per acre-foot, compared with $108 per acre-foot for desalinization. But at the conference someone estimated it would cost $30 million to take a plastic-covered iceberg on a 9-month trip to California, and Faisal announced that probably $100 million worth of research and engineering would have to precede the first successful iceberg move. That would include basic investigations of life cycles and melting rates of icebergs as well as a technology, as Miami consultant Henri Bader said to move "immense, fragile, shrinking masses on the order of 100 to 1000 million tons . . . global distances in rough seas."

The engineering challenge does appear to be stupendous and is matched only by the increasingly desperate search for water in Saudi Arabia and other arid parts of the world. Faisal told an Iowa television audience that his country would spend $15 billion on water desalinization between now and 1981, and that by 1985, the country wouldn't have enough drinking water if new sources were not found. He believes icebergs will ultimately prove a cleaner, cheaper, more abundant, and environmentally safer answer than stepped-up desalinization.

Faisal said the next step will be to set up a body of experts to analyze the findings and decide where to go from here. There was no indication where the money would come from, but the Prince (who is now a private businessman) said if the project could be proved feasible "we will get all the financing we need."

—CONSTANCE HOLDEN

Coal: Invoking "the Rule of Reason" in an Energy-Environment Conflict

Enactment of the strip-mining bill and the Clean Air Act amendments this past summer finally brought some surcease to the battle that had been going on since the early 1970's between environmental lobbyists and lobbyists for the coal and utility industries. But neither side had given any quarter. The major issues, such as those over the requirements for stack gas scrubbers and the elimination of the "highwalls" * left from stripping operations, were decided not through sweet reason or goodwill but on the basis of the votes that the lobbyists could muster in committee and on the House and Senate floors.

Yet, even as this fierce struggle was being waged by the lobbyists on Capitol Hill, some other environmentalists and industry people (mainly from coal-using enterprises such as utilities and steel and chemical companies) were quietly engaged in an ambitious and unusual attempt to reach a consensus on some of the still-unresolved issues associated with the mining and burning of coal. This latter effort was being carried on under the name of the National Coal Policy Project, put together in 1976 by Laurence I. Moss, a former president of the Sierra Club, and Gerald L. Decker, corporate energy manager of the Dow Chemical Company.

The project is now entering its final phase, and although it is clear that on some troublesome issues no agreement will be possible, most of the participants appear convinced that enough progress is being made to make the effort worthwhile. Some of the questions addressed are central to how the strip-mining and clean air legislation will be implemented or to decisions that will have to be made on federal coal leasing and the siting of coal-burning power plants. Therefore, if consensus can be reached on certain of these questions, the project could turn out to have important consequences. Certainly that could be the case if Carter Administration officials perceive recommendations from the project as generally representative of what environmental and industry leaders think.

Although nothing has been finally approved yet, five project task forces—on mining, air pollution, conservation, transportation, and pricing—have prepared preliminary drafts of papers setting forth, at least in a tentative way, areas of agreement and disagreement. For instance, it appears that the air pollution task force is near agreement on a recommendation that new coal-fired power plants should be built in the regions where the power will be consumed—which is to say, the people who get the electricity should also have to live with the environmental effects of generating it.

In light of all the power plants that have been built on or proposed for remote sites in states such as Arizona, Utah, and Wyoming, such a recommendation—prepared by a task force cochaired by an executive of Detroit Edison and an environmental lawyer who has represented the Sierra Club in two major coal suits—would be of no little interest, and it might carry considerable political weight.

Similarly, some of the policy recommendations which appear likely to come from the mining task force—cochaired by John Corcoran, former board chairman of Consolidation Coal Company (the industry's second largest producer), and Michael McCloskey, executive director of the Sierra Club—could have a political impact.

The draft papers on mining in the Midwest and Northern Great Plains regions contain recommendations bearing importantly on possible conflicts between surface mining and farming. According to these drafts, permits for surface mining on highly productive prairie soils in the Midwest or on alluvial valley floors on the Northern Plains should be issued only on an experimental basis until it has been demonstrated that agricultural productivity can be fully restored.

This conclusion follows logically from the consensus among the task force members (who include not only the former head of Consolidation Coal but also officials from two other big coal companies, Peabody and Amax) that the present state of the art for land reclamation involves some major uncertainties. That such a consensus has been reached on so important a point of fact is itself significant because, in the past, controversy has often raged over assessments as to the adequacy of this or that reclamation technique.

The recommendations cited above indicate that the environmentalists are presenting their arguments forcefully and effectively. Yet it seems certain that environmentalists on some of the task forces are being won over by certain industry arguments and points of view, too. As cochairman of the mining task force, John Corcoran has been particularly insistent that regulation of mining and reclamation be flexible enough to take into

*"Highwalls" are the walls created when strippers, either in open pit or "area mining" on gentle terrain, or in "contour mining" along mountainsides, cut into a coal seam and remove the overburden. Highwalls can be eliminated by backfilling the spoil or overburden into the cut and regrading it to the approximate original contour.

account differences among the various coal-mining regions. For instance, the paper on mining in the Midwest, which will be further revised, observes that the elimination of highwalls—as required by the new federal strip-mining law and by some state laws—"may not be the best means of accomplishing the basic goal of returning mined [farmland] to its previous or higher potential for agricultural use." It adds that "reduction of high walls to 3 to 1 slopes or less . . . reduces the amount of land that can be graded to gentle slopes."

In fact, environmental lobbyists who were working for the strip-mining and clean air bills earlier this year have viewed the coal policy project uneasily partly because they have been afraid that some of their major positions—such as their insistence on an absolute ban on highwalls—might be undercut.

The prime mover behind the project is Gerald Decker, an affable man who seems to impress everyone as an individual of sincerity and goodwill. Some 3 years ago, Decker, who was coming to know Larry Moss and other environmentalists by serving on the Federal Energy Administration's environmental advisory committee and other government panels, became interested in creating a mechanism through which environmentalists and industrialists might arrive at an accommodation. He perceived a special need for an accommodation on coal issues because of the critical place held by coal in national energy policies and because his own company, Dow Chemical, owns extensive lignite reserves in Texas which it plans to use both as a boiler fuel and chemical feedstock.

When Decker first broached the idea for the project to Moss and some other environmentalists in January 1976, they were lukewarm about it. They questioned whether the results would justify the time and effort the project would require. But Moss later agreed to help Decker see if the idea would fly, and together they organized a 2-day meeting of some 40 persons at a conference outside Washington in July 1976. The response from most (though not all) of the environmental and industry people present was favorable, and during the ensuing months Decker and Moss completed plans for the project and got enough commitments, financial and otherwise, to launch it in early 1977.

The plans were ambitious. The project budget was set at $675,000 (which, with only $410,000 raised up until now, looks quite optimistic), with foundations, federal agencies, and electric utilities and other coal-burning enterprises all expected to contribute. (A particular point was made of the fact that the environmentalists' expenses would be covered with government and foundation money and that they would therefore not have to depend on industry funds. The Ford and Rockefeller foundations have contributed $50,000 each, and the Energy Research and Development Administration and other agencies have given about $100,000.)

Unit train taking on coal at the Amax Coal Company's Belle Ayr Mine near Gillette in Campbell County, Wyoming, where the coal seams can be more than 100 feet thick. A question confronting the National Coal Policy Project is whether to recommend concentrating mining operations in such "thick-seam" areas and thereby limiting the environmental impact of western coal development. [Amax Photo]

The end product was defined as a substantial book-length report of findings and recommendations to be due in early 1978. Most of the substantive work would be done by the five task forces referred to earlier, subject to the review and approval of the project's plenary group. As the respective chairmen of the industry and environmental caucuses, Decker and Moss were to lead the project as a whole, though with the help of Francis X. Murray of Georgetown University's Center for Strategic and International Studies, which sponsors the project and provides much of the staff support.

The "rule of reason" was to guide the project, and, as elaborated by project leaders, it reads almost like a Boy Scout code: "They [project participants] will share all pertinent facts; they will not mislead each other with unfair tricks; they will not lightly impugn each others' motives; they will avoid dogmatism; they will simplify complex concepts so they can communicate to lay persons; they will identify and isolate subjective considerations; they will distinguish between facts and value judgments."

This code of behavior is said to have been faithfully observed in the task forces with but one major exception. Early in the project, the task force on the pricing of energy got caught up in such bitter personal recriminations that it appeared for a time that this group might break up in disarray—the controversial issue of "marginal cost pricing," whereby the price of each new increment of energy reflects the full cost of providing it, apparently can inspire in economists and utility officials passions akin to those of medieval theologians. But after Decker and Moss interceded, the task force members learned to agree to disagree and recent meetings have been free from rancor.

Especially warm and harmonious relationships between the environmental and industry people on the mining task force have had a chance to develop because of their numerous field trips together. "You can't go around all day on a bus, and have box lunches together, without getting to know one another as human beings," observes Harrison Loesch, a vice president of Peabody Coal Company and a member of the task force.

There is enough promise of substantive agreements coming from the task

force—although the members are still keeping their fingers crossed—that Loesch, for one, regrets that the project was not started sooner. Had it been started 2 or 3 years ago, he suggests, maybe the struggle over the strip-mine bill would have been foreshortened and perhaps the measure which emerged would have been more flexible than the one actually enacted.

On the other hand, it may well be, as Loesch concedes, that the project could not have been started sooner with any real chance of success. For, clearly, much of the motivation for industrialists to participate comes from an awareness that industry has been kept on the defensive in the federal and state legislatures and in the courts. "We've lost almost every battle on Capitol Hill," Decker says, overstating the case but indicating accurately enough the general drift of things.

On the environmental side, part of the motivation for taking part in the project comes from a deepening recognition that getting environmental laws passed is but the easier half of the battle. The problems of implementation and enforcement are frustrating and seemingly never-ending, especially where industry does not become reconciled to the new regulations imposed upon it. "The Environmental Protection Agency lives in a paper universe," observes Barbara Brandon, a Sierra Club member and University of Kentucky law professor who belongs to the mining task force.

Her colleague, Mike McCloskey, got some recent lessons in the limitations of government upon discovering during negotiations between environmental lead-

Briefing

Antitrust Suit Against Bell Winds Onward

It was almost 3 years ago, on 20 November 1974, that the government filed one of the largest antitrust cases in history, against the American Telephone and Telegraph Company (AT&T), the Western Electric Co., and Bell Telephone Laboratories, Inc. It sought to break up their alleged monopoly in the field of communications and communications equipment and to bring about the "divestiture and dissolution" of Western Electric. Although Bell Labs, which is jointly owned by AT&T and Western Electric, was named in the suit, the government did not indicate what should happen to the laboratory, which is often described as the nation's foremost industrial research laboratory. Presumably this will be revealed later when, if ever, the case comes to trial.

Since then, the two sides have been fighting mainly procedural battles. The Bell system has been arguing that the Justice Department has no right to try the suit, because the matters it is concerned with can only be regulated by the Federal Communications Commission. Bell system lawyers have tried to get the case set aside on these grounds twice, in two federal courts, but has lost each time, and has now appealed to the Supreme Court, which will consider the issue in its current session. But observers close to the proceedings say that, if the high court goes against the Bell system, and thus allows the Justice Department to go ahead and try the case, the company may just settle out of court. To do otherwise would mean a trial on the scale of the current antitrust trial against the IBM Corp. That case was announced in 1969, and trial began in 1975. To date, it has consumed 388 courtroom days, 60,000 pages of transcript, and 5,000 court exhibits. And the government hasn't even finished presenting its case. IBM, for its part, plans to put before the lone judge hearing all this another 350 witnesses and 5000 exhibits. The proceedings may go well into the 1980's.

The procedural sparring in the Bell system case has also been accompanied by some indications of the deeper questions each side plans to dredge up. For instance, the Bell lawyers have indicated in some briefs that the system should not be broken up because AT&T, Western Electric, and Bell Labs together, are a unique resource "vital" to the conduct of government business and national security. As evidence for this, they appear to be planning to produce the entire gamut of Bell-government relations.

For instance, in one move, Bell system lawyers obtained a court order forcing its adversary, the government, not to destroy the documentation of its relationship with the Bell system—presumably so these documents could eventually serve as part of Bell's evidence in the trial.

The order included a long list, submitted by the company, of every federal agency with which the Bell system has, or has had, some connection over the years. It included predictable areas of national defense, intelligence, and satellite communications. But it also included some surprises: the Bell system has designed a "critical telemetering and data service" for the Bureau of Land Management to monitor power generation in Western states; it provides the National Institutes of Health with telecommunications services to "disseminate biomedical information"; it developed communications services for regional offices and institutions run by the Veterans Administration; and, it developed the Inmate Calling Program for prisoners for the Bureau of Prisons.

Government lawyers, presumably, will have to counter by showing that the government can obtain these services elsewhere and that it can function perfectly well without the AT&T–Western Electric–Bell Labs combination. In short, they will have to prove that Uncle Sam doesn't need Ma Bell as much as she likes to think.

A Day in the Life of the Science Adviser

Scientists like to think that the person in the elevated post of Science Adviser to the President spends his time speaking momentous words about the relations between science and government—but this is not always so. Among the tasks recently assigned to Frank Press, the current occupant of the post, is that of finding some legal method of suppressing a government booklet on how to invade other people's privacy. Bootlegged copies of the report, which caused a stir over the summer, have been springing up all over Washington, even as Press is holding his finger in the dike, trying to prevent its official public release.

The report was prepared by the MITRE Corporation as volume 3 of a $47,000 study for the Office of Telecommunications Policy (OTP) on "the vulnerability of various commonly available electronic communications means to interception." The first two volumes of the study, delivered to OTP in January, were the usual government technical report—understandable mainly to people in the field.

But the third volume, which MITRE submitted separately and which a chastened OTP now says it never asked for,

ers and timber industry people over certain wilderness area boundaries in the Northwest that the role played by the U.S. Forest Service was not helpful but obstructive. Such negotiations over the Gospel Hump wilderness in Idaho proved successful, McCloskey says, only after the industry and environmental participants agreed to exclude the representatives of the Forest Service and the Idaho fish and game agency.

So, on both the industry and environmental sides, there has been an accumulation of experiences and insights over the last few years which, for a number of people, has made the idea of a search for accommodation attractive. But a more fundamental point may be that such a search has been greatly facilitated now that Congress has dealt with some of the more difficult and divisive issues—as, for instance, in its decision to ban highwalls and, in the case of all new coal-fired power plants, to require the best available pollution control technology, which for the moment means stack gas scrubbers.

Decisions of this kind impose such large costs and major changes in operating practices upon industry that, unless they are made by elected representatives through the political process, they are likely not to be made at all. Yet, after Congress does act on the larger regulatory issues, plenty of room is left for the kind of understandings and accommodations the coal policy project is trying to reach.

The fact that coal and power company executives were taking part in this project at the same time that their industries were making a no-holds-barred attempt

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was the kicker. It was a how-to manual, drawing on unclassified material in the first two volumes, and was written so simply and lucidly that it could tempt even the most somnolent armchair wiretapper to action.

Part one describes how to bug "a suburban residential telephone" in an "area similar to that found in Northern Virginia outside the Beltway." Steps included: "1. Visually trace drop wire to the distribution terminal. 2. Climb pole, open terminal enclosure and note color code of the [wire] pair in the distribution cable to which the drop wire is attached. . . ."

Part two tells how to intercept a business's data communication to a computer service "e.g. the business might have the computer center handling all their accounting." Here, the steps included: "4. Dig a trench from building to branch feeder cable and dig up cable. 5. Install gas pressurization bypass. Drill two small holes (say 24 inches apart) in cable sheath, being careful not to damage wire pairs and clamp by-pass to the two holes."

Part three describes how to intercept calls from a given phone to another city. "The interceptor . . . knows the difficulties of penetrating . . . coaxial cable systems. He is aware of the high voltage hazards and the monitoring and alarm systems associated with the coaxial cables. . . ." So he should intercept the microwave relay in the following way: "1. Locate microwave repeater sites for the route of interest either through physical observation or from FCC filings. 2. Acquire the use of a small farm along the route. . . ." And so on.

The telephone company is angered that the government might publish this incitement to the public to dig up its cables and drill holes in them. AT&T president Charles L. Brown wrote an angry letter to Vice President Mondale in late August, urging that the report not be released. Later, Mondale delegated the job to Press.

The first thing Press did, he says, was to withdraw the copy that had gone out to the government's National Technical Information Service, which otherwise might have distributed hundreds of thousands of them. Now, lawyers at the Justice Department, the White House, the Office of Management and Budget, the Department of Defense, and, yes, the OTP, are being asked if there is some way that the hundred or so of Freedom of Information Act requests for the report can be refused. This may be difficult, however, for the express purpose of the act is to enable taxpayers to get their hands on the documents and reports that they pay for.

Fill-in-the-Blanks Standards for Carcinogens Proposed

The workplace has long been suspected of being a major source of all human cancers. Nonetheless, the Occupational Safety and Health Administration (OSHA), the federal agency charged with regulating the thousands of carcinogens believed to be found in the workplace today, has only managed to promulgate standards for 17 in its 6 years of existence.

But now, the Carter Administration has dusted off and polished up a proposal developed by the Ford Administration for setting standards for all these carcinogens in a streamlined, sweeping manner.

Now, each time that OSHA—and for that matter most other health standard-setting agencies—has issued a standard for a carcinogen, the level has been contested on many different grounds, slowing down the entire process of implementation. How good were the scientific data? How much of the animal test data is applicable to human beings? What levels of exposure should be allowed, given the evidence on health effects? And so on.

Under the new policy, OSHA will use a fill-in-the-blanks method by which, on the basis of scientific evidence published in a preamble, any bureaucrat can assign the carcinogen to one of four categories, and then, depending on the category selected, calculate the appropriate standard. The idea is that, while manufacturers may later contest the standard on highly specific grounds, the big questions, which now delay implementation and are re-asked with each new standard, will all be settled.

The fill-in-the-blanks system could also circumvent the agency's chronic problem of staff turnover, according to sources familiar with OSHA's sluggish past performance. New staff members would have clear guidelines to follow, instead of, in the words of one source, having "to reinvent the wheel" with each new substance.

While the OSHA proposed policy, released by OSHA director Eula Bingham and Labor Secretary Ray Marshall on 3 October, has met with favorable response (except, of course, some manufacturers, one of whom denounced it as a "quick fix"), it could prove no panacea for OSHA's problems.

The basic validity of the proposed categories and corresponding tolerance levels could encounter early, drawn out court tests. Even if they are upheld, after a standard is imposed, a manufacturer may claim in court that his due process has been violated because, while he has to pay for worker protection under the standard, he was not specifically consulted in the formulation of the policy under which it was set.

Deborah Shapley

to kill the strip-mining bill and pass more permissive clean air legislation causes some environmental lobbyists to view the project cynically. The leader of the lobbying effort for the strip-mining bill, Louise Dunlap of the Environmental Policy Center, believes the project is at best irrelevant and at worst a device likely to be exploited by the coal industry now as it mobilizes to weaken implementation of the new strip-mining legislation. Talk of making the proposed regulations more "flexible" conjures up in her mind an administrative nightmare.

Decker and Moss are acutely aware of such fears on the part of environmental lobbyists, however, and know that they are on their mettle to disprove them. Their project is so structured, they believe, that industry people could not dominate the fashioning of the final report and its recommendations even if they tried to—in particular, only seven people associated with the coal or utility industries are on the 24-member plenary group that will review and approve the report. Dunlap herself regards Decker, chairman of the industry caucus, as a sometimes naive but always exceptionally straight forward and fair-minded individual.

In any case, the coal policy project represents something new in the vast and confusing field of energy development and environmental management. And, whatever the uncertainties and possible pitfalls involved, on the whole it seems not a bad idea for industry and environmental leaders to sit down earnestly and amicably together and have a fling at applying the rule of reason.

—LUTHER J. CARTER

RESEARCH NEWS

Sulfuric Acid from Cars: A Problem That Never Materialized

Potential environmental problems often seem to roar into the public consciousness on a typhoon of publicity and then, once satisfactorily resolved, creep away like morning fog, leaving confusion in the minds of the majority of the public who think the problem still exists. This is certainly the case with the problem of sulfuric acid emissions from automobiles equipped with catalytic converters. Only 3 years ago, there was a great outcry because it appeared that toxic concentrations of sulfuric acid would build up on and near roadways if all automobiles were equipped with catalytic converters. Subsequent research has shown that this is almost certainly not the case, but this conclusion and the story of how it was reached do not appear to have been told. There may be some potential hazard under certain, very limited conditions, but that hazard seems to be quite small.

The story began in late 1972 when William R. Pierson and his colleagues at the Ford Motor Company found that the platinum and palladium catalysts that were designed to oxidize carbon monoxide and unburned hydrocarbons to carbon dioxide would also oxidize sulfur in the gasoline to sulfuric acid. Ford promptly notified the Environmental Protection Agency (EPA). Subsequent limited tests with prototype catalyst-equipped automobiles suggested that as much as 85 percent of the sulfur could be oxidized. EPA investigators incorporated these results into a mathematical model—the only one then available—for dispersion of pollutants from fixed sites such as smokestacks. This computer simulation predicted that, under the worst meteorological conditions, the air over a heavily traveled highway on which most or all of the cars were equipped with converters would contain high concentrations of sulfuric acid, perhaps as much as 120 $\mu g/m^3$. It is not clear precisely what concentration of sulfuric acid is toxic to humans, but most investigators considered this concentration to be potentially hazardous.

Clearly startled by these initial projections—which were contained, incidentally, in an unsigned technical report—EPA undertook a major project to determine precisely how much sulfuric acid would be emitted under actual conditions and what the health effects would be. A principal goal of this research was to place the agency in a position to promulgate regulations limiting sulfuric acid emissions, since the need for such regulations seemed clear at the time. Many of the results from this study were obtained in laboratory tests of automobiles and catalysts and confirmed in two major studies of roadway emissions. These were the General Motors (GM) Sulfate Dispersion Experiment and EPA's Los Angeles Catalyst Study (LACS). The first of these monitored emissions on a test track in Michigan, while the second monitored them on the San Diego Freeway in Los Angeles (see box). The results from these two studies, in particular, have largely dispelled the idea that sulfuric acid emissions would be a major problem.

The first important results were obtained from the GM experiment, since it was the shorter of the two. Those results suggested several major conclusions:

▶ The catalysts do not oxidize as much of the sulfur as had been predicted. Edward S. Macias and his associates at Washington University determined that the cars in the test converted approximately 12 percent of the sulfur in the fuel to sulfuric acid. GM investigators found that about twice this percentage was oxidized.

▶ The sulfuric acid is formed as very small aerosols or particles. Peter Groblicki of GM and Kenneth Whitby of the University of Minnesota found that the aerosols ranged in size from 0.01 to 0.1 μm. Aerosols in ambient air, in contrast, generally have diameters ranging from 0.1 to 1.0 μm. The smaller aerosols do not absorb as much water vapor from the atmosphere as the larger ones, and therefore the acid is not diluted as much. The investigators also found, significantly, that this small aerosol disperses as though it were a gas.

▶ The computer model used by EPA did not accurately represent real conditions. Steven Cadle, Paul Monson, and their associates at the GM Research Laboratories found that turbulence from the cars tends to lift pollutants up and away from the roadway, even when there is no wind. The model tends to overestimate pollutant buildup by a factor of 2 to 3 when the wind direction is parallel to the roadway, according to Charles S. Tuesday of GM, and may overestimate the buildup by as much as a factor of 20 when there is no wind at all.

▶ Sulfuric acid from automobiles is probably not a problem. Robert K. Stevens and his colleagues at EPA found sulfuric acid inside the passenger compartment of a test vehicle at concentrations ranging from 1.2 to 3.3 $\mu g/m^3$. They also found the average concentration of