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Guidance for Obtaining Professional Services for Municipal Wastewater Treatment Facilities

GUIDANCE FOR OBTAINING PROFESSIONAL SERVICES FOR MUNICIPAL WASTEWATER TREATMENT FACILITIES

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CHAPTER 1
INTRODUCTION

Municipal wastewater treatment plants have been in operation in this country for over 100 years. State-of-the-art design and operating principles have become quite sophisticated in recent years as more stringent treatment standards have been set, enforcement has become more consistent, and energy, labor and chemical costs have increased. Problems which affect the ability of municipal plants to meet discharge limits or which result in excessive operating costs are a serious matter.

Communities which are experiencing difficulty in meeting discharge limits established for their treatment facilities or with controlling operating costs often retain an engineering consultant to solve these problems. Many firms can provide professional services related to municipal wastewater treatment facilities. Some professional firms specialize in this area, while others offer a broader range of capabilities. Of those firms which specialize in wastewater, some are involved primarily with design, others work mostly in plant operation and management, and a few have proven capability in both areas.

This manual is intended to serve as a guide for communities selecting a professional firm to help solve various problems related to wastewater treatment. Selection of a properly qualified firm is perhaps the single most important step in achieving stable, long term compliance with federal and state requirements at the lowest possible cost. Any community retaining a professional firm is entitled to full disclosure of the capabilities and experience of the firm, as well as guarantees that specific individuals from the firm will be involved in the project.

Although the guidelines presented in this manual may appear quite simple and straightforward, they include many points which are frequently

overlooked or left to the discretion of the professional firm. All too often, these omissions lead to misunderstanding and dissatisfaction on both sides, and to a less than satisfactory completion of the project. Following the recommendations in this manual will minimize the potential for this type of problem to occur.

CHAPTER 2

DEFINING THE PROBLEM

The design, construction and operation of municipal wastewater treatment facilities creates the potential for countless problems. Fortunately, most of them never happen. Those which do arise are not always easy to understand. Many problems which seem to have a single cause may actually be the result of several interrelated factors, each of which requires a separate solution. The first step which must be taken in selecting professional services is to define the problem which the firm will be expected to solve.

Generally, the need to hire a professional firm results from one of the following four situations:

1) A new treatment plant must be built, or an existing plant must be significantly upgraded because of organic and/or hydraulic overload.

2) An existing treatment plant has one or more specific unit processes which operate poorly at loadings within the design range.

3) An existing treatment plant has poor overall performance, although all units are operating within the design range.

4) Operating costs are considered to be higher than necessary.

Each of these situations requires a different solution, and, therefore, requires different capabilities within the professional firm.

Situation No. 1, above, usually requires design and construction management services. Situations 2 and 4 are often best approached by having an operations specialist investigate the problem and present specific recommendations which can be implemented with the help of a design firm. Situation 3 usually involves purely operational considerations.

In many cases, it may be difficult to determine which of these four general categories a given set of problems falls into. If there is any question at all about what the problem really is, a diagnostic evaluation of the treatment facility should be conducted. Although many firms active in the wastewater treatment field include diagnostic plant evaluations in their range of services available to clients, this activity actually is quite specialized. Firms specializing in this field, or firms with qualified staff members, should be capable of providing a more thorough evaluation and more detailed recommendations at a lower cost than can less specialized firms.

The following Chapter presents recommended criteria for evaluating the qualifications of firms who may be retained to provide diagnostic evaluation, operational and/or design services. Later Chapters will discuss contractural considerations and the relative advantages of local versus non-local firms for providing each type of service.

CHAPTER 3

EVALUATING THE QUALIFICATIONS OF PROFESSIONAL FIRMS

The selection process generally begins by requesting a proposal or statement of qualifications from firms who are interested in providing their services on a particular project. The request for proposals (RFP) itself is a very important document. Before preparing an RFP, the qualifications presented in Sections 3.1 through 3.3 should be reviewed. The RFP should specifically state that proposals must include all information needed to verify the fact that both the firm and the individual members of the project team meet these qualifications. Proposals which do not contain this information should not be considered. The RFP should also request a detailed work plan or conceptual approach and anticipated project schedule and budget. Overhead rates, hourly wages and expected profit should also be clearly identified. Proposals should then be carefully evaluated to ensure that the following professional capabilities can be provided for specific types of work.

3.1 Qualifications for Diagnostic Evaluations

Firms proposing to perform a diagnostic evaluation of a municipal wastewater treatment plant should demonstrate the following qualifications:

1. The firm, or principals of the firm, should have experience in treatment plant evaluation and trouble shooting.
2. The firm should demonstrate that diagnostic evaluations are an active part of the firm's regular business and not merely a stated capability which is seldom used.

3. The firm should demonstrate a number of recent examples of diagnostic evaluations conducted, and state the improvements realized as a result of these evaluations. These specific examples should serve as references.

4. At least one key individual named in the proposal should be able to demonstrate experience in the design of wastewater treatment facilities. Experience should include work on more than one type of treatment plant and must include experience on the type of process being evaluated.

5. Key individuals named in the proposal should be able to demonstrate experience in operation or troubleshooting of municipal treatment plants. Experience should include work in more than one type of treatment plant.

6. Each key individual named in the proposal should have a BS or higher degree in civil, sanitary, or chemical engineering, or biological science, and/or hold the highest level of operator certification in a state which follows as closely as is practical the guidelines established by the Associated Boards of Certification (ABC). Information on these guidelines can be obtained by contacting the ABC at the following address or telephone number:

   Address: ABC Administrative Office
   P.O. Box 2266
   Ames, Iowa 50010

   Telephone: 515/232-3623

   or state wastewater operator certification authority.

7. Each individual should delineate specific areas of expertise and include references documenting cases where he or she has been successful in diagnosing operational problems.

Additional qualifications which indicate capabilities beyond the minimum requirements include the following:

- Advanced educational degrees
- Professional wastewater O&M training and troubleshooting affiliations

- Professional Engineering Registrations
- Unique abilities of the firm, such as the acquisition and use of computerized diagnostic operational modeling programs validated under field conditions
- Previous experience as superintendent of a major wastewater treatment facility
- "Operator-of-the-Year" awards

3.2 Qualifications for Operational Assistance

The term "Operational Assistance" can be applied to either a technical assistance program, where a firm works with the staff of a plant to solve operational problems or train plant personnel, or to contract operations, where a firm assumes total responsibility for the management of a plant. The necessary qualifications for firms and individuals proposing either type of service are essentially the same, since the same skills are required in either case. These qualifications include the following:

1. The firm, or principals of the firm, should have experience in actual wastewater treatment plant operation.
2. The firm should demonstrate that either technical assistance or contract operation, depending on the type of service required, are an active part of the firm's general business activities and not merely stated capabilities which are seldom used.
3. The firm should demonstrate it has operated at least one wastewater treatment plant under contract continuously for several years or provided technical assistance or training programs in several treatment plants, depending on the type of services required.
4. Key individuals named in the proposal should be able to demonstrate experience in providing the type of operational assistance desired. Experience should include work in more

than one type of treatment plant and must include experience in the type of process under consideration.

5. Each individual named in the proposal should have either the highest grade of operator certification in a state which follows the ABC guidelines as closely as is practical or have a BS degree in civil, sanitary, or chemical engineering, or biological science, and the highest level of operator certification required at the treatment plant under consideration.

6. Each individual named in the proposal should delineate specific areas of expertise and include several references documenting cases where he or she has been successful in solving operational problems.

Additional qualifications which indicate capabilities beyond the minimum requirements include the following:

- Advanced educational degrees
- Previous experience as superintendent of a major treatment plant
- "Operator-of-the-Year" awards

3.3 Qualifications for Design Services

There are numerous firms currently involved in the design of municipal wastewater treatment facilities. Many are large and known nationally, while others are quite small and primarily serve local communities. The capability of any firm, large or small, to provide design services depends on both the qualifications of the firm as a whole and on the qualifications of the individuals who will work on the design. This point is often overlooked, especially when large consulting firms are being considered.

The following criteria should serve as a basis for evaluating the qualifications of both firms and individuals:

1. The firm, or principals of the firm, should have experience in civil or sanitary engineering design.

2. If the firm's primary emphasis is in sanitary engineering design, the firm should demonstrate several recent examples of designs which have been constructed and are now in successful operation.

3. Key individuals named in the proposal should be able to demonstrate experience in the design of wastewater treatment facilities. Experience should include work on more than one type of treatment plant and must include experience in the type of process under consideration.

4. If the firm's primary emphasis has been in civil engineering, but includes little work in sanitary engineering, (i.e., the firm cannot meet the qualifications described in items 2 and 3 above) the proposal should include a subcontract to a well-qualified sanitary engineer to review and approve all equipment selection and process and operational parameters, including significant changes made during construction. The subcontractor should be capable of demonstrating the qualifications indicated in items 1, 2 and 3 above.

5. Each key individual in the project team should have a BS or higher degree in civil, sanitary or chemical engineering and registration as a Professional Engineer or an Engineer-in-Training in the state in which he or she resides would be desirable.

Additional qualifications which indicate capabilities beyond the minimum requirements include the following:

- Advanced educational degrees
- Wastewater operators certification in conjunction with registration as a Professional Engineer or Engineer-in-Training
- Personal participation in a design project designated "Project-of-the-year" by the WPCF, particularly as Project Manager or Project Engineer.

3.4 Interviewing Firms

After proposals have been received and reviewed according to the criteria in Section 3.1, 3.2 or 3.3, a list of the firms which appear to be best qualified should be prepared. Those firms should then be interviewed in person before a final decision is made. The firms to be interviewed should agree to the following format:

1) All key individuals named in the proposal including subcontractors should be present.
2) Each key individual should personally present a summary of the work which he or she will perform.
3) The amount of time that each individual will devote to the project should be clearly stated.
4) Individuals from the firm who will serve primarily administrative roles, such as sales managers, principals-in-charge, etc., should not be permitted to present any information regarding the project other than to briefly introduce the firm, introduce members of the project team and state their role in the project. The technical presentation should be made entirely by the individuals who will do the technical work.

CHAPTER 4

CONTRACTS

The primary purpose of a contract is to ensure that the services which a firm has offered in their written proposal are delivered for the stated price. The contract itself should state the specific work items to be performed, the time frame in which they are to be performed, the compensation to be provided for successful completion of the project and the liquidated damages to be imposed for unsuccessful completion or unreasonable delay.

Unfortunately, it is often difficult or impossible to prepare a contract which guarantees that the degree of excellence suggested in most proposals and presentations is actually delivered. Usually the best that can be done is to clearly state the minimum acceptable standards. There are, however, several relatively straightforward requirements which can be included in contracts that will help protect the client's interest. These include the following:

1) State clearly in the contract that only those key individuals who are identified in the firm's proposal for specific tasks are permitted to charge their time and expenses to the job. This requirement should not apply to clerical staff, draftsmen, technicians or other support personnel. Any changes in the project team, or any subcontract which was not stated in a firm's proposal, or any change in subcontractors who were previously identified in a firm's proposal, must receive prior written approval from the client. Violation of any of these provisions should be grounds for termination.

2) State clearly in the contract that the time commitments stated in the proposal for each key individual in the project team must be honored unless changes are approved in writing by the client before the project is completed. Violation of this provision should be grounds for termination.

3) The contract should guarantee the client the right to inspect the firm's accounting records including direct and indirect costs which document charges to their job. All time and expense charge records should include the name of the individual making the charges.

4) It is incumbent upon the client to negotiate a fair and reasonable profit. The basis for determining fairness and reasonableness could include experience on previous projects, contacts with other municipalities or published professional guidelines covering the services to be provided.

5) The contract should state the cost limit to be allowed for technical review of the project if this type of review is required by the firm's corporate policy.

CHAPTER 5

LOCAL VS NON LOCAL FIRMS

Prospective clients for wastewater treatment facilities services who live in large metropolitan areas can usually choose from among several firms with offices near the project site. This is particularly true when design services are required. For more specialized work, it may be advantageous to look beyond the immediate area to ensure that the needed skills are provided.

In small communities, the situation is generally quite different. The issue of hiring a firm for a wastewater project frequently requires choosing between a local firm which may have very little experience with wastewater, and a more specialized firm located quite a distance away.

There are several issues to be considered in making such a choice. Local consultants often work on very friendly, informal terms with the community. It is also true that local firms can usually work at a lower cost to the community than a larger, non local firm. Another consideration is the desire of most communities, large and small, to keep available funds circulating within the community rather than "lose" them to an outside firm.

Specialized or larger consulting firms, on the other hand, can usually assemble a project team with more experience in a particular type of job than can a smaller or non specialized consultant. This could be advantageous in that the work product may prove far more satisfactory and economical in the long run than that produced at a lower initial cost by a less experienced firm.

The specific advantages and disadvantages of each type of firm are discussed below for each of the three types of services described in Chapter 3. The reader should bear in mind that since specific projects and firms are not being discussed, the recommendations that will be made are general in nature. However, the main objective of these recommendations is to ensure that the required qualifications described in Chapter 3 for each type of service are met, and to point out some of the more common problems that can result if they are not.

5.1 Diagnostic Evaluations

If there is any question at all as to the specific reasons why a treatment plant is not performing satisfactorily, the first step a community should take is to seek out the best qualified individual or firm it can find to conduct a diagnostic evaluation regardless of their location. Complete evaluations can be conducted on nearly any type of municipal treatment plant by qualified specialists for less than $10,000. Many evaluations have been done on small (less than 10 mgd) relatively simple plants for less than $5,000. Moreover, a properly conducted evaluation can pay for itself many times over by reducing unnecessary design and/or operating costs.

Since the cost of conducting a diagnostic evaluation is relatively small compared to the cost of most major wastewater treatment projects, the selection of the best firm should be based as far as is practical on qualifications alone, with location being an extremely minor consideration.

The training and experience needed to perform a comprehensive diagnostic evaluation on a wastewater treatment facility are extensive and very specialized. It is very unlikely that a local, relatively unspecialized firm could provide individuals with this type of expertise without subcontracting. Moreover, many large consulting firms have none or only a few individuals who are qualified to do this type of work.

5.2 Operations Assistance

Virtually all operations assistance programs involve day-to-day activities at the treatment facility. For this reason, it may seem at first glance that local firms are distinctly preferable to non-locals. However, the objectives of the program being considered should be clearly established before the consultant selection process is begun.

For example, if a particular plant staff is unable to maintain a satisfactory level of operation due to inadequate training but are capable and conscientious, the best course of action may be to retain an operations specialist to conduct a detailed training program specific to the needs of that particular plant. The individual or firm which provides these services could also provide a series of regularly scheduled follow-up visits to make sure that the objectives of the training effort are fully achieved. This approach ultimately provides the community with a staff made up entirely of local individuals who can continue to do their jobs effectively without continued reliance on outside professional assistance. In this case, it would clearly be in the community's best interest to retain the best qualified firm or individual available to provide the needed services regardless of location. The net cost of this type of program is often very low when factors such as energy conservation, employee productivity and reduced turnover are all considered.

If, on the other hand, the community's objective is to transfer complete responsibility for the operation, maintenance and management of a treatment facility to a private entity, there are several factors which may favor local firms. These include willingness of assigned staff to remain at the jobsite, reduced relocation costs, and the potential benefit to the community of having a permanently available staff of experienced operators who are familiar with their particular treatment plant. Obviously, the qualifications of each interested consulting firm should be carefully evaluated and certain standards must always be met. The prospective client must, however, keep both the short term and long term needs of the community in mind.

5.3 Design Services

Perhaps the greatest difference between the overall product of a design effort provided by an unspecialized firm and a large or specialized firm is not actually related to each firm's ability to produce quality bid documents. More often, the difference results from the experience that individuals in each firm have had with various designs they have produced. A thorough understanding of treatment processes and the advantages of various process equipment in a given application is absolutely essential in producing a design that will allow a reasonably skilled operating staff to achieve and maintain the required treatment standards at the lowest possible cost and with the highest degree of reliability. Communities should understand that wastewater treatment process knowledge is in many ways separate from the civil, structural and mechanical engineering knowledge needed for a design effort, and the two do not necessarily have to be provided by the same firm.

Large or specialized consulting firms can usually provide a project team which includes expertise in both areas, although all of the individuals involved may not work in the same office. This is not necessarily a disadvantage provided the contractual requirements described in Chapter 4 are insisted upon and met.

As an alternative to retaining the services of a non-local office of a large or specialized firm, communities should consider the possibility of hiring a local firm which may have less experience in wastewater treatment if a subcontract to a well-qualified sanitary engineer or engineering firm is included to provide the needed process knowledge. This approach can provide the same benefits as hiring a large or specialized firm with the additional benefit of simplifying follow-up work and resolving minor construction and start-up difficulties quickly and at minimum cost.

Both of these alternatives should be explored before a final decision is made. The overall cost of the two alternatives described above is usually about the same for equally capable project teams. The specific

needs of each project and the proven ability of each proposed project team should be the main considerations in the final decision. The issue of local vs non-local participation should only become a decision factor when all other considerations are equal.