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RECENT REGULATORY EXPERIENCE OF LOW-BTU COAL GASIFICATION

Volume 1—Recommendations to Industrial Users

By
Minh-Triet Lethi
Dabney G. Hart

February 1980

Work Performed Under Contract No. AC01-79RA20201

The MITRE Corporation
Metrek Division
McLean, Virginia

U. S. DEPARTMENT OF ENERGY

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Recent Regulatory Experience of Low-Btu Coal Gasification

Volume I—Recommendations to Industrial Users

Minh-Triet Lethi
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February 1980

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ABSTRACT

The MITRE Corporation conducted a five-month study for the Office of Resource Applications in the Department of Energy on the regulatory requirements of low-Btu coal gasification. During this study, MITRE interviewed representatives of five current low-Btu coal gasification projects and regulatory agencies in five states. From these interviews, MITRE has sought the experience of current low-Btu coal gasification users in order to recommend actions to improve the regulatory process.

This report is the first of three volumes. It contains the major findings of the study and recommendations to potential industrial users of low-Btu coal gasification. Recommendations to regulatory agencies are presented in the second volume. Individual case studies are documented in the third volume.

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Executive Summary

The Department of Energy (DOE) believes that the use of low-Btu coal gasification in specific industrial applications is a viable option for reducing the use of petroleum and natural gas. The apprehension of regulatory requirements is a potential barrier to this adoption. To support DOE, MITRE conducted a five-month study to identify the regulations applicable to low-Btu coal gasification, to determine the regulatory experience to date of low-Btu coal gasification users, and to develop recommendations for improvements in the regulatory process on the basis of lessons learned.

Case studies were conducted by MITRE on five projects* in Minnesota, Kentucky, and Pennsylvania. In addition, the states of Indiana and Texas were included in the study because of their abundant coal reserves and potential for coal gasification.

*These projects are: The University of Minnesota, Duluth, Minnesota; Pike County Industrial Development Corporation, Pikesville, Kentucky; CAN DO, Inc., Hazleton, Pennsylvania; Glen Gery Corporation, York, Pennsylvania; a manufacturing company in Pennsylvania (the company wishes its name to be temporarily withheld during the gasifier start-up phase).

Interviews were conducted with project representatives and with staff of Federal and state regulatory agencies. County agencies were not interviewed because they were not involved in regulating the projects in this study.

This report is prepared by The MITRE Corporation for the Office of Resource Applications (RA) in the Department of Energy, to present the study results. This volume is a guide to regulatory compliance for industrial users of low-Btu coal gasification technology. A second volume contains recommendations to regulatory agencies for actions to improve the regulatory process;* Volume III presents information obtained on the supporting case studies.**

Recommendations to industrial users are based on the lessons learned from the case studies, and are of a practical nature and specific to selected major regulations.

Low-Btu coal gasification is subject to many regulations (see Table 4-1 for the list of Federal regulations). Among these, environmental regulations cause the greatest concern to current users.

*MTR 79W00376, "Recent Regulatory Experience of Low-Btu Coal Gasification - Recommendations to Regulatory Agencies," MITRE Corporation, February 1980.

**MTR 80W00018, "Recent Regulatory Experience of Low-Btu Coal Gasification - Supporting Case Studies," MITRE Corporation, February 1980.

Occupational safety and health regulations are the next most significant area of regulatory requirements.

Although all the projects included in this study produce low-Btu coal gas, the recommendations could apply equally well to medium-Btu coal gasification. With medium-Btu coal gasification, the user would have to meet additional regulatory requirements due to the handling and/or on-site production of oxygen. However, precedents for oxygen are abundant. The regulations and the basic approach to regulatory compliance for operation with medium-Btu gas should therefore essentially remain the same as for low-Btu coal gasification.

Following the decision to adopt low-Btu coal gasification for its operation, and prior to any detailed design of the gasification plant, the user is urged to conduct a preliminary analysis to assess the regulatory requirements. This preliminary analysis could influence the siting and design decisions. (Table 3-1, Section 3.0, shows the steps in the analysis.) In addition, taking the following actions could save much time, costs and complications in regulatory compliance:

- Establish communication with regulatory agencies as soon as project planning begins
- Approach the regulatory agencies with a supportive, maximum compliance attitude.

- If the company does not have the expertise, obtain this expertise from a source that knows the technology and its specific application to this operation.
- Similarly, retain the necessary expertise in regulations, regulatory structure, and acceptance attitude at the Federal, state and local levels.

Section 4.0 discusses the major environmental legislation currently implemented by the states. Compliance with requirements of environmental regulations will probably be the most costly and time consuming. Therefore, it is essential to plan early for environmental regulatory compliance and to include the time and cost for this compliance in project scheduling and budgeting.

The major environmental regulations concern air emissions, water discharges and solid waste disposal. The significant element of the 1977 amendments to the Clean Air Act which affects low-Btu coal gasification is the program for prevention of significant deterioration (PSD). The National Emission Standards for Hazardous Air Pollutants (NESHAPs) and the New Source Performance Standards (NSPS) are also part of the above amendments. However, they do not affect low-Btu coal gasification now. New NSPS are expected to be promulgated in 1980 for low-Btu coal gasification.

The requirement for National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act of 1977 most directly affects low-Btu coal gasification. New effluents guidelines for gasification facilities are expected to be defined by the Environmental Protection Agency in 1980.

The major legislation concerning solid waste disposal is the Resource Conservation and Recovery Act (RCRA). Regulations for implementation of RCRA are only now being prepared and low-Btu coal gasification has not been included under these regulations.

Finally, the National Environmental Policy Act (NEPA) may affect significantly a low-Btu coal gasification project through its requirements for Environmental Impact Statements for some projects.

Enforcement of air, water and solid waste standards varies by states. However, the review process is relatively uniform and therefore, some compliance actions apply to all states. These are summarized in Figures 4-1, 4-2, and 4-3.

New environmental regulations expected in 1980 which may affect low-Btu coal gasification concern the definition of hazardous wastes by the Environmental Protection Agency, the setting of air quality

New Source Performance Standards for coal gasification facilities and for liquid effluents from these facilities.

Standards for occupational safety and health for general industry now apply to low-Btu coal gasification. Two criteria documents recently published by the National Institute of Occupational Safety and Health may influence the Occupational Safety and Health Administration to adopt standards specific to coal gasification (see Section 5.0).

Finally, the strategy for regulatory compliance is influenced by many factors, some of which relate to the characteristics of the chosen coal gasification process, others are related to the regulatory structure. Among the process factors are the feedstock, product gas and potential pollutants. In the regulatory structure, the major factors are the pattern of delegation of authority, the experience, and the approaches to compliance/enforcement of those involved in the regulatory process. Knowledge of these factors and their influence on the regulatory process improves the chance of success of a project from a regulatory viewpoint.

Table 1 summarizes the current and anticipated regulations which may affect low-Btu coal gasification, and their effects on a low-Btu coal gasification project. The siting decision is a very significant

TABLE 1

EXISTING AND ANTICIPATED REGULATIONS AND EFFECTS ON LOW-BTU COAL GASIFICATION PROJECTS

EXISTING REGULATIONS	EFFECTS ON LOW-BTU COAL GASIFICATION PROJECT							
	Siting Decision	Retrofit vs. New Construction	Planning of Coal Transportation	Design of Coal Handling and Storage	Design of Coal Gasification System	Design of Air Pollution Control	Design of Water Pollution Control	Design of Solid Waste Disposal
National Environmental Policy Act of 1969	✓							
Non Nuclear Energy Research and Development Act of 1974							✓	
Clean Air Act Amendments of 1970 and 1977	✓	✓	✓	✓	✓	✓		
Federal Water Pollution Control Act of 1972 as Amended by Clean Water Act of 1977	✓	✓		✓	✓		✓	
Resource Conservation and Recovery Act of 1976	✓							✓
Toxic Substances Control Act of 1976							✓	✓
Safe Drinking Water Act of 1974					✓			
Coastal Zone Management Act of 1972 as Amended	✓							
Marine Protection, Research and Sanctuaries Act of 1972	✓							
Rivers and Harbors Act of 1899	✓						✓	
National Historic Preservation Act of 1966	✓							
Endangered Species Act of 1973, as Amended	✓							
Fish and Wildlife Coordination Act of 1958, as Amended	✓						✓	
Wild and Scenic Rivers Act of 1968	✓						✓	
Airport and Airways Development Act of 1970	✓							
Noise Control Act of 1972			✓		✓			
Occupational Safety and Health Act of 1970			✓	✓	✓			
ANTICIPATED REGULATIONS								
Hazardous Waste Definition by EPA (1980)*								✓
New Source Performance Standards for Coal Gasification (1980)*	✓		✓			May apply retroactively to existing plants Apply only to new sources		
Liquid Effluent Guidelines (1980)*					May apply retroactively to all sources		✓	
Occupational Safety and Health Standards for Coal Gasification (undetermined)			May apply retroactively to all sources	✓	✓			

*Anticipated year of regulation promulgation.

✓Major area of impact.

one because it is affected by the largest number of regulations. Of the anticipated regulations, those that may apply retroactively (identified in Table 1) present the greatest potential problems for low-Btu coal gasification projects.

Regulatory requirements, though a definite added burden, are not insurmountable and have not discouraged the projects in this study from using low-Btu coal gasification. In the judgment of the current users, the increased uncertainty as to supply and costs of oil and natural gas far outweighs the regulatory requirements of low-Btu coal gasification.

1.0 Purpose of Report

This report is a guide to regulatory compliance for industrial users of low-Btu coal gasification technology. It is designed to help the project manager avoid regulatory delays and complications.

The regulatory scene continues to change rapidly as responsibilities for enforcement are transferred from one state agency to another, and as standards are added, modified, abolished. This report is designed to survive minor changes on the regulatory scene. This report addresses the major legislation which will continue to be preserved even if the details of implementation change. The report also identifies for the industrial manager

factors that should be taken into account in planning a low-Btu coal gasification project. An early awareness of these factors contributes much to a smooth regulatory process.

Although all of the cases studied use low-Btu gas, the recommendations should apply equally to medium-Btu projects. In the industrial use of medium-Btu coal gasification, additional constraints might be related to the probable increased plant capacity and to the use and/or on-site production of oxygen. However, the environmental/safety regulations and the basic approach to the regulatory process would remain.

2.0 Background and Content

2.1 BACKGROUND

The recommendations contained in this report are based on results of a five-month study conducted by MITRE. The objectives of the study are:

1. To identify the regulatory requirements applicable to low-Btu coal gasification.
2. To recommend to future users of the technology as well as to regulatory agencies actions to facilitate the regulatory process.

MITRE sought the experience of five current developers of low-Btu coal gasification:

- University of Minnesota, Duluth Campus
- Pike County Industrial Development Corporation; Pikesville, Kentucky

- CAN DO, Inc.; Hazleton, Pennsylvania
- Glen-Gery Corporation; York, Pennsylvania
- A manufacturing company in Pennsylvania

For each case, MITRE interviewed the project managers, their consulting architect and engineering (A&E) firms (when these have actively assisted the project in complying with regulations), and the regulatory agencies with whom the project staff and/or A&E firms dealt. MITRE also interviewed regulatory agencies in Texas and Indiana to determine the regulatory requirements applicable to low-Btu coal gasification in these states. They were selected by the Office of Resource Applications because of their abundant coal reserves and/or because of an indication of high industry interest in coal gasification. Since no low-Btu coal gasification project currently operates in Indiana and Texas, MITRE developed hypothetical cases to serve as a base for discussion with the regulatory agencies.

Results of each of the case studies are documented in detail in Volume III of this report.* Appendix A summarizes the project descriptions. The recommendations in this report are based on an analysis of the reported experience of the users as well as of the regulatory agencies and of their recommendations.

*MTR 80W00018, "Recent Regulatory Experience of Low-Btu Coal Gasification-Supporting Case Studies," MITRE Corporation, February 1980.

2.2 CONTENT

Section 3.0 of this report contains a preliminary analysis recommended before the detailed design of a gasification plant. Interviews with current users of low-Btu coal gasification indicate that environmental regulations cause the greatest concern. Next come the occupational safety and health regulations. These two types of regulations have been covered in Sections 4.0 and 5.0. Regulations outside the environmental and occupational health and safety domains are discussed in Section 6.0. These did not have an impact on the cases which MITRE included in the study. However, they are identified for purpose of completeness.

The reader is urged to contact the current users of low/medium-Btu coal gasification, listed in Appendix B, to obtain information on their regulatory experience.

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3.0 Preliminary Analysis of Regulatory Conditions

A preliminary analysis of regulatory conditions should precede the detailed examination of specific regulations and should be among the very first actions taken by an industrial manager once he has decided to consider low-Btu coal gasification for his operations. Table 3-1 shows the sequence of question-answer-decision that represents the preliminary analysis of regulatory conditions. The steps in this sequence are discussed in greater detail in this section. The questions asked in this analysis, and their answers, give the industrial manager initial directions for plant siting and design.

Of course, the questions and decisions discussed below only take into account regulatory requirements, which are the subject of this study. Economic and other constraints may still cause the manager to

TABLE 3-1

STEPS IN PRELIMINARY ANALYSIS OF REGULATORY CONDITIONS

QUESTION	ANSWER	DECISION
1. Will the low-Btu coal gasification facility be ADDED TO AN EXISTING PLANT or will it be a NEW PLANT?	☐ Added to an existing plant ☒ Whole new plant	Design to take greatest benefit of existing permits. Get ready to seek all new permits
2. If the project is new, is it already COMMITTED TO A SITE?	☒ Yes ☐ No	Design to meet Federal, State and local requirements. Take regulatory requirements into account in site selection.
3. Has the AUTHORITY FOR ENVIRONMENTAL PROGRAM ENFORCEMENT BEEN DELEGATED TO THE STATE where the project is located?	☐ Yes ☒ No	Obtain confirmation. Deal with State agencies. Deal with State and Federal agencies
4. Has the STATE of location DELEGATED THE AUTHORITY TO THE COUNTY of location?	☐ Yes ☒ No	Deal with County Deal with County and State
5. Does the STATE of location FAVOR THE USE OF COAL AND INDUSTRIAL DEVELOPMENT?	☐ Yes ☒ No	Establish early contact with State regulatory agencies. Design for maximum compliance Consider changing location or Design for maximum compliance.
6. Does the COUNTY/COMMUNITY of location FAVOR THE USE OF COAL AND INDUSTRIAL DEVELOPMENT?	☐ Yes ☒ No	Establish early contact with regulatory agency and community. Design for maximum compliance. Consider changing location, or Design for maximum compliance. Establish immediate contact with County/Community
7. Is REGULATORY AGENCY KNOWLEDGEABLE about the low Btu coal gasification technology and its use in this operation? (This question should be asked for each regulatory agency)	☐ Yes ☒ No	Provide sufficient and accurate information Make sure project manager or A&E consulting firm has sufficient knowledge to assist regulators in understanding the application of low-Btu coal gasification

✓ Mark the path with greatest potential for delay and complications

make less favorable choices from the viewpoint of regulatory requirements. If that were the case, this analysis would help the manager be aware of the extra efforts and costs he may have to incur in order to comply with regulations.

The importance of this preliminary analysis cannot be over-emphasized. Failure to consider any element of this analysis can result in extra costs, or extra delays, as will be discussed below. The path marked with checks on Table 3-1 is the "worst case" because of its potential for delays and complications.

3.1 ADDITION TO EXISTING PLANT VS. NEW PLANT

If the manager has a choice as to where the low-Btu coal gasifier is to be installed, the preferable one would be to place it where facilities already exist for coal handling and waste disposal. This assumes that these existing facilities have received the proper permits. The manager should plan for the gasifier to share the use of the existing facilities because this will require only modification of the existing permits, a process that is less time consuming than obtaining new permits. Among our case studies, the York Division of the Glen-Gery Corporation in York, Pennsylvania, had to meet the least requirements: The company did not have to obtain any new permit because the gasifier was added to an existing plant that

had been operating on the same site for a long time. The manufacturing company in Pennsylvania already held a National Pollutant Discharge Elimination System (NPDES) permit for water discharge at the plant site where the coal gasifier was introduced. Thus, it only needed a modification to its NPDES permit and the time required to obtain this modification was insignificant.

3.2 COMMITMENT TO A SITE

If reasons other than regulatory requirements cause the manager to be committed to a site, then there is no flexibility, and the gasification operation must be designed to meet Federal, state and local regulations within the constraints of this site. If the flexibility does exist, however, the manager should take into account regulatory requirements in the choice of a site.

As an example, the Pike County Industrial Development Corporation did not have a choice as to site location because of the limited availability of flat terrain for development. As a result, it must operate its boiler at half capacity in order to comply with air quality standards. The plant is located in a geographical depression, which causes a restriction in SO₂ emissions when operating the boilers on hot raw gas from the gasifier.

3.3 DELEGATION OF AUTHORITY

This question is particularly relevant to environmental regulations. The Environmental Protection Agency (EPA) may delegate the authority for enforcement of air and water quality standards to State agencies. These, in turn, may delegate further the authority to county agencies.

The case studies confirm expectations: the required time and paperwork, and risk of complications, are much smaller when the state agencies have been delegated the enforcement authority (as in Pennsylvania and Minnesota). The company, in this case, only deals with state agencies and not with Federal agencies.

This delegation of authority may not always be clear, as evidenced by the uncertainty in the case of CAN DO, Inc. where the Federal EPA seemed to indicate that it should be involved even though Pennsylvania has been delegated the authority for enforcement of the air and water quality programs. Thus, the project manager should ensure that the delegation is understood and observed by all involved (Federal and/or state authorities). It would be prudent for the manager to obtain a written statement delineating these responsibilities in order to avoid subsequent surprises. As soon as the contract was signed for the low-Btu coal gasification project, the consulting firm to the manufacturing company in Pennsylvania held a meeting

with the EPA regional office and the Pennsylvania Department of Environmental Resources (DER) to define their respective responsibilities. The consulting firm also obtained from the EPA regional office a written statement that all environmental permits will be handled by the state DER.

3.4 ACCEPTANCE BY STATE AND COMMUNITY

The projects examined in this study were all well accepted by the state and the community and consequently, experienced no delays due to lengthy public hearings or opposition. On the other hand, the case of Irvine Industrial Development, Inc. in Georgetown, KY is an illustration of the insurmountable obstacle presented to a low-Btu coal gasification project by community resistance to industrial development.

The attitude of the state toward the use of coal or toward industrial development will have much influence on the willingness of state regulatory agencies to work with the company toward regulatory compliance. Therefore, the company should have an accurate understanding of this acceptance factor in making its siting decision.

3.5 FAMILIARITY OF REGULATORY AGENCIES WITH TECHNOLOGY

If the regulatory agency is familiar with the technology, it will be able to determine which regulations apply to the proposed project and what information it needs from the permit applicant. When this familiarity is lacking at the agency, the permit applicant with adequate knowledge of the technology it proposes to use can help the agency learn more quickly than if it were left to itself. The projects examined in this study were among the first low-Btu coal gasification projects in their states. With only one exception, the project staff, or their consultants, were knowledgeable of the technology and helped the state regulatory agencies better understand the application of low-Btu coal gasification to their operations. These project representatives and the agencies with whom they dealt were satisfied with their regulatory experience. The exception is the Pike County case, where the county lacked technical expertise, and complications resulted from incomplete information initially submitted to the regulatory agencies.

3.6 PRACTICAL RECOMMENDATIONS

The above discussion leads to practical recommendations for simple actions which a project manager should take to save time, costs, and aggravation in regulatory compliance. These actions are summarized in Table 3-2.

TABLE 3-2
RECOMMENDED ACTIONS

- ESTABLISH COMMUNICATION WITH REGULATORY AGENCIES AS SOON AS PLANNING BEGINS FOR THE PROJECT.
- APPROACH THE REGULATORY AGENCIES WITH A SUPPORTIVE, MAXIMUM COMPLIANCE ATTITUDE.
- IF THE COMPANY DOES NOT HAVE THE EXPERTISE, RETAIN THIS EXPERTISE FROM A SOURCE THAT KNOWS THE TECHNOLOGY AND ITS SPECIFIC APPLICATION TO THIS OPERATION.
- SIMILARLY, RETAIN THE NECESSARY EXPERTISE THAT KNOWS THE REGULATIONS, REGULATORY STRUCTURE, AND ACCEPTANCE ATTITUDE AT THE FEDERAL, STATE AND LOCAL LEVELS.

The projects interviewed in the study attributed their successful regulatory experience to their early communication with regulatory agencies. The project staff met with the regulators early in the planning stage and sought their opinion. This opinion provided direction to the engineering design. Early communication also fostered a collaborative approach to the regulatory process.

When the company lacks expertise in either the technology or regulatory matters, it should seek support from a competent source. The savings in time and costs due to regulatory complications justify well the costs of this outside support. A source with experience in this area should be able to provide all the necessary explanation to

the regulatory agencies about the company's application of low-Btu coal gasification. Such a source would also have a ready and up-to-date knowledge of which regulatory agencies have jurisdiction over the project and which regulations apply. Particularly, such a source would have established contact with the state and local governments and the community and would be able to sense the trends and moods in that state and community.

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4.0 Requirements of Environmental Laws and Regulations

The regulations to which a low-Btu coal gasification project may be subject are listed in Table 4-1. Among these, environmental regulations cause the greatest concern to users interviewed by MITRE. This Section discusses the major environmental legislation and regulations and identifies compliance actions to be taken by an industrial manager who plans to use this technology.

4.1 MAJOR FEDERAL ENVIRONMENTAL REGULATIONS

In the past few years, regulations have undergone many changes. These changes affect the requirements with which facilities must comply in order to obtain permits and to operate. The requirements have become more stringent concerning emissions of pollutants into the

TABLE 4-1
FEDERAL REGULATIONS THAT MAY
AFFECT LOW-BTU COAL GASIFICATION PROJECTS

- NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
- NON-NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 1974
- CLEAN AIR ACT AMENDMENTS OF 1970 AND 1977
- FEDERAL WATER POLLUTION CONTROL ACT OF 1972, AS AMENDED BY CLEAN WATER ACT OF 1977
- RESOURCE CONSERVATION AND RECOVERY ACT OF 1976
- TOXIC SUBSTANCES CONTROL ACT OF 1976
- SAFE DRINKING WATER ACT OF 1974
- COASTAL ZONE MANAGEMENT ACT OF 1972, AS AMENDED
- MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT OF 1972
- RIVERS AND HARBORS ACT OF 1899
- NATIONAL HISTORIC PRESERVATION ACT OF 1966
- ENDANGERED SPECIES ACT OF 1973, AS AMENDED
- FISH AND WILDLIFE COORDINATION ACT OF 1958, AS AMENDED
- WILD AND SCENIC RIVERS ACT OF 1968
- AIRPORT AND AIRWAYS DEVELOPMENT ACT OF 1970
- NOISE CONTROL ACT OF 1972
- OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

environment. Specific requirements for the areas of air, water, and solid waste are discussed below.

AIR QUALITY LEGISLATION

Air quality legislation affects coal transportation and handling activities as well as coal gasification activities.

The first Federal legislation concerned exclusively with air pollution was enacted in 1955. Since that time, amendments have increasingly strengthened the Federal role in controlling air pollution. Much of the present regulatory setting can be traced to the Clean Air Act Amendments of 1970 (CAA, Public Law 91-604), which required the Environmental Protection Agency to establish national ambient air quality standards (NAAQS) as well as national emission standards for significant new pollution sources and for all facilities emitting hazardous substances. It also established the State Implementation Plans (SIPs) under which the states set emission standards for existing sources in order to achieve the national air quality standards.

NAAQS for particulate matter, sulfur oxides, carbon monoxide, photochemical oxidants, hydrocarbons, and nitrogen oxides were promulgated by EPA, as required in the Act. (Lead was added in 1978.) The primary standards are set at a level to protect public health, and the secondary standards to protect welfare.

In 1977, the Clean Air Act was again amended (PL 95-95), primarily modifying existing programs rather than setting new directions. The significant elements of the Clean Air Act Amendments are listed in Table 4-2 and explained below.

TABLE 4-2
REQUIREMENTS OF CLEAN AIR ACT AMENDMENTS OF 1977
(PL 95-95)

- NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) (109)*
- STATE IMPLEMENTATION PLANS (SIPS) (110)
- NEW SOURCE PERFORMANCE STANDARDS (NSPS) (111)
- NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS) (112)
- EMISSION STANDARDS FOR NEW MOTOR VEHICLES OR MOTOR VEHICLE ENGINES (202)

* Numbers in parentheses refer to Sections of the Act.

The 1977 amendments established a program for prevention of significant deterioration (PSD). IN CLEAN AIR AREAS, THE PSD PROGRAM REQUIRES PRECONSTRUCTION APPROVAL OF NEW PLANTS WITH SIGNIFICANT EMISSIONS. A plant may be subject to PSD if potential emissions of

any regulated pollutant exceed 100 tons per year for plants within 28 specified industrial categories, or if potential emissions exceed 250 tons per year for any other plant.

IN AREAS THAT HAVE NOT MET THE NAAQS (I.E., NONATTAINMENT AREAS) THE OFFSET POLICY APPLIES. Construction of new sources will be allowed only if stringent emissions controls are set. More than equivalent offsetting emission reductions must be obtained from other sources to ensure progress toward achievement of the ambient standards. Provisions of the Act allow variances for technological innovations.

To attain the NAAQS, state agencies also are directed by the CAA to develop state implementation plans (SIP's) setting forth all the necessary emission control efforts to achieve compliance with the standards. Under the 1977 Amendments, a complete revision of the SIPs must be completed by July 1, 1979, in all areas where air quality standards have not been attained.

Authority for implementing the PSD program may be delegated by EPA to the states. As of January 1980, four states have been fully delegated this authority: Georgia, South Carolina, Michigan, and Minnesota. Four other states have received partial delegation:

North Carolina, Kentucky, Tennessee, and Alabama. The list of states with delegated authority may change over time, because the delegation is either withdrawn by EPA or given up by the state.

The CAA also requires that Best Available Control Technology (BACT) be used for the control of emissions in areas of the country now cleaner than the air quality standards, and Lowest Achievable Emission Rates (LAER) be used in areas that continue to violate the air quality standards.

The National Emission Standards for Hazardous Air Pollutants (NESHAPs), New Source Performance Standards (NSPS), and emission standards for new motor vehicles limit the amounts of pollutants that may be emitted by specified sources. NESHAPs apply to all plants, new or old, that emit hazardous pollutants (now including asbestos, beryllium, mercury, and vinyl chloride). NSPS apply only to new plants and have been issued for 27 basic industrial categories, including steam generators, several categories of smelting, and petroleum refining and storage. NESHAPS DO NOT APPLY TO LOW-BTU COAL GASIFICATION NOW BECAUSE POLLUTANTS FROM THIS TECHNOLOGY HAVE NOT BEEN CLASSIFIED AS HAZARDOUS. THERE ARE CURRENTLY NO NSPS FOR LOW-BTU COAL GASIFICATION. HOWEVER, SUCH STANDARDS ARE LIKELY TO BE PROMULGATED IN 1980. It is reasonable to assume that the future NSPS for low-Btu coal gasification will parallel those now existing for electric utilities.

WATER QUALITY LEGISLATION

Water quality legislation affects coal handling and storage activities (prevention of runoff), coal gasification activities (control of wastes discharges), and waste disposal (prevention of leaching).

The first major Act applying to water was the Rivers and Harbors Act of 1899, also known as the Refuse Act, which prevented discharges into navigable rivers and harbors. The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) increased the Federal responsibilities for water quality, while still preserving the states' administrative and implementation responsibilities. The basic regulatory requirement of PL 92-500 was that point source discharges--industries, municipal treatment plants, feedlots, and other discrete sources--must obtain a permit specifying allowable amounts and constituents of effluent and a schedule for achieving compliance. The Act marked a change from standards of ambient quality to effluent limits as the basis for achievement of water quality.

The Clean Water Act of 1977 (CWA, PL 95-217) modified the clean-up deadlines of the 1972 Act, created several new categories of pollutants, and established a new technology-based standard for "conventional" pollutants (Biological Oxygen Demand, suspended solids, fecal

coliform, and pH). For these pollutants, the CWA requires "best conventional pollutant control technology" to be used by July 1, 1984. Dischargers must control toxic pollutants, including those on a list of 65 toxic pollutants identified in a consent decree, through the application of "best available technology economically achievable" (BAT) by July 1, 1984. Pollutants that are neither toxic nor conventional are called nonconventional, and EPA will issue effluent guidelines for them to be met by July 1, 1987. The CWA also authorizes additional regulations to require best management practices (BMP) to reduce runoff from plant operations.

Table 4-3 shows the significant requirements of the Clean Water Act of 1977.

TABLE 4-3
REQUIREMENTS OF CLEAN WATER ACT OF 1977 (PL 95-217)

- NEW SOURCE PERFORMANCE STANDARDS (NSPS)[306(B)(1)] *
- NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) [301(B)(2)]
- COMBINATION OF TECHNOLOGY STANDARDS (E.G. BEST PRACTICAL CONTROL TECHNOLOGY [301(A)(1)(A)], EFFLUENT LIMITATIONS (308), STATE WATER QUALITY STANDARDS (303), AND TOXIC EFFLUENT STANDARDS [307(A)]

* Numbers in parentheses refer to Sections of the Act

Regulating point sources under the CWA is under both Federal and state jurisdiction. States with qualified programs can take over the permit program of the National Pollutant Discharge Elimination System (NPDES), as 32 states and territories have done. (See Table 4-4). New Source Performance Standards (NSPS) have been issued for 31 industrial categories defining the level of pollution control required for new plants. These effluent standards require that the greatest degree of effluent reduction achievable through use of the best available demonstrated control technology be used. The NSPS are applied to individual plants through issuance of NPDES permits.

LOW-BTU COAL GASIFICATION IS SUBJECT TO NPDES. The Effluent Guidelines Division of EPA's Office of Water Planning and Standards currently plans to initiate the development of standards for liquid effluents from gasification facilities during FY 1980.*

EPA may grant waivers of best available control technology for nonconventional pollutants, but not for conventional or toxic ones. Industry must show that (1) best practicable control technology will be met; (2) the waiver will not result in any additional requirements on any other point or nonpoint source; and (3) the waiver will not interfere with the attainment or maintenance of water quality as set out in the objectives of the Act.

*Communications with Chief, Energy and Planning Branch, Office of Water Planning and Standards, U.S. EPA, June 6, 1979.

TABLE 4-4

**STATES THAT HAVE ASSUMED RESPONSIBILITY
FOR NPDES PERMITS (AS OF NOVEMBER 1979)**

CALIFORNIA	NEBRASKA
COLORADO	NEVADA
CONNECTICUT	NEW YORK
DELAWARE	NORTH CAROLINA
GEORGIA	NORTH DAKOTA
HAWAII	OHIO
ILLINOIS	OREGON
INDIANA	PENNSYLVANIA
IOWA	SOUTH CAROLINA
KANSAS	TENNESSEE
MARYLAND	VERMONT
MICHIGAN	VIRGIN ISLANDS
MINNESOTA	VIRGINIA
MISSISSIPPI	WASHINGTON
MISSOURI	WISCONSIN
MONTANA	WYOMING

SOLID WASTE LEGISLATION

Primary responsibility for solid waste disposal has traditionally been vested in local authorities.

The role of the Federal government was increased in 1976 when the Resource Conservation and Recovery Act (RCRA, PL 94-580) was passed. This Act promotes resource recovery and conservation and mandates Federal government control of hazardous waste from its generation to final disposal through a system of manifests. The major requirements of RCRA are shown in Table 4-5.

TABLE 4-5
REQUIREMENTS OF RESOURCE CONSERVATION AND RECOVERY ACT
OF 1976 (PL 94-580)

- STATE PLANS FOR DISPOSAL OF NONHAZARDOUS WASTES (4006)*
- MANIFEST SYSTEM THROUGH WHICH EVERY LOAD OF HAZARDOUS WASTE MATERIAL CAN BE TRACKED FROM GENERATION TO ULTIMATE DISPOSAL [3002(5)]
- PERMIT PROGRAM TO COVER EVERY HAZARDOUS WASTE DISPOSAL SITE (3005)

* Numbers in parentheses refer to Sections of the Act

RCRA requires a Federal and state regulatory, inspection, and enforcement program in every state. The Act calls for the identification and listing of hazardous wastes and for the setting of standards that will be applicable to generators and transporters of

hazardous wastes. The legislation takes a tracking approach that is concerned with the path of the waste. Resource recovery and waste reduction are indirectly affected since inexpensive disposal options will no longer be available. Federal assistance is an incentive for the states to adopt adequate programs. If a state fails to enact a program, the law empowers EPA to promulgate one. REGULATIONS FOR THE IMPLEMENTATION OF THE RCRA ARE NOW BEING PREPARED, THUS EXPERIENCE WITH THE ACT IS LIMITED. LOW-BTU COAL GASIFICATION HAS NOT BEEN SUBJECT TO RCRA.

NATIONAL ENVIRONMENTAL POLICY ACT

The Environmental Impact Statement (EIS) as set forth in the National Environmental Policy Act of 1969 (NEPA, PL 91-190) is a relevant requirement for low-Btu coal gasification. NEPA requires that all Federal agencies prepare an EIS on any proposal for legislation of other Federal action significantly affecting the quality of the human environment. Actions coming under this provision include the issuance of Federal licenses or permits to private parties or cases in which there is Federal funding. Each Federal agency is required to have guidelines detailing the circumstances under which an EIS must be prepared, based on its own mission and operating policies.

In addition to the need for an EIS for major Federal actions, a state EIS may be required also. The state EIS may be required when a state permit or approval is needed for a project, in the same manner as a Federal EIS is triggered. State EIS regulations differ as to the circumstances under which an EIS is required, but states that require EIS are likely to have stricter environmental regulations than states that do not. A list of states having EIS requirements is given in Table 4-6. Although none of the projects interviewed in this study had to prepare an EIS, three (University of Minnesota, CAN DO and Pike County) prepared environmental assessments, a less detailed form of analysis.

TABLE 4-6
STATES THAT HAVE ENVIRONMENTAL IMPACT STATEMENT REQUIREMENTS
(AS OF NOVEMBER 1979)

CALIFORNIA	NEW JERSEY
CONNECTICUT	NEW YORK
HAWAII	NORTH CAROLINA
INDIANA	SOUTH DAKOTA
MARYLAND	TEXAS
MASSACHUSETTS	UTAH
MICHIGAN	VIRGINIA
MINNESOTA	WASHINGTON
MONTANA	WISCONSIN

4.2 SEQUENCE IN COMPLIANCE ACTIONS

The implications of Subsection 4.1 above in terms of compliance actions that must be taken by the industrial manager are summarized in Figure 4-1. Figure 4-2 shows the sequence of actions for compliance with air quality regulations and Figure 4-3 for compliance with water quality regulations. While details may vary from state to state, Figures 4-2 and 4-3 show the major actions that are most likely to be required in all states.

Attention should be given to early identification of information required by the regulatory agency from the permit applicant. Data collection to meet these requirements may be time consuming and cause project delay if not properly planned for. In particular, if the company is required to provide one year of air quality monitoring data for its PSD permit, this data collection can be also expensive. In this case, the industrial manager should find out whether such data already have been collected by a source acceptable to the regulatory agency, such as by a neighboring weather station.

FIGURE 4-1
OVERVIEW OF ENVIRONMENTAL PERMIT COMPLIANCE PROCESS

FIGURE 4-2
COMPLIANCE PROCESS FOR AIR QUALITY PERMITS

FIGURE 4-3
COMPLIANCE PROCESS FOR WATER QUALITY PERMITS

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5.0 Occupational Safety and Health Administration (OSHA) Regulations

The Occupational Safety and Health Administration Act was promulgated in 1970 and states have been implementing the Act since 1973. Enforcement is through inspections of the work environment by state officials. Neither Federal nor state OSHA officials are involved in issuing preconstruction permits or licenses. Although OSHA regulations will not delay project start-up, violation of these regulations, if detected, can cause operations to be interrupted until the violation is corrected.

There are no current OSHA standards specific to coal gasification. Coal gasification facilities in all states are subject to General Industry Safety Standards (29 CFR 1910) that encompass:

- General industry safety standards

- General industry noise standards
- General industry toxic and hazardous substance exposure limits for: sulfur dioxide, carbon monoxide, hydrogen sulfide, benzene, toluene and ammonia.

A second body of regulations, Construction Industry Standards (29 CFR 1926), apply during the construction phase of the project. As applied to coal gasifiers, these standards dictate the use of:

- Carbon monoxide (CO) sensors, connected to an automatic shut-off, or automatic warning systems
- Respiratory equipment to protect workers against exposure to hydrogen sulfide (H₂S) and CO during emergencies
- Evacuation procedures to allow for rapid evacuation of contaminated areas during accidental releases
- Guard railings

Other areas of OSHA compliance that deserve particular attention in the case of low-Btu coal gasifiers include:

- Environmental control systems for air circulation: OSHA inspectors are sensitive to the potential for contamination of air brought into the workplace. For a coal gasification system, this means that the process equipment must not leak.

- Workers' exposure to high temperatures and fugitive emissions during manual poking operations
- Workers' exposure to gasifier by-product oil, a known carcinogen
- The noise level in the gasifier building.

Although OSHA officials do not approve or give advice on engineering design or construction plans, the company should consult OSHA if there is any question in interpreting the regulations.

Under OSHA's General Recordkeeping and Reporting Requirements (29 CFR 1910), operation of a coal gasifier will require the submission of an "annual log" and an "annual summary" of operations. In addition, the industrial user may be required to keep medical records on those employees who operate and maintain the gasifier.

While OSHA has not issued standards specific to coal gasification systems, two recent "criteria documents" developed by the National Institute of Occupational Safety and Health do indicate the likely direction of future standards development. They are: "Recommended Health and Safety Guidelines for Coal Gasification Pilot Plants," USDHEW 78-120, and "Criteria for a Recommended Standard," USDHEW 78-191. Both are available from the Government Printing Office, Washington, D.C.

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6.0 Other Regulatory Requirements

There are additional regulatory requirements to those discussed in the previous sections. These requirements are of lesser concern to the project managers interviewed either because they have not had to deal with them (e.g. Corps of Engineers permits) or because they are sufficiently familiar with them and feel less uncertain about them. These requirements are no less significant than those previously discussed in their potential for delaying projects, and deserve the industrial manager's attention.

6.1 U.S. CORPS OF ENGINEERS

Under the Rivers and Harbors Act of 1899, the Corps of Engineers (COE) of the U. S. Army is responsible for dredge and fill permits for all navigable waters of the United States. In many cases this permit is necessary for a new facility to build a dock, enlarge a channel to allow passage of boats, or any other action in a navigable body of water. The definition of "navigable waters" has been expanded from its original application to bodies of water that could float a ship to include all types of wetlands, streams, and floodplains. THE PROJECT MANAGER IS ADVISED TO OBTAIN THE MOST CURRENT DEFINITION OF "NAVIGABLE WATERS" (I.E. WHICH STREAMS, OR BODIES OF WATER ARE INCLUDED?) IN THE COMMUNITY WHERE THE PROJECT IS LOCATED.

6.2 COASTAL ZONE MANAGEMENT ACT

The Coastal Zone Management Act (CZMA, PL 92-583) attempts to stimulate land use planning and controls in the coastal states, including the Great Lakes states. The Act provides Federal grants as an inducement for the development of state management programs. Under the CZMA, no required Federal permit or approval of a project can be granted if it would violate requirements under an approved

state management program. After final approval of a state's plan, any applicant for a required Federal permit to conduct an activity affecting land or water use in the coastal zone of that state must provide a certification that the proposed activity complies with the state's program. The provisions of the CZMA will strengthen the involvement of state and local governments in the review of construction projects. This Act might affect any low-Btu coal gasification project located in a coastal zone.

6.3 BUILDING AND CONSTRUCTION PERMITS

All industrial constructions must secure these permits, which are usually administered by a State Department of Building and Construction. The project may also have to secure other permits from the city (e.g., driveway permits). If the low-Btu coal gasification process produces by-product oil (such as the two-stage Stoic gasifier at the University of Minnesota), a permit will also have to be secured from city authorities for storage of this oil. The projects interviewed in this study encountered no difficulty in securing building and construction permits.

The industrial manager should know whether the safety and fire codes enforced through these permits are process-specific. If so,

the project staff or their consultant must assist the state/county/city agency in deciding how to classify low-Btu coal gasification, which is not identified as a specific process in most state/county/city regulations. The Fire and Panic Code in Pennsylvania, for example, is very process-specific. The consultant to the manufacturing company in Pennsylvania had to work with the Department of Labor and Industry and the State Fire Marshall to demonstrate that low-Btu coal gasification should not be classified in the "chemical process" category but rather in the "Miscellaneous" category of the Code.

6.4 TRANSPORTATION REGULATIONS

Local laws may require that operations involving transportation of materials by trucks exceeding the state weight limits secure transportation permits from the State Department of Highways. None of the projects in this study required these permits.

6.5 FEDERAL AVIATION ADMINISTRATION

The proximity of a construction to an airport would make a permit from the FAA necessary for this construction. None of the projects in this study had to concern with this permit.

7.0 Summary: Process Factors Affecting Agency/User Interaction

The previous Sections of the report, particularly Sections 3.0 and 4.0, point to some factors that affect the agency/user interactions through 1) the amount of regulations with which the user of low-Btu coal gasification must comply, and 2) the degree of regulatory complications.

With a knowledge of these factors and their influence on the regulatory process, the user can improve the chance of success of the project from the regulatory viewpoint.

This Section identifies the influential factors and summarizes their effect on the regulatory process. The influential factors may be classified in two groups, one related to the

characteristics of the process design, the other to the nature of the regulatory structure.

7.1 PROCESS FACTORS

TABLE 7-1
PROCESS FACTORS AFFECTING AGENCY/USER INTERACTIONS

●	FEEDSTOCK AND PRODUCT GAS
-	TYPE AND AMOUNT OF COAL
-	METHOD OF COAL HANDLING AND STORAGE
-	SOURCE OF WATER WITHDRAWAL
-	INTENDED USE OF GAS
●	POTENTIAL POLLUTANTS
-	AMOUNT OF POLLUTANTS
-	METHOD OF WASTE DISPOSAL

The process factors shown in Table 7-1 affect the compliance strategy for meeting regulatory requirements and should be taken into account in designing the project.

FEEDSTOCK AND PRODUCT GAS

Because it determines the amount and nature of resulting pollutants, THE TYPE OF COAL USED influences the strategy to meet air quality requirements and the cost of compliance.

THE AMOUNT OF COAL USED influences the amount of pollutants from the process. Also, local transportation regulations may place constraints on the weight and frequency of trucks moving to and from the site for coal delivery or ash hauling.

OUTDOOR COAL HANDLING AND STORAGE requires greater environmental controls and permits than such activities conducted indoors. Thus, an NPDES (water discharge) permit may be required for runoff from an outdoor coal pile, as in the case of Pike County.

THE SOURCE FROM WHICH WATER IS WITHDRAWN for use in the process affects the permits that must be secured. If the water is taken from an existing municipal system, no new permits are required. If the facility constitutes a new withdrawal, state or local permits may be required, especially in areas that have a short supply of water. Withdrawal from "navigable waters" requires, in addition, permits from the Corps of Engineers.

THE USE OF PRODUCED GAS itself will affect the regulatory requirements. If the gas is to be sold, permission from the state utility commission is required.

POTENTIAL POLLUTANTS

The review process for air quality permits, is more stringent for large sources of emission than for minor ones. The definition of "large" is based on the amount of air pollutants emitted. The same statement applies for the water quality review process. With the only exception of Pike County, the projects studied by MITRE were all sufficiently small that they were not subject to the full review for PSD (Prevention of Significant Deterioration - Air Quality) or NPDES (National Pollutant Discharge Elimination System - Water Quality) permits. Thus, the AMOUNT OF POLLUTANTS influences the regulatory compliance strategy.

The METHOD OF WASTE DISPOSAL determines whether permits are required for this disposal. Problems with wastewater effluents can be reduced by using the company's existing treatment processes, or existing municipal systems or outfalls, rather than building new systems. Modifications to existing permits may still be required, but these modifications pose a lesser risk of delays and demand a lesser amount of information to be submitted than an application for a new permit. If a municipal system is used, the municipality (and

not the project) is responsible for securing any modifications to permits.

Similarly, permit requirements for the disposal of solid waste are fewer when an already existing disposal facility is used. If wastes from the low-Btu coal gasification are treated as are other coal combustion wastes, there should be little problem with disposal. In the case of CAN DO, Inc. in Hazleton, Pennsylvania, the State of Pennsylvania is waiting for tests on actual wastes generated by the gasifier to make a determination on whether the wastes will be classified as hazardous. In contrast, the Glen-Gery facility has been routinely disposing of its gasifier wastes in a quarry, with no regulation requirements to be met.

7.2 FACTORS RELATED TO REGULATORY STRUCTURE

The regulatory structure in a state has a significant influence on the ease--or complication--that a company will encounter in dealing with the regulatory agencies in the state. The most important factors related to the regulatory structure which affect the permitting process are summarized in Table 7-2. These factors are discussed below.

TABLE 7-2
FACTORS RELATED TO REGULATORY STRUCTURE AFFECTING
AGENCY/USER INTERACTIONS

- DELEGATION
- EXPERIENCE
- APPROACH TO COMPLIANCE/
ENFORCEMENT

DELEGATION

Under provisions of the Clean Air Act (CAA), the Clean Water Act (CWA), and the Resource Conservation and Recovery Act (RCRA), the Environmental Protection Agency (EPA) is allowed to delegate its permit-approval authority to a state agency. When this delegation takes place, the state examines the pertinent environmental factors and issues a state permit. Sometimes, the rules of delegation are not clear. The company must make sure that they are well understood and observed by all parties involved. In the case of the review of air quality, EPA may continue some of its functions, such as PSD review, while the State assumes all the others (NESHAPs and NSPS, for instance). Delegation of the issuance of NPDES permits under the CWA allows for the issuance of one state water discharge permit, rather than the two required (one Federal, one state) if a State has not been delegated authority. Since the programs for implementing RCRA

will be carried out by the States, regulations covering the hazardous waste and the State programs that will be issued by EPA in Spring 1980 are expected to contain permitting provisions similar to those of the CWA. Thus, experience to date indicates that REGULATORY COMPLIANCE IS SIMPLER FOR A COMPANY WHEN ITS PROJECT IS LOCATED IN A STATE WHICH HAS BEEN DELEGATED THE AUTHORITY FOR ENVIRONMENTAL PROGRAMS.

A major impact of delegation of authority is in the preparation of an Environmental Impact Statement (EIS). For NPDES permits, EPA has ruled that an EIS is not required even if a plant is classified as a new source if it is in a State that has assumed responsibility for the administration of NPDES permits. Under provisions of RCRA, a company seeking a solid waste disposal permit from EPA would have to meet EIS requirements if approval of the solid waste disposal facility were considered to be a major Federal action. When state agencies assume responsibility for issuance of RCRA permits, their approval of such a facility will be treated as a State action (and not a Federal action), and thus no EIS will be required.

TIMING AND SEQUENCE OF APPROVALS ARE IMPORTANT CONSIDERATIONS WHEN BOTH FEDERAL AND STATE PERMITS ARE REQUIRED, AS IS OFTEN THE CASE UNDER THE CLEAN AIR ACT. The requirements of preconstruction approvals differ among states, depending upon delegation status. The

industrial manager must understand these requirements and plan accordingly. Most state implementation plans require review of new plants and modifications of plants to ensure that New Source Performance Standards (NSPS) are not exceeded and that National Ambient Air Quality Standards are not violated. The program for prevention of significant deterioration (PSD) is separate from other air quality considerations and is to be gradually delegated to the states. This means that an applicant for an air permit may have to go to the state for NSPS and nonattainment approval, and to EPA for PSD approval. According to EPA regulations, the Federal agency will not act on an application until the State approval is secured. Therefore, the scheduling of all approvals must be considered by the industrial manager in deciding on necessary lead time.

EXPERIENCE

For the regulatory process to take place smoothly, either the industrial manager seeking the permits or the regulatory agency granting the permits must have sufficient experience with and/or knowledge of the low-Btu coal gasification process to which the permits apply. Among the cases included in this MITRE study, most problems were encountered when the permit applicant lacked the necessary knowledge to guide the regulatory agency (Pike County). It is logical that the project manager have a greater knowledge of the

technology he plans to use than the agency, which must deal with a large number of technologies. The collaboration between the manager and the agency leads to a successful regulatory experience, as evidenced by the remaining four cases in the MITRE study. The companies, in these cases, helped the regulatory agency understand the technology; the agency, in turn, helped the company understand the requirements for complying with the regulations.

APPROACH TO COMPLIANCE/ENFORCEMENT

The approach of the parties to the regulatory process evidently influences this process. On the industrial manager's part, a maximum compliance approach (i.e., not trying to avoid compliance) enhances the regulatory agency's response to the permit application. This cooperative approach is reflected in the design of the facility and in the supply of information to the regulatory agency. Much delay and conflict is avoided when the regulatory agency's involvement and guidance are sought early in the planning process and are taken into account in the plant design. The manager should plan always to provide sufficient and accurate information to the agency.

The agency's approach toward enforcing regulations concerning a low-Btu coal gasification project influences how closely the permit application for this project is scrutinized. The case studies point to several factors that influence the agency's approach, among them:

- Compliance approach of the permit applicant (discussed above). All users interviewed for this study consider this factor to be a significant one
- Whether or not the State has coal resources which it encourages industry to use
- Whether the low-Btu coal gasification project serves a "popular" purpose: for example, the CAN DO project is supported by the community because it brings industry and employment opportunities to Hazleton, Pennsylvania. Because of this support and the aid of the state, approvals have been obtained with little difficulty. At the University of Minnesota at Duluth, this community support was also evident. Consequently, the University encountered no major regulatory problems.

Regulatory requirements do not represent an insurmountable barrier to the low-Btu coal gasification developers interviewed by MITRE. Even though they do represent an added burden, they are still outweighed by the advantage that low-Btu coal gasification represents to these developers: the certainty in fuel supply (because the technology relies on domestic coal), and the lower fuel prices compared to oil and natural gas.

APPENDIX A
SUMMARY PROJECT CHARACTERISTICS AND EXPERIENCE

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UNIVERSITY OF MINNESOTA; DULUTH, MINNESOTA

● CHARACTERISTICS

Use: Heating Plant of Duluth Campus;
In Operation Since September, 1979

Producer: 10' Diameter Two-Stage Fixed Bed Foster Wheeler
Stoic Design

Coal Feed Rate: 6,000 pounds/hour

Coal Type: Wyoming Elkol

Maximum Gas Output: 55mm Btu/hour

Output of Heavy Oil: 3mm Btu/hour

Turn Down Rate: 5:1 on Automatic Control

Water Requirement: 500 gallon/hour (from Lake Superior)

Liquid Waste Expected: None

SO₂ Emissions: 24.3 pounds/hour
(MPCA Limit: 218.9 pounds/hour)

Particulate Emissions: 11.5 pounds/hour
(MPCA Limit: 21.89 pounds/hour)

Wet Ash: Disposed of at Offsite Landfill

● EXPERIENCE

University of Minnesota has had usual startup problems, but
few permitting problems

- University was very organized
- State was cooperative

REQUIREMENTS FOR COMPLIANCE WITH ENVIRONMENTAL REGULATIONS

DOCUMENT/PERMIT REQUIRED BEFORE CONSTRUCTION	RESPONSIBLE AGENCY	STATUTORY LIMITS (OR AGENCY EXPERIENCE)	ACTUAL EXPERIENCE OF UNIVERSITY OF MINNESOTA
Certificate of Need	Minnesota Energy Agency	Est. 6 months	Not required
Environmental Assessment Worksheet/Environmental Impact Statement	Environmental Quality Board	6 months/60 days for Negative Declaration Notice	Not required
Air Installation Permit	Minnesota Pollution Control Agency	30-60 days for minor source 90-120 days for major source 120-180 days for trade off policy	90 days Not required Not required
Air Operating Permit	Minnesota Pollution Control Agency	90 days after issuing Installation Permit	Not yet obtained
NPDES (Water) Permit	Minnesota Pollution Control Agency	180 days (5 year permit)	Not required
Minnesota State Disposal System Permit*	Minnesota Pollution Control Agency	180 days	Not required
Solid Waste Permit	Minnesota Pollution Control Agency	Not specified	Not required

* NPDES Permit and State Disposal System Permit are equivalent

PIKE COUNTY INDUSTRIAL DEVELOPMENT CORPORATION;
PIKE COUNTY, KENTUCKY

● CHARACTERISTICS

Use: To Serve a Planned Complex; Construction has not yet Started

Phase 1: Gas for a Steam Boiler

Phase 2: Gas for Steam Boiler and for Sale to Industrial
Users

Producer: Fixed-Bed Wellman-Galushas, two 6.5' Diameter

Coal Feed Rate: 3,000 pounds/hour, each

Coal Type: Eastern Kentucky Coal

Maximum Gas Output: 30mm Btu/hour, each

Turn Down Rate: 12:1

Water Requirement: 2820 gallons/hour to 7260 gallons/hour

Water Discharges: Expected to be Limited

SO₂ Emissions: 17.8 pounds/hour
(Allowable: 17.85 pounds/hour)

Particulate Emissions: 0.3 pounds/hour
(Allowable: 7.3 pounds/hour)

Dry Ash: Disposed of at Offsite Approved Landfill

● EXPERIENCE

Pike County has had more problems than other projects studied.

- Permit applications were incomplete.
- Applicant, a new community development organization, had no experience with gasification or permitting.
- Site chosen is physically difficult to develop.

TIME REQUIRED FOR ENVIRONMENTAL REGULATORY COMPLIANCE

ACTION	AGENCY INVOLVED	TIME REQUIREMENT	
		Statutory Time Limit (or defined by Agency)	Experienced by Pike County
AIR <ul style="list-style-type: none"> • New Source Review Program • Prevention of Significant Deterioration (PSD) Review Program • National Emission Standards for Hazardous Air Pollution (NESHAPS) Program • New Source Performance Standards (NSPS) Program 	Kentucky Department for Natural Resources and Environmental Protection (DNREP)	30 days for minor source 150 days for major source	14 months
	DNREP Regional EPA Office	1 year maximum following receipt of <u>complete</u> application	
	Regional EPA Office	None Specified	
	Regional EPA Office	None Specified	

TIME REQUIRED FOR ENVIRONMENTAL REGULATORY COMPLIANCE

ACTION	AGENCY INVOLVED	TIME REQUIREMENT	
WATER		Statutory Time Limit (or defined by Agency)	Experienced by Pike County
<ul style="list-style-type: none"> • National Pollutant Discharge Elimination System (NPDES) Permit • Construction Permit • Operating Permit • Water Withdrawal Permit • Floodway Construction Permit 	<ul style="list-style-type: none"> Regional EPA and DNREP DNREP DNREP DNREP DNREP 	<ul style="list-style-type: none"> 6 months for existing source Up to 24 months for new source 30-60 days maximum (if no public hearing) None specified, but should be short 20-30 days 30 days 	<ul style="list-style-type: none"> 4-5 months Not yet applied for Not required Not required

TIME REQUIRED FOR ENVIRONMENTAL REGULATORY COMPLIANCE

ACTION	AGENCY INVOLVED	TIME REQUIREMENTS	
		Statutory Time Limit (or defined by Agency)	Experienced by Pike County
SOLID WASTE			
• Landfill construction permit	DNREP	60-120 days (without public hearing) Up to one year if public hearing required	Not required
• Operating permit	DNREP	30 days	30 days

CAN DO, INC., HAZLETON, PENNSYLVANIA

● CHARACTERISTICS

Use: Process Heat for Industrial Park;
Construction Started in October 1979

Producer: Two 10' Diameter, Fixed-Bed, Agitating Wellman-Galushas

Coal Feed Rate: 1500 pounds/hour to 2200 pounds/hour each
(normal, about 2200 pounds/hour)

Coal Type: Pennsylvania Anthracite

Maximum Gas Output: 40mm Btu/hour each

Turn Down Rate: 12:1

Water Requirement: 300 gallons/hour, circulating
(2505 pounds/hour)

Water Discharges: None from the Process

SO₂ Emissions: 19.2 pounds/hour During Banked or Startup
Conditions (Allowable: 58.5 lbs/hr)

Particulate Emissions: 0.1 pounds/hour During Banked or Startup
Conditions (Allowable: 1.95 lbs/hr)

Ash: 264 pounds/hour (Will be Sold or go to Landfill)

● EXPERIENCE

CAN DO has had financial problems, few permitting problems

- Organization is experienced in development.
- Pennsylvania Department of Environmental Resources Regional Office has been helpful.

TIME REQUIRED FOR ENVIRONMENTAL REGULATORY COMPLIANCE

ACTION	AGENCY INVOLVED	TIME REQUIREMENT	EXPERIENCE
AIR			
<ul style="list-style-type: none"> • Pollution source--construction, modification, or reactivation Cleaning device--installation 	Department of Environmental Resources (DER)	Not specified. Limited permit may be extended	2 month average, 3 month maximum
<ul style="list-style-type: none"> • Operating source or cleaning device 	DER	Not specified. Limited permit, may be extended	Usually 1 week
<ul style="list-style-type: none"> • Source shutdown or evaluation (optional temporary permit) 	DER	Not specified. 60 day permit with 60 day extensions	-----
WATER			
<ul style="list-style-type: none"> • NPDES 	DER	60 days 5 yr. maximum permit	4-6 months
<ul style="list-style-type: none"> • Pollution control project permit 	DER	Not specified	-----
SOLID WASTE			
<ul style="list-style-type: none"> • Construction/operating 	DER	60 days from submittal of Phase 2 (see Table 3-3)	Not yet issued
LAND USE			
<ul style="list-style-type: none"> • Earthmoving permit (may not be necessary, see Table 3-4) 	DER	Not specified	-----
<ul style="list-style-type: none"> • Building Permit--state 	PA Department of Labor & Industry, & Industrial Board (for unique structure)	Not specified	2 days usually 1 week
<ul style="list-style-type: none"> • Building permit--local 	Local governing body	Not specified	-----

TIME REQUIRED FOR ENVIRONMENTAL REGULATORY COMPLIANCE

SOURCES: Environment Reporter, 1977a. Pennsylvania Air Pollution Control Act. Bureau of National Affairs, Inc., Washington, D.C.
Environment Reporter, 1977b. Pennsylvania Solid Waste Regulations. Bureau of National Affairs, Inc., Washington, D.C.
Environment Reporter, 1978a. Pennsylvania Erosion Control Regulations. Bureau of National Affairs, Inc., Washington, D.C.
Environment Reporter, 1978b. Pennsylvania Water Resources General Provisions. Bureau of National Affairs, Inc., Washington, D.C.
Environment Reporter, 1979a. Pennsylvania Clean Streams Law. Bureau of National Affairs, Inc., Washington, D.C.
Environment Reporter, 1979b. Pennsylvania Air Pollution Control Regulations. Bureau of National Affairs, Inc., Washington, D.C.

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GLEN-GERY CORPORATION; YORK, PENNSYLVANIA

● CHARACTERISTICS

Use: Firing of a Continuous Tunnel Brick Kiln

Producer: 10' Diameter Fixed-Bed Wellman-Galusha

Coal Feed Rate: 1000 pounds/hour

Coal Type: Pennsylvania Anthracite

Maximum Gas Output: 25mm Btu/hour

Turn Down Rate: 2:1

Water Requirement: 1500 gallons/hour

Water Discharge: Water Recycled

SO₂ Emissions: 0.5 pounds/mm Btu
(Allowable 3 pounds/MBtu)

Particulate Emissions: 0.015 pounds/mm Btu
(Allowable: .038 pounds/MBtu)

Ash: Used as Landfill, Cinder Block Production, or Road
Cindering

● EXPERIENCE

Glen-Gery has had minimum of problems

- Company did not have to apply for any permit, because the gasifier was added to an existing plant where another gasifier is already operating.
- Company is experienced with coal gasification.
- Project involved little construction.
- Pennsylvania has favorable attitude toward use of anthracite.

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MANUFACTURING COMPANY; PENNSYLVANIA

● CHARACTERISTICS

Use: Heat Treating of Metal Parts

Producer: Two 10' Diameter Wellman-Incandescent Two-Stage,
Fixed-Bed Design

Rated Capacity: 1.25 billion Btu/day each

Heat Value: 175 Btu/cubic foot

Coal Feed Rate: 6000 pounds/hour each

Coal Type: High Sulfur Eastern Kentucky Bituminous

Water Requirement: 1500 pounds/hour each

Water Discharge: None from the Process (water from the
gasification process is evaporated by
a thermal oxidizer)

SO₂ Emissions: Very Low (5PPM of Hydrogen Sulfide)
(Allowable: 3 pounds/MBtu)

Particulate Emissions: Very Low (less than allowable limits
of .04 pounds/MBtu)

Ash: One ton/day (to be sold)

By-Products: Oil (burned) and Tar (sold)

● EXPERIENCE

This company has not had permitting problems

- Organization has excellent attitude and reputation in regulatory compliance.
- Pennsylvania Department of Environmental Resources Regional Office has been helpful.
- Process is extremely clean.

- TIME REQUIRED FOR COMPLIANCE WITH ENVIRONMENTAL REGULATIONS

Air quality permits = 6 weeks

Water quality permit = not required

Solid waste permit = not required

Building permit = 4 months

Oil storage permit = 2 months

TEXAS HYPOTHETICAL CASE

- BASIC ASSUMPTIONS

- Existing Plant Producing Glass in Houston
- Existing NPDES Permit to Plant
- Sanitary Wastes to Existing Sewer
- Sulfur Cleanup (depending on coal, would probably be required for non-attainment area)
- Existing Sanitary Landfill
- State Selected Because of Lignite Deposits. However, initial conversations with staff of regulatory agencies indicate that priority is not placed on gasification of lignite. Thus, the hypothesis was made that coal will be brought into Texas by train from Utah.

- ALTERNATIVES

- New Plant
- No Landfill
- Coal by Barge from Illinois
- Texas Lignite Used

- FINDINGS

Type of coal, type of plant (retrofit or new) would not affect permitting.

Only concerns of state would be process design to reduce effluents and emissions.

U.S. EPA is responsible for NPDES permitting in Texas.

State Air Control Board is responsible for Air Quality.

Applicant must meet requirements under State Implementation Plan.

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INDIANA HYPOTHETICAL CASE

● BASIC ASSUMPTIONS

- State selected because of extensive coal deposits and previous interest in gasification.
- Existing plant producing glass in Vigo County
- Existing NPDES permit to plant
- Sanitary wastes to existing sewer
- Sulfur cleanup
- Existing sanitary landfill

● ALTERNATIVES

- New plant
- No landfill

● FINDINGS

State Board of Health is responsible for air, water and solid waste requirements.

Some counties have solid waste requirements.

Application would be considered by engineer in each department, no centralized function, no plan to centralize.

APPENDIX B

CURRENT LOW/MEDIUM-BTU COAL GASIFICATION USERS

CURRENT LOW/MEDIUM-BTU COAL GASIFICATION USERS

Stage of Development	Type of Funding	Operator	Initial Start-Up	Gas	Coal	Supporting A&E Firm
Operating	Private	National Lime & Stone Company, Ohio	1955	LBG*	Bituminous	McDowell-Wellman
	Private (DOE)	Glen-Gery Corporation, Pennsylvania	1953/1977	LBG	Anthracite	
	DOD	Holston Defense Corporation, Tennessee	1940	LBG	Bituminous	Wilputte Corp.
	Private	Hazleton Brick Company, Pennsylvania	1953/1978	LBG	Anthracite	
	Private	Gulf & Western (N.J. Zinc), Pennsylvania	1963	CO**	Coke	
	Private	Olin Chemical Corporation, Ohio	1963	CO**	Coke	
Start-Up	Private	Caterpillar Tractor Company, Pennsylvania	1979	LBG	Bituminous	Gilbert Associates
	Private	General Motors Corporation, Michigan	1979	LBG	Various	
	Private	Dow Chemical Company, Louisiana	1979	LBG	Lignite	
	DOE/Private	University of Minnesota, Minnesota	1979	LBG	Various	Orr-Schelen-Mayeron
	EPA/Private	Central Power & Light, Texas	1979	LBG	Lignite	
Construction	Private	Howmet Corporation, Pennsylvania	1979	LBG	Anthracite	Gas Generation Assoc. (Acurex)
	Private	Chemical Exchange, Texas	1979	LBG	Lignite	
	DOE/Private	Pike County Gasification Project, Kentucky	1980	LBG	Bituminous	Kenvirons, Mason-Hanger
	TVA	Tennessee Valley Authority, Alabama	1980	MBG***	Bituminous	
Design	Private	Carter Oil Company, Texas	1987*	MBG	Lignite	
	Private	Illinois Power Company, Illinois	1982	LBG	Bituminous	
	DOE/Private	Can-Do Incorporated, Pennsylvania	1980	LBG	Anthracite	Ebesco Associates
	Private	Southern California Edison, California	1980	MBG	Bituminous	Texaco
	DOE/Private	Memphis Light, Gas & Water, Tennessee	1982	MBG	Bituminous	Foster Wheeler
	DOE/Private	W.R. Grace, Kentucky	1982	MBG	Bituminous	EBASCO

*LBG: Low-Btu Gas
 **MBG: Medium-Btu Gas
 ***CO: Coke Fuel