RESOURCES RECOVERY AND CODISPOSAL IN AUBURN, MAINE

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ABSTRACT
As an outgrowth of efforts to solve their solid waste problems, many small municipalities are investigating a previously unutilized energy resource, solid waste. Revenues derived from a solid waste recovery program can, potentially, reduce overall disposal costs for such communities. A number of interrelated planning activities are required to answer all of the technical, institutional, environmental, and economic questions which arise in any community's consideration of resource recovery. Auburn, Maine is a community with typical waste disposal problems which has been attempting to implement a resource recovery system since 1974. Auburn's needs and methods of seeking solutions illustrate the new and often unique resource recovery questions faced by such municipalities' decision-makers on very unfamiliar ground in making long-term, solid waste management policy decisions. Auburn's method of implementing the concept should be of use to other similar communities. Ground was broken for the construction of a 150 ton/day (136 t/d) starved-air combustion energy recovery facility for the Auburn area in August 1979. The major planning areas identified by Auburn and the experts called upon to assist the community were:
1. Market development.
2. Technology/equipment selection.
3. Landfill development.
4. Regionalization.

All of these planning areas have been regarded as important in Auburn's system planning. None of them could be evaluated or effected without consideration of the others. Unique to this project's implementation has been the manner in which risks were allocated, guarantees obtained, and incentives/penalties provided between the City, its selected contractor (for the design, construction, start-up and commercial operation), and the steam purchaser (Pioneer Plastics, division of LOF Plastics Inc. and Libbey-Owens-Ford Company).

INTRODUCTION
Until the last decade, the only solid waste disposal problem faced by most small communities, including the City of Auburn, was the relocation of the municipal "dump" when residential encroachment or waning capacity indicated that it was time to do so. However, local officials began to find themselves faced with the problem of "finding the new dump" under a new set of constraints stemming from environmental awareness and economic limitations. It was increasingly appreciated that solid waste might be a potential source for either secondary materials which could be reused or energy which could be recovered. About the same time, many communities were constructing sewage treatment facilities to prevent water pollution. Such facilities were often developed with little awareness of the difficulty of dis-
posing of the resulting treatment plant sludges.

Auburn is Maine’s fourth largest community, with a population of 24,151 people (1970 Census). It is located in south-central Maine on the western shore of the Androscoggin River. Relatively large in area [65.5 sq miles (169.6 km²)], Auburn has historically had a strong industrial heritage. During the first half of this century, the shoe production industry was dominant in Auburn. During the last 25 years the industrial base of the community has shifted and become much more diversified by the establishment of such industries as Pioneer Plastics, General Electric, Tampax, Inc., and Allied Container. Administered by a City Manager-City Council form of government, Auburn maintains a rather healthy fiscal status and has an “A-I” bond rating by Moody’s.

In 1974, the Maine Department of Environmental Protection (DEP) adopted regulations which affect the operation of land waste-disposal sites. These regulations require open dumps to be closed or converted to sanitary landfills. Auburn’s consideration of its best options, then, obviously required taking steps to conform with these standards. The same general factors influence the disposition of sewage sludge. The timing of the promulgation of the DEP regulations provided an impetus to a regional approach in that all communities in the Auburn area were faced with the roughly simultaneous closing or upgrading of their disposal areas. Accordingly, Auburn and a group of surrounding communities formed a Regional Solid Waste Committee (RSWC) to explore alternatives. Conversations were begun among the communities who had similar solid waste problems to discuss potential common solutions. Charter members of the RSWC included six communities ranging in size from 1000 to 24,000 population.

The goals and objectives of the RSWC were:

1. To identify the best regional approach to solid waste disposal.
2. To determine if the regional approach would be advantageous to each of the member towns of the RSWC.
3. To develop a plan for implementation of the regional approach.

Regular meetings by the RSWC led to the commissioning of a consultant to evaluate the area’s solid waste disposal alternatives. The conclusions of this effort were published in May 1975 [1].

The consultant identified two alternatives: a regional landfill in Auburn, and an energy recovery program based on a potential contractual arrangement with an Auburn industry (Pioneer Plastics).

In support of its energy recovery conclusion, the report stated that:

“The net disposal cost(s) of the alternatives are comparable. However, steam recovery has considerably more risks, yet also offers several distinct advantages to Auburn. We, therefore, believe that Auburn should make the final choice. Auburn could elect to accept the higher economic risks of steam recovery in order to provide community support for the City’s largest industry or to try to reduce Auburn’s disposal costs even lower than those predicted for landfill. But if this were the choice, the other communities should not have to be a party to the venture.” [2]

At the same time, increased consciousness regarding the general energy situation was developing due to foreign oil pricing policies and the general political upheaval in countries controlling a good portion of the oil imported here. An analysis of New England energy resources indicated that almost 80 percent was provided by petroleum products and that approximately one-third were foreign imports. This highlighted Auburn’s awareness of New England’s unfavorable position in regard to energy supply and cost and was a major impetus to the community to make a full investigation of energy recovery from solid wastes.

**IMPLEMENTATION PLANNING**

In March 1977, a report [3] was published to aid Auburn’s decision makers in developing an implementation strategy. The report dealt with a specific definition of Auburn’s solid waste problem and development of a strategy to achieve an energy recovery or, if necessary, a sanitary landfill facility.

A qualitative analysis of Auburn’s waste stream was undertaken. Available truck scales in proximity to the existing Auburn landfill made it possible to monitor the waste stream for three separate one-week periods. The survey revealed that:

1. The average waste quantity being disposed of in Auburn’s landfill was approximately 100 tons/day (90 t/d) (commercial, industrial and residential).
2. Over 20 percent of this waste, by weight, originated from Pioneer Plastics’ manufacturing of decorative laminates.
3. The Pioneer waste material consisted of two distinct waste categories. Half of Pioneer’s waste stream consisted of broken laminates and regular mill waste. The other half consisted of a fine sawdust-textured material which results from cutting
and abrasion processes in manufacturing laminates. Pioneer’s waste was determined by laboratory analysis to have an average heat value of approximately 8000 Btu/lb (8400 kJ/kg).

An in-house review committee was formed as an implementation task force. Its composition reflected an appreciation of the complex mix of technical and broad community-interest components of Auburn’s eventual decision. This committee included: the City Manager, City Engineer/Public Works Director, the City Finance Officer, Purchasing Agent and two members of the City Council. The review committee proceeded to evaluate whether the potential advantages of energy recovery would offset the potential risks as compared to a sanitary landfill option.

The Committee’s work began with a familiarization with existing energy recovery systems. It was determined then that insufficient experience existed to easily answer all the questions which any municipality like Auburn would ask in attempting to implement a resource recovery system. At this point in the implementation planning, application was made to the Resource Recovery Division of EPA’s Office of Solid Waste Management for assistance. The Mayor’s letter to EPA stated that, "Obviously, with solid waste problems facing us and the ongoing energy crisis, Auburn is very excited about the possibilities of energy recovery in our community. However, our fiscal responsibility requires us to take the least risk with our taxpayer’s money. For most of us involved in this consideration in Auburn, this will probably be the first and last resource recovery system we might have to decide on. Accordingly, the expertise available through your technical assistance program will be a major factor in overcoming the hesitancy and time necessary in identifying and dealing with all of the ramifications which might exist." [4]

Acceptance of Auburn’s application by EPA provided the City with a valuable resource in dealing with the myriad of questions facing its decision-makers. Auburn felt that this assistance would ensure that mistakes other communities had made in such projects would be avoided. Assistance was focused on the technical and institutional aspects of the system’s implementation rather than in a treatise of landfill vs. energy recovery. A strategy options report [5] was prepared to aid the City in making required initial decisions concerning the project’s development. This report dealt with the pros and cons of private/public ownership and operation, the risks inherent to these various options, and the methodology for risk-avoidance, risk-sharing, or risk-assumption. Based on this analysis, Auburn recognized that risk inherent to the project must be properly shared among the City, the contractor, and the energy purchaser. These decisions led to a concept of municipal ownership of a guaranteed system with limited private operation.

The specific planning issues that followed centered around four areas:

1. Energy market.
2. Technology and contractor selection.
3. Residue disposal and landfill back-up.
4. Regional community waste (solid waste and sludge supply agreements).

It was decided also at this point that the City would finance the project with existing fund reserves and general obligation issues. Discussion of the Auburn experience will focus primarily on the energy market and technology and contractor selection.

ENERGY MARKET

No resource recovery project will be viable if sound markets for its products are not developed. The 1975 study of potential users of energy and/or materials recovered from solid waste indicated that Pioneer Plastics was the only viable energy customer within the RSWC area.

Recognizing that Pioneer might be a viable steam customer, the RSWC invited representatives from that company to join in forming the Auburn solid waste review committee to investigate the system’s feasibility.

Pioneer expressed interest in participating because:

1. A lower cost might be experienced in the development of the energy (steam) required by Pioneer for both heating and processing.
2. The fuel feedstock (solid waste) for the facility could provide a captive source of energy, while fossil fuels might be curtailed or regulated in the future.
3. The quantity of solid waste from Pioneer (20 percent of the total of Auburn’s waste) had to be hauled 10 miles (roundtrip) to Auburn’s existing landfill.
4. Pioneer’s position as one of Auburn’s major taxpayers generates an interest in Auburn municipal matters.

Pioneer’s energy needs were analyzed both quantitatively and qualitatively. The steam demand at the plant required superheated steam at 500-600 F
(260-315 C) and a pressure of 285 psig (1961 kPa) maximum respectively. In realizing Pioneer's steam demand, it was determined that an average of 50,000 lb/hr (22,500 kg/h) of steam was needed. Much of this steam was used for processing and would therefore be moderately constant throughout the year.

Negotiations were begun with Pioneer to secure an agreement which would require Pioneer to assume their share of the inherent "risk" of resource recovery. Major points of this agreement included, among others, the consideration that:

1. The purchase price of steam generated within the facility will escalate with escalations in fuel oil costs.

2. Auburn will guarantee to produce a minimum of 15,000 lb of steam per hour (6800 kg/h) at the previously-stated quality.

3. Pioneer will guarantee purchasing 15,000 lb of steam per hour [360,000 lb (163,400 kg)] over a 24 hr period) and 93,600,000 lb (4,249,000 kg)/yr for the 20-year duration of the contract.

4. Pioneer will deed five acres (20,200 m²) of land for the facility to the City as a part of their commitment to the project.

5. Pioneer will produce the rest of its steam requirements utilizing its existing boiler system. However, the energy recovery facility will provide base-load.

6. Condensate will be returned to the energy recovery facility with a credit given for returned energy.

7. Should Libbey-Owens-Ford close its Auburn plant, LOF will pay all remaining principal and interest on the facility and total facility operating costs for two years after its closing. Principal is calculated at $170,000 per year and interest at almost $200,000 during the second year while declining for subsequent contract years.

The City’s responsibilities included responsibility to deliver the specified steam minimums stated above, during an operating period to run from 11 p.m. on Sunday through 11 p.m. on Friday, 51 weeks per year, for 20 years. Additionally, the City will accept Pioneer’s solid waste material at no cost.

Two alternative steam price formulas were established, the lower of which will be the price to be paid during any given month. The first formula relates the steam price to the value of Pioneer’s current fuel oil cost. The second method ties the cost of steam to the Consumer Price Index.

Under the first alternative, the initial commodity charge ("base price") is calculated as follows:

\[
\text{base price} = \frac{12.18 \text{$/bbl (oil)} \times 6.3 \text{ million Btu (6.65 GJ)/bbl}}{6.3 \text{ million Btu (6.65 GJ)/bbl}} \times \text{boiler efficiency} \times 1.235 \text{ million Btu (1.3 GJ)/M lb (steam)} \times \frac{1}{1000} \text{lb (steam)}
\]

where the boiler efficiency is 84.4 percent. The base price will be adjusted if Pioneer's boiler efficiency is proven to have changed. The current monthly charge is then calculated as follows:

\[
\text{Current monthly charge ($/thousand lb steam)} = \frac{\text{Posted Price} - \text{Posted Price Base Month}}{1 + .75 \left( \frac{\text{Current Month Base Month}}{\text{Posted Price Base Month}} \right)}
\]

where "posted price current month" is Pioneer’s plant. The "posted price base month" is set at $12.18 per barrel. In the event that the "posted price current month" is lower than the base month, the monthly charge is calculated as follows:

\[
5. \text{Posted price current month (for month in which posted price is below posted price base month)} = \frac{6.3 \text{ million Btu (6.65 GJ)/bbl}}{6.3 \text{ million Btu (6.65 GJ)/bbl}} \times \text{boiler efficiency (percent)} \times \text{boiler efficiency (percent)} \times \frac{1}{1000} \text{lb (steam)}
\]

Under the second alternative, the steam price is set at $6.36/1000 lb ($11.45/t) of steam, adjusted (either up or down) for changes in the Bureau of Labor Statistics Consumer Price Index for Urban Wage Earners and Clerical Workers, Northern Region Class D Areas, All Items (1967 = 100.) The base price of $6.36 is divided by the Index number for the month preceding the month in which the term of the contract commences, and the resulting quotient shall be multiplied by the Index number for the month preceding the month with respect to which the price calculation is being made.

Negotiations between the City of Auburn and Pioneer Plastics were conducted on two levels. It had originally been contemplated by both the City and local Pioneer personnel/management that all negotiating could occur at a local level with final contract ratification by Auburn’s City Council and Pioneer’s parent company, LOF. However, when the locally negotiated documents were sent to the
parent company, a whole new round of negotiations ensued leading to the document's final approval by both the Auburn City Council and the Board of Directors of LOF.

Additionally, the negotiations dealt with two distinct categories of issues. In the first, the "positive" aspects of the system's functions, steam costs, etc. were dealt with to ensure a common understanding of each party's responsibilities. Considerable time, however, was also spent in dealing with "what if" situations such as terminations, failure to produce steam, etc. The contract [6] was signed in October 1979.

TECHNOLOGY AND CONTRACTOR SELECTION

The selection of technology is obviously a major decision in the implementation of a project. Once Auburn's interest in energy recovery had been publicly stated, numerous unsolicited proposals were received. To ensure that the system procurement would be on Auburn's terms, it was decided that a formal Request for Proposals (RFP) would be developed. The EPA technical assistance staff and consultants (Gordian Associates of Washington, D.C. and Malcolm Pirnie, Inc. of White Plains, New York) were particularly instrumental in the preparation of this RFP.

Recognizing that there could be very broad differences in technologies which could provide the service required, it was decided that the system procurement would utilize a modified turnkey approach. To ensure the selected contractor's intimate involvement in the project, the RFP was written so that the contractor would be required:

1. To provide complete architectural and engineering design in accord with detailed performance parameters.
2. To provide for the purchase of the necessary structures and equipment.
3. To provide all construction services for the approved project design on the City's site adjacent to Pioneer Plastics.
4. To provide all services necessary for plant start-up and trial operation of the facility in its entirety to establish operability of all component systems and equipment.
5. To provide all services necessary for plant acceptance in conformance with the performance requirements and guarantees required.
6. To provide operating, maintenance and output control services for a period of three years from the initial date of project acceptance.

The RFP contained the following sections:

Section 1. General Information: This section contained information relating to the purpose of the RFP, background information on the project, project goals and overview, project funding, procurement schedule to be followed, and overview of the preparation and submission procedures to be followed in consideration of Proposal.

Section 2. Facility Requirements: This section contained a detailed discussion of the performance requirements of the project's facility. This discussion included a complete discussion of the operating parameters of the facility as well as other requirements applicable during the facility's operations, management and control.

Section 3. Project Scope: This section contained a description of the different phases of the project and the administrative, operating, scheduling, management, and control aspects.

Section 4. Contract Definition: This section contained a discussion of the draft contract (included as an attachment) and the purpose and intent of including a draft contract in this RFP. In addition, discussion of bonding, insurance, payment and audit requirements were presented.

Section 5. Proposal Requirements: This section contained a discussion of instructions for proposers in preparing their proposal packages. This included minimum qualifications which must be demonstrated in the proposal, the actual content of the proposal, proposal format, signing of proposal, proposal guarantee, submission procedures, withdrawal of proposal and modifications to the proposal.

Section 6. Evaluation and Contractor Selection Procedures: This section contained a general discussion of the evaluation and contractor selection procedures including the methodology for evaluation, procedures and schedule to be followed, and negotiations and contract execution procedures and requirements.

Attachments to the RFP included the draft contract, a sample of Pioneer's solid waste with laboratory analysis, and engineering data on the topography and geology of the site.

Recognizing that the available waste steams which could be processed at the facility could range from 100-200 tons/day (90-180 t/d), proposals were requested for two basic system modes. System Mode 1 would have an installed capacity of 100 tons per day (90 t/d), while System Mode 2 would have a capacity of 220 tons/day.
Potential contractors were required to provide a proposal for each mode. Optional proposals were requested on ferrous metal recovery and sewage sludge disposal.

Contractors who submitted proposals were required to provide system guarantees for: 1. steam quantity and quality; 2. air emissions; 3. solid waste volume reduction; and 4. supplementary fuel consumption.

The RFP was issued on December 1, 1977; on February 28, 1978 proposals were received and six were accepted for evaluation. These proposals were submitted by:

1. Consumat Systems, Inc.
2. Eco Resources Limited
3. Envirotech Corporation
4. Lehigh Forming Co., Inc.
5. Vicon Construction Company
6. Waste Management Inc.
7. Scientific Energy & Recycling Group, Inc.
8. Paulis & Sokolowski Inc.
9. Gordian Associates

These proposals represented a variety of different technologies with capital cost for a Mode 1 system ranging from two million to over six million dollars.

For proposal evaluation, Auburn's solid waste review committee, along with a group of advisors (including EPA's technical assistance staff and consultants) were subdivided into two work teams. One team, headed by the City's Finance Officer, analyzed the economic and financial aspects of the proposals, while the other team, headed by the Public Works Director/City Engineer, dealt with the environmental, technical, and management aspects of the proposals.

It had been stated in the RFP that the proposals would be evaluated on the following weighted criteria:

2. Management Qualifications (Weight 10 percent).
3. Financial qualifications (Weight 20 percent).
4. Economics (Weight 30 percent).
5. Environmental impact and aesthetics (Weight 10 percent).

Initial evaluations were performed to determine which of the proposals were responsive to the RFP requirements. Of those submitted, three were determined to be responsive. These included the proposals received from: Consumat Systems, Inc., Waste Management Inc., and Envirotech Corp.

The general closeness of the evaluation results between Consumat Systems, Inc. and Waste Management Inc. led to the conclusion that, although the Consumat proposal was determined to be the best proposal submitted, the City could still be served well in negotiating a contract with Waste Management Inc. should negotiations with Consumat Systems fail.

In order to maintain project momentum at the conclusion of EPA's technical assistance, Gordian Associates continued their involvement under contract to the City. Their involvement included: 1. the development of a project cost model to evaluate the effect of various factors on system costs through the expected life of the facility; 2. assistance in the development of a contract with the energy user; 3. a review of the design and capital cost aspects of the system by an engineering consultant subcontractor (Camp, Dresser & McKee, Inc.).

The codisposal of solid waste and sewage sludge had been viewed as a potential alternative to siting a landfill for sludge disposal. Auburn and Lewiston jointly operate a secondary treatment sewage plant on the bank of the Androscoggin River, which generates 75,000 wet tons [68,000 t (20 percent solids)] of sludge per year. With this interest, application was made in August 1978 to the Department of Energy for funds to provide design of the basic solid waste facility and to perform a feasibility study of the potential of codisposal of municipal solid wastes and perhaps sludge in controlled air incinerators. Auburn was awarded a grant in October 1978, and as a result, a contract was signed with Consumat to perform those tests which could determine the feasibility of codisposal. A further award of a contract to the engineering subcontractor was also made to provide an overview of Consumat System’s efforts and of the handling problems associated with sewage sludge.

It was decided during the first part of the feasibility study that the major factors that had to be explored concerning the potential of codisposal included the following:

1. The ability of the modular controlled air incinerators to completely combust the sewage sludge without discharge of sludge associated organisms.
2. The relative tradeoffs required incombustion typical Auburn and Lewiston sludge (20 percent solids) had to be quantified. Energy utilized to combust the sludge could not be utilized to produce steam for the primary customer.
3. The alternatives in handling the sludge
(dewatering, etc.), also had to be evaluated to determine the most cost-effective manner of handling.

4. An assessment of environmental impacts needed to be made to determine any requirements for additional system components (air emissions control etc.).

Full-scale testing on most of the above question areas has been undertaken in the North Little Rock, Arkansas facility equipped with Consumat units. Initial tests have led to some optimism that co-disposal might be feasible. As of October 1979, however, final tests had not been run to settle the question of feasibility.

PERFORMANCE GUARANTEES

The Contractor (Consumat) has warranted that the process and equipment parameters provided can be consistently met during normal operations, provided the equipment is operated in accordance with the manufacturer’s instructions. Specifically, the following process and equipment operating parameters are warranted and guaranteed:

AIR EMISSIONS

When operated in accordance with the manufacturer’s instructions, the equipment will meet or surpass the State of Maine and federal D.E.P. air emissions standards in effect on the date of contract execution.

AUXILIARY FUEL CONSUMPTION

When operated at or near design capacity, in accordance with manufacturer’s instructions, the equipment will not consume more than 500,000 Btu’s of auxiliary fuel per ton (580 kJ/kg) of typical municipal solid waste processed.

PROCESS CAPABILITY

When operated on a continuous basis (24 hr/day), in accordance with manufacturer’s instructions, each incineration module will process 4200 lb/hr (1906 kg/h) of typical municipal solid waste during a 24-hr period.

ENERGY CONVERSION

When operated in accordance with manufacturer’s instructions at or near design conditions and supplied with feed water consisting of a mixture of 50 percent condensate return and 50 percent raw water, each module will produce 4800 lb (2180 kg) of steam when supplied with gas generated through processing of one ton of typical Auburn-Pioneer Plastics Solid Waste. The condensate return temperature shall be at least 200 F (93 C) and the raw water temperature shall be at least 54 F (12 C). If either waste quality or feed water temperature are other than described above, then performance requirements will be adjusted through calculations to reflect these changes.

ASH RESIDUE

When operated in accordance with the manufacturer's instructions, the combustible residue remaining after processing shall not exceed five percent weight of the total combustible tonnage processed.

The preparation of the protocol for the tests required to determine compliance with these process and equipment operating performance the guarantees will be developed in future negotiations between the Contractor and the City prior to performance testing. [8]

CONTRACTOR COSTS

The capital costs for construction of the facility in accordance with the contract documents is $3,281,250.00.

The cost for commercial operation of the facility in accordance with the contract documents in the base year is $429,555.00. Further adjustments can be made for additional waste and energy production as follows:

NET PROCESSING FEE

Contractor shall be paid $429,555 net processing fee each year for processing an annual base of 26,000 tons (23,400 t) of feedstock, in accordance with the terms and conditions of the contract. For each ton in excess of the annual base tonnage processed, the Contractor shall be paid $8.04/ton ($8.86/t) additional net processing fee. For each ton less than the annual base tonnage, which the Contractor cannot process but which the City is able to deliver, the City shall deduct $16.52/ton ($18.21/t) from the net processing fee paid to the Contractor. Notwithstanding the above, no adjustments shall be made in the net processing fee paid
to the Contractor if the actual annual tonnage processed is within five percent of the annual base tonnage previously stated.

**ADDITIONAL ENERGY FEE FORMULA**

Recognizing that the City receives substantial benefit for the effective and efficient operation of the plant by the contractor in the form of additional steam revenues and, further, that it behooves the City to provide an incentive to the Contractor to maximize the energy output of the system, therefore, the City agrees to pay to the contractor, as additional compensation, a percentage of the steam revenues generated that exceeds the system guarantee, based on the following formula:

\[
\text{Actual tons of feedstock processed} \times 4800 \text{ lb steam per ton processed} \times \text{steam price per pound} = \text{Base Steam Revenue}
\]

The Contractor shall be paid 25 percent of the difference between the actual steam revenues received and the base steam revenues projected as additional energy fees.

The Operating Cost Adjustment to which the Net Processing Fee shall be in effect and applicable for each ensuing fiscal year of the Facility’s Commercial Operation after the first fiscal year of Commercial Operation, including any extension or renewal periods agreed to. The Operating cost Adjustment shall be computed annually during the two months next following the close of the applicable fiscal year. The adjustment shall be equal to One Hundred Percent of the percentage change in the Consumer Price Index — All Urban Consumers (CPI-U) published by the Bureau of Labor Statistics, U.S. Department of Labor, for the Greater Boston Area, or a comparable, successor Index reasonably agreed upon by the parties. The Operating Cost Adjustment shall be added to, or subtracted from, the Net Processing Fee, according to the following formula:

\[
\frac{\text{CPI-U or 12th month of applicable fiscal year of commercial operations just concluded}}{\text{CPI-U for 1st month of commercial operations}} \times \text{Net Processing Fee} = \text{New Charge to City}
\]

Because the new charge to the City will not have been computed by the billing dates applicable to the first two months of the new fiscal year, the entire amounts of the increase occasioned under the Operating Cost Adjustment set forth above for those first two months may be added to the first billing to the City after this adjustment becomes known.

Should the Bureau of Labor Statistics not publish a CPI-U index relating to either the first month of the Commercial Operating Period or the twelfth month of any applicable fiscal year of Commercial Operations, the parties agree that they will average the closest month for which a CPI-U is published on either side of the reference month, according to accepted mathematical principles [9].

**LANDFILL DEVELOPMENT**

Auburn recognized early that no matter what solid waste management system was implemented, a landfill would still be necessary. During the initial planning phases of the project, it was decided that landfill development would be required 1. to provide the carry-over capacity needed for use during final planning and implementation of the resource recovery system; 2. to provide a disposal facility for the resource recovery system and residue materials; and 3. to provide a system bypass facility.

One of the reasons for Auburn’s consideration of a resource recovery system was the depletion of capacity in its existing landfill facility. An assessment of remaining capacity during initial planning indicated that there was insufficient capacity to serve the City during the time necessary to implement the resource recovery system. It was decided to design an interim landfill in proximity to the existing facility. This site was designed to serve the City for approximately two years and was approved by all local and State agencies for this period.

Simultaneous with the effort to develop an interim landfill, it was decided to also seek approval on an ash residue landfill. One of the sites originally evaluated was felt to have potential for this use. Within five miles of the proposed processing facility, the site had been rejected as a potential regional landfill because of its limited capacity. However, the volume and weight reduction anticipated from the resource recovery system allowed the site to be considered for a bypass/ash disposal facility. A long-term lease was nego-
tiated with the Maine Turnpike Authority (MTA), the existing land owner, for this use.

The plans for both facilities were submitted to local boards and the Maine Department of Environmental Protection and approval was received for both facilities. The City has been utilizing the interim landfill since approval. Developmental work has begun for the ash landfill.

In securing early approval of the residue disposal facility, it was also considered that, should the resource recovery system not be implemented, the MTA site, already approved, could have been used as a three year capacity, unprocessed sanitary landfill allowing time for implementation of a more long-term solid waste management system.

REGIONAL PARTICIPATION

Initial consideration of resource recovery in the Auburn area was through the Regional Solid Waste Committee (RSWC). The various members of the RSWC had been waiting for Auburn to develop the implementation of the system.

The proposals received indicated that a definite economy of scale exists in the technologies evaluated. The modular nature of the selected technology easily allows for different capacities based on the number of incinerators installed. Auburn has been concerned that installed incinerator capacity should be sufficient to handle only the waste actually committed to the project. Therefore, the conversations with the regional communities have been aimed at securing the waste which brings about the realization of the economy of scale. Flexibility is to be provided in the system design which will allow for future addition of an incinerator/energy module. Each regional community has had to weigh the cost and advisability of both disposal and transportation of its waste in comparison with its own local alternatives. Fifteen communities have thus far committed to the project representing an additional 70 tons/day (60 t/d) of solid waste.

COMMENTS

Resource Recovery would appear to be feasible for many small communities if certain factors exist. These factors must be evaluated to determine individual characteristics found in each community. At the very least, the planning areas mentioned in this report should be considered and the following issues addressed:

1. A market must exist for the recovered resource.
2. The technology selected to achieve a desired result must be capable of performing in an adequate economic and environmental manner.
3. A landfill (ash residue, etc.) is an integral part of most resource recovery systems.
4. Regionalization might be warranted by an economy of scale which appears to exist in many resource recovery technologies.

There are several other aspects of Auburn's experience which can provide valuable information for communities considering similar projects.

To obtain funding and expertise at relatively little cost to the community, Auburn made very good use of available federal programs. The DOE grant and judicious use of EPA's Technical Assistance Consultants were key factors in the implementation process.

Auburn also realized early in the process that appropriate consultant advice was important to making knowledgeable and cost-effective decisions. A corollary to this realization was that one consulting firm usually does not have the comprehensive expertise required to handle all of the disparate elements incorporated in such a project. Consequently, Auburn employed several different consultants, each specifically qualified to resolve a particular problem.

One of the most valuable lessons that can be gained from Auburn's experience is derived from the attention paid to the energy market, Pioneer Plastics, in developing the plans. By including Pioneer in the decision-making process, Auburn was able to develop a contract which clearly defined and allocated the respective risks and responsibilities involved in the project. Similarly, the contract with the system vendor incorporated strict performance requirements (backed by penalties for non-compliance) and included the risk transfer arrangements insisted upon by Auburn.

Auburn is now able to proceed full speed ahead with its project, confident that the risks inherent to the resource recovery system are wholly identified and managed in a way that is acceptable to the community.

REFERENCES


[9] Ibid.

Key Words
Facility
Incinerator
Municipality
Planning
Refuse
Sewage
System