

LICENSING OF DISTRICT HEATING BOILERS:

**THE MINNEGASCO ENERGY CENTER,
MINNEAPOLIS, MINNESOTA EXPERIENCE**

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THE MINNEGASCO ENERGY CENTER

A BRIEF SUMMARY

The Minnegasco Energy Center (MEC), located in downtown Minneapolis, was constructed in 1972 and is the result of a 50-50 partnership of Investors Diversified Services (IDS) and Minnesota Gas Company.

The new company was an offshoot of a smaller central system located in the Baker Block, serving facilities owned by Baker Properties in downtown Minneapolis. This was a relatively small system with a peak heating demand of around 80,000 lbs/hr.

In 1969, Baker Properties was sold to Investors Diversified Services and a subsidiary known as IDS Properties was formed. The construction of the 2.5 million square foot IDS Center, along with the Hennepin County Government Center and a number of other new buildings planned in Minneapolis, prompted IDS and Minnesota Gas Company to begin the construction of a new district heating facility and expansion of the system to serve new customers in downtown Minneapolis. In 1978, management was transferred to Minnegasco when IDS divested itself of its major real estate holdings. The system is currently managed by Minnegasco Energy Center, Inc., and since 1979 has maintained a contract steam demand of 350,000 lbs/hr.

Currently, downtown Minneapolis is enjoying considerable development. It is estimated that \$600 million to \$800 million is being spent on new building construction. During 1979, commitments were obtained for a new steam load of 180,000 lbs/hr and 8,500 tons of new cooling. Some of the load commitments obtained in 1979 will not actually come on the system

until 1983. However, planning is now underway to install new boiler equipment as well as a new refrigeration machine.

The Minnegasco Energy Center (MEC) operates in a slightly different manner than the average utility. It is not regulated or franchised by the City of Minneapolis. Only those loads which are relatively close to the distribution mains are selected. Prior to selection, an analysis is completed for each main extension to determine whether the extension has potential for additional future growth and if it will pay off on its own. MEC secures 20 year contracts with its customers which provide for a pass-through of increases in operating costs on an annual basis. In addition, MEC adjusts the fixed cost portion of its rate once every five years on the basis of a Cost of Living Index.

The present MEC system consists of two 200,000 lbs/hr boilers and two standby plants with capacities of 200,000 lbs/hr and 100,000 lbs/hr. The system has a firm capability of 450,000 lbs/hr, allowing for the emergency shutdown of one of the largest units and the subtraction of 50,000 lbs/hr for in-house requirements during peak load conditions. Since the new customers will bring contract demand to more than 530,000 lbs/hr, it is imperative that a new 200,000 lbs/hr unit be installed in the immediate future.

FUTURE MEC OPTIONS

During the past two years, MEC has discussed with Northern States Power Company the possible purchase of steam from their Riverside Plant, located four miles northwest of downtown Minneapolis. Generally, when district heating is discussed in connection with power generating stations,

there is much discussion concerning station de-rate and problems created by district heating systems. Through its course of discussion with Northern States Power, MEC has stated that its first goal is to get the system off of imported oil and on to coal. Fortunately, that Northern States Power Company now generates approximately 50.4% of its total production from coal, 45.4% from nuclear plants, 3% from hydro power and only 1.2% from oil.

When negotiating with Northern States Power, MEC has stated that it does not desire nor does it have the ability to absorb the burden for the power generating facility and wants the facility to continue to be dedicated to the production of electric power. Since much of the equipment within the Riverside plant is used for intermediate power, MEC is hoping to purchase interruptible steam and use the MEC gas-oil boilers as firm capacity. MEC believes that the interruptions will be of short duration and minimal in number.

The installation of coal-fired boilers in the MEC system is not being considered since the company feels the price of steam to its customers would no longer be competitive. However, MEC feels the proposed plan will save far more imported oil than the installation of a single coal-fired boiler and that the plan has cogeneration potential as well.

MEC also believes that such a plan will: be effective in many communities throughout the United States; make maximum use of coal-fired facilities; and result in the lowest possible customer cost.

THE REGULATORY PROCESS

Although MEC feels the district heating future is bright for Minneapolis, a key to the plan is to have sufficient capacity available during those periods when the steam from the Riverside Plant may be interrupted. This means the 200,000 lbs/hr required for the new loads must be built to serve until the steam line can be built and as backup once the steam line is completed.

The initiation of the MEC Plan will not be easy. Before construction can begin on the third boiler, all the proper approvals and permits must be received. For the proposed project, two major permits must be granted. Both are required by Federal law. In the following pages, a summary of these permits and the Minnegasco Energy Center's quest for permit approval is presented.

AIR QUALITY AND THE FEDERAL CLEAN AIR ACT AMENDMENTS

A Brief History

The Clean Air Act passed by Congress in 1970 was this country's first comprehensive air quality statute. National Ambient Air Quality Standards (NAAQS) were established for the air we breathe, and control of air pollution was to occur by placing limits on particulate and sulfur dioxide (SO₂) emissions on new major sources. Existing sources were to be controlled by state regulatory agencies through the preparation of State Implementation Plans (SIP).

In 1975, the U.S. Environmental Protection Agency (EPA), the federal regulatory agency with the responsibility for cleaning up the air, estab-

lished a policy referred to as the Prevention of Significant Air Quality Deterioration (PSD). The EPA learned early on that the NAAQS identified healthy or unhealthy air quality conditions but did nothing to protect those portions of the country where the air was far cleaner than what is required by the NAAQS. Thus, the Act actually allowed the air in these very clean air areas to be degraded. The PSD policy established limits on degradation in these clean areas. The policy survived a number of court challenges but still remained only EPA policy. A major revamping of the Act was needed.

In 1977, the Clean Air Act was amended. Significant changes were enacted as the control of both stationary and mobile sources were mandated. The PSD policy became law, a classification system for the clean air areas of the country was established and all the dirty air areas were identified. The states also were required to revise their SIP's to identify how they planned to bring these "non-attainment" (dirty air) areas into compliance.

Now, nearly three years since the passage of the Clean Air Act Amendments, the ramifications are slowly becoming apparent. The EPA has promulgated regulations for PSD and for non-attainment areas. The emission standards for new sources, the New Source Performance Standards (NSPS), are being revised and tightened. Non-attainment areas are being studied carefully and strategies for cleanup are being formulated. Still, with all the studies that have been made, many changes, as required by the Amendments, are yet to come. The licensing of a new stationary source will require close scrutiny of the continuous changes for years to come.

AIR QUALITY LICENSING OF DISTRICT HEATING BOILERS

The effect of the Clean Air Act Amendments on proposed district heating projects will depend upon the size, type and location of the proposed project. The length of time required to prepare, process and obtain the necessary air quality approvals will vary as will the agency which will issue the approval. The following provides some general steps for moving toward obtaining an air quality permit.

Size and Type

The first step in any project is to determine the size and type of the project proposed. If the flue gases or combustion products exceed 100 tons per year* of any of the federally regulated pollutants (particulate matter, sulfur dioxide, nitrogen oxides, photochemical oxidants, carbon monoxide and lead) or if the heat input is greater than 250 million Btu/hr, the source (the proposed facility) is considered a major source. In all cases, enough information must be generated to calculate the emissions.

The type of combustion unit and the types of fuel burned will also affect the regulatory process and the standards that the unit must meet. For instance, at present, fossil fuel-fired boilers (oil, gas, coal, etc.) have a set of standards (NSPS) that are different than fossil fuel-fired steam electric generating facilities. The mass burning of unprocessed solid waste with waste heat utilization is generally subject to incinerator New Source Performance Standards while processed Refuse Derived Fuel (RDF)

* The types of sources (28 in all) required to meet the PSD regulations are identified in the first part of the regulations (40 CFR 51.2). Most district heating sources will come under the 100 ton/250 million Btu/hr requirements. Otherwise, annual emissions of 250 tons/year are required for a source to be subject to PSD.

burned in a boiler is subject to the fossil fuel-fired NSPS since a fossil fuel is usually burned with the RDF. If electricity is to be generated in sufficient quantities along with process steam, the steam electric NSPS generally will apply. In all of the above cases, discussions with the regulatory agencies is necessary.

Location

The New Source Performance Standards for the proposed source defines the maximum emissions allowed for the type of unit. However, the location of the proposed unit and the existing air quality of the region may dictate the use of stricter emission standards. The law requires that NSPS or Best Available Control Technology (BACT), whichever is more stringent, be applied by sources in attainment areas. For sources in or near non-attainment areas, the Lowest Achievable Emission Rate (LAER) will be applied. Thus, in clean air areas, the Amendments require the proposed source to identify, to the satisfaction of the EPA, what technology is the best "readily available" pollution control technology while in dirty air areas the technology that will result in the cleanest air will be installed.

Air Quality Modeling, Monitoring and New Source Review

Once the size, type and location of the proposed district heating project is established and initial dialogue with the proper air quality regulatory agency has begun, the next step is to measure the potential impact of the project on the region's air quality. The regulations require that an inventory of all sources and air quality monitoring information be made available for review by the regulatory agency. If existing monitoring information is inadequate, then the proposer of the new source must estab-

lish a monitoring program and collect data for up to a year before the permit application can be submitted. Fortunately, most district heating systems are located in areas where sufficient monitoring data is available.

In addition to monitoring, air quality modeling is also required for New Source Review. The EPA has established computer models to measure the relative impact of a new source against other existing and proposed sources. The modeling is used to determine how much of the air quality will be degraded and how close to the limit, as defined by PSD regulations, the new source will come. This process identifies the amount of the available "increment" used.

For those potential sources located in non-attainment areas, inventory data, modeling and monitoring are still required, but instead of identification of the increment, analysis will show the types of reductions that must be made to move the region toward attainment status. In this case, the proposed source must legally obtain binding "emission offsets" on better than a one for one exchange. In other words, the proposed source must shut down other sources in the non-attainment area with emissions greater than its own. Emission offsets are acquired only for those pollutants which are non-attainment and for which the source is considered major.* The bad news here is that many district heating systems are located in cities which are generally non-attainment areas.

* Currently, a source is considered major only for those regulated pollutants for which it emits more than 100 tons/year. If a region is non-attainment for say particulates, emission offsets are required only if the proposed source will emit more than 100 tons/year of particulates. This may be changing shortly, however, since new regulations are to be promulgated in June.

The Regulatory Agency and the Schedule

As previously noted, it is important to know what regulatory agency will be involved in the permit review process. The Amendments mandate that states will eventually administer the air quality programs. However, many states do not yet have this authority. The recommended approach is to check with the state air quality regulatory agency to determine which agency has jurisdiction.

The schedule for acquiring the appropriate approvals can be determined only after the size, type and location of the facility have been established and after preliminary discussions have taken place with the proper regulatory agency. Once these factors have been established and the regulatory agency has begun its analysis, a determination should be completed within a year. Add up to one year for modeling, monitoring and permit preparation, and the entire process can take two years. However, practically speaking, a district heating permit process should take no more than one year.

THE MINNEGASCO PSD PERMIT APPLICATION

As stated earlier, Minnegasco Energy Center has proposed a 200,000 lb/hr gas/oil-fired package boiler to be installed next to its two other boilers in downtown Minneapolis. No. 6 fuel oil with a 1.5% sulfur content is proposed as the primary fuel. The presiding regulatory agency is the Minnesota Pollution Control Agency, Division of Air Quality (MPCA).

Air Quality Status

The seven county Twin Cities Area is non-attainment for particulates, SO₂, CO and oxidants. However, the licensing of the new boiler is being

conducted using the PSD regulations since the emissions will be below the 100 ton/year level recommended for particulates, CO and oxidants. SO₂ is not an emission offset problem since downtown Minneapolis is considered a clean air area of a non-attainment area.

The SO₂ situation required close evaluation since the primary source of the SO₂ was located approximately 20 miles to the southeast. MPCA modeling and monitoring information showed that Minneapolis did not violate SO₂ standards. An official request for designating Minneapolis as a clean air area was submitted to EPA Region V and approved. Had the EPA not allowed such a move, the City of Minneapolis would have had to officially petition the EPA for re-designation as an attainment area, thereby requiring extra time and public hearings.

Downwash - Short Stacks

One provision of the Clean Air Act Amendments is to keep the height of new stacks within the limits of good engineering practice. Similarly, a stack may be lower than the upper limit as long as atmospheric downwash will not result. In addition, existing stacks cannot legally be raised to gain better dispersion unless it is to eliminate an existing downwash condition.

The proposed new source takes advantage of this last provision since the two existing MEC stacks are considered too low and should be raised. The third boiler will add a new stack and the others will be raised. MEC gained greater dispersion and, thereby, greater flexibility in getting the new boiler licensed.

Monitoring and Modeling

As previously mentioned, being located in a metropolitan area can be beneficial if an adequate monitoring system exists. The MPCA waived the one year monitoring requirement since monitoring records in downtown Minneapolis were available for the past five years. However, air quality modeling indicated that more monitoring information would be beneficial in one particular area of downtown Minneapolis. The MPCA requested MEC to place a monitor within a designated area so that information could be collected on the ambient SO₂ concentrations during the worst meteorological months of the winter. MEC complied.

As part of the preparation of the State Implementation Plan, the MPCA evaluated the air quality of the Twin Cities using the EPA approved urban RAM air quality model. All sources were inventoried for use in the model. To meet the PSD permit application, the proposed new MEC boiler and new stacks were modeled and compared to the results of the MPCA model. The model showed that the new boiler would not result in the violation of federal air quality standards and that the increment used should be acceptable.

State Ambient Standards

Meeting the NAAQS and the other provisions of the PSD regulations normally would be all that is needed to obtain necessary air quality approvals. However, Minnesota, like some other states in the country, has State Ambient Air Quality Standards that are stricter than the NAAQS. These standards are not to be violated.

Since the air quality modeling had to be completed as part of the PSD process, state regulators could assess the impact of the new source on the state standards. Table 1 shows that a significant reduction of ambient SO₂ is required, thereby affecting the type of emission control strategy used.

For MEC, the choices became: 1) to reduce total SO₂ emissions by burning low sulfur fuel; 2) to reduce total SO₂ emissions by removing SO₂ with a scrubber; and/or 3) to lessen the impact of SO₂ by replacing or shutting down existing sources. The first two choices, although feasible, were rejected because of the operating and capital expenditures that could make district heating steam less competitive with other energy sources. Lower sulfur oil is not available in Minnesota and would have to be brought in from other states. Scrubbers are expensive, to operate and maintain and would result in a waste requiring disposal.

The last choice, in effect an emission offset approach, is almost a natural for district heating systems. As a system expands and new customers sign contracts, existing building boilers are shut down. For MEC, many of the proposed new customers represent some of the larger stationary sources in downtown Minneapolis. Thus, the elimination of the individual sources would allow MEC to gain an air quality credit towards meeting the state standards.

THE REGULATORY PROCESS AND CURRENT STATUS

The PSD permit application was officially submitted to the Minnesota Pollution Control Agency on October 29, 1979. The application consists of

TABLE 1

MINNESOTA AND FEDERAL AMBIENT AIR QUALITY STANDARDS ($\mu\text{g}/\text{m}^3$)

	<u>Minnesota</u>		<u>Federal</u>	
	<u>Primary</u>	<u>Secondary</u>	<u>Primary</u>	<u>Secondary</u>
<u>PM</u>				
24 Hr	260	150	260	150
Annual	75	60	75	60
<u>SO₂</u>				
3 Hr	<u>655</u>	<u>655</u>	---	<u>1,300</u>
24 Hr	<u>260</u>	<u>260</u>	<u>365</u>	---
Annual	60	60	80	---
<u>NO₂</u>				
Annual	100	100	100	100
<u>CO</u>				
1 Hr	35,000	35,000	40,000	40,000
8 Hr	10,000	10,000	10,000	10,000
<u>Ox</u>				
1 Hr	130	130	240	240
<u>HC</u>				
3 Hr	160	160	160	160

70 pages including 60 pages of calculations and appendices and is the result of approximately two months of work. A month following the submittal, the MCPA officially accepted the application for evaluation and completed their initial analysis in December, 1979. A draft permit for public review and official approval was due shortly thereafter; however, none was received.

Since January, 1980, there have been a number of meetings and conversations with the MPCA. The staff states that all federal requirements have been met but that they see some problems in meeting the state ambient air quality standards. More modeling has been completed, but no draft permit has been written. In one sense, MEC has fallen victim to regulatory priority and one of the biggest problems associated with regulatory agencies. . . lack of sufficient staff to handle all the work. The State Implementation Plan, as required by the Clean Air Act Amendments, is over a year late and the EPA is pressing. Permits at the present time are of lesser priority.

THE POWERPLANT AND INDUSTRIAL FUEL USE ACT EXEMPTIONS

INTRODUCTION

The second major hurdle in licensing MEC's third boiler is to obtain an exemption from the Powerplant and Industrial Fuel Use Act of 1978 (FUA) to allow combustion of oil and gas. Administered by the Economic Regulatory Administration of the U.S. Department of Energy, the FUA prohibits the use of petroleum or natural gas as a primary fuel in power plants and major fuel burning installations unless a proposer successfully "petitions" the ERA for a temporary or permanent exemption.

To be subject to the FUA, a new or existing facility must have a heat input of 100 million Btu/hour for a single unit or 250 million Btu/hour for an aggregate of units on a site. Regulations for administering the FUA have been approved on an interim basis and are currently being used for all cases. A facility subject to the FUA has the option of going after either a temporary (up to five year) exemption or a permanent exemption. At present, only new facilities are being reviewed by the ERA for compliance with the Fuel Use Act. Existing facilities could be subject to ERA scrutiny as it gains experience in administering the FUA.

DISTRICT HEATING SYSTEMS AND THE FUEL USE ACT

A new district heating boiler subject to the FUA is, by definition, a "major fuel burning installation" (MFBI) if it does not generate electricity. As an MFBI, the choice must be made as to how the proposed facility is to be used which will identify the need for a temporary or permanent exemption. Table 2 summarizes the types of exemptions available.

Once the type of exemption is identified, the proposer can now get an idea of the type of information required. For most exemptions, a Fuels Decision Report must be prepared to identify why alternate fuels could not be used and why the exemption should be granted. Table 3 presents an annotated outline of a Fuels Decision Report.

THE MINNEGASCO ENERGY CENTER EXPERIENCE

Since the U.S. Department of Energy and the Fuel Use Act are relatively new, experience to efficiently handle regulatory matters takes time to develop. The result is a new staff working with new laws and new regu-

TABLE 2

TEMPORARY AND PERMANENT EXEMPTIONS

FOR NEW MAJOR FUEL BURNING INSTALLATIONS

TEMPORARY EXEMPTIONS

<u>Section</u>	<u>Exemptions</u>	<u>Description</u>
§ 505.11	Lack of Alternative Fuel Supply	Granted due to the unavailability of an adequate and reliable supply of an alternate fuel.
§ 505.12	Site Limitations	Granted if alternate fuels would be inaccessible, transportation facilities for alternate fuels are unavailable, the site is physically limited, disposal of waste is a problem, water is unavailable or other conditions which would preclude use of the alternate fuel.
§ 505.13	Inability to Comply with Applicable Environmental Requirements	Granted if use of an alternate fuel would result in violation of environmental laws.
§ 505.14	Future Use of Synthetic Fuels	Granted if at the expiration of the temporary exemption, the facility will use synthetic fuels.
§ 505.15	Public Interest Exemption	Granted if immediate compliance with the FUA is not possible and the proposed facility is in the public interest

PERMANENT EXEMPTIONS

§ 505.21	Lack of Alternative Fuel Supply for the First 10 Year of Useful Life	See description of § 505.11
§ 505.22	Lack of Alternative Fuel Supply at a Cost Which Substantially Exceeds the Cost of Using Imported Petroleum	This is the exemption MEC is requesting. It can be granted if the cost analysis (§ 505.5) shows that cost of installing and operating an alternate fuel system is 1.3 times that of the oil fired equivalent.

PERMANENT EXEMPTIONS (Cont'd.)

<u>Section</u>	<u>Exemptions</u>	<u>Description</u>
§ 505.23	Site Limitations	Same as §505.12 but on a permanent basis
§ 505.24	Inability to Comply with Applicable Environmental Requirements	Same as §505.13 but on a permanent basis.
§ 505.25	Inability to Obtain Adequate Capital	Granted if the proposer cannot raise additional capital required for an alternate fuel capable of installation.
§ 505.26	State or Local Requirements	Granted if State or local requirements preclude construction and operation of an alternate fuel-fired installation.
§ 505.27	Cogeneration	Granted if the oil or gas consumed by the cogeneration facility will be less than that which would otherwise be consumed in the absence of a cogeneration facility and granting the petition would be in the public interest.
§ 505.28	Permanent Exemption for Certain Fuel Mixtures Containing Natural Gas or Petroleum.	Granted if the mixture is with an alternate fuel and the petroleum or gas use will not exceed the minimum percentage of the total annual Btu heat input needed to maintain operational reliability of the installation.
§ 505.29	Emergency Purposes	Granted if the facility is needed for plant protection, preservation of human health, or continued facility production which otherwise would be reduced to an interruption of alternate fuel supplies, equipment failures, or temporary environmental restrictions.
§ 505.31	Scheduled Equipment Outages	Granted if the facility is used during scheduled equipment outages.

TABLE 3

ANNOTATED FUELS DECISION REPORT OUTLINE

Most of the Temporary and Permanent Exemptions require preparation of a "Fuels Decision Report;" the following represents the general format of such report:

- | | | |
|--|---|--|
| Chapter One - Introduction
(§502.4) | - | This chapter is intended to give the ERA a guide/overview of the proposer's existing facilities, the proposed new facility and the exemption requested. |
| Chapter Two - Fuels Considered
(§502.5) | - | If alternate fuels are to be considered, then this chapter summarizes the fuels evaluated, why they were eliminated and the ones which will be further analyzed. |
| Chapter Three - Evidence in Support
(§502.7) of the Petition | - | This is the most important chapter. It is here that all the data is presented. For a §505.22 exemption, the cost calculation information is presented. For MEC all of the alternate fuel site development plans and estimates were presented here. |
| Chapter Four - Mixtures General
(§502.8) Requirement | - | The FUA requires that MFBI's examine the possibility of burning an alternate fuel in conjunction with petroleum. The MEC petition examined the use of a coal-oil mixture. |
| Chapter Five - Petroleum and Natural
(§502.11) Gas Use | - | This chapter has little bearing on the granting of an exemption; rather, it is a means of keeping records on fuel use and for other requirements of the FUA. |
| Chapter Six - Conservation Measures
(§502.12) | - | The purpose of this chapter is to provide the ERA with sufficient information to assist ERA to identify any conservation measures which could be included in the terms and conditions of the exemption. |
| Chapter Seven - Environmental Impact
(§502.13) Analysis | - | The content of this chapter is outlined in the ERA guidelines for environmental reports. It is required so the ERA can comply with the provisions of the National Environmental Policy Act of 1969. |

lations. No precedents exist for guidance, nor are there any policies to fall back on. Each new case adds to the learning process of the staff, but in many respects, at the expense of the proposer.

When such a situation exists, the proposer must be flexible and careful to ascertain what is needed by the regulatory staff. The approach taken in the MEC case is based on a free flow of information between MEC and ERA.

The first step was taken to carefully review the FUA and the regulations, and develop a preliminary concept of what the FUA was about, the type of exemptions available and the type of information required for petitioning the ERA for those exemptions.* MEC identified three permanent exemptions that appeared applicable and a series of questions about the regulations. MEC then arranged for a "prepetition conference" with the ERA in Washington, D.C. as recommended by the regulations.

The second step in the process was to prepare for the prepetition conference and to make the most of the meeting. To do this, a "Prepetition Conference Booklet" was prepared. A description of the Minnegasco Energy Center, the existing and proposed system, and the exemptions requested were made part of the Booklet. In addition, information summarizing the MEC's position on burning oil and the availability of other fuels was also presented.

The "Booklet", 24 pages in length including photographs, was sent to the ERA for distribution and review by the appropriate staff members about

* A proposer can request more than one exemption from the FUA.

10 days before the prepetition conference. It was hoped the ERA staff would review the information and have questions ready for the meeting.

The strategy worked very well. The ERA staff (all 8 of them) was prepared to discuss the project and had made some preliminary determinations. It soon became apparent that only the 505.22 "Lack of an alternate fuel supply at a cost of using imported petroleum" exemption would be applicable. The discussion on fuels led to the identification of which fuels would be evaluated completely in the Fuels Decision Report. An outline for the Fuels Decision Report was clarified as was the type of information and the amount of detail. Finally, and perhaps most importantly, a "case manager" was assigned to MEC. A point of communication was established.

Document Preparation

The prepetition conference identified five fuels that had to be analyzed and compared to the proposed oil-fired boiler. For each of the fuels (coal, petroleum coke, coal-oil mixtures, refuse derived fuel and steam from an existing power plant) site development layouts and equipment were sized and estimated. The "Fuel Cost" exemption requires that a "Cost Analysis" be completed according to the regulation's cost analysis formula. If, and only if, the cost of installing and operating the alternative fuel boilers was 1.3 times greater than that of the proposed boiler, the exemption could be granted.

The cost analysis is the most difficult part of the Fuels Decision Report. A computer program was developed to handle the variables, includ-

TABLE 4
INFORMATION REQUIRED FOR THE
§ 505.5 COST ANALYSIS

1. Price of oil - both domestic and imported and the anticipated percentage of use.
2. The useful life of the proposed facility and alternatives
3. The taxlife for the equipment.
4. The method of depreciation.
5. The salvage value of the facility
6. The Federal Investment Tax Credit if applicable.
7. The marginal income tax rate for the proposed facility.
8. The construction schedule and annual payment percentages for all cases.
9. Capital investment for the proposed facility and alternatives based on immediate construction and for each year of delay from one to ten years.
10. Operation and maintenance costs.

TABLE 5
SUMMARY OF COST RATIOS USED
IN THE MEC PETITION

<u>Years</u>	<u>Case 1</u>	<u>Case 2</u>	<u>Case 3</u>	<u>Case 4</u>	<u>Case 5</u>
<u>No</u> <u>0 Delay</u>	<u>1.422</u>	<u>1.435</u>	<u>1.545</u>	<u>1.511</u>	<u>1.682</u>
1	1.384	1.388	1.498	1.470	1.683
2	1.393	1.396	1.498	1.470	1.628
3	1.401	1.406	1.499	1.470	1.577
4	1.409	1.414	1.500	1.471	1.530
5	1.416	1.422	1.501	1.471	1.486
6	1.423	1.429	1.501	1.471	1.445
7	1.429	1.435	1.502	1.472	1.408
8	1.435	1.441	1.502	1.472	1.372
9	1.440	1.447	1.503	1.472	1.340
10	1.445	1.452	1.503	1.473	1.309

Case No. 1 - Coal with stoker firing;

Case No. 2 - Coal with petroleum coke mixture;

Case No. 3 - Refuse derived fuel (RDF);

Case No. 4 - Coal/Oil Mixture (COM); and

Case No. 5 - Steam from a coal-fired, off-site power plant

NOTE: To obtain a permanent exemption the cost of using an alternate fuel must exceed the 1.3 ratio for 10 years. The ratios represent the oil-alternate fuel cost differentials if the project were to begin immediately or were delayed from one to ten years. Temporary exemptions consider only the first five years.

ing the continuously changing cost of fuel oil. The Fuel Decision Report had to reflect the most recent fuel costs published by the Department of Energy in the Federal Register. Table 4 summarizes some of the other variables that are part of the cost analysis.

Close scrutiny of the cost analysis equations indicates that it is extremely difficult to demonstrate that oil is more economical than the other alternatives. The projected cost differential between fuel oil and the alternatives is more significant than the capital cost differential between the proposed facility and the alternatives.

For MEC, cost ratios for each of the alternative fuels exceeded the 1.3 ratio. Coal came closest, but did not drop below the 1.3 magic number (Table 5). The apparent reason for this is the annual capacity factor of 26% for the MEC system. The capacity factor is enough to prevent the fuel cost differential from becoming the dominating factor. The modeling seems to indicate that this situation changes at about a 30% capacity factor.

The other portions, although not quite as important as the cost analysis, required proper preparation to insure the completeness of the petition and that the entire story was told. The Introduction and Fuels Chapters presented what factors were being proposed and analyzed. The Petroleum and Natural Gas Use Chapter identifies how much petroleum is projected for future use and thereby limiting future consumption to those numbers. Of course, the numbers have to agree with those used in the cost analysis. All information provided must be explained and documented. The Conservation Chapter is a means for the ERA to insure that all efforts to insure the most efficient use of the energy are being taken.

The last chapter, and in many respects the second most difficult chapter to prepare, was the Environmental Impact Assessment. The social and environmental impacts of the proposed facility were presented in accordance with the ERA guidelines. For MEC, many of the impacts are negligible since the proposed boiler will be in an existing building. No noticeable changes to the exterior environment would be noticed with the exception of the new stack. However, all the concerns listed in the ERA guidelines had to be addressed for the proposed facility and alternate fuel facilities.

The area of most concern was the impact of the proposed facility and alternatives on the local air quality. For this analysis, a computer model was run to establish the worst case ambient air quality conditions for each of the regulated pollutants for all of the alternatives. The ERA environmental staff then looks for compliance with the National and State Ambient Air Quality Standards. As noted earlier, this can be difficult in an urban area.

The preparation time for the entire Fuels Decision Report was six months. The document consists of two volumes; the first is the narrative (134 pages) and the second is the appendices (122 pages).

In addition to the primary documents, there are nearly 400 pages of forms that had to be completed as required by the regulations. All the cost analysis data was broken into a specific format and was presented for the primary facility and each alternative. The task was unusually arduous.

The ERA issued the forms in January, 1980 and soon realized their complexity. Changes are being planned and MEC may be the only proposer to use them.

CURRENT STATUS

The "Fuels Decision Report" and forms were officially submitted on April 3, 1980 and received the next day in Washington, D.C. On May 7, 1980, official acceptance of the application was issued. The ERA found the data complete and was ready to begin its evaluation for compliance with the FUA.

The evaluation process is expected to take about six months. The significant factor up to this point is that the Fuels Decision Report was accepted. The first petition submitted to the ERA in 1979 was rejected a number of times and required six prepetition conferences. At the MEC prepetition conference, the ERA indicated that most proposers were requiring about three conferences before the exemption petitions were accepted for review.

IS THERE HOPE?

In the preceding pages, two major permits required for licensing the proposed Minnegasco Energy Center boiler No. 3 are discussed. Depending on the type of facility and the location of a project, there may be more permit hurdles. However, in spite of all of this, there is hope. Through proper planning and communication with the regulatory agencies, many of the difficulties inherent in the regulatory process can be minimized. The proposer must remain flexible, patient and firm.

The Minnegasco Energy Center has yet to receive a permit for its proposed No. 3 boiler, but important strides have been made. The Minnesota Pollution Control Agency has expressed its interest in the success of the project a number of times and has conducted special evaluations to assure the licensibility of the proposal. The Economic Regulatory Administration also recognizes that district heating is an important energy alternative for cities.

The general prognosis for success is positive.