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[The Role of the Federal Government
in Expanding the Use of Coal]

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Before

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of Coal: Today to 1990
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It's really a pleasure to participate in this symposium. Over the years I've worked with many of you personally. In my current role as Director of the General Accounting Office's Energy and Minerals Division, I have a great deal of interest in the future of America's coal.

While some here would argue that we can depend on coal and nuclear power for the indefinite future, I cannot come to that conclusion. In fact, it seems obvious to me that the United States in the long term--say beyond 2000--must develop our inexhaustible sources of energy for sustained economic growth and, in fact, for our very survival. Domestic oil and gas supplies are being depleted rapidly and international sources are plagued with security of supply problems. We must make plans now on how to move from our present energy base, which relies primarily on oil and natural gas, to an energy base which relies primarily on renewable sources. We must act now because this transition cannot be made overnight.

1/Michael Duffy of my staff was of invaluable help in preparing these remarks.

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It is also obvious by now that conservation, nuclear power and coal must be the bridge to a renewable energy base. In designing and implementing our national energy policy, policymakers, while keeping in mind the ultimate goal of developing renewable resources, must determine and plan for the relative roles of these three stepping stones.

.There is no question that coal can--in fact must--play an important part in the Nation's energy future. Its relative importance as an energy source, however, is still to be shaped by policies still under development. In fact, those policies are being debated on Capitol Hill at this very moment.

I have been asked to discuss "The Role of the Federal Government in Expanding the Use of Coal"--more specifically, those key issues which GAO believes will determine whether coal can play a significantly increased role in America's energy supply. I also have been asked to comment briefly on the likely impact of the financial incentives in the Administration's National Energy Plan.

My comments today are based primarily on our current work and on three of our recent reports to the Congress:

- "Rocky Mountain Energy Resource Development: Status, Potential, and Socioeconomic Issues" (EMD-77-23, July 23, 1977).
- "An Evaluation of the National Energy Plan" (EMD-77-48, July 25, 1977).
- "U.S. Coal Development--Promises, Uncertainties" (EMD-77-43, Sep. 22, 1977).

My comments are also based on my October 25 testimony on the Federal coal leasing program before the Senate Subcommittee on Energy Production and Supply.

CONSTRAINTS TO COAL DEVELOPMENT

Coal Demand--How Much Do We Need (Or Can We Use)?

There is no hard, fast figure on how many tons of coal the Nation needs by 1990. The coal demand estimates that are available vary tremendously.

In its National Energy Plan, the Administration expects annual coal production and use of 1.2 billion tons by 1985, up from 665 million tons in 1976.

As many of you may know, we have recently reported to the Congress that we believe achieving 1.2 billion tons is highly unlikely--in fact, we believe it will be very difficult to achieve even one billion tons annually by 1985.

In any case, given the objectives of reducing energy imports and protecting our dwindling oil and gas supplies, the Nation needs all the coal it can possibly mine and burn--without doing irreparable damage to the environment.

The actual tonnage of coal produced and used has increased through the years, but has declined relative to other fuels. Coal has not been as attractive as other fuels for a number of reasons, including

- uncertain environmental standards (both land and air),
- increased capital and operating costs due to environmental control requirements,
- transportation and storage problems, and
- earlier perceived cost advantages of nuclear power (which parenthetically I might add are more and more being called into question).

The electrical sector has the best potential for coal substitution. The 1973 oil embargo and subsequent price increases stimulated Government action to force electric utilities and others to switch from natural gas and oil to coal.

Under the Energy Supply and Environmental Coordination Act, this conversion effort has not lived up to expectations. This is principally due to the difficulty and cost in switching to coal and burning it in compliance with clean air standards.

Over the next 25 years, coal and nuclear power increasingly are expected to displace oil and gas for baseload electric capacity.

In the residential/commercial sector, there is not much opportunity for direct coal use, but a large portion of the

increased energy use to 1990 may be from electricity generated with coal in lieu of gas and oil. The industrial sector has some potential for direct substitution of coal--as boiler fuel --but will mainly rely on electricity. In the longer term, both of these sectors could use synthetic gas from coal.

The transportation sector appears to be the least amenable to increased reliance on coal. This sector relies on oil almost exclusively. The prospects for coal substitution here depend on the

- outlook for electric rail transport,
- growth of electrified intra-city mass transit systems,
- outlook for the electric car, and
- development of coal-based synthetic liquid fuels.

Energy demand and coal's portion are difficult to project because of three variables--population and economic growth; composition of national output; and the cost of energy relative to that of other resource inputs.

Coal Supply--How Much Do We Have?

Again, there are no hard, fast figures that policymakers can rely on. Current data on coal resources and reserves are extremely spotty and outdated.

The current "best estimate" says we have 3.9 trillion tons of coal--1.7 trillion are called identified resources and 2.2 trillion tons are called hypothetical (undiscovered) resources.

Why are accurate data so important? Because coal is a finite resource and will not last forever. Of the identified resources, 256 billion tons presently are considered to be economically recoverable. However, that amount would last only about 75 years under certain high-growth energy scenarios.

Accurate reserve data on low-sulfur coal could affect both air pollution regulations, and leasing decisions for the vast Federal coal resources in the West.

We believe that more accurate coal resource and reserve data are needed to permit sound public policy decisions on what kind of coal to mine, where, and when.

Coal Production--How Do We Get It?

We will mine it, of course, but it is not quite that simple. We estimated that achieving annual coal production of 1 billion tons will require

- opening more than 250 new mines,
- recruiting and training about 157,000* new miners,
- manufacturing enormous quantities of mining equipment,
and
- coming up with over \$15 billion in capital.

We found that 11 major coal producers believe the industry can double coal production by 1985 and triple it by 2000.

This may be possible, but we believe it could only happen if many things fall into place. Such things, for example, as

*A recently released study by the former Energy Research and Development Administration suggests we might need as many as 235,000 new miners.

- mining equipment manufacturers will have to fill orders promptly;
- coal producers must have the foresight and capital to open mines when the added production is needed;
- the Government must get its act together on its responsibility for resource management;
- labor-management relations must go smoothly; and
- mining productivity must not be unnecessarily impaired by overly zealous strip mining and health and safety regulations.

The Federal coal leasing program can have a significant impact on coal production. In testimony two weeks ago before the Senate Subcommittee on Energy Production and Supply, I recommended that the Secretaries of Energy and the Interior work closely in the coming months to (1) improve coal leasing data; (2) define "maximum economic recovery" and establish guidelines for its implementation in the estimating process; and (3) take some fundamental steps to relate the amount of Federal coal required to meet National goals to any program of renewed leasing.

Coal Transportation--How Can We
Get It To Where We Want It?

Railroads carried 65 percent of this Nation's coal during 1975, and they will continue to be the principal coal transporters in the foreseeable future.

Other transportation modes also will expand as part of the total transportation system. However, these other modes are ultimately limited by physical, economic, and/or environmental constraints.

The Nation's inland waterway system, for example, carries over 100 million tons of coal each year, and is the cheapest transportation mode. However, the system does not directly serve many areas scheduled for major coal development and is hindered by ice in the winter and the physical capacity of its locks.

Trucks cannot compete with railroads because of costs. A 1974 report to the Interagency Coal Task Force showed truck costs per ton-mile to be five times higher than railroads (\$.05/ton-mile vs. \$.01/ton-mile).

Another alternative is to build powerplants near the mines and transport the electricity over extra-high voltage transmission lines. A Bureau of Mines study, however, found this to be about 30 percent more expensive than shipping the coal on railroads.

Coal slurry pipelines appear to be economically competitive with railroads, but they are constrained by many other problems. For example, pipelines require enormous amounts of water at the point of shipment--a key constraint in arid western coal fields. There is also a problem of disposing of the pipeline effluent at the destination. Coal slurry pipelines also face a big legal hurdle in trying to assemble rights-of-way, often over property owned by the railroads.

Obviously it will fall to the railroads to move the bulk of any greatly expanded coal production.

We believe that the Nation's transportation system can be expanded to meet expected needs. In part, this is based on our conclusion that transport facilities can be put into place as fast or faster than new mines can be opened and new boiler capacity installed.

Coal And The Environment--
How Do We Make It Usable?

The environmental issue is paramount. We cannot use one billion tons of coal in one year without harming our environment. At least not with current technology.

This is a tradeoff. We are relinquishing some of our environmental quality to reduce our energy imports and extend the life of our dwindling oil and gas reserves. The tradeoff is made in each step of the coal fuel cycle--mining, transporting, and using.

The environmental problems fall into three general categories

- problems we have been aware of for a long time and have taken steps to control,
- problems we have more recently become aware of and are taking steps to control, and
- new problems on the horizon which we are just beginning to study.

The first category primarily deals with air pollution caused when coal is burned. Beginning in 1963, the Congress enacted a number of laws to control air pollution. The Clean Air Amendments of 1970, as amended, most affect current coal combustion. That law resulted in primary and secondary standards being established for various classes of pollutants.

These standards will necessitate scrubbers and other desulfurization techniques in many coal-burning plants. These techniques can help maintain our air quality, but they are costly.

We estimate the cumulative additional capital costs for controlling emissions to be \$19.1 billion and \$26.4 billion in 1985 and 2000, respectively. Annual operating costs would be \$1.3 billion and \$2.3 billion in each respective year. Unfortunately, these costs will not be evenly distributed across the Nation, but will vary widely by geographic region.

The second category of environmental problems primarily involves adverse impacts from underground and surface mining operations. Reclamation is neither easy nor inexpensive, but it must be included in the cost of doing business. Total surface and underground mining reclamation costs could be as high as \$1.2 billion in 1985 and \$1.9 billion in the year 2000.

The third category of environmental problems involves those that have not yet been fully studied and for which we cannot presently estimate all the potential consequences.

These include:

- Enormous quantities of sludge that accumulate in air pollution control devices and which must be disposed of.
- Currently uncontrolled emissions from coal burning plants, including trace elements, particulates, carbon dioxide, and waste heat.

Scrubbers may be key elements in cleaning up air pollution from coal. But, they will give rise to a whole new

pollution problem--sludge. Under a high-growth energy scenario, by 1985 the amount of sludge generated each year could be about the same as the total municipal solid waste produced in America in one year.

Coal combustion also releases about 53 elements referred to as "trace elements." These include mercury, lead, beryllium, arsenic, and fluorine. Coal combustion also releases minute "particulates" of soot and fly ash.

Both the trace elements and particulates are considered dangerous, but very little research has been done on them.

Another uncontrolled substance is carbon dioxide. Its build-up in the atmosphere, according to some experts, causes a "greenhouse effect." This could eventually cause global warming trends, and result in redistribution of temperature patterns and rainfall levels.

In the years ahead as we begin to use more coal, much more will be heard about these developing environmental problems.

How Do We Solve The Social Problems?

Increased coal production will expand both the industry and communities surrounding the development areas.

The newcomers will need public facilities and services immediately, but the revenues to pay for them may not be available--not until the powerplants, mines, and new citizens begin paying taxes. To meet this time lag, communities may

need advance or front-end financing. On a nationwide basis, these costs might run as high as \$4.4 billion by 1985, and another \$10.5 billion between 1985 and 2000.

The biggest impact will be on sparsely-populated areas, such as those in the West. The people brought to these communities by the coal development projects may well outnumber the original residents. They will bring their own social, political and moral values, and may change the character of the communities.

Through adequate planning and financing, the blow can be cushioned, to be sure, but it will be a blow nonetheless, and the social fabric of the community will be rent and another formed from it.

In another report issued to the Congress earlier this year, we concluded that presently we do not need more Federal dollars to mitigate these socioeconomic impacts. What we do need is better coordination among the various Federal, State and local agencies involved, and better use of the dollars that are already available.

Where Do We Go From Here?

If coal is to help reduce our dependence on oil imports and relieve pressure on our dwindling domestic natural gas reserves, then certain Federal Government actions will be necessary.

In our Evaluation of the National Energy Plan, we pointed out that the administration's plan deals with some of the

constraints to increased coal use, but not all of them. We see the need for

- more accurate and comprehensive resource and reserve data;
- congressional resolution of the rights-of-way issue for coal slurry pipelines;
- capital to upgrade large portions of the Nation's railroads, particularly in the Eastern States, together with the need to expand existing capabilities;
- improved labor relations to prevent disruptions due to wildcat strikes, together with the need for improved miner health and safety conditions, recruitment, and training;
- greater miner productivity; and
- accelerated Federal research to develop less costly and more reliable technology to control air pollution from coal burning facilities, and to determine the long-term health and environmental effects of burning greater amounts of coal.

There is no question that coal will supply a large part in the Nation's energy future. So will foreign oil and nuclear power. Natural gas will decline and probably have to be restricted to optimum end uses such as home heating, etc.; domestic oil will decline. Solar energy will increase slowly, as a complement to other fuel types.

On the demand side, the best answer to the Nation's energy bind is conservation, through increased efficiency and decreased use.

FINANCIAL INCENTIVES IN THE NATIONAL ENERGY PLAN

As I mentioned earlier, I have been asked to comment briefly on the likely impacts of the Administration's proposed financial incentives.

The Administration estimates that its oil- and gas-users tax combined with its conversion regulatory policy will generate new coal demand equivalent to about 3.4 million barrels of oil per day. After adding and subtracting the estimated impacts of the other proposals in the plan, the Administration estimates that the net increase in coal demand would be the equivalent of 2.4 million barrels of oil per day if the plan were fully implemented.

We have not yet analyzed these figures in detail, so I cannot comment in specific terms. However, I will speculate with you for a moment.

The version of the National Energy Plan passed by the House of Representatives did change many of the Administration's proposals. For example, the House estimates that its version of the oil- and gas-users tax would generate only about one-third to one-half the coal demand of the Administration's version.

On the Senate side, your guess is as good as mine.

We really don't know what the financial incentives will look like when they finally come out of the House and Senate Conference Committee.

In the near term, through 1985 and possibly 1990, will those incentives really make any difference as to how much coal actually gets burned? I don't have the answer. But, a strong case could be made that the incentives won't really generate much new coal demand by 1990 given the lead times needed to develop new markets and install new capacity.

It would appear that the utility sector is planning to use just about all the coal it can even without those incentives. And the industrial sector may not have that much flexibility in the near term to convert oil and gas burning facilities to coal. The simple fact is that most of what we can say about 1985, and even 1990, is already known. Unless the incentives passed by the Congress are in the form of some miraculous formula that I haven't yet seen, it appears to me that coal use, with or without incentives, will be hard pressed to get close to one billion tons a year in that timeframe.