not.

The MMSD initially hoped that recent technological advances would enable it to use modern technology to reduce the cost of replacing the worn out Milorganite plant. Extensive design and pilot projects indicated that this new technology would not produce a saleable product. It would have been irresponsible to build a facility without knowing it would work. Thus, the older proven technology was the only cost-effective solution to the disposal of sludge at Jones Island.

The LAB has accurately summarized the history of these cost estimate changes which have been reported extensively in local news media stories. Far from raising questions, this history shows the PMO changing its estimate as circumstances change, and shows the MMSD making policy decisions to continue the production of Milorganite to produce revenue for the MMSD to save landfill space, and to avoid legal liability problems. MMSD took all these actions in a timely, open, public manner, and even reduced the scope of the project to save money.

The LAB sets forth a list of alternatives which the MMSD could have chosen rather than accept the low bid. Each alternative was evaluated and rejected for sound engineering or economic reasons as having too high a probability of costing the tax payers more than the low bid.

THE MASTER AGREEMENT AND ITS COMPANION TASK ORDER SYSTEM PROVIDED THE MMSD WITH COMPLETE PROJECT CONTROL AND OVERVIEW.

The master agreement and task order system must be viewed together to understand the total project control and monitoring system available to the MMSD. The master agreement spells out the basic business, financial, and legal relationship between the MMSD and lead consultant. It does not contain cost, schedule, or scope of work for the Program. Those important control provisions are embodied in task orders. A task order when signed by the District and the consultant becomes a contract for the work agreed to in the task order. Design assignments that the lead consultant subcontracts to design firms are negotiated with direct MMSD involvement. No payment is made by MMSD on any task order unless it is within the approved budget. DNR reviews every grant-related PMO task order for grant funding eligibility. This MMSD task order control of the Program is as stringent as will be found in any well-managed engineering program in the U.S.

MMSD PROVIDED EXTENSIVE MANAGEMENT AND OVERSIGHT OF PMO PROJECTS AND PERSONNEL

The LAB report states that the district could have done more to monitor the lead consultant's performance to ensure that funds were spent effectively. We would have expected a review of the management of the program to have provided at least some discussion of the primary tool used by the MMSD to monitor and oversee consultant performance and costs.

The MMSD recognized at the onset of the program that the consultant's extensive responsibilities for planning, design, construction management and program coordination required a commensurate in-house District management effort.

The District implemented an extensive in-house management structure to oversee each project assigned to the PMO. Depending on the nature of the projects, this in-house structure often mirrored the management structure of the PMO at the upper levels of the organization. The District has expended over \$36 million dollars on staff oversight and management of the PMO to date. This is the equivalent of 7.6% of the consultant costs. Between 1985 and 1990, for example, the District spent approximately \$5 million dollars per year on in-house direct labor and overhead managing PMO

projects and personnel. This management oversight, not final contract approval, or reclaiming some relatively minor management responsibilities from the PMO, such as records management, constitutes the core of the District's or indeed any management and oversight effort.

THE MMSD CONTRACTING APPROACH WITH LEAD CONSULTANT STRICTLY COMPLIES WITH FEDERAL LAW

The MMSD must comply with applicable federal law contained in the Code of Federal Regulations (CFR), Title 40 (Protection of Environment), Chapter 1 (Environmental Protection Agency), Part 35 (State and Local Assistance). Under 40 CFR 35.937-1, Type of Contract, certain contracting types are prohibited and others are allowed. The two types of contracts described as prohibited are 1) cost plus percentage of cost and 2) percentage of construction cost. These contracts, not used in the WPAP, were prohibited because they lack the incentive for the contractor once he has been given notice to proceed to perform the work at the least possible cost. The types of contracts which are allowed are cost reimbursement, fixed price, and per diem. Cost plus award fee contracts are not mentioned in the CFR for grant funded projects.

The Cost Reimbursement Contracts (cost plus fixed fee or CPFF), provide a cost ceiling which the engineer may not exceed without a formal amendment to the contract, and a fixed dollar profit which may not be increased except in case of a contract amendment which increases the scope of work. This type of contract is most easily administered by the engineer and the MMSD and provide for extensive flexibility. The MMSD has used CPFF contracts on the WPAP for 216 task orders.

The fixed price contract establishes a guaranteed maximum price which may not be increased except to the extent that a contract amendment increases the scope of work.

THE LEGISLATIVE AUDIT BUREAU SUGGESTED COST PLUS AWARD FEE CONTRACT COULD COST THE MMSD MILLIONS MORE IN CONSULTANT FEES

The Legislative Audit Bureau (LAB) suggests that cost plus award fee contracts would have been more appropriate for control of the PMO operations. Cost plus award fee contracts are practically never used in preference to the cost plus fixed fee type except in EPA direct federal contracting; i.e., in the Superfund Program, where the federal government can orchestrate the large number of evaluators needed to administer that type of contract. For projects administered under EPA Grants, it is neither practicable nor prudent to require the grantee (MMSD) to use up the grant funds to administer the award fee part of that type of contract. The fixed fee (profit) of a CPFF contract is less costly to administer than the award fee contract. The fee (profit) window allowed by statute for research type projects like Superfund has a not-to-exceed ceiling of 15 percent. The lead consultant's average fee to date on the WPAP is 10 percent (total to date, \$37.4 million). An award for outstanding performance would be 15 percent (pushing the total up to \$56.1 million). The MMSD views a large percentage of the PMO performance on Program task orders as meriting outstanding consideration. For example, the PMO performance in delivering every final design set of plans and

specifications on schedule for the entire Program was such an achievement. This performance greatly aided the MMSD in maximizing its grant capture and minimizing construction cost increases caused by inflation. An award fee for excellent work for even half of the Program would have substantially increased the profits paid to the LEAD CONSULTANT by millions of dollars.

The LAB statement that the PMO is induced to drive up costs to obtain a higher fee (profit) is without basis in the nature of a fixed fee contract and without factual support in record of the WPAP. The task order negotiation process that establishes the up front cost and a fixed profit for the work precludes an incentive for inducing any unnecessary cost increases which only reduce the percent profit on a given contract. Indeed, the fixed (limited) fee provides an incentive to finish the work quickly and move on to the next contract (task order) where another fee is available.

**LEAD CONSULTANT PROFITS ARE WELL WITHIN THE
RANGE OF THE INDUSTRY STANDARDS FOR THE WORK
BEING DONE BY THE PMO**

The lead consultant costs through December 31, 1990, including its subcontractors' cost are shown below. The lead consultant is responsible for all its subcontractors' work and its profits are applicable to all the resources it used to accomplish the WPAP. Accordingly, consistent with Industry practice, generally recognized accounting and audit standards, DNR and EPA guidelines, and the commonly understood use of the term "profit," the percentage profit amounts should be calculated as follows:

	<u>In Millions</u>
Cost of lead consultant's own resources	\$162.8
Cost of lead consultant's subcontract resources	212.8
Total Cost:	\$375.6
Lead consultant's profit on all Program Resources	37.4
Percent Total Profit:	10.0%

These profit percentages, as compiled above, are well within all public guidelines for projects of the complexity of the WPAP.

**COSTS FOR CHANGED CONDITIONS DO NOT EQUAL "COST INCREASES"
AS UNDERSTOOD IN THE INDUSTRY - INCREASES TO THE COSTS OF
CONSTRUCTION WORK ARE WELL WITHIN THE RANGES OF INDUSTRY
STANDARDS, AND OVER 80 PERCENT OF ALL APPLICABLE CONSTRUCTION
PROJECTS RECEIVED A VALUE ENGINEERING STUDY.**

Table 4 in the LAB report is an accurate but incomplete portrayal of the cost and reasons for construction contract modifications issued to date on the project. It does not note that one differing site condition change order, for the North Shore Tunnel, out of 555 total change orders, amounted to \$140 million or 78 percent of the cost of all differing site condition cost increases. As stated by the LAB, the designer cannot foresee

differing site conditions and so costs for these kinds of changes should be removed from actual costs when comparing increased costs to award costs to actual costs to determine cost increases or decreases. Without differing site condition costs, the overall increase in construction cost of contracted work is 1.8 percent. This is an exceptionally fine record for any project - more so for one as complex and as large as the WPAP.

VALUE ENGINEERING EXCEEDED EPA STANDARDS

LAB states there could be Value Engineering (VE) savings of 50-125 million which they base on the total construction cost of \$1.5 billion for the entire Program. In fact the MMSD conducted VE studies for the indicated percentage of contracts in the following three categories: 89 percent of Jones Island construction, 88 percent of South Shore construction, and 86 percent of interceptor construction. MMSD included this large percentage of Program work even though EPA regulations state that interceptors and collectors are excluded from VE requirements, as can contracts worth \$10M or less. Although EPA required VE on \$592M of construction, VE studies were actually done on \$1.1 billion of construction, producing savings of \$23.2 million. VE studies were diligently accomplished on a large segment of the Program. The "savings" estimated by the LAB are not realistic. These "savings" result from applying an EPA generic percentage range to construction costs, without showing that the EPA studies or methods regarding other programs are applicable to the WPAP. Moreover, VE does not necessarily produce savings proportionate to the cost of the work. A thorough study would show that PMO designs were of generally higher than average quality. This results in less "VE savings" but a better work product.

PMO TASK ORDER COSTS HAVE SHOWN ONLY 1.1 PERCENT INCREASE

The LAB statement that Program Management and Engineering costs have increased by \$94.6 million, or 25 percent, is not correct.

The correct cost change history for amendments for the 240 task orders issued to date to the lead consultant is as follows:

	<u>Number of Amendments</u>	<u>Cost Change</u>
Scope Amendments	324	\$109.8 Million
Cost Amendments (Including Overhead and other Adjustments)	13	4.2 Million
Closeout Amendments	97	(23.2 Million)
No Cost Amendments	302	<u>0</u>
Total Cost of Amendments:		\$ 90.8 Million

Scope amendments are the equivalent of additional contracts adding to task orders new work not previously included by the MMSD in the initial task

orders. These cannot be characterized as cost increases or compared with the percentage cost of changes to construction contracts as was done by the LAB. A significant portion of these scope amendments were simply additions to existing task orders of work that was planned in advance to be brought under contract on a staged basis. These amendments were all negotiated by the MMSD using the same rigorous requirements as was done when originally establishing the task order.

Cost amendments are increases in cost of original work where no new work was added to the task order. These amount to 1.1 percent of the total value of task orders issued to the lead consultant through 31 December 1990.

OVERALL COSTS FOR THE PROGRAM NON-CONSTRUCTION WORK ARE NOT IN EXCESS OF ANY KNOWN COMPARABLE PROJECT WORK

A study, known as the Similar Projects Study, was performed in 1983 for the lead consultant and the MMSD by Arthur Andersen & Company, to make a comparison of WPAP non-construction costs with non-construction costs of similar projects existing in the U.S. The study concluded that the MMSD costs were comparable to similar projects.

There are strong indications that other projects such as the Boston Harbor project and rail transit programs in Los Angeles and San Francisco have non-construction costs in excess of the WPAP costs. A recent study of information from the California Department of Transportation, which does most major project work with in-house staff, indicates non-construction costs exceeding 40 percent of the cost of construction.

The percentage of non-construction cost for the WPAP, as estimated in the 1983 was 24.9 percent. Currently it is estimated to be 28 percent, or a 12 percent increase over the estimated percentage from the 1983 study. A major factor causing this increase is the internal lengthening of Program schedules to improve grant capture.

The current WPAP ratios of non-construction to construction costs are commensurate with all known industry experience.

Cost/price reviews have been done on all management and engineering contracts for the last 5 - 7 years. There is no "back log" of these reviews because EPA and DNR have approved, late 1970's - early 1980's, contracts without those reviews and it would serve no purpose to do them now. Further, the "final contract amounts" for contracts with and without cost/price overruns were different because of the number of planned amendments to the early contracts not because of the cost/price review.

EFFECTIVE USE OF CONSULTANTS

The MMSD has hired consultants to evaluate the work product of both engineers and from the inception of the Program contractors as part of its usual, extensive monitoring of the spending of its funds. The consultants referenced by LAB were retained with a request for proposals and have provided MMSD with facts, insights, and analyses that have enabled MMSD to monitor the PMO, improve its own work, and ensure that taxpayers were receiving value for their money. It is not uncommon for auditors to

determine after extensive review of a consultants work that the consultants work is of high quality. While this may produce no "recommendation for improvement" or "significant new" information it is just as useful to the MMSD as a critical audit. These evaluations include the very monitoring which LAB urges in other parts of its study.

COMPETITIVE CONSULTANT NEGOTIATIONS AND SELECTION

The MMSD issued a nationwide request for proposal for a consultant to be used in "construction risks and claims throughout Program implementation." Only then did the MMSD hire a consultant to do the funded work. MMSD's policies and their implementation comply with state law concerning competitive procurement of services. Most of the "18 professional service contracts" referenced by the LAB were not individual contracts but work assignments on "task orders" from a single contract.

SERIAL PURCHASING

MMSD agrees that serial purchasing is inappropriate if done to avoid MMSD Commission oversight. In fact, MMSD staff recognized the potential problem in early 1990, at least 3 months before LAB began its work, and the Commission has approved policies recommended by staff that address this concern.

PURCHASING PRACTICES

As the LAB indicates, MMSD staff follows purchasing practices expressly authorized by MMSD policy, and all such practices noted in the report are authorized by state law applicable to the MMSD. Limits of staff contracting authority are in place and were in place before LAB did its study.

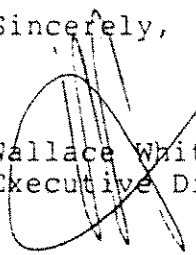
USE OF CONTRACTED CONSULTANTS (AUDITORS)

The audits totaling \$96,000 referenced by the LAB were required to determine that the inappropriate financial transactions were not part of a pattern of conduct by the consultants' employee and were not done in collusion with the prime contractor. These and other matters were not studied or resolved. The District could not properly rely on the consultants' determination that its subcontractors' actions resulted in no further loss to the District.

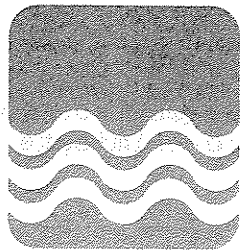
The appropriateness of the amount of money for an audit is not necessarily gauged by the amount of the underlying contract. Is a suspected \$5,000.00 misappropriation to go unaudited because it might cost more than \$5,000.00 to study? This information will help prevent recurrences of these transactions. The cost of prevention is less than the cost of a cure.

Thank you again for the opportunity to respond to your review of the
Water Pollution Abatement Project.

Sincerely,


Wallace White
Executive Director

WW/3958


Milwaukee Metropolitan Sewerage District

260 West Seeboth Street

P.O. Box 3049

Milwaukee, Wisconsin 53201-3049

(414) 272-5100

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projects in St. Louis, San Francisco, Columbus (Ohio), San Antonio, Sacramento, Seattle, and Los Angeles.

The advantages of the PMO approach include quick staffing, access to specialists on short notice, maximum owner control and single source technical responsibility and legal liability.

Thus, there are self-evident advantages to the owner to place most, if not all, direct management and coordination responsibility with the PMO instead of many individual firms: the owner has more control over the project in such critical areas as schedule, cost, design criteria, facility performance, and overall policy. The owner can exercise this control with far fewer people than it would need under any other method, thus saving taxpayers short and long range costs.

THE DEEP TUNNEL STORAGE FACILITY REMAINS THE BEST, MOST COST-EFFECTIVE SOLUTION

The Lab report states that an alternative to the present deep tunnel storage system was separation of storm sewers from sanitary sewers and treatment of the two waste streams separately. There was considerable controversy regarding this matter that focused on such issues as significant home owner and commercial disruption from torn up streets and yards if separation were to occur, the construction of deep tunnels excluding opportunities for local construction contractors to participate in that work, and the contention that the deep tunnel system was constructed only to solve the combined sewer problem that existed for the most part in the City of Milwaukee.

The controversy, which has been extensively reported in the local media, however, is not founded on the real facts of the need for the deep tunnel system. It was needed to solve, in the most cost-effective way, the collection, storage, and transport of the flows from clear water entry to the separated systems that existed throughout the entire Sewerage District's flows from all communities that contribute flow to the MMSD. The real alternatives to the deep tunnel were either significantly increasing the treatment plant sizes or trying to keep nearly all clear water from ever entering the separated system.

The MMSD studied alternatives extensively and found both to be much more costly, inefficient to operate, and totally disruptive to the community during construction. These non-cost-effective alternatives would never have received EPA and DNR approval for any grant fund participation. The added cost to the community, if it had undertaken one of the alternatives, is conservatively estimated at over \$1 billion.

Thus the MMSD selected the deep tunnel system as the most cost effective way to deal with the massive storm related flows from leaks in sewers in the separated sewer areas. It then became obvious that - when not needed for clear water from the separate sewer systems - it could receive the flows from the combined sewer system, thus eliminating any need to separate the combined system. In the end, EPA funded the segments of the deep tunnel receiving separated flows; DNR funded the balance. The WPAP did employ many local contractors, and minimized surface disruption.

Some have suggested that difficulties with one segment of the deep tunnel system, the North Shore Tunnel, should be construed as a reason why the other alternatives might have been a better approach. Nothing could be further from the truth. The cost-effectiveness of the selected approach even with changed condition costs is beyond question. The increased cost involved with solving the North Shore Tunnel problem is estimated at \$140 million, compared to the one billion dollar cost savings as against the other two alternatives.

**THE "COST INCREASE" ON THE NORTH SHORE TUNNEL
DEMONSTRATES THE "COST SAVINGS" OF THE RISK
SHARING CONTRACT PHILOSOPHY**

The MMSD realizes that there are, as stated by the LAB, still unanswered questions about the costs for the North Shore Tunnel differing site condition. Further studies by impartial people were scheduled over a year to be undertaken as soon as the project is complete. This differing site condition may have cost the MMSD some added funds for the North Shore Tunnel beyond what it may have spent if the difficulties of boring the tunnel had been known by the contractor when it bid the work. However, most, if not all, of the \$140 million cost would have been added by the contractor if he had known of the "changed conditions" at the time of the bid.

In reality, the process of the MMSD paying the costs of the North Shore Tunnel differing site condition is an excellent example of the effectiveness of the MMSD risk sharing program. The extremely difficult tunneling conditions encountered in this very limited area of the entire deep tunnel system were not predictable. The MMSD's risk sharing program, applicable to all contracts, told all tunnel contract bidders that the MMSD would pay for such risk if the conditions should occur. Thus, contractors could bid without including massive risk contingencies for just such incidents in each contract. To its credit, the LAB has recognized the goal of risk sharing. Absent the MMSD risk sharing program, such bids, which were fixed price, would have produced massive increased costs to the MMSD. For example, Milwaukee's deep tunnel costs averaged \$3,045/ft. (including the North Shore Tunnel changed condition costs). Comparable projects outside of Milwaukee without risk sharing \$4,500-\$5,000/foot. Based on the number of feet in the Milwaukee project this represents a \$160 million savings.

**PRELIMINARY JONES ISLAND DEWATERING AND DRYING FACILITY
COST ESTIMATES, NOT COSTS, HAVE INCREASED FOR SOUND REASONS**

LAB states that the costs for the facility increased from an estimate of \$36.4 million to a bid of \$194.6 million. This conclusion rests on the assumption that the first planning stage estimate for this project is comparable to a contractor's bid estimate. It is not.

The MMSD initially hoped that recent technological advances would enable it to use modern technology to reduce the cost of replacing the worn out Milorganite plant. Extensive design and pilot projects indicated that this new technology would not produce a saleable product. It would have been irresponsible to build a facility without knowing it would work. Thus, the older proven technology was the only cost-effective solution to the disposal of sludge at Jones Island.

The LAB has accurately summarized the history of these cost estimate changes which have been reported extensively in local news media stories. Far from raising questions, this history shows the PMO changing its estimate as circumstances change, and shows the MMSD making policy decisions to continue the production of Milorganite to produce revenue for the MMSD to save landfill space, and to avoid legal liability problems. MMSD took all these actions in a timely, open, public manner, and even reduced the scope of the project to save money.

The LAB sets forth a list of alternatives which the MMSD could have chosen rather than accept the low bid. Each alternative was evaluated and rejected for sound engineering or economic reasons as having too high a probability of costing the tax payers more than the low bid.

THE MASTER AGREEMENT AND ITS COMPANION TASK ORDER SYSTEM PROVIDED THE MMSD WITH COMPLETE PROJECT CONTROL AND OVERVIEW.

The master agreement and task order system must be viewed together to understand the total project control and monitoring system available to the MMSD. The master agreement spells out the basic business, financial, and legal relationship between the MMSD and lead consultant. It does not contain cost, schedule, or scope of work for the Program. Those important control provisions are embodied in task orders. A task order when signed by the District and the consultant becomes a contract for the work agreed to in the task order. Design assignments that the lead consultant subcontracts to design firms are negotiated with direct MMSD involvement. No payment is made by MMSD on any task order unless it is within the approved budget. DNR reviews every grant-related PMO task order for grant funding eligibility. This MMSD task order control of the Program is as stringent as will be found in any well-managed engineering program in the U.S.

MMSD PROVIDED EXTENSIVE MANAGEMENT AND OVERSIGHT OF PMO PROJECTS AND PERSONNEL

The LAB report states that the district could have done more to monitor the lead consultant's performance to ensure that funds were spent effectively. We would have expected a review of the management of the program to have provided at least some discussion of the primary tool used by the MMSD to monitor and oversee consultant performance and costs.

The MMSD recognized at the onset of the program that the consultant's extensive responsibilities for planning, design, construction management and program coordination required a commensurate in-house District management effort.

The District implemented an extensive in-house management structure to oversee each project assigned to the PMO. Depending on the nature of the projects, this in-house structure often mirrored the management structure of the PMO at the upper levels of the organization. The District has expended over \$36 million dollars on staff oversight and management of the PMO to date. This is the equivalent of 7.6% of the consultant costs. Between 1985 and 1990, for example, the District spent approximately \$5 million dollars per year on in-house direct labor and overhead managing PMO

projects and personnel. This management oversight, not final contract approval, or reclaiming some relatively minor management responsibilities from the PMO, such as records management, constitutes the core of the District's or indeed any management and oversight effort.

**THE MMSD CONTRACTING APPROACH WITH LEAD CONSULTANT
STRICTLY COMPLIES WITH FEDERAL LAW**

The MMSD must comply with applicable federal law contained in the Code of Federal Regulations (CFR), Title 40 (Protection of Environment), Chapter 1 (Environmental Protection Agency), Part 35 (State and Local Assistance). Under 40 CFR 35.937-1, Type of Contract, certain contracting types are prohibited and others are allowed. The two types of contracts described as prohibited are 1) cost plus percentage of cost and 2) percentage of construction cost. These contracts, not used in the WPAP, were prohibited because they lack the incentive for the contractor once he has been given notice to proceed to perform the work at the least possible cost. The types of contracts which are allowed are cost reimbursement, fixed price, and per diem. Cost plus award fee contracts are not mentioned in the CFR for grant funded projects.

The Cost Reimbursement Contracts (cost plus fixed fee or CPFF), provide a cost ceiling which the engineer may not exceed without a formal amendment to the contract, and a fixed dollar profit which may not be increased except in case of a contract amendment which increases the scope of work. This type of contract is most easily administered by the engineer and the MMSD and provide for extensive flexibility. The MMSD has used CPFF contracts on the WPAP for 216 task orders.

The fixed price contract establishes a guaranteed maximum price which may not be increased except to the extent that a contract amendment increases the scope of work.

**THE LEGISLATIVE AUDIT BUREAU SUGGESTED COST PLUS
AWARD FEE CONTRACT COULD COST THE MMSD MILLIONS
MORE IN CONSULTANT FEES**

The Legislative Audit Bureau (LAB) suggests that cost plus award fee contracts would have been more appropriate for control of the PMO operations. Cost plus award fee contracts are practically never used in preference to the cost plus fixed fee type except in EPA direct federal contracting; i.e., in the Superfund Program, where the federal government can orchestrate the large number of evaluators needed to administer that type of contract. For projects administered under EPA Grants, it is neither practicable nor prudent to require the grantee (MMSD) to use up the grant funds to administer the award fee part of that type of contract. The fixed fee (profit) of a CPFF contract is less costly to administer than the award fee contract. The fee (profit) window allowed by statute for research type projects like Superfund has a not-to-exceed ceiling of 15 percent. The lead consultant's average fee to date on the WPAP is 10 percent (total to date, \$37.4 million). An award for outstanding performance would be 15 percent (pushing the total up to \$56.1 million). The MMSD views a large percentage of the PMO performance on Program task orders as meriting outstanding consideration. For example, the PMO performance in delivering every final design set of plans and

specifications on schedule for the entire Program was such an achievement. This performance greatly aided the MMSD in maximizing its grant capture and minimizing construction cost increases caused by inflation. An award fee for excellent work for even half of the Program would have substantially increased the profits paid to the LEAD CONSULTANT by millions of dollars.

The LAB statement that the PMO is induced to drive up costs to obtain a higher fee (profit) is without basis in the nature of a fixed fee contract and without factual support in record of the WPAP. The task order negotiation process that establishes the up front cost and a fixed profit for the work precludes an incentive for inducing any unnecessary cost increases which only reduce the percent profit on a given contract. Indeed, the fixed (limited) fee provides an incentive to finish the work quickly and more on to the next contract (task order) where another fee is available.

**LEAD CONSULTANT PROFITS ARE WELL WITHIN THE
RANGE OF THE INDUSTRY STANDARDS FOR THE WORK
BEING DONE BY THE PMO**

The lead consultant costs through December 31, 1990, including its subcontractors' cost are shown below. The lead consultant is responsible for all its subcontractors' work and its profits are applicable to all the resources it used to accomplish the WPAP. Accordingly, consistent with Industry practice, generally recognized accounting and audit standards, DNR and EPA guidelines, and the commonly understood use of the term "profit," the percentage profit amounts should be calculated as follows:

	<u>In Millions</u>
Cost of lead consultant's own resources	\$162.8
Cost of lead consultant's subcontract resources	212.8
Total Cost:	\$375.6
Lead consultant's profit on all Program Resources	37.4
Percent Total Profit:	10.0%

These profit percentages, as compiled above, are well within all public guidelines for projects of the complexity of the WPAP.

**COSTS FOR CHANGED CONDITIONS DO NOT EQUAL "COST INCREASES"
AS UNDERSTOOD IN THE INDUSTRY - INCREASES TO THE COSTS OF
CONSTRUCTION WORK ARE WELL WITHIN THE RANGES OF INDUSTRY
STANDARDS, AND OVER 80 PERCENT OF ALL APPLICABLE CONSTRUCTION
PROJECTS RECEIVED A VALUE ENGINEERING STUDY.**

Table 4 in the LAB report is an accurate but incomplete portrayal of the cost and reasons for construction contract modifications issued to date on the project. It does not note that one differing site condition change order, for the North Shore Tunnel, out of 555 total change orders, amounted to \$140 million or 78 percent of the cost of all differing site condition cost increases. As stated by the LAB, the designer cannot foresee

differing site conditions and so costs for these kinds of changes should be removed from actual costs when comparing increased costs to award costs to actual costs to determine cost increases or decreases. Without differing site condition costs, the overall increase in construction cost of contracted work is 1.8 percent. This is an exceptionally fine record for any project - more so for one as complex and as large as the WPAP.

VALUE ENGINEERING EXCEEDED EPA STANDARDS

LAB states there could be Value Engineering (VE) savings of 50-125 million which they base on the total construction cost of \$1.5 billion for the entire Program. In fact the MMSD conducted VE studies for the indicated percentage of contracts in the following three categories: 89 percent of Jones Island construction, 88 percent of South Shore construction, and 86 percent of interceptor construction. MMSD included this large percentage of Program work even though EPA regulations state that interceptors and collectors are excluded from VE requirements, as can contracts worth \$10M or less. Although EPA required VE on \$592M of construction, VE studies were actually done on \$1.1 billion of construction, producing savings of \$23.2 million. VE studies were diligently accomplished on a large segment of the Program. The "savings" estimated by the LAB are not realistic. These "savings" result from applying an EPA generic percentage range to construction costs, without showing that the EPA studies or methods regarding other programs are applicable to the WPAP. Moreover, VE does not necessarily produce savings proportionate to the cost of the work. A thorough study would show that PMO designs were of generally higher than average quality. This results in less "VE savings" but a better work product.

PMO TASK ORDER COSTS HAVE SHOWN ONLY 1.1 PERCENT INCREASE

The LAB statement that Program Management and Engineering costs have increased by \$94.6 million, or 25 percent, is not correct.

The correct cost change history for amendments for the 240 task orders issued to date to the lead consultant is as follows:

	<u>Number of Amendments</u>	<u>Cost Change</u>
Scope Amendments	324	\$109.8 Million
Cost Amendments (Including Overhead and other Adjustments)	13	4.2 Million
Closeout Amendments	97	(23.2 Million)
No Cost Amendments	302	<u>0</u>
Total Cost of Amendments:		\$ 90.8 Million

Scope amendments are the equivalent of additional contracts adding to task orders new work not previously included by the MMSD in the initial task

orders. These cannot be characterized as cost increases or compared with the percentage cost of changes to construction contracts as was done by the LAB. A significant portion of these scope amendments were simply additions to existing task orders of work that was planned in advance to be brought under contract on a staged basis. These amendments were all negotiated by the MMSD using the same rigorous requirements as was done when originally establishing the task order.

Cost amendments are increases in cost of original work where no new work was added to the task order. These amount to 1.1 percent of the total value of task orders issued to the lead consultant through 31 December 1990.

OVERALL COSTS FOR THE PROGRAM NON-CONSTRUCTION WORK ARE NOT IN EXCESS OF ANY KNOWN COMPARABLE PROJECT WORK

A study, known as the Similar Projects Study, was performed in 1983 for the lead consultant and the MMSD by Arthur Andersen & Company, to make a comparison of WPAP non-construction costs with non-construction costs of similar projects existing in the U.S. The study concluded that the MMSD costs were comparable to similar projects.

There are strong indications that other projects such as the Boston Harbor project and rail transit programs in Los Angeles and San Francisco have non-construction costs in excess of the WPAP costs. A recent study of information from the California Department of Transportation, which does most major project work with in-house staff, indicates non-construction costs exceeding 40 percent of the cost of construction.

The percentage of non-construction cost for the WPAP, as estimated in the 1983 was 24.9 percent. Currently it is estimated to be 28 percent, or a 12 percent increase over the estimated percentage from the 1983 study. A major factor causing this increase is the internal lengthening of Program schedules to improve grant capture.

The current WPAP ratios of non-construction to construction costs are commensurate with all known industry experience.

Cost/price reviews have been done on all management and engineering contracts for the last 5 - 7 years. There is no "back log" of these reviews because EPA and DNR have approved, late 1970's - early 1980's, contracts without those reviews and it would serve no purpose to do them now. Further, the "final contract amounts" for contracts with and without cost/price overruns were different because of the number of planned amendments to the early contracts not because of the cost/price review.

EFFECTIVE USE OF CONSULTANTS

The MMSD has hired consultants to evaluate the work product of both engineers and from the inception of the Program contractors as part of its usual, extensive monitoring of the spending of its funds. The consultants referenced by LAB were retained with a request for proposals and have provided MMSD with facts, insights, and analyses that have enabled MMSD to monitor the PMO, improve its own work, and ensure that taxpayers were receiving value for their money. It is not uncommon for auditors to

determine after extensive review of a consultants work that the consultants work is of high quality. While this may produce no "recommendation for improvement" or "significant new" information it is just as useful to the MMSD as a critical audit. These evaluations include the very monitoring which LAB urges in other parts of its study.

COMPETITIVE CONSULTANT NEGOTIATIONS AND SELECTION

The MMSD issued a nationwide request for proposal for a consultant to be used in "construction risks and claims throughout Program implementation." Only then did the MMSD hire a consultant to do the funded work. MMSD's policies and their implementation comply with state law concerning competitive procurement of services. Most of the "18 professional service contracts" referenced by the LAB were not individual contracts but work assignments on "task orders" from a single contract.

SERIAL PURCHASING

MMSD agrees that serial purchasing is inappropriate if done to avoid MMSD Commission oversight. In fact, MMSD staff recognized the potential problem in early 1990, at least 3 months before LAB began its work, and the Commission has approved policies recommended by staff that address this concern.

PURCHASING PRACTICES

As the LAB indicates, MMSD staff follows purchasing practices expressly authorized by MMSD policy, and all such practices noted in the report are authorized by state law applicable to the MMSD. Limits of staff contracting authority are in place and were in place before LAB did its study.

USE OF CONTRACTED CONSULTANTS (AUDITORS)

The audits totaling \$96,000 referenced by the LAB were required to determine that the inappropriate financial transactions were not part of a pattern of conduct by the consultants' employee and were not done in collusion with the prime contractor. These and other matters were not studied or resolved. The District could not properly rely on the consultants' determination that its subcontractors' actions resulted in no further loss to the District.

The appropriateness of the amount of money for an audit is not necessarily gauged by the amount of the underlying contract. Is a suspected \$5,000.00 misappropriation to go unaudited because it might cost more than \$5,000.00 to study? This information will help prevent recurrences of these transactions. The cost of prevention is less than the cost of a cure.

Thank you again for the opportunity to respond to your review of the Water Pollution Abatement Project.

Sincerely,

Wallace White
Executive Director

WW/3958