

FULL SERVICE PROCUREMENT OF WASTE-TO-ENERGY PROJECTS WITH SHORT-TERM OPERATING CONTRACTS

JAMES REYNOLDS AND MARY K. WEES

HDR Techserv, Inc.
Omaha, Nebraska

ABSTRACT

Typically, full service procurement of publicly owned waste-to-energy projects has included long-term (i.e., 20 year) operating contracts. However, short-term (i.e., 5 years or less) operating contracts may become more desirable, particularly in light of tax reforms affecting project financings and the rapidly changing waste-to-energy industry. This paper discusses the conceptual differences between long- and short-term operating contracts; technical concerns and their related contractual measures which could be considered to mitigate the assumption of risk in short-term operating contracts; the impact on construction contract provisions; and the effect on revenue-secured financings.

INTRODUCTION

For purposes of this discussion, a short-term operating contract is considered to be five years or less, with a most probable duration of between one and three years. This type of approach is distinguished from turnkey procurement in that the contractor is required to operate the facility and meet performance criteria as opposed to "turning the facility over" to a public owner upon completion of construction. In a full service arrangement, a contractor is selected to design,

build, start-up and perform acceptance testing, and operate the plant during the term of the operating contract. The short-term operating contract is not automatically renewable, but the contractor may negotiate with the public owner upon expiration of the operating period. Contractual provisions which might be open for renegotiation would be contractor compensation for operations and, possibly, performance guarantees. Upon expiration of any operating term, the public owner would be free to select a new contractor or to operate the project itself.

Why would a public owner decide to enter into a short-term operating agreement rather than the typical long-term full service arrangement? One reason might be tax reforms affecting project financing. In identifying whether a project qualifies for financing with industrial development bonds (IDB's) or nonessential use bonds, one of several elements evaluated is the length of the management agreement. IRS Revenue Procedure 82-14 has been interpreted by bond counsels to limit management agreements to 2 years or less in order to avoid classification as an IDB, assuming all other parameters are satisfied. With the passage of the Deficit Reduction Act of 1984, classification as an IDB resulted in limiting the volume of IDB's available as well as loss of arbitrage earnings. The comprehensive tax reform proposal published in May, 1985 recommends further changes affecting the tax-exempt nature

of IDB's, and new recommendations as recent as January, 1986 continue to affect the tax-exempt nature of IDB's. Although at the time of this writing proposed tax revisions have not been finally determined, the philosophy of such issues as equating public purpose or benefit with the duration of management contracts is an important consideration in using short-term contracts.

Aside from tax reforms, there are several other reasons to consider short-term operating contracts. Waste-to-energy projects have generally been considered high-tech operations requiring specialized expertise. However, certain communities may have the technical capabilities to operate such facilities, as in the case of Ames, Iowa, which has experience operating its solid-fuel power plant. Other communities may want to acquire the expertise needed to maintain public operations, as evidenced in the cities of Chicago and Hampton, Virginia. Typically, either A/E or turnkey procurements have been used when a public owner desires to operate a public works project. However, full service procurement with a short-term initial operating contract provides the public owner with a mechanism for retaining the option of public operation while requiring the contractor to solve latent design or operational problems which might not be evident in initial plant acceptance testing.

Changes in the attitudes of decision makers can also affect operating contracts. As an example, the original operating contract for the Dade County, Florida project was prematurely ended and a new operator selected. The potentially increased profitability of recovered energy may make future public operation a more attractive alternative. A short-term contract would allow the public owner flexibility in this respect; however with additional control comes additional risks which must be addressed and mitigated to an acceptable level.

Another consideration in entering into a short-term contract is the potential volatility of individual corporations in the waste-to-energy industry. As an example, the Pinellas County, Florida, project was designed and constructed by UOP, Inc. using the Martin mass-burn technology. Prior to commercial operations, UOP's parent corporation merged with Wheelabrator-Frye, which held the rights to the von Roll technology in the U.S. This resulted in release of the Martin technology and retention of the von Roll technology, while the operational arrangement for Pinellas County, which has Martin grates, continued. Although operating contracts could contain provisions for termination at the owner's option in situations involving mergers or unacceptable assignments, an originally envisioned long-term operating contract might

not contain adequate protection for the public owner in such an event.

For whatever reason a short-term operating contract is selected, there are certain conceptual and technical considerations which must be incorporated in the contractual arrangements once such a decision is made. These concerns must be handled not only in the operating contract, but in the contractor procurement process and construction contract as well.

DESIGN AND CONSTRUCTION CONSIDERATIONS

In a conventional full service procurement with a long-term operating agreement, the bid documents do not generally incorporate design specifications in a level as detailed as those typically found in an A/E or turnkey procurement process. Vendors are given relatively wide latitude in design, equipment selection, plant layout, and construction. This is based on the concept that the vendor is guaranteeing certain owner-specified performance levels for the duration of the long-term contract. It is an individual business decision on the part of the vendor to weigh equipment quality and design parameters which influence the construction price against potentially higher long-term operational and maintenance expenses in order to meet specified performance levels.

In a short-term operating contract, the public owner, or his designated representative, must have a more active role in the plant's design criteria and equipment selection. The objective is to provide a quality plant at a competitive price without jeopardizing long-term maintenance and operating integrity. The bid documents and plant specifications should provide specific requirements relating to significant design parameters. In a mass-burn specification for example, appropriate minimum and maximum limits for the following items could be included: refuse feedrate; steam flowrate; gross heat release on a volumetric and a grate area basis; furnace exit gas temperature; economizer exit gas temperature; flue gas velocity through furnace passes, superheater sections, and boiler sections; air temperature at the various locations; feedwater temperature; and superheater outlet steam temperature and pressure. Design elements such as the feedwater quality should be explicitly specified if they result in less expensive construction but will impact the long-term maintenance of the project.

In addition to detailed design considerations, the experience of the contractor with the selected equipment becomes a more prominent concern in a short-

term operating contract. The demonstration of successful long-term commercial operation of proposed equipment provides comfort to the public owner that the plant will be productive and can reasonably expect a long-term operational life even though the contractor may only operate it for a short time. In a long-term operating contract, the equipment experience factor may be overshadowed by the strength of corporate commitments to guarantee long-term plant performance.

During project construction, the public owner should also be actively present on-site, verifying the quality of equipment supplied, plant construction procedures, site and foundation preparations, and adherence to plant equipment specifications. As-built drawings, operations and operator training manuals, and equipment manuals must be provided to the owner and updated as required. This is essential, particularly if plant modifications or additions are required to be made by someone other than the contractor.

Following construction, rigid acceptance testing protocol and procedures must be performed. The results of the acceptance tests define the base-line plant performance level. As discussed in the following section, the results of the acceptance tests can be compared with subsequent performance tests. This standard can be used to verify future plant performance criteria prior to termination of a short-term operating contract.

PROJECT OPERATIONS

The concept inherent in the operations phase of conventional full service procurement is the vendor's guarantee of performance generally relating to solid waste processing capacity, the quantity and quality of recovered energy and/or materials, and adherence to permit conditions. In a long-term operating agreement, the vendor's compensation formula will typically include positive incentives (such as revenue sharing), in addition to penalties for nonperformance. The long-term vendor has an incentive to correct plant deficiencies as quickly as possible to avoid the payment of penalties. In addition, revenue sharing provisions for performance at or above guaranteed levels provide a profit motive to operate the plant efficiently. Since the vendor is liable for long-term operation, this establishes a natural system of checks and balances.

In a short-term operating agreement, positive incentives to perform at or above guaranteed levels could lead the contractor to operate the plant beyond its design limits with subsequent degradation of plant equipment or maintenance. The following discussion

focuses on several principal areas of concern during project operation and proposes methods of dealing with potential risk areas. It should be noted that some of these measures will not prevent the occurrence of adverse situations, but will help alleviate certain risks.

Compensation Provisions

The compensation formula could be structured as an operational expense component related to the amount of solid waste processed (e.g., a per ton fee), plus a fixed fee for operation. A special payment for enhanced performance could be held in escrow and paid at the end of the contract term or annually, provided certain criteria have been met. Such criteria might include adequate maintenance records, appropriate operating procedures monitored on a continuous basis, and/or the passage of performance tests at the end of the operating period with the release of a portion or all escrowed funds based on the results of the tests. Enhanced performance payments might also be limited to a maximum amount as an additional protection against operating the plant beyond its design limits. Any compensation provision for enhanced performance should be carefully reviewed for compliance with tax regulations and rulings if IDB financing considerations are the impetus for a short-term contract.

Performance Testing

Before the contract term expires, the contractor could be required to conduct plant performance tests. The procedures and protocol would be identical to those of the initial acceptance tests conducted upon completion of construction, and the required level of performance also identical. Failure to meet the performance test criteria would result in payment of performance liquidated damages in amounts similar to those originally provided for in acceptance of the project. As the plant becomes older and normal equipment wear occurs, a predetermined schedule of reduction in the performance level and/or respective damage payments may be negotiated.

Latent design or major equipment problems would most likely become apparent during the initial years of operation following completion of construction. Requiring the contractor to pass performance tests prior to expiration of a short-term contract or to pay liquidated damages would be a means of compelling the contractor to correct defects. Additionally, the requirement to meet such performance criteria would positively influence the contractor to operate and maintain the plant properly.

The objective is to ascertain that the plant's state of repair at the end of the short-term contract is equivalent to its state in the beginning. Testing also provides a base-line for plant performance in the event a new operator is selected. Nevertheless, testing should not be relied upon alone; there should also be a continuous program for monitoring operations and/or evaluating maintenance records.

Continuous Operations Monitoring

Continuous monitoring of plant operations would provide a firm basis for evaluating ongoing plant operations in relation to design parameters. It would also indicate potential problem areas quickly. A continuous monitoring program would require automatic sensory devices to determine specific operating parameters. In a mass burn plant, for example, a continuous monitoring system could include items such as the following: boiler outlet steam rates, temperatures, and pressures; feedwater rates, temperatures, and pressures; boiler drum pressures; turbine throttle flow; flue gas flows and temperatures at economizer outlets; CO₂, O₂, and CO levels; power consumption; turbine exhaust pressure; and steam quality. The continuous monitoring program could be incorporated as part of the plant's control system. It would enhance the contractor's operational control as well as provide the public owner with access to pertinent operating information.

In addition to automated monitoring of operations, records regarding other operating elements should be maintained. This might include employee records, turnover, seasonal variations in waste quality (e.g., moisture content), unusual waste types received, and traffic or queuing problems. Accounting procedures should be monitored and a management information system developed.

Maintenance Records

The contractor should be required to maintain detailed maintenance procedures and logs verified by the public owner. This would provide a mechanism for assessing the contractor's performance and ascertaining that proper equipment maintenance is being performed. The contractor should also be required to maintain a spare parts inventory at the same level as originally specified upon completion of construction. Evaluation of maintenance logs should be based on good engineering practices and generally accepted standards used at similar facilities. Detailed maintenance

procedures should be requested during the initial bid process, prior to commercial operations, and/or during renegotiation periods. This could provide an additional benchmark in the evaluation of maintenance records. An on-site representative of the public owner, conducting regular inspections, would also enhance the evaluation process.

Special Funding

In order to provide an additional level of security to insure that the plant is properly maintained, a separate equipment repair and replacement (R&R) fund should be established. The equipment replacement schedule should be provided during the procurement process or by the contractor prior to initial operations. This schedule should outline a major expenditure timetable throughout the effective life of the plant, with updates or modifications on an interim basis. The R&R fund could be provided by contract at specified levels from the operating expense compensation, or initially funded in the project financing. Methods for disbursement of the R&R fund should be carefully outlined, and include consideration of the predetermined schedule, evaluation of operating and maintenance records, and on-site inspections.

Contract Renewal

A key element in the success of short-term operating arrangements is retaining good operators. Initially, this is done in the procurement process by selecting a contractor who can demonstrate management experience at successfully operating plants of similar design. Throughout the operating contract term, evaluation of the contractor's maintenance and operating performance would provide sufficient justification for continuation of the contractor's operating contract or for termination.

Because automatic renewals of short-term operating contracts are viewed by the IRS as long-term contracts, renegotiation is necessary. The operating costs and performance levels might be opened to renegotiation if the operating contract were to be renewed. Detailed operating and maintenance logs would be beneficial in ascertaining the actual costs incurred. In addition, situations of an unforeseen nature could be more readily quantified on an interim basis, and appropriate adjustments made. The issue of gradual loss of equipment efficiency over time could also be more readily addressed during interim negotiations.

FINANCING CONSIDERATIONS

Typically, waste-to-energy plants are financed through project revenue bonds. The security for the bonds is based on the availability and adequacy of the revenue stream. In assessing the creditworthiness of a project, the investment community reviews the manner in which a short-term operating contract manages technological risks as well as the appropriateness of incentives offered to the contractor for efficient operation.

The primary consideration is the risk to the bondholder beyond the initial operating contract term. As discussed above, there are various mechanisms which can be incorporated in a short-term operating contract to mitigate technical risks relating to performance and plant operations and maintenance. The proper combination of penalty payments and performance incentives varies with individual projects and depends on the overall deal structure. Additional security, such as a performance bond from the contractor or maintenance of a special operating expense contingency fund, may be required.

In addition to the measures incorporated in the operating contract, the public owner may be required to provide a deep-pocket security in order to enhance the bond sales. Such a deep pocket commitment may in-

clude a rate covenant associated with the plant's disposal fee. The primary concern is to mitigate risks associated with events beyond the contractor's control. The deep pocket security would be required to extend to plant performance, and operating and maintenance costs beyond the initial operating contract term.

CONCLUSIONS

In conclusion, instituting a short-term operating contract requires modifications of the concepts typically incorporated in long-term full service operating contracts. There are inherently higher risks for the public owner. However, there are several risk mitigation measures available for short-term operating contracts, including continuous operations monitoring, special fund requirements, maintenance of detailed operating and maintenance logs, performance test requirements, and compensation incentives. The application of one or a combination of these concepts will vary depending on individual project financing criteria. Additionally, operational risks can be reduced if an experienced contractor is selected for plant design, construction and operation.

INTRODUCTION

Waste-to-energy plants provide a means for disposing of solid waste, and are often found in urban areas. They are a key element in the waste management system. Figure 1 illustrates a list of the major project development considerations which must be considered in developing a waste-to-energy project. The financial success of a project is a key element and hinges on a number of important factors. Therefore, with few exceptions, the financing of such projects is based on:

- (1) a long-term government or bonded debt source
- (2) a pre-type contract
- (3) a guaranteed power technology contract by a reputable engineering firm