PRODUCTION AND LOGISTICS

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DEFENSE ENERGY PROGRAM POLICY MEMORANDUM (DEPPM) 91-3

MEMORANDUM FOR DESIGNATED ENERGY OFFICIALS OF THE OFFICE OF THE SECRETARY OF DEFENSE, ORGANIZATION OF THE JOINT STAFF, MILITARY SERVICES, AND DEFENSE AGENCIES

SUBJECT: Waste-to-Energy Projects

This memorandum establishes guidelines for waste-to-energy capital investment projects. Experience has shown that these projects require particularly close coordination between DoD officials responsible for a wide variety of matters, including facilities engineering, contracting, legal, environmental and energy management. Such projects also require close coordination with the host and nearby communities.

Waste-to-Energy conversion involves many technologies. Except for pyrolysis of or methane extraction from existing landfills, the most common conversion of solid waste (and the exclusive focus of this DEPPM) is by Incineration. Incineration may be co-fired with conventional fuel and may include co-generation of electricity. Projects may be funded with Military Construction funds, but the House Defense Authorization Committee has stated that such projects should be requested only if cost effective private sector provision of the service has been sought unsuccessfully. Projects proposed for accomplishment through Military Construction programming or under the contract authority of section 2394 of Title 10 United States Code should be developed using the procedures of this guide.

It is DoD policy that conversion of waste-to-energy technology will be used when cost-effective and consistent with DoD waste management needs and community interest. Each such project is unique, complex and costly and must be managed according to the highest standards. The guidelines described in the following attachment reflect successful project experience. We encourage you to provide suggestions for improving these guidelines.

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Attachment

the uncertainty of the final outcome. Nevertheless, estimates must be seen as just that. If the cost/benefit potential of a waste-to-energy plant looks like a close call, ***it might be best to decide against the complex project development obligation you must make to be successful, and go with a less risky alternative***.

Successful Management – First Steps

Most DoD projects to date were initiated by nearby communities interested in DoD as a source of land for facility construction, an energy load, and additional waste fuel. In these cases the communities managed most aspects of public participation; but the key elements to project success will remain essentially the same. DoD involvement will necessitate an enduring interest in the quality of project management, regardless of how much responsibility is assumed by the community. This interest is driven by:

- Concern for the welfare of the base community;
- Need for reliable, economical delivery of services by the waste facility operator;
- Potential liability of DoD for the failures of facility and/or its operator.

The first step in developing a waste-to-energy project is to identify the parties of interest: the community, the base, the media, inside and outside interests, such as environmental, regulatory bodies, etc. To the extent possible, develop a plan to establish the financial aspects of each party's interests. Later you will use this data to determine shares of costs and benefits.

Second Steps -- Total Quality Management Process Application

Waste-to-Energy projects require great attention to detail throughout their development, which can be in excess of 10 years, both in Government and the private sector. Waste-to-energy projects depend on public confidence. Such projects are technically complex as well and must meet evolving criteria for emissions and residual waste. The environmental impact analysis process of the National Environmental Policy Act, 42 U.S.C. 4321, et. seq., should be incorporated early into the project planning process. The length of time is often reduced by initial management attention and is nearly always lengthened by poor management or failure to attend to some of the many details necessary to comply with environmental process.

For several years the Department of Defense has been initiating the adoption of the Total Quality Management concept. The application of the Total Quality Management commitment to continual process improvement, attention to detail and focus on customer satisfaction is particularly appropriate to the accomplishment of these projects. Experience has shown that the use of the following general management guidelines can significantly increase the chances for success in developing a waste-to-energy project:

Waste-to-Energy Project Management Guidelines

Waste-to-Energy projects are complex and may be controversial. Acceptance of waste incinerators for energy production ***depends largely on public views about the quality of project management, construction, and facility operation***. The importance of public involvement in these projects cannot be overemphasized. The bulk of this enclosure condenses experience in DoD and the private sector about how best to manage such projects.

Relationship to Other Guidelines

Waste-to-Energy conversion, if done properly, can safely dispose of refuse and other waste materials and produce usable energy, both at a net lower cost. The decision to select waste-to-energy as an energy source, however, must be based on favorable economic analysis. ***10 USC 2690*** requires that the primary energy fuel source to be used in any new heating system constructed on lands under the jurisdiction of the military department be ***the lowest life cycle cost alternative***. When a waste-to-energy conversion system is contemplated, ***you must compare the resulting energy cost to alternatives, including Military Construction***. DEPPM 88-1, available from the Directorate, Energy Policy, Office of the ASD(P&L), Washington DC 20301-8000, explains how to perform this analysis. ***For waste-to-energy plants, any savings (or higher costs, if they occur) resulting from combining waste processing with energy production should be part of your comparison*** to coal, gas, etc.

Most waste-to-energy plants will be built with private funds. DEPPM 88-2 describes the procedures for energy facilities built under 10 USC 2394, which, by delegation from the Secretary of Defense, requires ASD(P&L) project approval.

Making the Energy Choice

Deciding whether to build a waste-to-energy facility requires developing public acceptance of this alternative, without making a commitment to proceed prior to knowing the cost of alternatives. This is a difficult process at best. You must first develop an understanding with the community (DoD or DoD and host), that ***an unfavorable cost comparison will kill the project***. Achieving this understanding is difficult because the facility may have benefits to the external community that cannot be considered by DoD. You cannot know the least cost energy solution without, at some point, formally soliciting; and you cannot solicit in the absence of community acceptance of the project. Worse, no one wants to make the effort required to build a waste-to-energy facility without the certainty of a "go" decision. Even reaching agreement on terms of a solicitation is laborious. Further, if the State or local government entity wants to control the contracting, the problem of knowing how to compare costs becomes more complex yet.

There is no certain way around this "Catch-22." Certainly you must make clear your constraints up front and get acceptance of how you will operate. Develop working estimates of some alternatives, such as Military Construction. Perform a cogeneration market analysis in your area, to find out whether a contractor might have an opportunity to propose a privately-financed energy plant with cogeneration, which can make DoD's net energy cost lower than the government's estimate. If you can eliminate possibilities early on, you can limit

- Establish a **process action team (PAT)** covering all technical elements needed for project definition through completion. A PAT is a tool or technique of TQM in which various members representing all aspects of a problem or challenging situation or process are brought together in a flexible environment such that their synergy leads to the highest quality problem solution, process improvement or project result. The waste-to-energy team should consist of the senior technical managers responsible for installation functions including: **environmental management**, particularly air emissions and solid waste, but not excluding water quality and pest management; **public affairs**; **legal**; **contracting**, including contract administration; **financial management**; **real estate**; **energy management**; **civil and mechanical engineering**. It is also strongly suggested that someone trained in the TQM process and techniques be assigned to facilitate the PAT.

- The PAT should have direct access to top management to facilitate decision making. Top management support and involvement are critical to success. The PAT leader should have no other responsibilities until the decisions of the team have been fully evaluated and accepted by top management for implementation. The team can and should have work groups to deal with specific technical issues but vertical communication within the PAT is critical and easier to maintain with smaller structures.

- DoD Components should consider developing Component-wide centers of technical knowledge specializing in this type project and management process. It may be more efficient to rely, for example, on centralized expertise in negotiated procurements, with local contracting officer representative (COR) participation. Whatever the decision of the component, you must still have a base-level PAT with representation from the contracting function having final responsibility.

Essential Elements for PATs to Include in Project Plans

A. Solid Waste Analysis

Regardless of the origin of interest in a waste-to-energy project, the PAT must develop a plan for involving all public interest elements, including the news media. Based on experience we believe the PAT should take a pro-active approach and query potential supporters and opposition to determine their concerns, which have often included the following:

- Concern that ***the waste Incineration alternative was selected without a complete solid waste management plan***. Incinerators have faced opposition when proponents were not willing to do a full analysis of the range of potential waste treatment options, particularly recycling. Thus waste-to-energy PATs should do such an analysis up front.

- Fear of ***compromising quality of water, air, wildlife preservation and human health*** from inadequate abatement and operating practices. This fear can only be mitigated by complete knowledge of all the relevant environmental regulations, quality design, and good project management with open public participation and review.

  Based on past experience, the PAT should plan to:

- Perform a detailed analysis of the total waste stream and its sources to determine the actual recyclable and non-burnable content. Communities must participate if they are contributing waste for fuel. Avoid estimates based on statistics, such as "average truck trips", that may mask potentially critical details.

- Determine the potential for on-base, or community-wide recycling programs. Such programs will depend both on the types and amount of materials available and local markets for them. (The cost-benefit analysis of the project should include a sensitivity test of the potential change in the marketability of recyclable materials.) Make sure the effects of recycling or segregation of non-combustibles, if feasible, are applied to the volume of waste fuel available.

- Look carefully at cost and benefit of segregating non-combustibles from the waste stream. It is usually better to perform this activity prior to delivery of the waste to the incinerator. Second best alternative is to provide sufficient room in the tipping area to segregate such items (including potentially hazardous materials) prior to Incineration.

- Determine whether "Refuse-Derived Fuel" (RDF) should be evaluated. In certain areas of the country, it may be cost-effective to have the waste processed into 100 percent combustible fuel products. The main drawback is increased fuel cost. The benefits can be smaller, cheaper facilities and less operation and maintenance problems.

- Develop a plan for sampling and inspection of deliveries of refuse to the facility, especially (but not only) when the analysis concludes that non-combustibles are to be removed from the waste stream prior to delivery.

- Develop a plan for periodic sampling of solid residues to detect any hazardous constituents, and actions necessary to contain, store and dispose of any if found.

- Subject the assumptions, analyses and conclusions on solid waste management concepts and alternatives to public review throughout the decision process.

- Incorporate data into the environmental assessment or impact statement under the National Environmental Policy Act.

B. Pre-Planning Actions that Can Save PAT Time and Trouble Later

As noted earlier, projects of this type can take many years, and a stable management structure is needed--even if individuals change. The structure needs to contain some means of ensuring continuity, particularly regarding key agreements on basic assumptions and process between the parties. In addition, a successful project depends on thorough analyses and an agreement between all parties to specify quality at the expense of cost. Specifics you should include in a project:

- Gather the ambient environmental data you will need as soon as possible. The PAT should take ambient air quality measurements for at least one full year prior to the date the operating permit is required. Compliance with emissions regulations after operation often depends on the structure of the operating permit, which, in turn, can best be negotiated knowing ambient air quality prior to project construction.

- Establish high quality standards for facility design and for operations and maintenance. Many projects have failed due to "low bidder" contract approaches which resulted in unacceptable technical quality and long term problems. As outlined below, it is absolutely essential to design these projects to the highest reasonable standard, rather than the minimum acceptable standard, and to make clear throughout the contracting process that offers will be so evaluated. If the government's contract is with a municipality which will perform the construction and operating contracting function, the government should insist on comparable standards. Selection criteria should give clear preference to companies with proven high quality experience in the design, construction and operation of RDF facilities.

- When communities are directly involved suggest formation of a special legal entity (such as a solid waste incineration or energy conversion authority) covering the jurisdiction(s) involved as a means of establishing responsible continuing management structure, funding, and operations functions on behalf of local government.

C. Design and Operating Details

As a general guideline, design waste-to-energy facilities to meet all the most demanding standards existing ***or pending*** at Federal, State, and local level. Many environmental standards are in flux and will not be settled for years. Make deliberate provision to accommodate the most demanding standards under consideration, if and when they become applicable.

- Quality must be designed into a successful facility. Omit no details. Subject every aspect of the system flow to scrutiny, from waste collection procedures and equipment to all aspects of facility construction, operation and continuing maintenance. All components from scales and materials handling equipment through combustors, heat exchangers and pollution abatement systems must be of sufficient quality to prevent catastrophic breakdowns. Use well-tested designs.

- Regulatory uncertainty poses inherent risks, which in some cases can only be mitigated by detailed planning. Examples:

  - Control known toxics in the fuel supply and know the qualities of the ash. Environmental Protection Administration (EPA) guidelines presently exempt residential trash from the Resource Conservation and Recovery Act (RCRA), but disposal of incinerator ash is based on its actual characteristics.

  - Plan and cost the proposal against the monofill standard for ash disposal as a minimum. State guidelines are often more stringent than EPA. Many states already require disposal of incinerator ash as a "special waste," in single lined

monofills. Similar Federal standards are likely to emerge within two years. In the future, incinerator ash may be classified as a hazardous waste.

- Design the facility that can adapt to changing emissions standards (leave room for dry scrubbers and bag houses). State regulations on air emissions vary widely. Southern California standards, for example, require controls that can only be achieved with dry scrubbers and fabric filters (no static precipitators). In addition, NOx limits effectively require NOx-limiting technology, such as ammonia injection and exhaust temperature monitoring. Prepare to meet these standards unless you can determine without question they will not apply in your area.

- Control toxic compound emissions with the best available control technology. Some controls can be relatively simple, such as time-at-temperature dioxin destruction.

- Design the operating permit to allow for unavoidable variations in emissions of various products. Air quality management often requires continuous emission monitoring. ***All incinerators show peaks and valleys on a continuous output reading.*** In some districts, three hour (or shorter) limits are the best obtainable. Consult thoroughly with engineers and, ideally, with operators of existing plants to learn the patterns of emission generation. The operating permit must both protect public health and allow the facility to function. Proper operation, controls and management can achieve the necessary levels of performance.

- DoD installations must make provisions and plan to exercise them, to monitor waste entering these facilities, emissions and waste leaving, to ensure compliance with environmental regulations. DoD facility managers are responsible to assure that all environmental regulations are complied with on their facility even if equipment and facilities are owned and operated by private parties. Most waste-to-energy plants require large amounts of water and particular attention should be given to the potential impact on the locality's potable and ground water supplies.

D. Financial Management and Revenues

- Be aware of the often direct relationship between public bond financing and DoD's role in defining risk. Bonds are usually the source of construction and initial operating revenues for projects proposed by state and local governments or the special solid waste "districts," if created. Use care to ensure equity of risk between DoD and the community, with all parties having strong incentives to ensure a good result.

- Risk inherent in regulatory uncertainty can be minimized by quality design, good up-front market research, and clear commitment of key parties. To the extent this improves bond ratings, the subsequently lower interest costs will benefit DoD.

- Understand the cogeneration market in your area (discussed above). Revenues from cogeneration will generally be lower than in past years, because of changing regulations on how cogenerated power is priced by utilities. If cogeneration is not an option, it is

even more important to ensure good data collection on cash flow generated from disposal alone.

- ***Obtain equity contributions from communities*** to ensure interest in the project. Establishment of a special project authority (as noted above) often help manage equity interests of the community.

- DoD has the authority, under 10 USC 2394, to purchase energy or energy facilities from a private provider (including a public utility) for up to 30 years, including energy from a waste-to-energy facility. See DEPPM 88-2 for guidance on using this authority.

- Defense components have the authority for utility contracts for up to ten years for energy supplied from such facilities under the current Defense Acquisition Regulation Supplement 5.

- 10 USC 2809 now allows long-term contracts for purchase of utilities services through privately-financed construction and operation of requisite facilities. Unlike 10 USC 2394, this authority permits contracts for facilities such as waste incineration where energy is not necessarily a byproduct.

- Ensure that bond or other financing is sufficient to cover construction, initial operation, contingency and other common start-up costs. Obtain an independent business plan analysis, if in-house expertise is not available.

- Ensure the financing anticipates modifications. ***All*** facilities of these types have required modification (sometimes substantial) during the first few years of operation. ***Estimates of contingencies should consider the certainty of how well the facility design anticipates potential changes in environmental regulation.***

- Make sure estimates of Federal revenue contributions (e.g. through energy purchases, tipping fees, etc.), reflect realistic estimates of base requirements--certainly no different from those used by the government in preparing its in-house cost estimate. Sensitivity tests should be run to determine how susceptible project success may be to inadvertent errors in assumptions of various revenue sources.

- Make certain that you understand the ***degree of control exercised by local political jurisdictions over private waste collectors.*** If their collections constitute any of the energy source, establish how the governing authority will control their activities. This is particularly true when (as usual) any government fees for energy depend on cost-sharing and joint-revenues.

- ***Prepare a joint interest statement*** when dealing with local government partners in such facilities (see attached example). The statement should clearly lay out the costs and benefits to all parties, to ensure equitable treatment in the contract. This is where the "first step" of identifying the parties and their interests can pay off.

E. Public Affairs

One of the most critical elements of a successful project with controversial issues such as waste-to-energy plants is acceptance by the local community. The only way to deal with the public on such projects is to initiate completely open and direct communication with all interested, or potentially interested, parties from the beginning and keep them informed throughout the process. The following process is recommended as a base to initiate an effective public information effort:

- Identify all potentially interested parties.
- Schedule an initial meeting to announce the intent of the project study.
- Publicize the initial meeting as widely as possible, including notices in community libraries and newspapers (personally contact newspaper editors since they may not see the notification in their own newspaper.) Provide written background material to all interested parties.
- Hold an initial pre-meeting with project managers, involved base personnel, Environmental Protection Agency representatives, representatives of the appropriate State agencies and any contractors. Try to anticipate significant questions and develop well considered, technically correct answers.
- Hold a well structured public meeting to discuss the project and allow all interested parties to present their views. Record the proceedings for future use by parties not in attendance.
- Follow through on all issues raised during the initial meeting and stay in touch with all interested parties identified, throughout the project's process.

Attachment

Example of a Joint Interest Analysis

Present Value of Project Benefits:

To DoD		To Community	
Current Steam Cost	$100 million	Current Disposal Cost	$ 35 million
Contract Steam Cost	-75	Anticipated Land-fill	+ 45
Steam Cost Savings	25	Total Avoided Costs	80
Disposal Savings	+15	Contract Disposal Cost	-20
DoD Benefits	$ 40 million	Community Benefit	$ 60 million

Present Value of Contract Liabilities:

Plant Construction	$100 million
Operations & Maintenance	75
Interest	30
Fees, contingencies, etc	15
Total	$ 220 million

This example presupposes the generation of electricity which will result in revenues of $125 million in costs. Thus $220 million will be paid by DoD payments of $75 million plus the Communities contribution of $20 million and the $125 million in electricity sales.

It would appear, at first glance, that the Community is receiving a disproportionate benefit-to-cost ratio 60/20 as compared with the DoD's 40/75. But the relative risk of contract fulfillment responsibility contained in the contract liabilities clauses may make this a prudent deal for the DoD if the majority of risk is borne by the Community through their contractor. If the responsibility for steam provision, in the case that the contractor is unable to perform, is on the DoD then the contract is clearly not a good deal.

In contracts of this nature with which we have experience, the tendency of the Communities has been to propose contract terms which would assign most, if not all, of the contract performance risk to the DoD in an attempt to get more favorable project bond rates. If this is the case in this particular example, it would appear that the DoD would be advised to negotiate a better ratio of benefits to costs in order to justify the increased risk.