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By David Logsdon

As you are all well aware, Native Americans, individually and through their organized tribes, own very valuable resources -- coal, timber, water, and minerals. The way in which these resources are developed is the critical element that will determine the ultimate survival or destruction of Indian people.

For too long the development of these resources has been controlled by the BIA, the Interior Department, and American industry. It has been shown time after time in developing countries that without native control over resource wealth there can be no freedom; without native control there can be no progress.

It is therefore imperative that Indian people secure and maintain control of their resource wealth. A continuation of Indian resource exploitation will result in continued poverty and subjugation for Native Americans.

A first vital step in securing and developing Indian resources in a culturally, environmentally, and economically sound manner is knowledge. Before we can plan and implement we must know what our resource potential is; we must know how to negotiate, finance, and market tribally--controlled resource programs; we must protect our environment ---- for without clean air and water,

without the beauty of the trees, flowers, and wildlife —— can we ever be proud of our successes? Can we ever be Indians in its purest and most beautiful sense?

Let this paper and the workshops Americans for Indian Opportunity is holding in Billings begin the fight to insure Indian cultural integrity and economic self-determination.

Coal is abundant and widespread in the United States. The U. S. reserve of coal, an estimated 1.5 trillion tons, is larger than the combined reserves of natural gas, petroleum, oil shale, and bituminous sandstone, but coal use has lagged far behind the use of natural gas and petroleum due to the cleaner burning and more economical excavation and transportation characteristics of these latter fossil fuels. However, due to the growing shortages of petroleum and natural gas, coal is becoming the focal point of America's search for petroleum substitutes, namely, as a source of synthetic gas, liquified fuels, and lubricants.

As petroleum's role in the U. S. energy system declines, coal will become a critical source of energy for the next 10 to 20 years. President Ford, in his message on the economy in October, called for a sharp reduction in the use of oil to fire electrical generators by 1980. The Federal Energy Administration's summary report on energy also contains suggestions that would reduce the consumption and reliance on oil as the major energy source in this country. To promote the substitution of coal, the report suggests that new homes should not be equipped with oil-fired furnaces, rather, they should be heated with electricity generated by coal-fired steam converters.

At the present, approximately 67% of the U. S. mined coal is used in the production of electricity. By all estimates this figure is sure to rise. A Federal Energy Administration background paper on Project Independence, the government's program for U. S. energy self-sufficiency, predicts an increase in U. S. coal production from the 602 million tons mined in 1973 to 962 million tons mined per year by 1980. The FEA paper states:

> This would involve the rapid development of gasification techniques, the setting aside of some secondary air quality standards for a five-year period, expansion of our coal transportation system, the reconversion of oil burning plants to coal, abandonment of price controls on coal, and a major expansion of the coal mining industry.[1]

Until new technologies are developed which would enable the U. S. to tap new energy sources, i.e. the sun, hydrogen fusion, and geothermal energy, coal will seemingly play a major role in meeting the growing energy needs of this country.

Project Independence, while holding great opportunity for the development of Indian resources, may also lead to an unprecidented campaign to exploit Indian resources, resulting in irreparable damage to Indian lands, cultures, and natural environment. Indians must begin preparing now for the pending thrust to develop Indian coal lands.

In order to avert disaster, Indians must secure and maintain control over resource development projects on Indian lands. The purpose of this paper is to discuss some of the major problems and issues that will arise when a coal development project is being considered.

At this point, specific problems and issues dealing with coal mining will be discussed.

STRIP MINING

As the search for alternative energy sources continues, the pressure to expand strip mining operations in the Western states has increased dramatically. Although only 7.5% of U. S. coal reserves are strippable, strip mining accounted for 46% of the coal mined in 1973.[2] The reasons for the widespread popularity of strip mining in recent years can be seen in the following: in comparison to underground mining, surface mining produces three times the coal per man hour; strip mining requires little manpower; nearly 100% of the coal seam can be recovered by strip mining, whereas the recovery rate of underground mining is only 50%; as a result, strip mining is 40% cheaper than underground mining.[3]

Although strip mining is advantageous to the coal companies, it is extremely destructive to the environment.

The uncertain rehabilitation potential of Western coal lands, the impact strip mining has on underground and surface water flow patterns, and the limitations it places on future land use has led to a confrontation between the coal companies and Indian tribes and environmental organizations.

The National Academy of Sciences has conducted extensive research into the rehabilitation potential of Western coal lands. In their report entitled Rehabilitation Potential of Western Coal Lands, the NAS concluded that in areas receiving over 10 inches of rain per year, the rehabilitation chances are fairly good, provided large sums of money are invested and rehabilitation efforts continue over a number of years. Sixty percent of the Western coal lands receive the necessary 10 inches of rainfall, these include the Ponderosa pine areas, the mountain shrub areas, and the high grasslands. In the Southwest desert lands where annual rainfall is below 10 inches, revegetation MAY NOT OCCUR FOR CENTURIES, no matter how extensive the reclamation efforts.[4]

The NAS report emphasizes the need for adequate planning, monitoring, enforcement, and financing to insure the highest degree of rehabilitation possible. Their recommendations

read as follows:

1. We recommend that surface mining for coal should not be permitted on either public or private lands without the prior development of rehabilitation plans designed to minimize environmental impacts, to meet on - and off-site air and water pollution regulations, and to define a timetable for rehabilitation concurrent with mining operations. The preplanning should be part of an original environmental impact analysis for the region and should clearly indicate the basis on which conditions at the proposed mine sites are evaluated. It is important that adequate provision for public participation be a part of the review of the preplans.

2. We recommend that minimum regulations governing the surface mining of coal be promptly established by Federal statute to provide for the planning, monitoring, enforcement, and financing of rehabilitation, and that the costs of these activities be financed by mining operations. We also recommend that rehabilitation management plans be made and enforced for a period sufficiently long to assure vegetative stability. We recognize that state and local governments may also wish to impose further rehabilitation requirements to meet additional goals. The sharing of the responsibilities for regulating surface mining and rehabilitation in this way should be encouraged. Methods for public participation at these several levels of government should be improved.

3. Rehabilitation of surface mines on public lands should set the example of the best available planning and the most rigorous application of rehabilitation techniques. Administrative regulations of the Federal land management agencies should go well beyond what is demanded by statute, if technology is available. Leases and permits for mining coal on Federal lands should be so written as to demand the application of the most advanced rehabilitation technology.

4. Improvement of rehabilitation techniques and the reduction of environmental impacts depend critically upon monitoring and evaluation. Therefore, we recommend establishment of a comprehensive, non-industry

program to monitor and evaluate the rehabilitation of all current and future coal surface mining operations. Through such experience, performance standards for rehabilitation can be based on technical knowledge. The evidence must include a complete baseline inventory of the existing ecology, geology, and hydrology prior to granting a permit and the establishment of a set of continuing observations to monitor the on-site and off-site effects of mining and rehabilitation. Such studies must also include the determination of the chemical properties of the soils and overburden and the hydrologic effects of surface mining on ground water, surface drainage and water quality as affected both on-site and off-site. These data will be a necessary measure of what has been accomplished and serve as an essential guide for ongoing and future operations. The observations should be verified by agencies independent of the mining operation, because many years of objective observations are required and organizational continuity is essential.

5. Since mining and rehabilitation involve many diverse economic, ecologic, engineering, hydrologic, and social factors in complex inter-actions and feedback loops, we recommend that Federal research and development programs for coal include studies on total system approaches to energy resource mining, mined land rehabilitation, and energy conversion. Because rehabilitation depends on qualified people, we recommend that the responsible governmental agencies develop interdisciplinary teams to assess the potential for rehabilitation of proposed mine sites and to conduct the research for rehabilitation.

6. Certain features of the landscape cannot be restored at any price. If irreplaceable historic, scenic, or archeological sites or endangered species are present in an area proposed for mineral exploration or surface mining, or if such values in a neighboring area would be irreparably damaged by such activity, no mining should take place without an extensive review of the consequences. In some cases artifacts may be salvaged or moved with minimal loss of their value to society. In those instances the salvage operation should be considered part of the cost of rehabilitation and charged against the mining operation. If such irreplaceable cannot be removed or protected, or if the landscape and associated biota

cannot be rehabilitated for social purposes, surface mining should be prohibited.

7. Modern technology provides opportunities for changed uses and design of new landscapes in mined areas. Overburden is a resource for these activities, not a waste material. We recommend that regional planning for subsequent land uses, such as rangeland parks, recreational areas, and urban disposal centers, take advantage of these opportunities.

8. The shortage of water is a major factor in planning for future development of coal reserves in the American West. Although we conclude that enough water is available for mining and rehabilitation at most sites, not enough water exists for large scale conversion of coal to other energy forms (e.g., gasification or steam electric power). The potential environmental and social impacts of the use of this water for large scale energy conversion projects would exceed by far the anticipated impact of mining alone. We recommend that alternative locations be considered for energy conversion facilities, and that adequate evaluations be made of the options (including rehabilitation) for the various local uses of the available water.[5]

In most Western states coal seams are conduits for underground water flow. Strip mining operations will inevitably intersect the aquifer causing drastic alterations in the underground water flow patterns. The water system may flow far underground causing wells to dry up, leaving reclaimed areas and surrounding agricultural lands too dry to support native vegetation.

Surface mining will also cause alterations in the surface water flow patterns. Stream channels and alluvial valley floors which carry surface water will be destroyed.

The rechanneling of surface streams will cause heavy erosion, and alluvial valleys, once highly productive grazing areas may dry up. It is, therefore, essential to stipulate in the planning of mining operations that alluvial valley floors and stream channels must be preserved. Indian tribes who enter into strip mining agreements must be willing to sacrifice not only the lands to be mined, but also surrounding areas that may be dewatered as a result of the mining operation.

As of 1973, the rehabilitation efforts of the major coal companies leave much to be desired. Only 49% of all federal and Indian lands have been rehabilitated to meet USGS standards, which in many cases involves only the leveling off of the spoils banks. In terms of total unrehabilitated acres, Utah International is the worst offender with 986 acres left unrestored. An additional 1133 acres have been stripped, but the spoils banks have been recontoured to coincide with the original landscape. Out of these 1133 acres, only 100 acres have been reseeded. Of the 3772 acres of federally leased land, none have been reclaimed satisfactorily or permanently.[6]

The potential for vast environmental devastation caused by ill-planned and mismanaged strip mining operations demands strong legislative action to prevent this unnecessary

destruction. Currently, strip mining bills are before committee in the House and in the Senate. By all indications, the final legislation will be a plus for environmentalists. Indian tribes should consider adopting firm and comprehensive legislation to augment and reinforce the pending federal legislation.

As is always the case, legislation without monitoring and enforcement is ineffective. Ted Schwinden, Montana State Reclamation Chief, says that the policing task is next to impossible.

> We know there are a lot of companies operating in violation of the law, but we don't have the time to run them down.[7]

Indian tribes must begin pressuring the BIA and the Interior Department to insure that federal and local strip mining laws are enforced. We cannot afford to be lax; we must take the initiative now to see that our lands are not needlessly destroyed. Bob Bailey, A Northern Cheyenne from Montana, says:

> The question is, do we perpetuate ourselves or do we extinguish ourselves? The very land we stand on, sleep on, eat on, will be torn up. This is our last piece of land, and if we lose it, we'll be Indians without lands in the future.[8]

ELECTRICITY AND COAL

Electricity is an essential and convenient energy source for American industries and consumers. Electricity is non-

polluting, flexible, efficient in its end use, and easily transported. The demand for electricity for illumination, heating, and for running motors and appliances will increase rapidly as we approach the year 2000. At present, electricity makes up less than 10% of the total energy consumed in the U. S. Experts estimate this figure will rise to 50% by the year 2000. This rapid increase in the demand for electricity will greatly accelerate the pace of coal development in the West.

Currently, two-thirds of the coal mined in the U. S. is used to produce electricity. In October, 1971, the Bureau of Reclamation and 35 power companies released the "Northern Central Power Study," which located 42 potential sites for coal-fired power plants. Thirteen of the plants were to have a generating capacity of 10,000 megawatts. The study also identified sites for larger plants to be built by 1985, which would greatly increase the production of electricity and the demand for Western coal.

Two power plants are operating, and three more are under construction in the Southwest. The operating plants are the Four Corners facility in Fruitland, New Mexico and Southern California Edison's Mohave Plant. The spewing smokestacks of the Four Corners generating facility earned

notoriety a few years back as the only manmade creation visible to the Apollo astronauts. These plants alone burn 12 million tons of coal each year.[9] The anticipated rapid growth of coal-fired electrical power plants will have a tremendous impact on the economy, water availability, and the environment in the Western states.

The major environmental drawback to coal-fired generators is the emission of sulfur dioxide, carbon monoxide, and small particle matter into the atmosphere. Air pollutants increase the severity of respiratory illnesses such as colds, sore throats, bronchitis, and pneumonia. Air pollution can also adversely effect livestock, agricultural crops, and property.

Standards for the control of air pollution were established under the 1970 Clean Air Act. Research has shown that the air quality in urban areas has improved in recent years due to federal and state cleanup efforts. However, President Ford, in his economic message in October, suggested that some "secondary" air quality standards may have to be suspended to facilitate the Administration's energy program, Project Independence.

In 1971, the Ford Foundation sponsored the Energy Policy Project, a comprehensive look at America's energy

future. In their report released in November, 1974, they warned that "available scientific evidence indicates that there is no basis for relaxing present air quality standards."[10] The report calls for an immediate program to regulate the emission of small particles which today are largely uncontrolled, and may prove to be a greater hazard to human health than the sulfur and carbon pollutants. The Project's report calls for strict enforcement and regulation of air quality standards, pollution taxes levied against violators, and a national energy conservation program as the means to achieve air quality.

If coal-fired generators are to help meet our energy needs without causing irreparable harm to the environment, technology must be developed to minimize the proliferation of sulfur dioxide and small particles into the atmosphere. Recently, a new process, flue gas desulfurization (FGD), has been developed which may, to a large extent, solve the sulfur dioxide and particle pollution problem.

The system, commonly known as the scrubber, has raised much controversy. The Chairman of the Tennessee Valley Authority stated in early 1974:

> The country's knowledge of scrubbers has not yet progressed to the point where TVA can have any degree of assurance that it is not buying a billion dollar pig in a poke.[11]

The Environmental Protection Agency, in an effort to assess the status of sulfur dioxide control, held hearings on FGD technology in October, 1973. The main findings emerging from the hearings were:

> - Flue gas desulfurization (FGD) technology must be installed on large numbers of power plants if sulfur dioxide emission requirements adopted pursuant to the Clean Air Act are to be met in the 1970's.....
>
> - With several noteworthy exceptions, the electric utility industry has not aggressively sought out solutions to the problems they argue exist with FGD technology.....
>
> - Although most utility witnesses testified that FGD technology was unreliable, that it created a difficult sludge disposal problem, and that it cost too much, the hearing panel finds, on the basis of utility and vendor testimony, that the alleged problems can be, and have been, solved at a reasonable cost. The reliability of both throwaway-product and saleable-product FGD systems has been sufficiently demonstrated on full scale units to warrant widespread commitments to FGD systems for sulfur dioxide control at coal and oil fired power plants.....[12]

Alexander Weir Jr., principle scientist for air quality of Southern California Edison Co., recently obtained an exclusive license to sell stack-gas scrubber systems he developed. A large-scale unit of the Weir system has been operating successfully for nine months at the Mohave generating facility in Nevada. The system has proven to be 95% effective in removing sulfur dioxide, and has effectively removed over 90% of the small particle matter. The solid wastes from the FGD system, essentially gypsum,

can be used as a parking-lot filler, or can be used to make gypsum wallboard. The Philadelphia Electric Company has decided to install scrubber units in three of its generating plants at a cost of 68 million dollars. This expressed confidence in, and the preliminary success of the scrubber system has done much to undermine the claims of the American Electric Power System that the scrubber is unproven, unreliable, and prohibitively costly.

The FEA report emphasizes the need for the installation of scrubber units if sulfur dioxide and particle matter pollution are to be controlled. Indian tribes interested in, and investing in, the power plant industry must secure firm guarantees that scrubber systems will be installed. With the development of coal-fired generating facilities proceeding at an already near reckless pace, the need for the guaranteed installation of these units becomes all the more urgent.

A second method designed to alleviate the air pollution problems inherent in coal-fired electrical generation is the fluidized-bed boiler. In the fluid-bed system, chunks of coal are mixed with limestone in a bed, and the mixture is aerated from below, producing a bubbling fluid-like mass. The coal is then ignited, heating water-filled coils sub-

merged in the bed. The water in the coils changes to steam which is used to run the electrical generators.

When the coal burns, oxides of sulfur are produced. The released sulfur reacts with the limestone to produce calcium sulfate, thus preventing its entry into the atmosphere. Currently, the firm Pope, Evans, and Robbins is under contract from the Office of Coal Research to design, construct, and operate a 30 megawatt coal-fired fluidized-bed boiler. The boiler will be the first large-scale fluid-bed boiler, and will, hopefully, demonstrate the fluidized-bed's capability to burn coal without emitting excessive amounts of sulfur dioxide and nitrogen oxide.

The fluidized-bed boiler has a second advantage over conventional coal-fired plants, that being efficiency. The rate of heat release per cubic foot of combustion space will be more than 10 times the heat release rate of conventional pulverized coal boilers. Augmented by the addition of a heat recovery system, the fluid-bed boiler system should approach efficiencies of 50%, as opposed to conventional boiler efficiency, 36%.[13]

The fluidized-bed boiler holds great promise for the use of coal to generate electricity without the inherent air

and feasibility for commercial use can not be documented. By estimates of the Office of Coal Research, the fluid-bed boiler will be ready for widespread application in the late 1970's.

Thus far only the air pollution problems incurred in coal-fired electrical generation have been discussed. The projected expansion of the coal-fired utility industry will also have a major impact on water availability and land use alternatives in the West. In order to aviod repetition, and to sketch a more comprehensive picture of energy development benefits and liabilities, these topics will be discussed in the following section on coal gasification.

COAL GASIFICATION

With shortages of natural gas and liquid fuels becoming more acute, and with fossil fuel demand expected to double by the year 2000, extensive research and development is being done in coal gasification and coal liquification techniques. The production of clean gaseous and liquid fuels from coal, suitable for electrical power generation, transportation, and for residential and commercial use, will play a key role in meeting U.S. demands for the next 20 to 30 years. That is, until replenishable energy sources

such as wind, geothermal, and solar energy are developed.

Basically, the coal gasification process involves the heating-of-coal in the presence of steam, whereby the carbon in the coal reacts with the hydrogen in the steam to produce methane gas, the main component in natural gas. This process produces carbon monoxide and hydrogen as byproducts, which, through a process called methanation, react to produce more methane, thus increasing the concentration of methane in the synthetic gas.

Research in coal liquification lags far behind gasifcation research, and as a result, major liquification pilot projects are not expected in the near future.

If the energy shortage pushes the expansion and development of stripmining, coal gasification, and electrical power generation as far and as fast as present predictions indicate, the land and way of life of the Western Indians will be drastically altered. At present, some 20 billion tons of coal under nearly 1 million acres of public and Indian lands has been leased to private industry by the Interior Department. The Interior Department has leased these lands without adequate consideration of the environmental effects of stripmining, and without any assessment of the staggering impact coal development will

have on the economy and society of the Western states. Currently, only 11% of these leases on public and Indian lands are producing coal, but as the network of electrical generating facilities and coal gasification facilities expands, the increased demand for coal will result in the rapid development of Indian and public coal leases.

In 1964, a consortium of investors, publicly owned utilities, and government agencies was formed to plan, construct, and operate a coal-fired network of electrical generating facilities to serve the Southwest. The consortium, called WEST (Western Energy Supply and Transmission Associates), has built two power plants and has three more under construction. When all five plants are in operation, total coal consumption will exceed 30 million tons per year. In addition, huge quantities of water, an estimated 100,000 acre feet per year, will be needed to cool the generating equipment. Most of the water will be returned to the water supply between 10 and 15 degrees hotter. A small percentage of the water will be lost to evaporation.

Under the present development scenario, seven gasification plants will be built in the Southwest, each producing 250 million cubic feet of gas a day and consuming

6 million tons of coal and 20,000 acre feet of water a year -- water which is lost in the gasification process and not returned to the ecosystem. If all seven gasification plants and all five generating facilities are in operation, they will collectively consume approximately 176 million tons of coal and 170,000 acre feet of water per year. To feed this monstrous energy network, over 100 square miles of Indian coal land will be strip mined over the next 15 years.

An energy network of even greater dimensions is being planned for the Northern Plains. The North Central Power Study located 42 potential sites for coal-fired generating facilities, with a total generating capacity of 50,000 megawatts to be in operation in the 1980's. In addition, the Northern Great Plains Resource Program calls for the construction of 7 gasification plants by 1985, and an additional 9 plants by the year 2000.

The Northern Cheyennes and the Crows have already leased large tracts of their land for coal development. Between 1969 and 1971, the Northern Cheyenne tribe auctioned prospecting permits for 52% of their reservation. The Peabody Coal Co. has converted 6 prospecting permits into long term leases. Consolidation Coal has asked the Northern

Cheyennes to lease 30,000 acres for 4 gasification plants and a 30 million ton per year strip mining operation. Shell Oil, American Metal's Climax, and Westmoreland Resources hold leases on 75,358 acres of the Crow reservation. With wind erosion, and the direct effects surface mining has on water flow patterns, the acreage committed to coal development may more than double.

The enormity of the energy networks planned for the Southwest and the Northern Plains will, without doubt, cause irreparable disruptions in the lifestyle and lands of the American Indian. Coal development will necessitate the expansion of the railway system, highways, electrical power lines, sanitation facilities, water supply, law enforcement, housing, etc. Indian people must consider the staggering and irreversible consequences of large-scale coal development projects before entering into contract agreements. Coal development will have a major impact on:

WATER

The projected scenarios for coal development that are currently under consideration will severely tax the water supply in the Western states. The National Academy of Sciences stresses that the water supply in Montana is "completely committed, perhaps overcommitted;" Wyoming's

water supply is being heavily taxed; and the Colorado River Basin's water allocation is, without doubt, overcommitted. The Navajos have allocated two-thirds of their water allotment to coal development. Science reported the NAS findings, noting:

> there is simply not enough water in the Western states to permit the enormous congregations of coal-fired generating, gasification, and liquification plants envisioned in recent years by utilities and oil companies...any large-scale commitment of water to on-the-spot consumption of coal would lock such states as Montana, Wyoming, and the Dakotas into a coal based economy they hadn't bargained for.[14] (emphasis added)

If Western water is going to be committed to coal development, agriculture, ranching, recreation, and water for human needs will be in short supply. In essence, the whole economy and way of life in the West will be drastically changed. Are Indians willing to accept the consequences of large-scale coal development? Is this what Indian people want for themselves and for their children? The choice is yours. An equitable compromise on water use must be found, or the Western Indians will have no future, no means to survive. The time is now to secure Indian rights to water; delay will spell disaster for Indian people.

SOIL AND AIR QUALITY

The soils of the Northern Plains and the Southwest are high in alkaline salts. These salts filter through the topsoil and reach high concentrations in the subsoil. Surface mining disrupts the soil, causing the alkaline salts to surface -- polluting the soil and water supply. The higher salt concentration results in stunted or destroyed crops; streams and rivers become contaminated killing fish, wildlife, and livestock; and the salts can filter into wells causing human sickness.

Air pollution from the strip mines, coal-fired generators, gasification plants, and secondary industries will substantially degrade the clean air of the West. Even after the removal of 99.5% of the ash, sulfur dioxide, and small particle matter through the installation of scrubbers (a percentage by no means guaranteed), 100,000 tons of pollutants will enter the atmosphere each year by 1985, if power plants planned for the Northern Plains are in operation.

> According to Environmental Defense Fund calculations, the air pollution that will result from development on such a scale will produce more air pollution than that which chokes the 9,219 square mile Los Angeles basin.[25]

The air pollution problem will be further aggravated by the increase in auto and truck traffic that will follow coal development.

The influx of people to plan, manage, and operate the coal industries will overstrain community housing, public facilities, and services, and schools, hospitals, sewage treatment facilities, and retail stores. The projected rapid growth of Western mining towns will far exceed urban planning and development, resulting in a chaotic and unmanageable habitat. Simply stated, development of the coal industry at the pace planned by the coal industry is unmanageable, unnecessary, and ill-advised. A young Hopi articulates the fears of all Western Indians.

> You are taking our water. You are destroying our land...How can we live? It will be the end of our way of life, the end of the Hopi people.[16]

ECONOMY

Many Indian tribes, living in poverty and suffering from high unemployment and low-paying jobs, view coal development as their only chance to escape their persistent economic depression. The revenues generated by coal development are substantial and attractive, but the negative aspects: air pollution, water shortages, and the destruc-

tion of the land, must also be considered. While the income from coal development is substantial, so are the costs. Coal development will necessitate expansion of housing, roads, railways, schools, medical facilities, etc. Indian tribes will undoubtedly be called on to finance a considerable part of these expanded services.

Coal development will provide increased job opportunities to on-the-reservation Indians. However, the number of jobs, the types of jobs, and the pay scales are by no means guaranteed. Strip mining operations are highly automated, and therefore, will not generate many jobs. In electrification and gasification plants, many jobs will require extensive expertise, expertise Indians do not have. This problem can be remedied through apprenticeship programs organized and financed by the coal companies. To secure such training programs, contract agreements with the coal companies must be reached that will include such provisions.

The commitment of Indian lands, capital, and water resources to coal development will have an adverse effect on ranching and agriculture, Indians must be aware of the fact that coal development is a temporary enterprise; that coal supplies will run out; and that new energy

sources will be developed that will decrease the need for coal-fired electrical generation, synthetic gas, and synthetic liquid fuels.

When coal is mined, capital assets are lost. When the coal industry leaves the reservation what will be left? Empty mines, closed industries, land ravaged by strip mining, polluted air, a critical shortage of clean water -- these are the final consequences of large-scale coal development. This is what Indian people must ultimately understand. The Northern Cheyenne Landowners' Association feels that the

> ultimate end of the Northern Cheyenne Reservation, the removal of its people, and the destruction of culture seems inevitable unless measures are taken now to control the planned mining of coal on the reservation.[17]

Rapid, random, and uncoordinated large-scale coal development in the West is both unnecessary and unacceptable. The nation has enough time and expertise to research and develop procedures and technologies that will minimize the adverse effects of surface mining, electrification, and coal gasification. A continuation of the current development schemes will result in the disruption of the land, people, and the environment on a scale which is neither acceptable nor tolerable.

INTERIOR DEPARTMENT, THE BIA AND LEASING

The leasing of public and Indian lands is administered by the Interior Department and the Bureau of Indian Affairs. The authorization permitting the Interior Department to lease public lands is pursuant to the Mineral Leasing Act of 1920; the Omnibus Tribal Leasing Act of 1938 provides for the leasing of Indian lands under the auspices of the BIA. The leasing policy of the federal government has been a failure in every way. It has failed to encourage coal production; has failed to provide a fair market price for Indian and public coal through a combination of non-competitive bidding and a preference rights leasing policy, resulting in laughably low rental and royalty payments; and has failed to assess and minimize the environmental impact of strip mining and the related coal industries. The mismanaged and uncoordinated leasing policy has thus resulted in the exploitation of Indian and public resources and lands, all to the benefit of the coal industry.

Since the enactment of leasing legislation, the Interior has approved 463 leases on public lands covering over 680,000 acres, and leases on Indian lands totaling 259,000 acres. Of these 474 leases only 52, or 11%, are

producing coal. The leasing policy of the Interior while purporting to be competitive, in reality, has not been. 59% of the Interior's leases have been awarded with only one bid submitted. Richard Bodman, Assistant Secretary of the Interior, has admitted, "leasing generally has been on the basis of industry expressions of interest."[18] The non-competitive leasing policy has resulted in ridiculously low returns for public and Indian coal: the public has received, on the average, only 12.5 cents per ton of coal, while Indians have fared slightly better, averaging 15.8¢ per ton. The few leases that have been granted through competitive bidding have yeilded 11 times more revenue per acre in comparison to the non-competitive leases. An example: The Northern Cheyennes leased 16,000 acres of their land to Peabody Coal for 12 cents an acre. Just two years later, two sales in the same area drew six bidders each, and the winning bids approached 16 dollars per acre! Thus, the advantage of a competitive leasing system.

The lengthy adjustment period of federal leases has also contributed to the low revenues received for Indian and public coal. Public leases are adjusted every 20 years,

while Indian leases are adjusted every 10 years. During the adjustment period there is no mechanism through which rent and royalty payments can be escalated to reflect increases in the market value of coal, or to compensate for rapidly rising land values. The inequity of the lease adjustment policy is evident in light of the fact that retail coal prices have increased 60% in 1974 alone.

The preference rights policy, a third factor which as institutionalized the non-competitive leasing practice, was included in the 1920 Mineral Leasing Act to stimulate industry funded mineral exploration in the Western states. Under this procedure, a corporation or individual is granted an exclusive right to explore a specified tract of land. And if minerals are found in sufficient quantities, the mining company has an exclusive option to lease the tract. The cost for an exploratory permit is 25¢ per acre per year, plus an initial filing charge of 10 dollars. The preference rights clause, while providing private capital for mineral exploration, also reinforces the non-competitive nature of the federal leasing program. It is the position of critics of the preference rights system, that the value of the information received through exploratory permits does not adequately compensate for the low coal revenues

resulting from the non-competitive bidding practice.

The minimal cost of obtaining and holding a preference rights lease, the Interior's policy of granting leases in response to industrial initiatives, regardless of market demands, and the non-competitive nature of the leasing policy has encouraged the coal companies to hold leases in speculation. That is, to not develop the lease in hopes of an increase in the market value of coal, or transferring the lease to another mining company at a profit. For these reasons, leasing has not served the interests of the Indian Community.

INTERIOR DEPARTMENT AND ENVIRONMENTAL PROTECTION

There are three Interior Department regulations which are intended to assess and minimize the destruction of the environment due to strip mining. Section 5 of the standard lease form states that "reasonable steps" must be taken to prevent the "unnecessary" pollution of the air, water, and land; 43 CFR 23 obligates the leaseholder to prepare exploratory and mining plans with the intent to minimize environmental disruption; and section 102 (2) (c) of the 1970 National Environmental Policy Act (NEPA) requires all federal agencies to prepare environmental impact statements to assess the potential environmental disruption

of any federal action (leasing).[19] All these regulations have failed to achieve their intended purpose. The Interior never defined or established a regulating mechanism for section 5, thus it proved unenforceable. The CFR regulation was not made retroactive, and therefore applies to only 27 leases. And as before, the Interior never issued guidelines for the enforcement of the regulations. The Interior has ignored completely the environmental impact statement required pursuant to the NEPA of 1970. Of the 20 leases issued following the passage of the act, not one included the mandatory impact statement.

The BIA, a subdivision of the Interior Department, has also failed in its assigned task. That is, advising the Indian tribes in resource development planning and representating them in leasing negotiations with coal companies. The low revenues Indians receive for their coal and the lack of information made available to them with regard to the impact strip mining, coal gasification, and coal-fired generation has on water, air, and the land testifies to the failure of the BIA to represent the Indian community 'fairly, competently & rightously'. Also, the BIA, being a subdivision of the Interior, is responsible to the Interior Department, and more specifically to

Rogers Morton, the Ford Administration energy chief. We must ask, "How can the BIA represent the Indian community fairly, when their chief enchilada?, Rogers Morton, is pushing coal production? The will of the Interior will always supercede the interests of the Indian community as long as the BIA remains a part of the Interior Department.

In light of these facts: one, that coal development is a complex operation with a tremendous potential for devastation -- cultural, economic, and environmental, and that the Interior Department and the BIA have continually failed to represent the Indian position equitably in resource development programs; there is an urgent need to provide the Indian community with the information, contacts, and available alternatives to leasing that are designed to help the Indian, and not fatten the coffers of American industry.

Decisions with regard to coal development can not be made in a vaccuum, and it is obvious that we can not rely on the government to provide the kinds of information, consultation, and technical assistance that are critical in deciding and implementing a resource development program. It is the expressed purpose of AIO's resource development

workshop to provide the information and access to reliable consultants that have been so lacking in the past, due to the ineptness of Washington's bureaucracy.

We must begin working together now to stave off the development initiatives of the coal companies, backed by the federal government. The task ahead is formidable; our commitment must be equally strong, or the next decade may well be the last for the American Indian. It is our sincere hope that this paper and the regional conferences we are sponsoring will prove a valuable and enduring tool in the cause of Indian natural resource control and Indian self-determination.

[1]James Cannon, Leased and Lost, New York: Economic Priorities Report, 1974, pg. 1.

[2]Exploring Energy Choices, Energy Policy Project of the Ford Foundation, Cambridge, Mass.: Ballinger Publishing Co., 1974, pg. 39

[3]Thadis W. Box, Rehabilitation Potential of Western Coal Lands, Cambridge, Mass.: Ballinger Publishing Co., 1974, pg. 51.

[4]Leased and Lost, pg. 8.

[5]Rehabilitation Potential of Western Coal Lands, pg. 4-5

[6]Leased and Lost., pg. 27.

[7]Ibid. pg. 8.

[8]Ibid.

[9]Ibid. pg. 13

[10]A Time to Choose, Energy Policy Project of the Ford Foundation, Cambridge, Mass.: Ballinger Publishing Co., 1974, pg. 190.

[11]Ibid. pg. 192

[12]Ibid. pg. 193

[13]Clean Energy from Coal Technology, Office of Coal Research: United States Department of the Interior, 1974, pg. 23

[14]Leased and Lost, pg. 16

[15]Ibid, pg. 17

[16]Ibid, pg. 18.

[17]Ibid. pg. 19.

[18]Ibid. pg. 22

[19]Ibid. pg. 28-29.

An AIO Red Paper

COAL: BLACK DEATH FOR RED CULTURE

by David Logsdon

As you are all well aware, Native Americans, individually and through their organized tribes, own very valuable resources -- coal, timber, water, and minerals. The way in which these resources are developed is the critical element that will determine the ultimate survival or destruction of Indian people.

For too long the development of these resources has been controlled by the BIA, the Interior Department, and American industry. It has been shown time after time in developing countries that without native control over resource wealth there can be no freedom; without native control there can be no progress.

It is therefore imperative that Indian people secure and maintain control of their resource wealth. A continuation of Indian resource exploitation will result in continued poverty and subjugation for Native Americans.

A first vital step in securing and developing Indian resources in a culturally, environmentally, and economically sound manner is knowledge. Before we can plan and implement we must know what our resource potential is; we must know how to negotiate, finance, and market tribally--controlled resource programs; we must protect our environment ---- for without clean air and water,

without the beauty of the trees, flowers, and wildlife --- can we ever be proud of our successes? Can we ever be Indians in its purest and most beautiful sense?

Let this paper and the workshops Americans for Indian Opportunity is holding in Billings begin the fight to insure Indian cultural integrity and economic self-determination.

Coal is abundant and widespread in the United States. The U. S. reserve of coal, an estimated 1.5 trillion tons, is larger than the combined reserves of natural gas, petroleum, oil shale, and bituminous sandstone, but coal use has lagged far behind the use of natural gas and petroleum due to the cleaner burning and more economical excavation and transportation characteristics of these latter fossil fuels. However, due to the growing shortages of petroleum and natural gas, coal is becoming the focal point of America's search for petroleum substitutes, namely, as a source of synthetic gas, liquified fuels, and lubricants.

As petroleum's role in the U. S. energy system declines, coal will become a critical source of energy for the next 10 to 20 years. President Ford, in his message on the economy in October, called for a sharp reduction in the use of oil to fire electrical generators by 1980. The Federal Energy Administration's summary report on energy also contains suggestions that would reduce the consumption and reliance on oil as the major energy source in this country. To promote the substitution of coal, the report suggests that new homes should not be equipped with oil-fired furnaces, rather, they should be heated with electricity generated by coal-fired steam converters.

At the present, approximately 67% of the U. S. mined coal is used in the production of electricity. By all estimates this figure is sure to rise. A Federal Energy Administration background paper on Project Independence, the government's program for U. S. energy self-sufficiency, predicts an increase in U. S. coal production from the 602 million tons mined in 1973 to 962 million tons mined per year by 1980. The FEA paper states:

> This would involve the rapid development of gasification techniques, the setting aside of some secondary air quality standards for a five-year period, expansion of our coal transportation system, the reconversion of oil burning plants to coal, abandonment of price controls on coal, and a major expansion of the coal mining industry.[1]

Until new technologies are developed which would enable the U. S. to tap new energy sources, i.e. the sun, hydrogen fusion, and geothermal energy, coal will seemingly play a major role in meeting the growing energy needs of this country.

Project Independence, while holding great opportunity for the development of Indian resources, may also lead to an unprecidented campaign to exploit Indian resources, resulting in irreparable damage to Indian lands, cultures, and natural environment. Indians must begin preparing now for the pending thrust to develop Indian coal lands.

In order to avert disaster, Indians must secure and maintain control over resource development projects on Indian lands. The purpose of this paper is to discuss some of the major problems and issues that will arise when a coal development project is being considered.

At this point, specific problems and issues dealing with coal mining will be discussed.

STRIP MINING

As the search for alternative energy sources continues, the pressure to expand strip mining operations in the Western states has increased dramatically. Although only 7.5% of U. S. coal reserves are strippable, strip mining accounted for 46% of the coal mined in 1973.[2] The reasons for the widespread popularity of strip mining in recent years can be seen in the following: in comparison to underground mining, surface mining produces three times the coal per man hour; strip mining requires little manpower; nearly 100% of the coal seam can be recovered by strip mining, whereas the recovery rate of underground mining is only 50%; as a result, strip mining is 40% cheaper than underground mining.[3]

Although strip mining is advantageous to the coal companies, it is extremely destructive to the environment.

The uncertain rehabilitation potential of Western coal lands, the impact strip mining has on underground and surface water flow patterns, and the limitations it places on future land use has led to a confrontation between the coal companies and Indian tribes and environmental organizations.

The National Academy of Sciences has conducted extensive research into the rehabilitation potential of Western coal lands. In their report entitled Rehabilitation Potential of Western Coal Lands, the NAS concluded that in areas receiving over 10 inches of rain per year, the rehabilitation chances are fairly good, provided large sums of money are invested and rehabilitation efforts continue over a number of years. Sixty percent of the Western coal lands receive the necessary 10 inches of rainfall, these include the Ponderosa pine areas, the mountain shrub areas, and the high grasslands. In the Southwest desert lands where annual rainfall is below 10 inches, revegetation MAY NOT OCCUR FOR CENTURIES, no matter how extensive the reclamation efforts.[4]

The NAS report emphasizes the need for adequate planning, monitoring, enforcement, and financing to insure the highest degree of rehabilitation possible. Their recommendations

read as follows:

1. We recommend that surface mining for coal should not be permitted on either public or private lands without the prior development of rehabilitation plans designed to minimize environmental impacts, to meet on - and off-site air and water pollution regulations, and to define a timetable for rehabilitation concurrent with mining operations. The preplanning should be part of an original environmental impact analysis for the region and should clearly indicate the basis on which conditions at the proposed mine sites are evaluated. It is important that adequate provision for public participation be a part of the review of the preplans.

2. We recommend that minimum regulations governing the surface mining of coal be promptly established by Federal statute to provide for the planning, monitoring, enforcement, and financing of rehabilitation, and that the costs of these activities be financed by mining operations. We also recommend that rehabilitation management plans be made and enforced for a period sufficiently long to assure vegetative stability. We recognize that state and local governments may also wish to impose further rehabilitation requirements to meet additional goals. The sharing of the responsibilities for regulating surface mining and rehabilitation in this way should be encouraged. Methods for public participation at these several levels of government should be improved.

3. Rehabilitation of surface mines on public lands should set the example of the best available planning and the most rigorous application of rehabilitation techniques. Administrative regulations of the Federal land management agencies should go well beyond what is demanded by statute, if technology is available. Leases and permits for mining coal on Federal lands should be so written as to demand the application of the most advanced rehabilitation technology.

4. Improvement of rehabilitation techniques and the reduction of environmental impacts depend critically upon monitoring and evaluation. Therefore, we recommend establishment of a comprehensive, non-industry

program to monitor and evaluate the rehabilitation of all current and future coal surface mining operations. Through such experience, performance standards for rehabilitation can be based on technical knowledge. The evidence must include a complete baseline inventory of the existing ecology, geology, and hydrology prior to granting a permit and the establishment of a set of continuing observations to monitor the on-site and off-site effects of mining and rehabilitation. Such studies must also include the determination of the chemical properties of the soils and overburden and the hydrologic effects of surface mining on ground water, surface drainage and water quality as affected both on-site and off-site. These data will be a necessary measure of what has been accomplished and serve as an essential guide for ongoing and future operations. The observations should be verified by agencies independent of the mining operation, because many years of objective observations are required and organizational continuity is essential.

5. Since mining and rehabilitation involve many diverse economic, ecologic, engineering, hydrologic, and social factors in complex inter-actions and feedback loops, we recommend that Federal research and development programs for coal include studies on total system approaches to energy resource mining, mined land rehabilitation, and energy conversion. Because rehabilitation depends on qualified people, we recommend that the responsible governmental agencies develop interdisciplinary teams to assess the potential for rehabilitation of proposed mine sites and to conduct the research for rehabilitation.

6. Certain features of the landscape cannot be restored at any price. If irreplaceable historic, scenic, or archeological sites or endangered species are present in an area proposed for mineral exploration or surface mining, or if such values in a neighboring area would be irreparably damaged by such activity, no mining should take place without an extensive review of the consequences. In some cases artifacts may be salvaged or moved with minimal loss of their value to society. In those instances the salvage operation should be considered part of the cost of rehabilitation and charged against the mining operation. If such irreplaceable cannot be removed or protected, or if the landscape and associated biota

cannot be rehabilitated for social purposes, surface mining should be prohibited.

7. Modern technology provides opportunities for changed uses and design of new landscapes in mined areas. Overburden is a resource for these activities, not a waste material. We recommend that regional planning for subsequent land uses, such as rangeland parks, recreational areas, and urban disposal centers, take advantage of these opportunities.

8. The shortage of water is a major factor in planning for future development of coal reserves in the American West. Although we conclude that enough water is available for mining and rehabilitation at most sites, not enough water exists for large scale conversion of coal to other energy forms (e.g., gasification or steam electric power). The potential environmental and social impacts of the use of this water for large scale energy conversion projects would exceed by far the anticipated impact of mining alone. We recommend that alternative locations be considered for energy conversion facilities, and that adequate evaluations be made of the options (including rehabilitation) for the various local uses of the available water.[5]

In most Western states coal seams are conduits for underground water flow. Strip mining operations will inevitably intersect the aquifer causing drastic alterations in the underground water flow patterns. The water system may flow far underground causing wells to dry up, leaving reclaimed areas and surrounding agricultural lands too dry to support native vegetation.

Surface mining will also cause alterations in the surface water flow patterns. Stream channels and alluvial valley floors which carry surface water will be destroyed.

The rechanneling of surface streams will cause heavy erosion, and alluvial valleys, once highly productive grazing areas may dry up. It is, therefore, essential to stipulate in the planning of mining operations that alluvial valley floors and stream channels must be preserved. Indian tribes who enter into strip mining agreements must be willing to sacrifice not only the lands to be mined, but also surrounding areas that may be dewatered as a result of the mining operation.

As of 1973, the rehabilitation efforts of the major coal companies leave much to be desired. Only 49% of all federal and Indian lands have been rehabilitated to meet USGS standards, which in many cases involves only the leveling off of the spoils banks. In terms of total unrehabilitated acres, Utah International is the worst offender with 986 acres left unrestored. An additional 1133 acres have been stripped, but the spoils banks have been recontoured to coincide with the original landscape. Out of these 1133 acres, only 100 acres have been reseeded. Of the 3772 acres of federally leased land, none have been reclaimed satisfactorily or permanently.[6]

The potential for vast environmental devastation caused by ill-planned and mismanaged strip mining operations demands strong legislative action to prevent this unnecessary

destruction. Currently, strip mining bills are before committee in the House and in the Senate. By all indications, the final legislation will be a plus for environmentalists. Indian tribes should consider adopting firm and comprehensive legislation to augment and reinforce the pending federal legislation.

As is always the case, legislation without monitoring and enforcement is ineffective. Ted Schwinden, Montana State Reclamation Chief, says that the policing task is next to impossible.

> We know there are a lot of companies operating in violation of the law, but we don't have the time to run them down.[7]

Indian tribes must begin pressuring the BIA and the Interior Department to insure that federal and local strip mining laws are enforced. We cannot afford to be lax; we must take the initiative now to see that our lands are not needlessly destroyed. Bob Bailey, A Northern Cheyenne from Montana, says:

> The question is, do we perpetuate ourselves or do we extinguish ourselves? The very land we stand on, sleep on, eat on, will be torn up. This is our last piece of land, and if we lose it, we'll be Indians without lands in the future.[8]

ELECTRICITY AND COAL

Electricity is an essential and convenient energy source for American industries and consumers. Electricity is non-

polluting, flexible, efficient in its end use, and easily transported. The demand for electricity for illumination, heating, and for running motors and appliances will increase rapidly as we approach the year 2000. At present, electricity makes up less than 10% of the total energy consumed in the U. S. Experts estimate this figure will rise to 50% by the year 2000. This rapid increase in the demand for electricity will greatly accelerate the pace of coal development in the West.

Currently, two-thirds of the coal mined in the U. S. is used to produce electricity. In October, 1971, the Bureau of Reclamation and 35 power companies released the "Northern Central Power Study," which located 42 potential sites for coal-fired power plants. Thirteen of the plants were to have a generating capacity of 10,000 megawatts. The study also identified sites for larger plants to be built by 1985, which would greatly increase the production of electricity and the demand for Western coal.

Two power plants are operating, and three more are under construction in the Southwest. The operating plants are the Four Corners facility in Fruitland, New Mexico and Southern California Edison's Mohave Plant. The spewing smokestacks of the Four Corners generating facility earned

notoriety a few years back as the only manmade creation visible to the Apollo astronauts. These plants alone burn 12 million tons of coal each year.[9] The anticipated rapid growth of coal-fired electrical power plants will have a tremendous impact on the economy, water availability, and the environment in the Western states.

The major environmental drawback to coal-fired generators is the emission of sulfur dioxide, carbon monoxide, and small particle matter into the atmosphere. Air pollutants increase the severity of respiratory illnesses such as colds, sore throats, bronchitis, and pneumonia. Air pollution can also adversely effect livestock, agricultural crops, and property.

Standards for the control of air pollution were established under the 1970 Clean Air Act. Research has shown that the air quality in urban areas has improved in recent years due to federal and state cleanup efforts. However, President Ford, in his economic message in October, suggested that some "secondary" air quality standards may have to be suspended to facilitate the Administration's energy program, Project Independence.

In 1971, the Ford Foundation sponsored the Energy Policy Project, a comprehensive look at America's energy

future. In their report released in November, 1974, they warned that "available scientific evidence indicates that there is no basis for relaxing present air quality standards."[10] The report calls for an immediate program to regulate the emission of small particles which today are largely uncontrolled, and may prove to be a greater hazard to human health than the sulfur and carbon pollutants. The Project's report calls for strict enforcement and regulation of air quality standards, pollution taxes levied against violators, and a national energy conservation program as the means to achieve air quality.

If coal-fired generators are to help meet our energy needs without causing irreparable harm to the environment, technology must be developed to minimize the proliferation of sulfur dioxide and small particles into the atmosphere. Recently, a new process, flue gas desulfurization (FGD), has been developed which may, to a large extent, solve the sulfur dioxide and particle pollution problem.

The system, commonly known as the scrubber, has raised much controversy. The Chairman of the Tennessee Valley Authority stated in early 1974:

> The country's knowledge of scrubbers has not yet progressed to the point where TVA can have any degree of assurance that it is not buying a billion dollar pig in a poke.[11]

The Environmental Protection Agency, in an effort to assess the status of sulfur dioxide control, held hearings on FGD technology in October, 1973. The main findings emerging from the hearings were:

> - Flue gas desulfurization (FGD) technology must be installed on large numbers of power plants if sulfur dioxide emission requirements adopted pursuant to the Clean Air Act are to be met in the 1970's.....
>
> - With several noteworthy exceptions, the electric utility industry has not aggressively sought out solutions to the problems they argue exist with FGD technology.....
>
> - Although most utility witnesses testified that FGD technology was unreliable, that it created a difficult sludge disposal problem, and that it cost too much, the hearing panel finds, on the basis of utility and vendor testimony, that the alleged problems can be, and have been, solved at a reasonable cost. The reliability of both throwaway-product and saleable-product FGD systems has been sufficiently demonstrated on full scale units to warrant widespread commitments to FGD systems for sulfur dioxide control at coal and oil fired power plants.....[12]

Alexander Weir Jr., principle scientist for air quality of Southern California Edison Co., recently obtained an exclusive license to sell stack-gas scrubber systems he developed. A large-scale unit of the Weir system has been operating successfully for nine months at the Mohave generating facility in Nevada. The system has proven to be 95% effective in removing sulfur dioxide, and has effectively removed over 90% of the small particle matter. The solid wastes from the FGD system, essentially gypsum,

can be used as a parking-lot filler, or can be used to make gypsum wallboard. The Philadelphia Electric Company has decided to install scrubber units in three of its generating plants at a cost of 68 million dollars. This expressed confidence in, and the preliminary success of the scrubber system has done much to undermine the claims of the American Electric Power System that the scrubber is unproven, unreliable, and prohibitively costly.

The FEA report emphasizes the need for the installation of scrubber units if sulfur dioxide and particle matter pollution are to be controlled. Indian tribes interested in, and investing in, the power plant industry must secure firm guarantees that scrubber systems will be installed. With the development of coal-fired generating facilities proceeding at an already near reckless pace, the need for the guaranteed installation of these units becomes all the more urgent.

A second method designed to alleviate the air pollution problems inherent in coal-fired electrical generation is the fluidized-bed boiler. In the fluid-bed system, chunks of coal are mixed with limestone in a bed, and the mixture is aerated from below, producing a bubbling fluid-like mass. The coal is then ignited, heating water-filled coils sub-

merged in the bed. The water in the coils changes to steam which is used to run the electrical generators.

When the coal burns, oxides of sulfur are produced. The released sulfur reacts with the limestone to produce calcium sulfate, thus preventing its entry into the atmosphere. Currently, the firm Pope, Evans, and Robbins is under contract from the Office of Coal Research to design, construct, and operate a 30 megawatt coal-fired fluidized-bed boiler. The boiler will be the first large-scale fluid-bed boiler, and will, hopefully, demonstrate the fluidized-bed's capability to burn coal without emitting excessive amounts of sulfur dioxide and nitrogen oxide.

The fluidized-bed boiler has a second advantage over conventional coal-fired plants, that being efficiency. The rate of heat release per cubic foot of combustion space will be more than 10 times the heat release rate of conventional pulverized coal boilers. Augmented by the addition of a heat recovery system, the fluid-bed boiler system should approach efficiencies of 50%, as opposed to conventional boiler efficiency, 36%.[13]

The fluidized-bed boiler holds great promise for the use of coal to generate electricity without the inherent air

and feasibility for commercial use can not be documented. By estimates of the Office of Coal Research, the fluid-bed boiler will be ready for widespread application in the late 1970's.

Thus far only the air pollution problems incurred in coal-fired electrical generation have been discussed. The projected expansion of the coal-fired utility industry will also have a major impact on water availability and land use alternatives in the West. In order to avoid repetition, and to sketch a more comprehensive picture of energy development benefits and liabilities, these topics will be discussed in the following section on coal gasification.

COAL GASIFICATION

With shortages of natural gas and liquid fuels becoming more acute, and with fossil fuel demand expected to double by the year 2000, extensive research and development is being done in coal gasification and coal liquification techniques. The production of clean gaseous and liquid fuels from coal, suitable for electrical power generation, transportation, and for residential and commercial use, will play a key role in meeting U.S. demands for the next 20 to 30 years. That is, until replenishable energy sources

such as wind, geothermal, and solar energy are developed.

Basically, the coal gasification process involves the heating-of-coal in the presence of steam, whereby, the carbon in the coal reacts with the hydrogen in the steam to produce methane gas, the main component in natural gas. This process produces carbon monoxide and hydrogen as byproducts, which, through a process called methanation, react to produce more methane, thus increasing the concentration of methane in the synthetic gas.

Research in coal liquification lags far behind gasifcation research, and as a result, major liquification pilot projects are not expected in the near future.

If the energy shortage pushes the expansion and development of stripmining, coal gasification, and electrical power generation as far and as fast as present predictions indicate, the land and way of life of the Western Indians will be drastically altered. At present, some 20 billion tons of coal under nearly 1 million acres of public and Indian lands has been leased to private industry by the Interior Department. The Interior Department has leased these lands without adequate consideration of the environmental effects of stripmining, and without any assessment of the staggering impact coal development will

have on the economy and society of the Western states. Currently, only 11% of these leases on public and Indian lands are producing coal, but as the network of electrical generating facilities and coal gasification facilities expands, the increased demand for coal will result in the rapid development of Indian and public coal leases.

In 1964, a consortium of investors, publicly owned utilities, and government agencies was formed to plan, construct, and operate a coal-fired network of electrical generating facilities to serve the Southwest. The consortium, called WEST (Western Energy Supply and Transmission Associates), has built two power plants and has three more under construction. When all five plants are in operation, total coal consumption will exceed 30 million tons per year. In addition, huge quantities of water, an estimated 100,000 acre feet per year, will be needed to cool the generating equipment. Most of the water will be returned to the water supply between 10 and 15 degrees hotter. A small percentage of the water will be lost to evaporation.

Under the present development scenario, seven gasification plants will be built in the Southwest, each producing 250 million cubic feet of gas a day and consuming

8 million tons of coal and 20,000 acre feet of water a year -- water which is lost in the gasification process and not returned to the ecosystem. If all seven gasification plants and all five generating facilities are in operation, they will collectively consume approximately 176 million tons of coal and 170,000 acre feet of water per year. To feed this monstrous energy network, over 100 square miles of Indian coal land will be strip mined over the next 15 years.

An energy network of even greater dimensions is being planned for the Northern Plains. The North Central Power Study located 42 potential sites for coal-fired generating facilities, with a total generating capacity of 50,000 megawatts to be in operation in the 1980's. In addition, the Northern Great Plains Resource Program calls for the construction of 7 gasification plants by 1985, and an additional 9 plants by the year 2000.

The Northern Cheyennes and the Crows have already leased large tracts of their land for coal development. Between 1969 and 1971, the Northern Cheyenne tribe auctioned prospecting permits for 52% of their reservation. The Peabody Coal Co. has converted 6 prospecting permits into long term leases. Consolidation Coal has asked the Northern

Cheyennes to lease 30,000 acres for 4 gasification plants and a 30 million ton per year strip mining operation. Shell Oil, American Metal's Climax, and Westmoreland Resources hold leases on 75,358 acres of the Crow reservation. With wind erosion, and the direct effects surface mining has on water flow patterns, the acreage committed to coal development may more than double.

The enormity of the energy networks planned for the Southwest and the Northern Plains will, without doubt, cause irreparable disruptions in the lifestyle and lands of the American Indian. Coal development will necessitate the expansion of the railway system, highways, electrical power lines, sanitation facilities, water supply, law enforcement, housing, etc. Indian people must consider the staggering and irreversible consequences of large-scale coal development projects before entering into contract agreements. Coal development will have a major impact on:

WATER

The projected scenarios for coal development that are currently under consideration will severely tax the water supply in the Western states. The National Academy of Sciences stresses that the water supply in Montana is "completely committed, perhaps overcommitted;" Wyoming's

water supply is being heavily taxed; and the Colorado River Basin's water allocation is, without doubt, overcommitted. The Navajos have allocated two-thirds of their water allotment to coal development. Science reported the NAS findings, noting:

> there is simply not enough water in the Western states to permit the enormous congregations of coal-fired generating, gasification, and liquification plants envisioned in recent years by utilities and oil companies...any large-scale commitment of water to on-the-spot consumption of coal would lock such states as Montana, Wyoming, and the Dakotas into a coal based economy they hadn't bargained for.[14] (emphasis added)

If Western water is going to be committed to coal development, agriculture, ranching, recreation, and water for human needs will be in short supply. In essence, the whole economy and way of life in the West will be drastically changed. Are Indians willing to accept the consequences of large-scale coal development? Is this what Indian people want for themselves and for their children? The choice is yours. An equitable compromise on water use must be found, or the Western Indians will have no future, no means to survive. The time is now to secure Indian rights to water; delay will spell disaster for Indian people.

SOIL AND AIR QUALITY

The soils of the Northern Plains and the Southwest are high in alkaline salts. These salts filter through the topsoil and reach high concentrations in the subsoil. Surface mining disrupts the soil, causing the alkaline salts to surface -- polluting the soil and water supply. The higher salt concentration results in stunted or destroyed crops; streams and rivers become contaminated killing fish, wildlife, and livestock; and the salts can filter into wells causing human sickness.

Air pollution from the strip mines, coal-fired generators, gasification plants, and secondary industries will substantially degrade the clean air of the West. Even after the removal of 99.5% of the ash, sulfur dioxide, and small particle matter through the installation of scrubbers (a percentage by no means guaranteed), 100,000 tons of pollutants will enter the atmosphere each year by 1985, if power plants planned for the Northern Plains are in operation.

> According to Environmental Defense Fund calculations, the air pollution that will result from development on such a scale will produce more air pollution than that which chokes the 9,219 square mile Los Angeles basin.[5]

The air pollution problem will be further aggravated by the increase in auto and truck traffic that will follow coal development.

The influx of people to plan, manage, and operate the coal industries will overstrain community housing, public facilities, and services, and schools, hospitals, sewage treatment facilities, and retail stores. The projected rapid growth of Western mining towns will far exceed urban planning and development, resulting in a chaotic and unmanageable habitat. Simply stated, development of the coal industry at the pace planned by the coal industry is unmanageable, unnecessary, and ill-advised. A young Hopi articulates the fears of all Western Indians.

> You are taking our water. You are destroying our land...How can we live? It will be the end of our way of life, the end of the Hopi people.[16]

ECONOMY

Many Indian tribes, living in poverty and suffering from high unemployment and low-paying jobs, view coal development as their only chance to escape their persistent economic depression. The revenues generated by coal development are substantial and attractive, but the negative aspects: air pollution, water shortages, and the destruc-

tion of th land, must also be considered. While the income from coal development is substantial, so are the costs. Coal development will necessitate expansion of housing, roads, railways, schools, medical facilities, etc. Indian tribes will undoubtedly be called on to finance a considerable part of these expanded services.

Coal development will provide increased job opportunities to on-the-reservation Indians. However, the number of jobs, the types of jobs, and the pay scales are by no means guaranteed. Strip mining operations are highly automated, and therefore, will not generate many jobs. In electrification and gasification plants, many jobs will require extensive expertise, expertise Indians do not have. This problem can be remedied through apprenticeship programs organized and financed by the coal companies. To secure such training programs, contract agreements with the coal companies must be reached that will include such provisions.

The commitment of Indian lands, capital, and water resources to coal development will have an adverse effect on ranching and agriculture, Indians must be aware of the fact that coal development is a temporary enterprise; that coal supplies will run out; and that new energy

sources will be developed that will decrease the need for coal-fired electrical generation, synthetic gas, and synthetic liquid fuels.

When coal is mined, capital assets are lost. When the coal industry leaves the reservation what will be left? Empty mines, closed industries, land ravaged by strip mining, polluted air, a critical shortage of clean water -- these are the final consequences of large-scale coal development. This is what Indian people must ultimately understand. The Northern Cheyenne Landowners' Association feels that the

> ultimate end of the Northern Cheyenne Reservation, the removal of its people, and the destruction of culture seems inevitable unless measures are taken now to control the planned mining of coal on the reservation.[17]

Rapid, random, and uncoordinated large-scale coal development in the West is both unnecessary and unacceptable. The nation has enough time and expertise to research and develop procedures and technologies that will minimize the adverse effects of surface mining, electrification, and coal gasification. A continuation of the current development schemes will result in the disruption of the land, people, and the environment on a scale which is neither acceptable nor tolerable.

INTERIOR DEPARTMENT, THE BIA, AND LEASING

The leasing of public and Indian lands is administered by the Interior Department and the Bureau of Indian Affairs. The authorization permitting the Interior Department to lease public lands is pursuant to the Mineral Leasing Act of 1920; the Omnibus Tribal Leasing Act of 1938 provides for the leasing of Indian lands under the auspices of the BIA. The leasing policy of the federal government has been a failure in every way. It has failed to encourage coal production; has failed to provide a fair market price for Indian and public coal through a combination of non-competitive bidding and a preference rights leasing policy, resulting in laughably low rental and royalty payments; and has failed to assess and minimize the environmental impact of strip mining and the related coal industries. The mismanaged and uncoordinated leasing policy has thus resulted in the exploitation of Indian and public resources and lands, all to the benefit of the coal industry.

Since the enactment of leasing legislation, the Interior has approved 463 leases on public lands covering over 680,000 acres, and leases on Indian lands totaling 259,000 acres. Of these 474 leases only 52, or 11%, are

producing coal. The leasing policy of the Interior while purporting to be competitive, in reality, has not been. 59% of the Interior's leases have been awarded with only one bid submitted. Richard Bodman, Assistant Secretary of the Interior, has admitted, "leasing generally has been on the basis of industry expressions of interest."[18] The non-competitive leasing policy has resulted in ridiculously low returns for public and Indian coal: the public has received, on the average, only 12.5 cents per ton of coal, while Indians have fared slightly better, averaging 15.8¢ per ton. The few leases that have been granted through competitive bidding have yeilded 11 times more revenue per acre in comparison to the non-competitive leases. An example: The Northern Cheyennes leased 16,000 acres of their land to Peabody Coal for 12 cents an acre. Just two years later, two sales in the same area drew six bidders each, and the winning bids approached 16 dollars per acre! Thus, the advantage of a competitive leasing system.

The lengthy adjustment period of federal leases has also contributed to the low revenues received for Indian and public coal. Public leases are adjusted every 20 years,

while Indian leases are adjusted every 10 years. During the adjustment period there is no mechanism through which rent and royalty payments can be escalated to reflect increases in the market value of coal, or to compensate for rapidly rising land values. The inequity of the lease adjustment policy is evident in light of the fact that retail coal prices have increased 60% in 1974 alone.

The preference rights policy, a third factor which as institutionalized the non-competitive leasing practice, was included in the 1920 Mineral Leasing Act to stimulate industry funded mineral exploration in the Western states. Under this procedure, a corporation or individual is granted an exclusive right to explore a specified tract of land. And if minerals are found in sufficient quantities, the mining company has an exclusive option to lease the tract. The cost for an exploratory permit is 25¢ per acre per year, plus an initial filing charge of 10 dollars. The preference rights clause, while providing private capital for mineral exploration, also reinforces the non-competitive nature of the federal leasing program. It is the position of critics of the preference rights system, that the value of the information received through exploratory permits does not adequately compensate for the low coal revenues

resulting from the non-competitive bidding practice.

The minimal cost of obtaining and holding a preference rights lease, the Interior's policy of granting leases in response to industrial initiatives, regardless of market demands, and the non-competitive nature of the leasing policy has encouraged the coal companies to hold leases in speculation. That is, to not develop the lease in hopes of an increase in the market value of coal, or transferring the lease to another mining company at a profit. For these reasons, leasing has not served the interests of the Indian Community.

INTERIOR DEPARTMENT AND ENVIRONMENTAL PROTECTION

There are three Interior Department regulations which are intended to assess and minimize the destruction of the environment due to strip mining. Section 5 of the standard lease form states that "reasonable steps" must be taken to prevent the "unnecessary" pollution of the air, water, and land; 43 CFR 23 obligates the leaseholder to prepare exploratory and mining plans with the intent to minimize environmental disruption; and section 102 (2) (c) of the 1970 National Environmental Policy Act (NEPA) requires all federal agencies to prepare environmental impact statements to assess the potential environmental disruption

of any federal action (leasing).[19] All these regulations have failed to achieve their intended purpose. The Interior never defined or established a regulating mechanism for section 5, thus it proved unenforceable. The CFR regulation was not made retroactive, and therefore applies to only 27 leases. And as before, the Interior never issued guidelines for the enforcement of the regulations. The Interior has ignored completely the environmental impact statement required pursuant to the NEPA of 1970. Of the 20 leases issued following the passage of the act, not one included the mandatory impact statement.

The BIA, a subdivision of the Interior Department, has also failed in its assigned task. That is, advising the Indian tribes in resource development planning and representating them in leasing negotiations with coal companies. The low revenues Indians receive for their coal and the lack of information made available to them with regard to the impact strip mining, coal gasification, and coal-fired generation has on water, air, and the land testifies to the failure of the BIA to represent the Indian community 'fairly, competently & rightously'. Also, the BIA, being a subdivision of the Interior, is responsible to the Interior Department, and more specifically to

Rogers Morton, the Ford Administration energy chief. We must ask, "How can the BIA represent the Indian community fairly, when their chief enchilada?, Rogers Morton, is pushing coal production? The will of the Interior will always supercede the interests of the Indian community as long as the BIA remains a part of the Interior Department.

In light of these facts: one, that coal development is a complex operation with a tremendous potential for devastation -- cultural, economic, and environmental, and that the Interior Department and the BIA have continually failed to represent the Indian position equitably in resource development programs; there is an urgent need to provide the Indian community with the information, contacts, and available alternatives to leasing that are designed to help the Indian, and not fatten the coffers of American industry.

Decisions with regard to coal development can not be made in a vaccuum, and it is obvious that we can not rely on the government to provide the kinds of information, consultation, and technical assistance that are critical in deciding and implementing a resource development program. It is the expressed purpose of AIO's resource development

workshop to provide the information and access to reliable consultants that have been so lacking in the past, due to the ineptness of Washington's bureaucracy.

We must begin working together now to stave off the development initiatives of the coal companies, backed by the federal government. The task ahead is formidable; our commitment must be equally strong, or the next decade may well be the last for the American Indian. It is our sincere hope that this paper and the regional conferences we are sponsoring will prove a valuable and enduring tool in the cause of Indian natural resource control and Indian self-determination.

[1]James Cannon, Leased and Lost, New York: Economic Priorities Report, 1974, pg. 1.

[2]Exploring Energy Choices, Energy Policy Project of the Ford Foundation, Cambridge, Mass.: Ballinger Publishing Co., 1974, pg. 39

[3]Thadis W. Box, Rehabilitation Potential of Western Coal Lands, Cambridge, Mass.: Ballinger Publishing Co., 1974, pg. 51.

[4]Leased and Lost, pg. 8.

[5]Rehabilitation Potential of Western Coal Lands, pg. 4-5

[6]Leased and Lost., pg. 27.

[7]Ibid. pg. 8.

[8]Ibid.

[9]Ibid. pg. 13

[10]A Time to Choose, Energy Policy Project of the Ford Foundation, Cambridge, Mass.: Ballinger Publishing Co., 1974, pg. 190.

[11]Ibid. pg. 192

[12]Ibid. pg. 193

[13]Clean Energy from Coal Technology, Office of Coal Research: United States Department of the Interior, 1974, pg. 23

[14]Leased and Lost, pg. 16

[15]Ibid, pg. 17

[16]Ibid, pg. 18.

[17]Ibid. pg. 19.

[18]Ibid. pg. 22

[19]Ibid. pg. 28-29.

1. Box, Thadis W. Rehabilitation Potential of Western Coal Lands, Cambridge, Mass.: Ballinger Publishing Co., 1974

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PERSONAL CONTACTS

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