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BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Chairman, Subcommittee On Fossil And Synthetic Fuels Committee On Energy And Commerce House Of Representatives

RELEASED

Federal Efforts To Control The Environmental And Health Effects Of Synthetic Fuels Development

Because the synthetic fuels industry is still relatively new with no commercial-scale projects initiated under the Energy Security Act operating successfully in the United States, many uncertainties exist concerning the environmental and health effects of industry emissions

The Environmental Protection Agency (EPA) and states regulate some synthetic fuels emissions through a process that requires project sponsors to obtain permits to construct and operate their projects However, information on the environmental and health effects of other potentially harmful emissions--some of which may be carcinogenic--is needed from commercial-scale synthetic fuels projects before EPA will make regulatory decisions on these emissions The Synthetic Fuels Corporation, which provides financial assistance for synthetic fuels projects, requires that an environmental monitoring plan be established for each project. The Corporation will establish Monitoring Review Committees to review the data generated from these plans The data could provide the information needed for determining whether additional research and regulatory actions are needed

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

B-204290

The Honorable Philip R. Sharp
Chairman, Subcommittee on Fossil
and Synthetic Fuels
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

This report responds to your request concerning the federal role in addressing the environmental and health effects of synthetic fuels projects. The report points out that the environmental and health effects of the emissions from synthetic fuels projects are regulated through a permitting process. It also points out, however, that this process does not regulate all potentially hazardous emissions whose effects cannot be analyzed until operating data are generated from commercial-scale projects. The report states that the Synthetic Fuels Corporation, pursuant to the environmental monitoring plan requirement of the Energy Security Act, has established a system to generate and disseminate commercial data on the environmental and health effects of synthetic fuels.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of the report until 30 days from the date of the report. At that time we will send copies to other interested committees, the Synthetic Fuels Corporation, the Department of Energy, and the Environmental Protection Agency. Copies will also be made available to others upon request.

Sincerely yours,

J. Dexter Peach
Director

REPORT BY THE U.S. GENERAL ACCOUNTING OFFICE TO THE CHAIRMAN, SUBCOMMITTEE ON FOSSIL AND SYNTHETIC FUELS COMMITTEE ON ENERGY AND COMMERCE HOUSE OF REPRESENTATIVES

FEDERAL EFFORTS TO CONTROL THE ENVIRONMENTAL AND HEALTH EFFECTS OF SYNTHETIC FUELS DEVELOPMENT

D I G E S T

Because of the Arab oil embargo in late 1973 and the Iranian crisis in late 1979, the United States was faced, twice in less than a decade, with skyrocketing oil prices and diminishing supplies. To develop secure domestic sources of energy, the Energy Security Act of June 30, 1980 (Public Law 96-294), established the Synthetic Fuels Corporation (the Corporation) and authorized it to provide financial assistance for the purpose of encouraging private industry to undertake projects that produce synthetic fuels.[1]

The Congress has provided $17.2 billion for commercial development of synthetic fuels--$12.2 billion for the Corporation's activities and $5 billion to the Department of Energy (DOE) to undertake an interim alternative fuels program. DOE awarded $3.6 billion in financial assistance for three projects and transferred the remaining funds to the Corporation when it became operational in February 1982. As of December 31, 1983, the Corporation had awarded about $121 million for 2 additional projects, but it plans to make awards to about 12 projects by early 1985.

Synthetic fuels is a new emerging industry with no commercial-scale projects initiated under the act operating successfully in the United States. Accordingly, many uncertainties exist concerning the potential environmental and health impacts.

Because of these uncertainties, the Chairman, Subcommittee on Fossil and Synthetic Fuels, House Committee on Energy and Commerce, asked

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[1]Substitutes for petroleum and natural gas derived from other natural resources such as coal, oil shale, and tar sands.

GAO to review the federal government's involvement in identifying and controlling the environmental effects of synthetic fuels development. Specifically, he asked (1) how is the "system" working to protect the environment while the synthetic fuels industry is being developed, (2) do the layers of government involvement enhance or impede environmental protection, (3) are projects structured to protect the environment, and (4) how are the data developed on the environmental effects of synthetic fuels being coordinated among potential users of this information.

The Environmental Protection Agency (EPA) is the primary federal agency responsible for regulating emissions from synthetic fuels projects that may be harmful to health and the environment. EPA and states, which have entered into agreements with EPA, use a permitting process to regulate hazardous emissions from synthetic fuels projects. However, synthetic fuels is a new industry and further research information is needed to identify all potential harmful effects. Environmental monitoring plans the Corporation requires sponsors to prepare for their projects will be the primary source for such information. Because no commercial-scale synthetic fuels projects initiated under the act are operating successfully in the United States, it is too early to tell how well the permitting and monitoring plan processes will work to ensure protection of health and the environment as the synthetic fuels industry develops.

ENVIRONMENTAL IMPACTS OF SYNTHETIC FUELS PROJECTS ARE ADDRESSED THROUGH A PERMITTING PROCESS

Companies that wish to construct synthetic fuels projects must obtain permits from EPA or the appropriate state agencies that EPA has delegated such responsibility. EPA and the states use this permitting process to regulate emissions from synthetic fuels projects that may be harmful to health and the environment. Regulations developed by EPA and states pursuant to environmental legislation (i.e., the Clean Air and Clean Water Acts) generally require that permits be obtained. The Corporation monitors the permitting process since it must assure that projects it funds comply with

environmental regulatory requirements. (See pp. 5 and 7.)

In those cases where standards exist on known emissions of synthetic fuels projects, such as sulfur and nitrogen compounds, the environmental and health impacts are regulated through the permitting process. However, for other emissions--such as those from hazardous wastes--their impacts on health and the environment are not regulated through the permitting process because standards have not yet been developed. Since EPA's legislative mandates require that standards be developed on sound scientific data, operating experience from commercial-scale synthetic fuels projects would be valuable to develop this information. Because the synthetic fuels industry has not advanced to full-scale commercialization in the United States, the data have not been generated and EPA does not plan to set industrywide standards until they are available. (See pp. 12 and 13.)

FEDERAL EFFORTS TO DEVELOP DATA ON THE ENVIRONMENTAL AND HEALTH EFFECTS OF SYNTHETIC FUELS PROJECTS

Federal agencies have sponsored some research on small-scale synthetic fuels projects and projects in other energy industries to assess their environmental and health effects. EPA and DOE have been the principal sponsors of such research. Others such as the Department of Health and Human Services' National Institute for Occupational Safety and Health and the National Institute of Environmental Health Sciences have also been involved but on a more limited scale. This research indicates that commercial-scale synthetic fuels projects could emit toxic substances, some of which may be carcinogenic.

As synthetic fuels projects proceed to commercialization, data on the environmental and health effects of these emissions must be developed so that specific needs for additional research and regulatory action can be determined. Currently, the primary sources of such information are the environmental monitoring plans that the Corporation requires sponsors to prepare for their projects. (See pp. 25 to 27.)

The Corporation has issued environmental monitoring plan guidelines that will require sponsors of synthetic fuels projects receiving Corporation financial assistance to prepare quarterly and annual monitoring reports on project emissions. The guidelines state that the Corporation will use these reports to develop a data base and will make them available to federal agencies, organizations, and the public to the extent authorized by the Trade Secrets Act (18 U.S.C. 1905). The Corporation also established Monitoring Review Committees for each project--made up of representatives of the Corporation, DOE, EPA, appropriate state agencies, and the sponsor--which will periodically review the information contained in the reports to determine if changes are necessary in the monitoring tasks performed, the monitoring techniques used, or the data submitted. (See pp. 25 to 29.)

AGENCY COMMENTS AND GAO EVALUATION

GAO provided draft copies of this report to the Corporation, EPA, and DOE for comment. The Corporation and EPA concurred with the facts and conclusions stated in the draft report as they relate to their activities. DOE, however, had several concerns.

DOE's primary concern was that the draft report did not give sufficient coverage to its efforts to address the environmental and health effects of synthetic fuels. The final report includes additional information on the roles of DOE's Offices of Fossil Energy and Energy Research and DOE's involvement in the environmental and health programs of other federal agencies. (See pp. 16 and 17.) The report also provides additional information on DOE's role as a consulting agency in the Corporation's environmental monitoring plan process. (See p. 25.)

Contents

ABBREVIATIONS

DOE	Department of Energy
EPA	Environmental Protection Agency
GAO	General Accounting Office

CHAPTER 1

INTRODUCTION

Synthetic fuels technologies are not new, but it was not until the United States was faced with oil embargoes, rapidly rising oil prices, and a need for domestically secure energy supplies that a major effort to develop these technologies in this Nation occurred. The environmental aspects of a viable synthetic fuels industry are important factors in its development.

Synthetic fuels are substitutes for petroleum and natural gas derived from other natural resources such as coal, oil shale, and tar sands. Liquid fuels include methanol, fuel oil, naphtha,[1] and gasoline. Synthetic gas can either be a high heating value fuel equivalent to natural gas, or it can be of low or medium heating value for industrial uses.

STATUS OF SYNTHETIC FUELS INDUSTRY

Because of the Arab oil embargo in late 1973 and the Iranian crisis in late 1979, the United States was faced, twice in less than a decade, with skyrocketing oil prices and diminishing supplies. To develop secure domestic sources of energy, President Carter, on June 30, 1980, signed the Energy Security Act (Public Law 96-294). The act established the Synthetic Fuels Corporation (the Corporation), which is authorized to provide financial assistance to encourage private industry to undertake synthetic fuels projects.

The Energy Security Act stipulates synthetic fuels production goals of 500,000 barrels a day of crude oil equivalent by 1987 and 2 million barrels a day by 1992. Between June 1984 and June 1985, the Corporation is required to submit to the Congress a comprehensive strategy to achieve these goals. If the Congress approves the strategy, the Corporation may then request additional appropriations for synthetic fuels development. The act also provides for the Corporation to be terminated between September 30, 1992, and September 30, 1997.

The U.S. synthetic fuels industry has faced changing economic and energy conditions since passage of the Energy Security Act. At the time the act was passed, past trends indicated that high prices and scarce supplies of imported oil would continue. However, worldwide recessions and oil conservation and substitution programs have reduced overall petroleum use, while domestic production has increased. In March 1983 oil prices declined when the Organization of Petroleum Exporting Countries announced a crude oil price reduction from $34 to $29 a barrel.

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[1]A liquid used as a feedstock to make gasoline and other products.

Synthetic fuels development also faces uncertainties with its technology, financing, and regulatory compliance. Regarding technical aspects, commercial experience with most of the key processes and technologies ranges from limited to virtually nonexistent. Financial uncertainties include not only the future prices of conventional energy sources but also the costs of plant construction and marketability of the plant's products. Regulatory concerns include potential environmental, health, and safety impacts.

The Department of the Interior and Related Agencies Appropriations Act of 1980 (Public Law 96-126, Nov. 27, 1979) and the Supplemental Appropriations and Rescissions Act of 1980 (Public Law 96-304, July 8, 1980) provided a total of $17.5 billion, which can be obligated for commercial synthetic fuels projects. Of these funds, $12.2 billion was provided for the Corporation's activities, and the remaining $5 billion ($300 million was rescinded in June 1981) was provided to the Department of Energy (DOE) to finance an interim alternative fuels program. Under this program, DOE awarded a $2.02-billion loan guarantee to the Great Plains coal gasification project and a $400-million price guarantee to the Union oil shale project. It also awarded a $1.2-billion loan guarantee to an oil shale project that was terminated in May 1982. The remaining unobligated funds from the DOE alternative fuels program were transferred to the Corporation, when the President declared it operational in February 1982. As of December 31, 1983, the Corporation had made two financial assistance awards--a $120-million price guarantee for the Cool Water coal gasification project in California and about $820,000 in design assistance money for the First Colony peat-to-methanol project in North Carolina[2]--and plans about 12 other awards by early 1985.

OBJECTIVES, SCOPE, AND METHODOLOGY

On April 12, 1982, the Chairman, Subcommittee on Fossil and Synthetic Fuels, House Committee on Energy and Commerce, asked us to review the federal involvement in identifying and controlling the environmental effects of synthetic fuels projects. Specifically, the Chairman's office requested that our work focus on the following questions:

--How is the existing "system" working to protect the environment while a synthetic fuels industry is being developed recognizing that there is limited experience with projects being constructed?

--Are government controls over the environmental impacts of synthetic fuels necessary and/or sufficient? Are the

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[2]Our report, Circumstances Surrounding the First Colony Peat-to-Methanol Project (GAO/RCED-84-32, Nov. 10, 1983), discusses the status of this project.

levels of government involvement resulting in overlapping programs? Do the layers of government involvement enhance or impede environmental protection?

--Are projects structured to protect the environment?

--Is information on environmental effects being collected, transferred, and used to determine potential and unknown impacts for future projects? Who is responsible for coordinating this effort? Should it be done on a national basis?

The Chairman also requested that we perform a review of the Corporation's progress in meeting the goals of the Energy Security Act. This issue is being addressed in a separate review, which should be completed in the spring of 1984. In addition, the Chairman asked that we review the circumstances revolving around the project sponsors' intentions to scale down the size of the Colony oil shale project. Since the project was terminated in May 1982, the Chairman's office agreed that all work relating to this issue was no longer necessary.

Since no commercial-scale synthetic fuels projects are operating in the United States, we could not address these issues by reviewing the experience under completed projects. Rather, we reviewed federal and state systems in place to control and monitor environmental and health effects and how these systems will address synthetic fuels development. This included reviews of federal legislation and Colorado and Wyoming legislation and regulations. We selected these two states because of their expected heavy synthetic fuels development.

Our review was performed between May 1982 and July 1983. We held discussions with, and reviewed documents obtained from, officials of the headquarters offices of the Corporation, Environmental Protection Agency (EPA), and DOE in Washington, D.C. Because significant synthetic fuels activities have taken place or are expected to take place at the following locations, we also held discussions and reviewed documents obtained from officials at the Corporation and EPA field offices in Denver, Colorado; EPA's offices at Research Triangle Park, North Carolina, and Cincinnati, Ohio; and DOE's national laboratories at Oak Ridge, Tennessee; Brookhaven, New York; and Livermore, California.

Because the issuance of several plant construction and operation permits--the mechanism to control some environmental aspects of synthetic fuels projects--has been delegated to states, we discussed permitting processes with state officials in Wyoming and Colorado. We obtained the views and environmental concerns about synthetic fuels production from officials of certain public interest and environmental groups--the Environmental Policy Institute, Washington, D.C.; the Powder

River Basin Resource Council, Sheridan, Wyoming; the Environmental Defense Fund, Boulder, Colorado; the Friends of the Earth, Denver Colorado; and the Western Organization of Resource Councils, Washington, D.C. These groups have been very active in reviewing and commenting on synthetic fuels projects. To obtain industry views on environmental control technology and environmental monitoring plans, we interviewed officials of Union Oil Company of California in Grand Junction and Parachute, Colorado, and Hampshire Energy Company in Denver, Colorado. The Union Oil Company of California is sponsoring a synthetic fuels project whose construction was completed in late 1983; however, significant technical problems must still be resolved. The Hampshire Energy Company was the sponsor of a project which, at one time, was the Corporation's leading candidate for financial assistance.

We discussed programs that could be established to monitor the effects of synthetic fuels plant emissions on the workforce and the public with officials of the Department of Health and Human Services' National Institute for Occupational Safety and Health and National Institute of Environmental Health Sciences. We also interviewed officials of the Office of Technology Assessment in Washington, D.C., and reviewed their September 1982 report, Increased Automobile Efficiency and Synthetic Fuels, which discusses in detail the environmental, health, and safety concerns associated with synthetic fuels. In addition, we reviewed the Colorado Department of Health study, Assessment of Cumulative Environmental Impacts of Energy Development in Northwestern Colorado and the Utah Energy Office study, An Assessment of Oil Shale and Tar Sand Development in the State of Utah.

Chapter 2 addresses the Chairman's first three concerns. The chapter discusses how the permitting process addresses the environmental and health effects of synthetic fuels, coordination procedures adopted to facilitate and clarify how projects should obtain permits, and the fact that the permitting process does not presently cover all potentially harmful emissions of synthetic fuels development. Chapter 3, which addresses the Chairman's final concern, discusses past and ongoing federal research activities on the environmental and health effects of synthetic fuels technologies and efforts to coordinate the results of these and future federal research efforts.

Our review was conducted in accordance with generally accepted government auditing standards.

CHAPTER 2

ENVIRONMENTAL AND HEALTH IMPACTS OF SYNTHETIC FUELS PROJECTS ARE ADDRESSED THROUGH THE PERMITTING PROCESS

EPA is the primary federal agency responsible for regulating emissions from synthetic fuels projects that may be harmful to health and the environment. EPA and states, which entered into agreements with EPA, use a permitting process to regulate hazardous emissions from synthetic fuels projects. Companies must obtain various federal and/or state permits to construct and operate a synthetic fuels facility.

The Corporation monitors this permitting process for the projects it is considering for financial assistance. The Energy Security Act states that the Corporation shall consider, in awarding financial assistance to projects, their ability to comply with applicable regulatory requirements. Consequently, the Corporation, in evaluating projects, assesses each project's ability to obtain all required permits.

In those cases where standards exist on known emissions from synthetic fuels projects, such as sulfur and nitrogen compounds, the environmental and health impacts are regulated by the permitting process. However, for other emissions, such as those from hazardous wastes, their environmental and health impacts are not regulated through the permitting process because standards have not yet been developed. EPA does not plan to set industrywide standards on these emissions until data from commercial-scale synthetic fuels projects are generated.

KEY ENVIRONMENTAL AND HEALTH LEGISLATION

Environmental protection is a broad issue that encompasses not only the preservation of the biological and physical environment but also human health, safety, and socioeconomic factors. Extensive federal and state legislation has evolved to deal with the issue of protecting the environment. For example, EPA, by specific acts, and the Corporation, by the Energy Security Act, are required to carry out activities relating to environmental protection as the synthetic fuels industry develops.

EPA is a focal point for environmental protection through its standards established to limit the discharge of certain regulated pollutants. The cost of control technologies required to limit the discharge of these pollutants can affect the construction and operation of synthetic fuels facilities. The following enabling legislation established the regulatory framework through which EPA operates:

--Clean Air Act Amendments of 1970 (Public Law 91-604) and Subsequent Amendments of 1977 (Public Law 95-95). The act establishes air quality control regions in which national ambient[1] air quality standards will be achieved and maintained. Ambient air quality standards were set for air pollutants that may endanger public health or welfare. National emission standards for hazardous air pollutants must also be met. A state whose implementation plan meets EPA approval may set its own standards, which may be more stringent than EPA's. In 1977, important amendments were added, which include more stringent standards for new facilities and provisions aimed at preventing significant deterioration of air quality in areas now meeting national ambient air quality standards.

--Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), as amended by the Clean Water Act of 1977 (Public Law 95-217). This act generally limits pollution of surface water. Established goals of the act are to: prevent, by 1985, discharges of pollutants into navigable streams; attain, by July 1, 1983, water quality suitable for protection and propagation of fish, shellfish, and wildlife, and suitable for recreational use; and limit discharges of toxic pollutants.

--Safe Drinking Water Act of 1974 (Public Law 93-523). This act generally protects the groundwater system by regulating underground injection of any fluids.

--Resource Conservation and Recovery Act of 1976 (Public Law 94-580). This act governs the treatment, storage, transport, and disposal of solid and hazardous wastes.

--Toxic Substances Control Act of 1976 (Public Law 94-469). This act governs the testing, recordkeeping, reporting, and conditions for the manufacturing and handling of toxic substances.

Additionally, the National Environmental Policy Act of 1969 (Public Law 91-190) provides legislative authority to analyze the environmental impacts of synthetic fuels projects, in which major federal actions (such as for projects to be built on federal lands) affecting the quality of the environment, are involved.

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[1]Refers to the air quality conditions in the vicinity of a project.

For example, the act requires that the responsible agency prepare a detailed statement (Environmental Impact Statement) assessing the environmental impacts of the major federal action. However, according to the Energy Security Act, the awarding of financial assistance to synthetic fuels projects by the Corporation is not considered a "major federal action" under the National Environmental Policy Act.

The Energy Security Act of 1980 also addresses environmental concerns. It requires that, before providing assistance, the Corporation shall consider a project's potential for complying with applicable regulatory requirements. The act also requires that any contract for financial assistance shall require the project sponsor to develop a plan, acceptable to the Corporation's Board of Directors, to monitor emissions from the construction and operation of the synthetic fuels project that effect the health and environment. The recipient of financial assistance must develop such a plan after consultation with EPA, DOE, and appropriate state agencies.

Since environmental protection encompasses human health and safety, as well as the biological and physical environment, other federal legislation is also involved. For example, the Occupational Safety and Health Act of 1970 and the Federal Mine Safety and Health Act of 1980 require worker safety in the synthetic fuels industry just as they do in other industries.

Federal and state regulations implementing the above legislation normally provide for a permitting process. Generally, companies must obtain federal permits to construct and operate a synthetic fuels facility, or if the responsibility has been delegated to the state, state permits must be obtained to construct and operate a facility.

HOW PERMITS ARE OBTAINED

Federal and state environmental legislation provides a framework for developing regulations to protect the environment from potential sources of pollution, including synthetic fuels projects. The Congress gave EPA legislative mandates to (1) protect air and water quality, (2) ensure a safe drinking water supply, and (3) provide for a generally healthy environment. To accomplish these goals, EPA is involved in a partnership with state and local agencies to formulate and enforce regulations that implement this legislative intent. Since the regulatory process requires industrial operations such as synthetic fuels facilities to obtain permits for their projects, the Corporation relies on the permitting process to ensure that these projects meet established environmental protection requirements.

Under the permitting process, federal and state agencies share responsibilities for protecting the environment as the synthetic fuels industry develops. EPA provides technical

assistance and funding to help state agencies develop and administer the federally mandated programs. For example, in the summer of 1983 EPA issued Pollution Control Technical Manuals to advise state permitting officials, among others, of the expected emissions from synthetic fuels facilities and the technologies capable of controlling them. These manuals are discussed further on page 18.

Although EPA delegates much of its permitting responsibility to states, in all instances, it retains an oversight/reviewing role. Additionally, if EPA delegates a federally mandated permit program, the state's legislation and regulations governing such a program must be at least as stringent as the federal requirements.

Federal and state legislation and regulations generally describe the procedures for applying for and obtaining permits to construct projects. For example, according to a June 1980 DOE report, Synthetic Fuels and the Environment, An Environmental and Regulatory Impacts Analysis, most western states have strict regulations regarding applying for a groundwater permit. Any project or development requiring the use of groundwater in these states must apply to the state for written permission, usually in the form of a permit, authorizing the use of water. The permit process allows the state to maintain control over (1) the use of water by specifying the amount of water to be withdrawn, (2) the use to be made of the water, and (3) the source of the water supply. Separate permits would also be required to release emissions from the projects into the air, water, or land near the project sites.

While all federal and state permit issuance procedures are not alike, the process generally includes the following elements. A project sponsor files an application for a permit to discard or dispose of a specific emission, effluent, or waste material. The permitting agency prepares a draft permit accompanied by a statement explaining the terms and conditions of the permit and any associated major legal or policy issues. The information is made available to the public, who can request hearings on issues about the permit, such as the project's emission levels and their effects. If a hearing is held by either the federal or state permit-issuing agency and a decision is made to grant a permit, a final permit is issued with notice to interested parties, who are given a specific number of days to appeal the terms of the permit and perhaps request another hearing before the permit becomes effective.

Obtaining the necessary permits is obviously a key item in planning any synthetic fuels project. The process of obtaining permits is complex because of the linkage and interdependence of actions required by federal, state, and local governments in reviewing and issuing permits for energy and mineral resource development projects. The process has been simplified, however, in states that EPA has delegated permit authority and in states

that have developed a coordinated review process for permit applications.

During our review, we looked at the permitting processes in two states--Wyoming and Colorado--where extensive synthetic fuels development is anticipated. Wyoming had been delegated total authority for all permitting programs while Colorado had been delegated authority for all but one air quality permit program. To better coordinate its permitting process, Wyoming adopted a very structured legal approach through its "Industrial Development Information and Siting Act." Colorado, on the other hand, adopted a voluntary program designed to encourage concurrent scheduling by appropriate agencies of a project's regulatory review and permitting process. Colorado's "Joint Review Process" works entirely within established regulatory requirements but offers industry participants an alternative to traditionally sequential regulatory reviews. Both the Colorado and the Wyoming approaches try to get all parties together early in the process.

Sponsors have requested permits for a proposed coal liquefaction[2] project under Wyoming's Industrial Development Information and Siting Act, and four oil shale projects have been accepted into the Colorado Joint Review Process. However, the relative merits of these differing approaches could not be evaluated because experience is limited under each of these programs. According to the Corporation's Contract Manager for the Union oil shale project in Colorado, Union has received all the permits necessary to begin operations, and construction of this project was completed in the fall of 1983. However, operating experience has been minimal because of significant technical problems.

Wyoming's permitting process

In Wyoming, permits are required from the State Engineer's Office, the Industrial Siting Administration, and the Department of Environmental Quality Divisions of Air Quality, Water Quality, and Solid Waste Management. Under terms of the Industrial Development Information and Siting Act, the State Engineer's Office first must issue an opinion on whether sufficient water is available for the proposed project. Upon receipt of a favorable opinion, the Industrial Siting Administration begins its deliberations for permit issuance for projects meeting the act's size requirements.[3]

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[2]A term given to synthetic fuels processes that basically convert coal into liquid fuels.

[3]Facilities that can generate 100,000 megawatts of electrical capacity, 100 million cubic feet of synthetic gas per day, or 15,000 barrels per day of liquid fuel. Some of the initial synthetic fuels projects in Wyoming may not meet these size requirements.

The industrial siting decision is made after evaluations are completed of the project's plans and proposals for alleviating social, economic, or environmental impacts on local government entities. The evaluations cover land use patterns, economic base, housing, transportation, sewer and water facilities, solid waste facilities, and other relevant issues. Although the industrial siting permit decision does not preempt other state agencies, the Industrial Siting Administration does consider whether issuance of all preconstruction permits can be expected. Therefore, it may issue the siting permit with the condition that other preconstruction permits must be awarded. This process brings all parties (permitting agencies, developer, and the public) together early in the permitting process.

Colorado's review process

The Colorado Joint Review Process differs from the Wyoming process in that

--permits are not issued during the Joint Review Process,

--project sponsors are given the choice between the Joint Review Process and going to the various permitting agencies individually, and

--concurrent reviews are encouraged rather than sequential regulatory reviews.

Since 1978 the Colorado state government, in cooperation with federal and local agencies and the sponsors of several major energy and mineral resource development projects, has conducted this voluntary program, which is designed to minimize the environmental and health risks, confusion, and potential delays associated with issuing permits for major projects. According to Colorado officials, their process encourages concurrent scheduling of regulatory processes rather than the traditional sequential approach, thus minimizing conflicting and duplicative activities by different permitting entities.

Key activities in the Colorado process are

--designating one representative from each level of government (federal, state, and local) to coordinate activities at their respective levels;

--writing a "Joint Agreement" confirming commitments to the process and a "Statement of Responsibilities" outlining the responsibilities of every federal, state, and local agency involved in the project review;

--holding public meetings to solicit concerns about the project; and

--developing a "Project Decision Schedule Agreement" to signify good faith intentions of all involved to perform their jobs within the agreed upon timeframes.

Implementing the decision schedule is the final stage of the review process. During this stage, the normal regulatory processes are implemented on a schedule, which was planned earlier. The multiagency team monitors the permitting activities and helps resolve coordination problems as they arise. The team also encourages agencies to jointly participate in meetings with project sponsors before application filings, allows sponsors to file only one master application for the permits needed, and encourages agencies to hold joint public hearings.

The Corporation's role in the permitting process

The Corporation closely monitors the permitting process. Section 131(b) of the Energy Security Act requires that the Corporation, in awarding financial assistance, consider the potential compliance of a project's technology with applicable regulatory requirements. To meet this statutory requirement, the Corporation's project evaluations include determining whether projects are likely to obtain required federal and state permits. For example, one criterion the Corporation uses in conducting these evaluations states that the project sponsor must commit resources and develop a realistic schedule sufficient to ensure that necessary permits are likely to be obtained without delaying the project schedule proposed to the Corporation.

In a prior report on the Hampshire Energy Project,[4] we discussed how the Corporation determined if the project met criteria relating to permits. The report states that the Corporation's review of Wyoming's permitting process[5] consisted of identifying the permits required by the Hampshire project; discussing the steps for obtaining the permits with the permitting agencies; and based on numerous discussions with permit officials and the sponsor, determining if and when permits could be obtained.

Based on its discussion with state officials and the project sponsors, the Corporation concluded that necessary preconstruction permits could have been obtained on a schedule that would have permitted construction of the project to begin in the spring of 1983. It therefore initiated financial assistance

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[4]Environmental and Socioeconomic Status of the Hampshire Energy Project (GAO/RCED-83-38, Oct. 22, 1982).

[5]Hampshire was to be constructed in Wyoming, a state which has been delegated permitting responsibility by EPA.

negotiations with sponsors of the Hampshire project.[6] However, in December 1982, Hampshire's sponsors announced that they were postponing project construction plans indefinitely, and the Corporation terminated financial assistance negotiations.

ADDITIONAL RESEARCH INFORMATION IS NEEDED ON POTENTIALLY HARMFUL SYNTHETIC FUELS PLANT EMISSIONS

Certain emissions of synthetic fuels projects are commmon to other energy projects, and consequently regulated through the permitting process, but other potentially harmful emissions unique to synthetic fuels projects, including those which may be carcinogenic, are not. EPA's legislative mandates require that standards be developed on sound scientific data. Although not mandatory in every case, operating experience of commercial-scale synthetic fuels projects would be valuable to develop this information. However, because the synthetic fuels industry has not advanced to full-scale commercialization in the United States and only limited commercial experience exists in foreign countries, much operating information does not exist on such matters as the types and concentrations of potentially hazardous air and water pollutants. This is true in assessing both the impacts of individual projects and the cumulative impacts of several projects in a given area. According to EPA officials, until these data are generated, EPA does not plan to perform the research necessary to set industrywide standards, especially, given other priorities within the agency.

Based on our discussions with regulators, the industry, and environmental groups, this lack of certain industry-specific standards leads to apprehension and concern on their part that all potentially hazardous environmental impacts will not be adequately addressed in the first synthetic fuels plants. However, EPA's Associate Director in the Office of Policy Analysis stated that a growing number of those involved in the synthetic fuels industry would prefer that EPA not set standards on the limited information currently available.

Hazardous wastes are an example of where additional data are needed. Section 3001(b) of the Resource Conservation and Recovery Act precludes EPA from regulating certain wastes from the extraction, beneficiation,[7] and processing of ores and minerals as hazardous wastes defined in the act. The exemption will continue until at least 6 months after the studies required under section 8002(2) of the act have been completed. EPA has

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[6]The Corporation continued its regulatory review during the Hampshire negotiations, as it does for other projects in negotiations, to determine if there is any change in the status of the permits.

[7]To treat in order to improve the properties of.

interpreted the language of the exemption to include wastes from the initial extraction, beneficiation, and processing steps of coal and oil shale technologies. Wastes from processing of intermediate and final products of these technologies are not included in the exemption, however.

The act requires EPA to complete the study before regulating hazardous synthetic fuels wastes. The study must include an analysis of solid wastes produced by synthetic fuels facilities, including such information as the source and annual volume of such materials; previous disposal and utilization practices; and potential dangers, if any, to the human health and the environment from the disposal and reuse of such materials. EPA officials told us that due to the time needed to generate these data, it will be at least several years before the study is completed. Until this time, these wastes cannot be regulated as hazardous.

Consequently, in addition to regulating the first synthetic fuels plants to ensure compliance with existing standards, it is just as important to characterize[8] and monitor the emissions, effluents, and waste materials that these standards do not cover. Such characterizations from the monitoring of facilities can produce essential input into developing a synthetic fuels industry. The status of federal efforts to develop information on the various environmental, health, and safety effects of synthetic fuels is discussed in chapter 3.

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[8]This involves identifying components of a material, including properties responsible for adverse biological effects.

CHAPTER 3

FEDERAL EFFORTS TO DEVELOP DATA ON THE ENVIRONMENTAL AND HEALTH EFFECTS OF SYNTHETIC FUELS PROJECTS

Research on small-scale synthetic fuels projects and data from energy industries using some of the processes likely to be used in synthetic fuels projects indicate that commercial-scale synthetic fuels projects could emit toxic substances, some of which may be carcinogenic. Since synthetic fuels is a new industry, further research information is needed to further identify potential harmful effects. Currently, the primary source of such information is the environmental monitoring plans that the Corporation requires sponsors to prepare for their projects.

POTENTIALLY HARMFUL ENVIRONMENTAL AND HEALTH EFFECTS OF SYNTHETIC FUELS EMISSIONS

While no commercial-scale synthetic fuels projects initiated under the Energy Security Act are operating successfully in the United States, research indicates that these plants will generate risks of exposure to toxic substances comparable to other fossil fuel industries and possibly additional environmental and health risks. Substances such as sulfur and nitrogen compounds resulting from the burning, refining, distilling, or cracking of fossil fuels have been associated with certain types of lung and skin cancers among workers in the industries involved. Public health and ecological risks are associated with the disturbance and contamination of land surface, ground and surface water, and solid-waste landfills, and from inadequate treatment of wastewaters.

Data from fossil fuel plants that are similar in type to those plants proposed for producing synthetic fuels have raised concerns regarding worker health and safety. For example, a 1980 Department of Commerce report[1] stated that a high incidence of skin cancer was documented among workers in coal-tar industries and gas plants. Also, substantial increases in lung cancer mortality rates over those of the general population have been noted among gas generator and coke oven workers. However, these occupational settings are not representative of those in current industry practice or those to be found in commercial synthetic fuels plants. For example, in the coke ovens examined--by the nature of the technology itself--workers were

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[1] Leading Trends and Environmental Regulations That Effect Energy Development, Department of Commerce, Jan. 1980.

often in prolonged contact with cancer-causing organic materials. In contrast, synthetic fuels plants will be closed systems in which such contact should not occur.

The manufacturing of synthetic fuels, however, is not a simple extension of existing technologies such as petroleum refining. According to a report prepared for DOE,[2] producing synthetic fuels from solid raw materials differs from petroleum processing in the variety, types, and complexities of compounds which occur. Second, the range of pressures and temperatures encountered is much wider. For example, the temperature range for petroleum crude processing is -50° to 1200° Fahrenheit and the pressure is up to 1,000 pounds per square inch, whereas in synthetic fuels processing, the temperature range is from -50° to 4000° Fahrenheit and the pressure is up to 3,000 pounds per square inch. Such changes could account for differing environmental and health impacts. In fact, the higher temperatures and pressures reached in coal gasification processes, for example, result in a more complete decomposition of feedstock[3] than is found in petroleum crude processing. These conditions generally destroy (or preclude the formation of) most potentially carcinogenic organic materials found at lower temperatures and pressures.

Oak Ridge National Laboratory chemists found that wastewaters from coal liquefaction test facilities contain a high percentage of phenolic compounds. Phenols, produced by the carbonization of coal, can be tumor-promoting agents; that is, they render cells susceptible to the action of known carcinogens. The same research facility also determined that an acridine derivative, a common waste component from coal gasification and liquefaction processes, can cause fetal abnormalities in certain forms of insects. Preliminary tests indicate that treatment of cricket eggs with impure acridine caused the crickets to develop two head structures. However, the operating conditions of the processes from which the test samples were taken were not representive of a commercial facility and more in-depth research is needed to determine where, within the commercial process, such materials might be produced (if they are) and how modifications of the process might be developed or controls added to ensure that such materials are not released to the environment.

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[2]Thermophysical Properties for Synthetic Fuels, prepared by the Working Group on Thermophysical Properties of Synthetic and Related Fuels under contract to the Department of Energy, Nov. 1982.

[3]The raw material (i.e., coal or oil shale) used in the synthetic fuels project.

An EPA document[4] states that mining certain synthetic fuels feedstock materials such as coal and oil shale has the potential to significantly disturb large areas of the land surface as well as surface and underground water systems. Even underground mining may contaminate surface or groundwater though the surface disturbance problem will be minimized. Large areas may be disturbed because of the amounts of mining needed to provide sufficient feedstock to a synthetic fuels plant--a 50,000 barrel a day oil shale facility will require about 60,000 tons of oil shale to be mined daily.

The disposal of solid waste is another area of concern. For example, an EPA study[5] states that in the case of retorted shale, tremendous volumes of waste, some of which contain toxic trace elements, will need to be disposed of in an acceptable manner. However, considerable research--both privately and publicly funded--has been conducted on spent shale disposal techniques. Also, the permit issued for the Union oil shale project will contain numerous conditions designed to mitigate potential impacts and to monitor retorted shale piles.

FEDERAL RESEARCH ON THE ENVIRONMENTAL AND HEALTH EFFECTS OF SYNTHETIC FUELS TECHNOLOGIES

Several federal agencies participate in programs to identify and document the environmental and health effects of synthetic fuels technologies. While EPA and DOE have provided the most funds for environmental and health effects research, other agencies such as the National Institute for Occupational Safety and Health and the National Institute of Environmental Health Sciences have also been involved. However, without the benefit of commercial-scale operating information, data used in this research have been limited to that from small-scale projects and projects in foreign countries.

Department of Energy

DOE's support for environmental research is a result of its mission to pursue new energy sources using the best technological, economical, and environmental means available. DOE's Offices of Energy Research and Fossil Energy are both involved. The Office of Energy Research supports research to determine the adverse environmental and health effects of energy technologies. The primary emphasis of the Office of Fossil Energy's environmental and health research is to identify methods of mitigating or eliminating these effects.

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[4]Energy/Environment III, EPA Decision Series, Oct. 1978.

[5]Environmental Perspective on the Emerging Oil Shale Industry, EPA, 1981.

For the past several years, DOE has conducted extensive research on the environmental and health consequences associated with advanced energy technologies. These programs include research in health effects, ecological effects, chemistry, industrial hygiene, and risk assessment. The major objective of these programs has been, and continues to be, to ensure the environmental acceptability of emerging energy technologies.

In the case of coal liquefaction and coal gasification, at the inception of DOE's program, the environmental and health data base was essentially nonexistent. Therefore, in the original phases of the program, considerable effort was focused on short-term issues and developing a short-term data base for addressing long-term environmental and health issues on coal conversion. This phase of the program is now complete.

To address the longer-term issues related to coal conversion, DOE is preparing reports that address the status of the environmental and health data base in each area of research, the conclusions which could be drawn from this data base, and the future research needs based on the available data base. In addition, DOE is holding technical review meetings to provide an open forum for discussing future environmental and health research needs in coal conversion technologies.

DOE also is conducting some informal coordination activities by helping support environmental and health research of other federal agencies. For example, DOE is supporting the Department of the Interior's efforts to assess the environmental effects of oil shale. DOE is also helping the National Institute for Occupational Safety and Health prepare worker registries[6] on employees of synthetic fuels plants.

In regard to data base development, DOE's Oak Ridge National Laboratory is developing an environmental, health, and safety prototype data base which government agencies, the Corporation, and as appropriate, industry and the public would have access. Much of the environmental and health data on coal liquefaction processes are located at DOE's Pittsburgh Energy Technology Center. While some of these data are still being reviewed, they are publicly available. Environmental and health data on coal gasification, as well as additional data on coal liquefaction, are located at DOE's Morgantown Energy Technology Center.

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[6]Recordkeeping systems that integrate different sources of information, such as worker exposure data from industrial hygiene measurements, medical screening data, previous job exposures, etc. One of the uses of the registries is to keep track of workers over extended periods of time in order to identify occupationally induced diseases that may take several years to appear; e.g., cancer.

DOE and also EPA rely heavily on DOE's national laboratories to perform the research on the environmental and health impacts of synthetic fuels. For example, DOE's Oak Ridge National Laboratory has been performing multifaceted research programs ranging from identifying problems to developing systems to solve problems. The following information provides an example of the type of synthetic fuels research that the facility performs.

--Specimens of wastewater and crude oil from a small-scale coal liquefaction plant were sent to the laboratory. The wastewater was studied for such factors as its chemical content, toxicity to micro-organisms and fish, and whether its components get into the aquatic food chain. Effluent material and product oil were tested for their biological effects on specific cells and laboratory animals. Synthetic fuels oil samples were subjected to a battery of tests to find out if the substance in question was mutagenic (alters the genes or chromosomes of an organism) or carcinogenic. When tests show the substance to be mutagenic or carcinogenic to animals, there is always the chance it may cause mutations or cancer in humans. In these cases, more extensive tests on the substances are performed to identify the hazardous chemical component and develop methods for neutralizing its effects.

Environmental Protection Agency

EPA's support for synthetic fuels research is based on its responsibility to issue permits and set environmental protection standards for industries, as necessary. EPA has supported major programs in the areas of discharge characterization, pollution control evaluation/development, health/ecological effects, and risk assessment. EPA has completed discharge characterization studies on all major coal and oil shale conversion technologies. Pollution control evaluation has addressed available systems on commercial coal conversion plants and applicable controls on similar process streams in other industries. EPA also has performed laboratory and test facility research on wastewater/gaseous discharge control techniques. Recently, EPA has initiated programs evaluating emissions from the distribution and end uses of synthetic fuels.

A major EPA effort was to publish six Pollution Control Technical Manuals addressing key coal and oil shale conversion systems. The manuals are designed to assist government officials in granting permits for synthetic fuels facilities, synthetic fuels process developers, and other interested parties. They provide technical data on waste streams from synthetic fuels facilities and technologies capable of controlling them. The manuals offer no regulatory guidance, however, allowing the industry flexibility in deciding how to best comply with environmental regulations. EPA also expects to get some

significant testing information from private industry through its premanufacture notification process under the Toxic Substances Control Act. As part of EPA's recent agreement with the Union Oil Company regarding its oil shale project, Union agreed to conduct extensive toxicity tests of various process products and waste streams to ensure that the project does not pose unreasonable health risks to the public and project workers.

National Institute of Environmental Health Sciences

The institute is a Department of Health and Human Services research organization that provides data on the impact of environmental factors on human health to aid those agencies charged with devising and instituting health control measures. The institute supports basic and applied research on the consequences of the exposure of humans and other biological systems to potentially toxic or harmful agents in the environment. The institute also supports efforts to identify hazardous agents before they are released into the environment, including the development, testing, and validation of test systems. These tests can be used to predict the toxicity in man that would occur from exposure to environmental factors resulting from synthetic fuels development.

Once the institute has developed an information base on a particular agent, it transmits the information to regulatory agencies, the medical community, industry, and the general public. This research forms a basis for preventive programs for environmentally related diseases and action by regulatory agencies.

National Institute for Occupational Safety and Health

This institute, also within the Department of Health and Human Services, is the principal federal agency engaged in research to assure a safe and healthful work environment for the American workforce. Protecting the health and safety of the workforce involves surveying work environments to identify problems, conducting research to establish dose-effect relationships on which standards are based, and evaluating the effectiveness of standards and use of prevention and control mechanisms. The institute conducts evaluations to determine whether substances found in workplaces, including synthetic fuels projects, have potentially toxic effects. These evaluations are conducted in response to requests from any employer, employee, representative of employees, or they may be self-initiated.

The institute has implemented programs to evaluate the health effects of chemical and physical agents in coal liquefaction and gasification processes. By assessing the hazards while coal liquefaction and gasification processes are being

developed, the agency believes the risk of adverse health effects can be substantially reduced. If funding allows, the institute will periodically update its assessments and documents, evaluate new emissions data and information as it becomes available, and propose recommendations for standards to protect workers in commercial facilities.

Federal support for environmental and health research programs

Administration changes in energy policies and accompanying budget cuts have reduced federal support for synthetic fuels environmental and health effects research programs. Officials within the affected agencies have mixed opinions regarding the appropriateness of these reductions.

DOE and EPA administrative officials have justified the budget cuts in the research area on the basis that overall efforts to commercialize synthetic fuels have slowed considerably; thus, the environmental and health effects of these technologies are not considered an immediate threat. DOE and EPA officials also point out that synthetic fuels is just one of the many research areas in their agencies that have experienced budget cuts. These officials also stated that certain areas of synthetic fuels control technology research cannot be conducted cost effectively unless commercial facilities are available to generate the information on the types and concentrations of potentially hazardous pollutants. In addition, they point out that project sponsors have the capability to perform certain environmental research.

Environmental scientists within EPA and at national laboratories recommended that environmental and health effects research be performed before synthetic fuels reach the commercialization stage to prevent workers from becoming "guinea pigs." However, some scientists said that they are losing interest in long-term research projects that the federal government sponsors. These scientists warned that if uncertainty continues and/or EPA and DOE reduce their research funding, it will not only delay concluding ongoing research projects but also will likely reduce the research staff and quality of facilities at national laboratories and research centers.

The proposed fiscal year 1984 EPA budget for synthetic fuels research is $4.8 million, a decrease of $1.1 million from 1983. With this $4.8 million, the agency plans to sponsor environmental and health risk analyses for oil shale- and coal-based processes; characterize emissions and effluents from synthetic fuels facilities; evaluate control technology performance, reliability, and cost of oil shale- and coal-based processes; and provide technical support to the regions and states as they review Environmental Impact Statements and permit applications.

According to the Director of DOE's Office of Health and Environmental Effects Research, his office's expenditures relating to synthetic fuels reached levels close to $30 million in fiscal years 1981 and 1982. However, as DOE reduced its work in project-specific synthetic fuels research, the office's annual research budget dropped to $13 million in fiscal year 1983 and will be $9.7 million in fiscal year 1984.

The synthetic fuels research budgets for the National Institute of Environmental Health Sciences and the National Institute for Occupational Safety and Health had ranged from $2 million to $4 million per fiscal year for each agency from 1975 through 1980. However, funding has been reduced to the point that these agencies did not receive any funds in fiscal year 1983 for synthetic fuels research nor will they receive funds in fiscal year 1984 for this research.

Federal coordination of synthetic fuels environmental and health effects research programs

In addition to DOE's informal coordination activities discussed on page 17, two formal interagency efforts have planned and coordinated federal environmental and health effects research programs. In 1973, a Federal Interagency Energy/Environment Research and Development Program was established. In 1977, a presidential directive set up the Federal Interagency Committee on the Health and Environmental Effects of Energy Technologies. The federal government continues to support some energy-related research and development programs; however, support for the Interagency Research and Development Program has been reduced drastically and the Interagency Committee has been terminated. The activities of these entities and the reasons for their funding reductions are summarized below.

During the 1973-74 oil embargo, the Federal Interagency Energy/Environment Research and Development Program was established to identify programs for developing domestic energy resources, including coal and oil shale, without damaging the environment. Funds to support this program were added to the EPA budget by Congress to pass through to other federal agencies to conduct research on the environmental and health effects of energy development. This program was thus referred to as the "Pass-through Program." It established a mechanism for planning, coordinating, and funding research and development on energy use and pollution control technology activities. The program operated on the premise that environmental research should be structured to identify long-range health effects and other unexpected problems. It also provided a vehicle for utilizing expertise and experience that each agency could offer and for communicating the results of all agency research efforts to the research community and the general public.

The Pass-through Program, particularly until 1981, operated as planned. EPA did not only its own research but also funneled monies to other agencies such as DOE, the National Institute of Environmental Health Sciences, and the National Institute for Occupational Safety and Health to initiate control technology and environmental and health effects research.[7] The program developed data on groundwater impacts and methodologies for environmental and health assessments of emerging energy technologies. Work to identify any hazardous components of waste streams was also initiated at two DOE coal liquefaction research projects.

As stated in the previous section, EPA's total research budget has been reduced and synthetic fuels research has been given a lower priority than most other research areas. Regarding the Pass-through Program budget, funding ranged between $19 million and $32 million in fiscal years 1975 through 1982; however, funds were reduced to about $2 million in fiscal years 1983 and 1984. According to an EPA official, EPA has used some of these remaining funds to supplement its own research and has given the remaining funds to DOE's national laboratories to perform environmental and health risk analyses. The National Institute for Occupational Safety and Health and the National Institute of Environmental Health Sciences, on the other hand, which were researching the health problems likely to affect synthetic fuels plant workers, received no further funding in this area.

In congressional testimony, a leading environmental scientist[8] stated that the institutes have played important roles in synthetic fuels research, for example, developing industrial hygiene practices and protective clothing. He stated that with the loss of the Pass-through Program funding, the National Institute for Occupational Safety and Health and the National Institute of Environmental Health Sciences efforts have halted and other agencies are not addressing these issues.

Another federal program designed to help coordinate environmental and health effects research on synthetic fuels was the Federal Interagency Committee on the Health and Environmental

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[7]While EPA did funnel monies to other agencies for environmental and health research, it had no control over how these monies were spent. Also, DOE environmental and health research efforts were much more extensive than what was funded through the Pass-through Program.

[8]Dr. Richard D. Brown, department staff of the Mitre Corporation and former Executive Secretary for the Federal Interagency Committee on Health and Environmental Effects of Energy Technologies, before the Subcommittees on Energy Development and Applications and on Agriculture Research and Environment, House Committee on Science and Technology, Oct. 1981.

Effects of Energy Technologies. In his 1977 environmental message, President Carter directed the Secretary of Energy; the Secretary of Health, Education, and Welfare; and the Administrator of EPA to establish a joint program to identify the environmental and health problems associated with advanced energy technologies and review the adequacy of environmental and health research programs. In response to the President's directive, representatives of the three agencies formed the Interagency Committee. The committee's goals were to (1) review and identify specific environmental and health issues and potential problems associated with developing and commercializing conventional and advanced energy technologies, (2) identify the research information required to resolve the uncertainties of assessing relevant impacts, (3) specify research projects to provide such information, and (4) review the adequacy of current federal research regarding these projects.

To attain these goals, the committee sponsored a series of workshops and established working groups to address the environmental and health consequences of energy technologies. Workshops were held between 1978 and 1980 on the health and safety, ecological, and air quality effects of coal gasification and liquefaction and oil shale development. Typically, the workshops consisted of biomedical and environmental scientists discussing specific environmental and health issues and problems associated with commercializing synthetic fuels. Information needs were identified and research strategies were conceived for addressing identified issues and problems. Research needs were compared with existing or planned federal research programs to provide a basis for strengthening the federal programs. However, the committee was not authorized the funds to initiate research programs to fill data gaps. Therefore, committee representatives, having accomplished their objective of identifying research gaps, disbanded in early 1981 without any assurance that the administration would accept their recommendations.

A report on committee conclusions entitled Health and Environmental Effects of Synthetic Fuel Technologies: Research Priorities was published in April 1981. The report outlined many existing research gaps on the environmental and health effects of coal gasification and liquefaction and oil shale development. The following excerpts from the report identified some research needs and suggested research programs in the health and safety, ecology, and air quality areas.

--Health and safety--Determining the degree of worker exposure to toxic substances within the workplace is critical. Animal toxicology, particularly inhalation research and dermal exposure, is critical to the assessment of the impact of worker exposure to airborn chemicals. Little research has been conducted in this area with respect to pollutants from synthetic fuels

facilities, largely because of the lack of appropriate materials in amounts sufficient for testing and the relatively high costs.

--Ecology--Research should encompass short- and long-term studies at the population, community, and ecosystem levels. Cumulative effects must be identified through regional studies, such as those associated with western oil shale development. Preoperational baseline data collection is an important part of regional studies, and this information can obviously only be acquired before development takes place. Broad areas of high priority research should relate to liquid product and wastewater spills, solid waste disposal and reclamation, changes in land use patterns and secondary impacts, and development of test and evaluation techniques unique to synthetic fuels research.

--Air quality--This research will require additional source and ambient air characterization, sampling, and monitoring of those pollutants common in conventional fossil fuels. These include the oxides of sulfur and nitrogen, particulate matter, and carbon monoxide. Synthetic fuels processing facilities will likely emit additional pollutants, which will require the development of unique, relatively low cost, reliable instrumentation and techniques for sampling and analysis.

ENVIRONMENTAL AND HEALTH INFORMATION WILL BE GENERATED BY ENVIRONMENTAL MONITORING PLANS

Because the Pass-through Program has been curtailed and the Federal Interagency Committee on the Health and Environmental Effects of Energy Technologies has been terminated, the federal government no longer has a formal means for communicating environmental and health research needs or coordinating the research efforts such as those recommended by the Interagency Committee. Because of the environmental and health uncertainties surrounding the emerging synthetic fuels industry, a system needs to be in place to identify potential hazardous substances, their effects, needed additional research, and possible regulatory measures. The environmental monitoring plan system that the Corporation put in place could potentially satisfy these needs.

The Energy Security Act states that the Corporation must require project sponsors to develop plans to monitor the environmental- and health-related emissions from their synthetic fuels projects. However, the act provides little guidance on how the monitoring plan provision is to be implemented other than to require that project sponsors develop a monitoring plan after contract execution.

In May 1982, the Corporation sent letters to DOE, EPA, appropriate state agencies--referred to as the consulting agencies--and current project sponsors, which provided some information on how it planned to implement this provision of the act. The letters stated that environmental monitoring plans would be developed in two stages. The first stage entails developing an outline of the plan. Sponsors are expected to consult with DOE, EPA, and appropriate state agencies on outline contents. The outline is expected to contain a list of monitoring tasks and must be acceptable to the Corporation's Board of Directors for incorporation into the financial assistance agreement. According to Corporation staff, this step helps underscore to sponsors the importance of environmental monitoring to the Corporation. The second stage requires developing a detailed environmental monitoring plan consistent with the terms of the outline. The plan must include specific monitoring reports to be prepared, locations of monitors, and estimates on the frequency of monitoring.

In March 1983, the Corporation staff developed interim detailed guidelines for preparing outlines and plans and presented them to the Corporation's Board of Directors. After a period for public comment, the Corporation's Board approved the guidelines at its July 1983 meeting.[9]

The guidelines state that the project sponsors will be required to perform environmental compliance monitoring and, as appropriate, supplemental monitoring. While compliance monitoring is a part of the sponsor's regulatory obligations and will have to be performed regardless of the environmental monitoring plan requirement, the Corporation included it in order to develop a coordinated data base for future projects' use and provide a basis for evaluating the proper scope of supplemental monitoring. The purposes of supplemental monitoring are to (1) provide data on the types and amounts of certain unregulated substances emitted from a synthetic fuels plant, (2) require that worker exposure and worker health be monitored and information be placed in a "worker registry," and (3) require summaries and analyses of data by project sponsors. The Corporation will determine the need for and scope of supplemental monitoring on a project-by-project basis, considering, among other things, those unregulated substances of significant environmental and health concern. Thus, some provision will be made for collecting data on unregulated substances from the Nation's first commercial synthetic fuels plants.

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[9]EPA also published a related document in July 1983, Environmental Monitoring Reference Manual for Synthetic Fuels Facilities. This manual contains information about likely pollutants from synthetic fuels plants and how they can be monitored.

The guidelines state that after the project sponsor develops a draft environmental monitoring plan outline, it should be submitted to the Corporation's consulting agencies for comment. The consulting agencies should review and comment on the outline within 5 weeks. In responding to the comments of the consulting agencies, the sponsor should prepare a revised outline and/or explain the specific reasons for not accepting consulting agencies' suggestions. This material is then submitted to the consulting agencies, who are expected to complete their final review and comment within 4 weeks. The Corporation will evaluate the revised outline and consulting agencies' comments and will ultimately make a decision on its acceptability.[10] The sequence for developing the monitoring plan, including the time periods for consulting agencies' comments, follows the steps described for the outline. DOE and EPA officials involved in reviewing environmental monitoring plan outlines stated that the sponsors and the Corporation have been very responsive to their comments on the outlines, making appropriate changes and additions.

The guidelines direct that sponsors submit to the Corporation quarterly and annual reports containing summaries of data on the monitoring plan requirements. The guidelines state that the Corporation will use these reports to develop an information base for the construction of additional synthetic fuels projects as well as address the environmental components of Corporation reports to the Congress required by the Energy Security Act. The format and contents of the monitoring reports will be developed by sponsors after consulting with EPA, DOE, and appropriate state agencies and will be indicated in the monitoring plan. Elements required to be included in each quarterly report are (1) the identification and amounts of unregulated substances found to be of significant environmental and health concern, (2) any significant changes in the terms of the environmental permits, (3) instances where permit conditions have been exceeded, and (4) copies of all compliance reports sent by sponsors to the regulatory agencies. The annual reports are to contain summary information and analyses of the data presented in preceding reports within the period of coverage. The reports must indicate, based on monitoring information, if there are any actual or potential environmental or health

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[10]The Corporation will determine whether the outline or plan has included (1) an appropriate list of substances to be monitored, (2) a monitoring procedure adequate to produce a statistically valid body of data, (3) the development of health and exposure data on plant workers, including the requirements for maintenance of a worker registry, (4) a sound quality assurance/quality control program, (5) an adequate reporting and data management program, and (6) a commitment to other monitoring if circumstances during plant operations dictate.

impacts and whether any problem areas identified in past reports have been resolved, and if not, what corrective action is being taken.

The guidelines further state that the contents of all environmental monitoring outlines and plans (including drafts and revisions), all formal written comments of the consulting agencies on the outlines and plans, minutes of monitoring review committee meetings (discussed on p. 28), and all quarterly and annual reports will be available for public review in the Corporation's public reading room.

Data dissemination and analysis

Although the Corporation will be establishing a data base using the information provided by its project sponsors, it must allow sponsors the opportunity to designate monitoring information as confidential. Since the Trade Secrets Act (18 U.S.C. 1905) is applicable to the Corporation, the Corporation cannot disclose certain types of confidential information. The Corporation's Guidelines on Disclosure and Confidentiality state that the Corporation will generally not make any decision on the validity of confidentiality markings of sponsors at the time of submission, only when a request is made for this information. At that time, the relevant sponsors will have an opportunity to support the confidentiality markings of such information, after which the Corporation will make its determination.

The environmental monitoring plan guidelines state that the Corporation does not expect that the monitoring data, data summaries, data analyses, and reports will contain proprietary or otherwise confidential business information. Moreover, the Corporation is seeking to minimize the sponsor's use of confidentiality markings by making advance determinations with the sponsor as to what monitoring information will not be confidential. Also, Corporation officials stated that since the quarterly and annual monitoring reports will consist of data aggregated to a level unlikely to compromise a proprietary process within a project and that disclosure of emissions data would generally not cause competitive harm to sponsors, confidential markings should be minimal and not be of serious consequence. However, until projects are operating and sponsors have submitted monitoring data and reports, it cannot be determined whether the needs of those agencies involved in further research and regulatory assessments will be fully satisfied.

With regard to EPA's regulatory responsibilities, withholding of emissions data resulting from the environmental monitoring plans could present a problem. EPA cannot collect data on an unregulated emission unless it has embarked on a formal standards setting effort for that emission, which according to EPA's Associate Director in the Office of Policy Analysis, can be timely and costly. The EPA Associate Director said that, given other higher priorities within EPA coupled with the slow

development pace of synthetic fuels, few if any, standards setting efforts in regard to synthetic fuels emissions will be initiated in the near future. Therefore, he stated that EPA must rely on the Corporation's environmental monitoring plan process to collect environmental data from unregulated emissions of the initial synthetic fuels plants. This data should enable EPA to make more informative decisions on which emissions should enter into EPA's standards setting process.

The Energy Security Act gives the Corporation authority to require project sponsors to monitor and subsequently report on the effects of unregulated pollutants. EPA can only make recommendations to the Corporation, in its role as a consulting agency, in establishing monitoring programs. Although the agency has no assurance that its recommendations will be carried out, the Corporation stated that it will continue to rely heavily on the input from its consulting agencies in making its acceptability determinations; and in those areas where an EPA recommendation is not implemented, the sponsors must justify in writing the basis for its decision.

Another issue concerns the procedure the Corporation established to analyze monitoring information. According to the Corporation's Environmental Monitoring Plan Guidelines, each financial assistance contract entered into by the Corporation will require establishing a Monitoring Review Committee consisting of representatives of the Corporation, the sponsor, and the consulting agencies. The Corporation's representative will act as chairperson for the committee, which will meet at least once a year.

The guidelines state that the committee will assess the sponsor's environmental monitoring data, including the quarterly and annual reports. This review is to determine if the data contain any significant findings; for example, identifying trends in pollutant releases from the project, which could result in future major environmental and health impacts. The Corporation shall prepare minutes of each meeting.

Based on their review, members of the committee can recommend to the Corporation that monitoring tasks be discontinued, modified, or added; new analytical techniques or instrumentation be substituted; or the reporting formats be changed. The Corporation, after consulting with all committee members, may authorize such changes. The committees will, consequently, have the ability to be the "watchdogs" for environmental and health problems associated with the first synthetic fuels plants.

Other federal agencies, such as the National Institute for Occupational Safety and Health and the National Institute of Environmental Health Sciences, could provide valuable expertise and assistance in this process. Although the only federal agencies named as consulting agencies in the Energy Security Act are DOE and EPA, the act does not state that other federal

agencies must be excluded. It seems that when other such agencies could assist the Corporation in determining the environmental and health acceptability of synthetic fuels projects, their assistance should be requested.

The Corporation's intentions are to keep the number of members on these committees at a manageable level. Corporation officials stated that by extending membership outside the consulting agencies, the committees would become too cumbersome, lose their effectiveness, and limit the free flow of dialogue. As an alternative, it will encourage other interested agencies to express their thoughts, opinions, and ideas to consulting agency representatives before the committee meetings. We cannot determine whether this approach will be effective until these committees have been functioning over a period of time.

CHAPTER 4

CONCLUSIONS, AGENCY COMMENTS, AND OUR EVALUATION

The environmental and health effects of a viable synthetic fuels industry must be considered in its development. Since no commercial-size synthetic fuels plants are operating successfully in the United States, environmental monitoring systems and controls have been developed from research and operations at small-scale projects and other related energy and chemical facilities. Research indicates that if these plants are not properly regulated, environmental and health dangers could develop from the emissions of commercial-size synthetic fuels projects. Additional research must be done to identify the effects of emissions from these projects and controls needed so that effective emissions standards (in addition to those already in place) can be established to protect both the workers of these projects and the public. The monitoring required for projects receiving Corporation assistance is an important first step in generating an information base to identify potential concerns.

The permitting process plays a major role in regulating the environmental and health effects of the emissions from synthetic fuels projects. However, this process does not regulate those potentially hazardous emissions where standards have not yet been established. The effects of these emissions cannot be analyzed until operating data are generated from commercial-scale plants.

The Corporation, pursuant to the environmental monitoring plan requirement of the Energy Security Act, has established a system in which the generation and dissemination of commercial data on the environmental and health effects of synthetic fuels can be accomplished. The Corporation is requiring project sponsors, in developing environmental monitoring outlines and plans, to consult with DOE, EPA, and appropriate state agencies. The Corporation has strongly encouraged the project sponsors to consider the comments of the consulting agencies in revising these outlines and plans. According to DOE and EPA officials who have reviewed the outlines thus far developed, the project sponsors and the Corporation have been very responsive to their comments and have made the appropriate changes and additions.

The Corporation is requiring that the sponsors submit quarterly and annual reports to the Corporation containing summaries of data related to the monitoring plan requirements. Except for that deemed confidential, all information contained in the reports will be available to the public. However, the Corporation wants to keep the confidential information to a minimum by making advance determinations with the project sponsor of what information will not be confidential. By minimizing the

amount of confidential monitoring information, EPA can obtain certain emissions data on unregulated pollutants. EPA may need this information to determine if future regulations are necessary.

The Corporation is also establishing monitoring review committees consisting of representatives of the Corporation, the project sponsor, and the consulting agencies. The committees will analyze the monitoring information and make recommendations regarding whether monitoring tasks should be discontinued, modified, or added; new analytical techniques or instrumentation be substituted; or the reporting format be changed. While membership on the committees will be limited, the Corporation is encouraging other agencies wishing to advise the committees to do so through the consulting agencies.

The permitting process in combination with the environmental monitoring plan process sets a framework to allow the environmental and health effects of synthetic fuels to be identified, monitored, and regulated. While some issues and uncertainties have surfaced, the key responsible federal entities are working toward resolving them. However, with only a small number of projects under construction and no commercial projects initiated under the Energy Security Act yet operating successfully in the United States, it is too early to tell how well the systems in place will work to assure that health and the environment are protected as the synthetic fuels industry develops.

AGENCY COMMENTS AND OUR EVALUATION

We provided draft copies of this report to the Corporation, EPA, and DOE for comment. EPA concurred with the facts and conclusions stated in the draft report as it related to its activities. The Corporation stated that it found the draft report to be factually and analytically sound in the areas relating to the Corporation's activities. DOE, however, had a number of concerns.

DOE stated that the draft report did not give sufficient coverage to its efforts to address the environmental and health effects of synthetic fuels. While we initially only intended to provide summary information on DOE's activities in these areas, the final report now includes additional information on the roles of DOE's Offices of Fossil Energy and Energy Research (see pp. 16 and 17). We also provide additional information on DOE's role as a consulting agency in the Corporation's environmental monitoring plan process (see pp. 25 and 26).

DOE was concerned that the importance of the Pass-through Program, a program set up in the mid-1970's to coordinate

environmental research relating to energy development, was overemphasized in the draft report. This report describes the Pass-through Program as an example of a formal coordinating mechanism that existed between several federal agencies involved in environmental research (see pp. 21 and 22). We are not making a judgment of the program's past effectiveness nor are we calling for it to continue. Furthermore, page 17 of the report points out that DOE has been involved in the environmental research efforts of other federal agencies. The report also discusses the coordination between federal agencies that will be accomplished through the Corporation's environmental monitoring plan process (see pp. 25 to 29).

DOE stated that we should distinguish between the research and data needs relevant to regulated versus unregulated pollutants. While we recognize DOE's concerns, our purpose was to emphasize the most critical concern about both regulated and unregulated pollutants; that data must be generated from commercial-scale synthetic fuels projects in order to perform thorough assessments of their environmental and health effects (see p. 30).

DOE was also concerned that the draft report did not sufficiently describe the permitting status or the environmental and health monitoring that will be performed at the Union oil shale and Great Plains coal gasification projects. The final report briefly discusses Union's permitting status (see p. 9). It also discusses Union's agreement with EPA to perform certain tests to assess environmental and health risks (see p. 19). However, the environmental and health monitoring work relating to Great Plains was not included in this review since an extensive effort has been underway, required by the Department of Energy Act of 1978--Civilian Applications (Public Law 95-238), to review and report on the Great Plains project every 6 months. Our September 1983 report, Status of the Great Plains Coal Gasification Project--Summer 1983 (GAO/RCED-83-212), contains a discussion of the project's environmental program.

APPENDIX I

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 7 1983

OFFICE OF
POLICY AND RESOURCE MANAGEMENT

Mr. J. Dexter Peach
Director
Resources, Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

On August 22, 1983, the General Accounting Office (GAO) issued a draft report entitled "Federal Efforts to Address the Environmental and Health Effects of Synthetic Fuels Projects Must be Coordinated" (Code 306296) to affected departments and agencies for review and comment.

As suggested in your transmittal letter, the Environmental Protection Agency's (EPA's) Office of Policy Analysis has worked closely with William C. Oelkers, Group Director, and Dennis Matteotti, Senior Evaluator, in revising and improving this report. Through a series of meetings and an exchange of information over the past three weeks, we have jointly reached agreement on issues which were raised while reviewing the report.

We appreciate the opportunity to work with your staff. We would also like to commend your auditors who were responsible for this report for their cooperation and dedication.

Sincerely yours,

John M. Campbell, Jr.
Acting Associate Administrator
for Policy and Resource Management

United States Synthetic Fuels Corporation
2121 K Street, N.W. Washington, District of Columbia 20586 Telephone: (202) 822-6600

October 3, 1983

Mr. J. Dexter Peach
Director
Resources, Community, and
Economic Development Division
United States General Accounting Office
Washington, DC 20548

Dear Mr. Peach:

The U.S. Synthetic Fuels Corporation has reviewed the General Accounting Office's report entitled "Federal Efforts to Address the Environmental and Health Effects of Synthetic Fuels Projects," and we find it to be factually and analytically sound in the areas relating to the Corporation's activities. In particular, we concur with the GAO's emphasis that data from commercial-size facilities are critical to performing thorough assessments of the environmental and health effects of the emerging synthetic fuels industry. I would also like to highlight briefly several aspects of the Corporation's environmental activities discussed in the report.

Chairman Sharp asked the GAO to investigate, among other things, how the "existing system" is working to protect the environment while the synthetic fuels industry is being developed. As the GAO report states, the Corporation, pursuant to its responsibilities under Section 131(e) of the Energy Security Act, has developed Environmental Monitoring Plan Guidelines. These Guidelines establish a clear basis on which environmental data from the nation's first commercial synthetic fuels facilities can be collected and disseminated. The Guidelines establish a system which fully integrates the participation of the "consulting agencies"--the Environmental Protection Agency, the Department of Energy, and selected state agencies--into the monitoring plan development process. This process has brought project sponsors and consulting agency personnel together in a highly cooperative and productive manner. The GAO staff did not have the opportunity to review the numerous monitoring plan documents which have recently been developed pursuant to these Guidelines, but approximately twenty projects have submitted such documents, which are currently under review by the Corporation's consulting agencies. We believe the quality of these documents clearly indicates that the process is working successfully and that Corporation-assisted projects will have sound monitoring programs.

The Guidelines also require the establishment of a Monitoring Review Committee for each project. The committees will provide the consulting agencies with access to, and a role in the review of, the results of the sponsors' monitoring activities. Moreover, the consulting agencies and the sponsors can recommend to the Corporation modifications to sponsors' monitoring programs as future circumstances change. We believe the Monitoring Review Committees will be an excellent vehicle through which EPA, DOE, and state agencies can identify the research tasks necessary for assessing the environmental effects of synthetic fuels facilities and establishing scientifically based standards for their control.

J. Dexter Peach
U.S. General Accounting Office
October 3, 1983
Page 2

Concerning Chairman Sharp's question on the potential environmental effects of future projects, the Corporation's Guidelines provide that the Corporation's primary focus in sponsors' monitoring programs is on substances which are expected to be released from synthetic fuel plants but are not currently regulated under existing laws. Further, the Guidelines require that each project sponsor perform occupational exposure and medical surveillance monitoring and establish a long-term worker registry to assess the potential occupational health impacts of synthetic fuel plants operations. Data on unregulated substances and data collected in worker registries, which will supplement information being collected pursuant to federal and state permits, will be essential in understanding the environmental effects of the emerging synthetic fuels industry.

While we will rely on DOE and EPA to comment on the report's statements regarding the impact of funding reductions on their synthetic fuels activities, we would note that we have not seen evidence that such reductions have adversely affected the permitting of synthetic fuels facilities or other environmental activities which we review. We do not believe the report supports the concerns it raises on this matter. (See GAO note.)

The Corporation places great importance on meeting its environmental responsibilities. I believe we have a unique opportunity to study the environmental effects of the nation's initial commercial facilities so that the synthetic fuels industry will develop in an environmentally safe manner.

The Corporation wishes to thank the GAO for the opportunity to provide you with these comments. We hope they are helpful.

Sincerely,

Edward E. Noble
Chairman of of the Board

GAO note: This section was deleted from the final report.

APPENDIX III

Department of Energy
Washington, D.C. 20585

OCT 4 1983

Mr. J. Dexter Peach
Director, Resources, Community
and Economic Development Division
U. S. General Accounting Office
Washington, DC 20548

Dear Mr. Peach:

Enclosed are the requested comments on the General Accounting Office's (GAO) draft report entitled "Federal Efforts to Address the Environmental and Health Effects of Synthetic Fuels Projects Must be Coordinated." Representatives of various Department of Energy (DOE) offices met with representatives from your office on September 14, 1983, to provide additional information about environmental, health and safety research and coordination efforts pursued by DOE. We appreciate the willingness of your staff to meet with us about our concerns. However, since time constraints do not allow us to see any possible revisions which might be made in the draft report, we are also submitting these comments to you with this letter.

We appreciate being afforded the opportunity to comment and hope that the comments are helpful in producing the final report.

Sincerely,

Martha O. Hesse
Assistant Secretary
Management and Administration

Enclosure

DOE Comments on Draft GAO Report
"Federal Efforts to Address the Environmental and Health Effects of Synthetic Fuels Projects Must be Coordinated"

1. General Comments

a. Review of the subject draft GAO report leads one to believe that GAO does not understand completely the existing processes within the Federal Government for acquiring, handling, and communicating scientific information concerning synthetic fuels. Additionally, it is felt that additional DOE offices actively involved in synfuels should have been interviewed, and the most active ones that were interviewed should have been better considered, with their comments more completely reflected in the report. Why these important groups actively involved in synthetic fuels that provided comments were not more fully considered and utilized, and why additional important groups in DOE were not interviewed, is not understood. The following are several examples:

1) The GAO may have been thorough in their contacts with the EPA—which accounts for the regulatory emphasis in the report—but it is not evident that the scope of DOE's program, particularly that of Energy Research (ER) is understood. For example, on page 17*, GAO references the development of techniques to characterize and test emissions but makes no reference to the main thrust of the program which centered on the health and environmental consequences of synthetic fuel technologies. Also, Chapter 3 cites only minor research activities, despite extensive DOE research efforts in both the Offices of Fossil Energy and Energy Research, information dissemination, and coordination in recent years. We believe the report must take into account the DOE program and, more importantly, the coordination mechanisms that exist within DOE and between DOE and the Synthetic Fuels Corporation (SFC).

2) The EPA Pass-through program is identified on Page 21*, as the principal mechanism for the distribution of synthetic fuels funding and the coordination of interagency activities. In fact, it served neither of these functions. DOE coordinates research efforts and integrates technical development of synthetic fuel process with health and environmental effects research. The DOE program was developed outside the "umbrella" of the Pass-through program, but included EPA as a participant.

3) In evaluating the magnitude of the health and environmental effects of synfuels research, the report emphasizes a tabulation of EPA Pass-through funding when there are other (possibly more important) criteria. Funding levels alone are not an adequate measure of research activities in progress—and concomitant coordination among agencies and others. For example, certain basic research programs (which are not directed toward one particular technology) in DOE and other agencies (i.e., in PAHs and other organic compounds) have relevance to synthetic fuels.

* Page numbers have been changed to correspond to the final report.

4) The Office of Health and Environmental Research in ER alone has sponsored over $20 million of research on synthetic fuels each year for the past several years at four national laboratories including Oak Ridge National Laboratory (ORNL), Pacific Northwest Laboratory (PNL), Los Alamos National Laboratory (LANL), and Argonne National Laboratory (ANL). Brookhaven National Laboratory (BNL) and Lawrence Livermore National Laboratory (LLNL) have been minor participants in synfuels research and coordination with other groups. Multi-laboratory status reports summarizing much of the ER work in coal liquefaction and coal gasification are included for your consideration. In addition to the ER funds, in FY 83, Fossil Energy funded approximately $12 million for environmental research and compliance effort and, in prior years, funded even larger programs in environmental research studies where many final reports on toxicology, etc., are now being delivered and disseminated to the environmental and industrial community.

5) With regard to interagency committee activities, Dr. Richard Brown is an appropriate source of information about some interagency activities; however, there are other interagency activities--some less formal and smaller--that have proven to be effective. A complete picture of the strengths and weaknesses of existing interagency coordination cannot be obtained from a single source no matter how knowledgeable. Program managers and senior scientists who are engaged actively behind the scenes in such committees and who are implementing the programs in concert with other agencies have equal or better perspectives. Without this background information, the need for the value of a formal interagency group, as suggested by GAO, has not been established. In fact, a single focal point for coordination may be restrictive or damaging to successful interagency functions that are not addressed in the report.

[GAO COMMENTS:

In the course of our audit, we discussed the environmental and health effects of synthetic fuels with representatives in DOE's Offices of Fossil Energy and Energy Research, the Brookhaven, Lawrence Livermore, and Oak Ridge National Laboratories, and the Laramie Energy Technology Center. All comments provided by these officials were not reflected in the draft report since our purpose was to summarize and give examples of the work being performed by the Department. We have included additional information on DOE research activities, particularly those performed and directed by the Office of Energy Research. (See p. 17.) We also discussed that DOE supports the environmental and research efforts of other government agencies such as the Department of the Interior and the National Institute for Occupational Safety and Health and provided updated information on the coordination that exists between DOE and the Synthetic Fuels Corporation in regard to the Corporation's environmental

monitoring plan process. (See pp. 17, 25, and 26.) In addition, DOE stated that the draft gives an undeserving endorsement to the Pass-through Program. We do not believe the draft endorses this program, but merely points out that it is an example of a formal coordinating mechanism for federal agency environmental and health research. (See pp. 21 and 22.) Further, we are not calling for additional funding for the Pass-through Program. We believe that the Corporation's environmental monitoring plans have the potential to effectively identify areas involving environmental and health risks. Also the Monitoring Review Committees being established by the Corporation for each project can be the vehicle to coordinate any additional research needed to resolve these matters. (See pp. 28 and 29.)]

In the report GAO should distinguish between: (1) research and data needs relevant to compliance-related monitoring of criteria pollutant emissions from synfuel activities versus research aimed at better understanding the potential health and environmental effects of the complex materials associated with synfuel operations for which no regulations exist; (2) the existence of and differences in research program objectives and content for the DOE synfuels-related health and environmental research sponsored by the Office of Fossil Energy and the Office of Energy Research; (3) the quite different missions and priorities for energy-related research by NIEHS and NIOSH; (4) the EPA-sponsored Energy Program versus its media-oriented criteria pollutant research efforts; and (5) the role and activities of industry and the SFC and how these groups coordinate with DOE. The report incorrectly implies that most of the above entities are performing roughly similar functions.

[GAO COMMENTS:

As suggested by DOE, we incorporated information in the final report to better distinguish between the roles of DOE's Offices of Fossil Energy and Energy Research. (See p. 16.) Also, revisions were made to clarify the research and data needs of regulated versus unregulated emissions. (See p. 12.) Further, additional information has been incorporated on DOE coordination efforts with industry and the public. (See p. 17.) We believe the report adequately reflects the roles and missions relating to the environmental and health effects of synthetic fuels of each of the other agencies discussed in the report--EPA, the National Institute for Occupational Safety and Health, and the National Institute of Environmental Health Sciences. (See pp. 18 to 20.)]

b. After reviewing the report, it appears that the principal issue is funding levels for research and development, rather than an existing gap in regulatory responsibility and required coordination. The funding issue is one to be resolved between the legislative and executive branches and is outside the scope of our review. The Department's position is that the most beneficial time to conduct research in toxicology, health, safety, and other environmental areas is at the early stages of synfuels development and therefore, is pursuing research within our available funding levels.

[GAO COMMENTS:

Although pages 20 and 21 of the final report discuss funding for federal research on environmental and health effects of synthetic fuels development, research funding is not the report's "primary" issue. The report emphasizes that known environmental and health impacts of synthetic fuels are regulated through the permitting process and that data from commercial-scale synthetic fuels projects are essential before a better assessment of all environmental and health effects of synthetic fuels can be made. (See p. 12.)]

c. Many of the environmental, health and safety (EH&S) concerns expressed throughout the report are not unique to the synfuels industry. They are equally applicable to the electric utility industry, chemical industry, and others. In fact, because of experiences learned from these other industries, the Department has developed the Supplemental Environmental Program (SEP) concept that has as its goal the generation of environmental data necessary to predict and then alleviate any EH&S hazards associated with synfuels development. A later comment will provide a specific example.

[GAO COMMENTS:

Page 14 of the final report discusses expected risks of synthetic fuels projects and the similarities to those of other fossil fuel industries. Regarding the Supplemental Environmental Program, see our discussion following comment (f).]

d. The report does not portray the close coordination and cooperation achieved among the Federal agencies associated with EH&S research, development, and commercialization of synfuels as directed by Public Law 96-294, the Energy Security Act.

[GAO COMMENTS:

The discussion of the environmental monitoring plan process required by the Energy Security Act has been expanded. Pages 25 to 27 of the final report discuss how DOE and EPA are involved in reviewing the draft environmental monitoring outlines and plans submitted by project sponsors to the Corporation and how the Corporation is encouraging the project sponsors to consider the comments of these agencies. The report also discusses how the Corporation will establish Monitoring Review Committees for each project, which will include representatives of DOE and EPA, to review the information generated from environmental monitoring plans. (See pp. 28 and 29.)]

e. There is no rationale provided in the report to support the suggestion that "one Federal entity may be needed as the focal point for coordinating the environmental and health data needs of the affected agencies." Nuclear power has a single regulatory focal point, yet the licensing of nuclear power plants is often more lengthy and controversial than other sources of power. Issues, rather than procedures, more often determine the time and effort required for permitting. In fact, DOE has the lead mission responsibility at the Cabinet level as it applies to EH&S concerns of fossil energy. The Department has accepted the responsibility and is conducting a vigorous research and development program within limited funding levels. The SFC and DOE exchange technical information relating to synthetic fuel development as specified in Section 172 of P.L. 96-294, the Energy Security Act (ESA).

[GAO COMMENTS:

The "focal point" discussion has been eliminated from the final report. After completing our audit work, the Corporation issued its final environmental monitoring plan guidelines which describe, in detail, how the monitoring plans will be formulated and reviewed, what information will be generated, and how this information will be analyzed and disseminated. Also, several environmental monitoring plan outlines submitted by project sponsors have been reviewed by the Corporation, EPA, and DOE. Corporation, EPA, and DOE officials stated that the environmental monitoring plan process established by the Corporation is working well thus far. The report states that this process could provide the format for identifying and coordinating future data needs, monitoring, controls, and research associated with commercial synthetic fuels facilities. (See pp. 30 and 31.)]

f. The GAO draft report included insufficient coverage of the successful and expeditious permitting efforts for Union Oil Company's oil shale project in Colorado and the Great Plains Coal Gasification Project (GPCGP) in North Dakota. All necessary permits have been obtained to permit the orderly construction of these projects. The Union project is near completion and the GPCGP is more than 86% complete as of August 31, 1983. Both projects have agreed to do environmental compliance monitoring through the contracts. In addition, GPCGP has an environmental monitoring plan as a part of the project management plan. The GPCGP agreement authorizes that up to $12 million of project funds be used to conduct an SEP (research in addition to compliance activities) that is jointly planned by DOE, and the primary purpose of the supplemental program is to reduce the EH&S unknowns associated with early synfuels plants and initial replications. The Union agreement has no such SEP requirement. However, Union has agreed during the permitting process to conduct a limited amount of research to gain necessary information from this first-of-a-kind plant to improve the State of Colorado's and local municipalities' future permitting processes.

[GAO COMMENTS:

We have included the permitting status of the Union project. (See p. 9.) We added a discussion of Union's agreement with EPA to perform certain tests to assess enyironmental and health risks. (See p. 19.) We did not include the Great Plains project as a part of this review because, unlike other commercial-scale synthetic fuels projects, it will not be under the Corporation's purview. However, p. 17 of our report, Status of the Great Plains Coal Gasification Project--Summer 1983 (GAO/RCED-83-212), discusses the project's environmental program.]

[GAO NOTE:

In addition to the general comments, DOE also provided specific comments. These were primarily of an editorial nature or suggested additions and/or clarifications. Changes were incorporated in the final report as appropriate.]

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