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Acid Rain Debate Continues

By TIMOTHY MULLANEY

Journal of Commerce Special

Legislation to fight acid rain by cracking down on sulfur emissions and coal-burning electricity plants is likely to make progress in 1987, but activists and Capitol Hill staffers disagree on whether a bill will emerge from Congress this year.

"The prospects for progress are very good, if not final passage," said Laurie Boeder, a spokeswoman for Sen. Quentin Burdick, D-N.D., the new chairman of the Senate Environment and Public Works Committee.

Any acid rain bill coming out of Congress would provoke both confrontation and consternation. The confrontation would be between Capitol Hill and the Reagan administration, which has steadfastly opposed emissions controls. The consternation would come from industry, which contends that the scientific case for emissions controls is too weak to justify regulations that industry says would cost as much as \$10 billion a year or more.

The coal industry's stake in acid rain legislation is high: the utility industry buys 80% of the nation's coal output. In turn, the utility industry generates about 65% of the nation's sulfur dioxide emissions, which are the most publicized cause of acid rain.

While the Edison Electric Institute, which represents investor-owned utilities, and other industry groups continue to fight against controls, their spokespeople and legislative allies often sound as if they feel besieged. On the other hand, confident environmentalists talk about not whether acid rain controls will happen, but what shape they will take and whether 1987 or 1988 will be the year they finally pass.

"You will need to be prepared to expect acid rain legislation that would impose drastic new emissions reduction requirements on coal-fired electric utilities," Senate Majority Leader Robert Byrd, D-W. Va., told an EEL gathering in December. "If we do not stand together as an industry, if we allow ourselves to be divided either by region or fuel source, the proponents of oppressive mandatory controls will surely succeed."

"I think (acid rain controls will pass) this year, but certainly in this Congress," said Richard Ayres, chairman of the National Clean Air Coalition. This year is the first of the 100th Congress' two-year term. "The balance of forces in this Congress will result in a pretty good acid rain bill."

Four acid rain bills have been introduced in the Senate this year. Debate so far centers around three of them, sponsored by Sens. Robert T. Stafford, R-Vt., George Mitchell, D-Maine, and William Proxmire, D-Wis.

• The Stafford bill would require utilities to reduce sulfur dioxide emissions from electricity plants to 9 pounds of sulfur a million British

Thermal Units of coal burned by Jan. 1, 1991. Aides to Sen. Stafford estimate the bill would reduce the nation's annual sulfur emissions by 12 million tons from 1980 levels. The 1980 national total of sulfur emissions was about 26 million tons.

If emissions are between 9 and 1.5 pounds a million Btus, the plant may remain open for only 30,000 hours — about 3.5 years of round-the-clock generation — after that date. If emissions are more than 1.5 pounds a million Btus, the plant has to close after 10,000 hours. The bill Sen. Stafford's introduced last year would have imposed even tighter controls.

• Sen. Mitchell's bill, which is similar to Sen. Stafford's, would require states to devise plans that will lead to average statewide emissions of 9 pounds of sulfur a million Btus of fuel used. Sen. Mitchell's bill would introduce those standards in 1996; it would also allow some facilities to emit more sulfur dioxide than the standards would allow, as long as other plants in the same state produced less sulfur dioxide.

Those standards would reduce the nation's annual sulfur emissions by 10 million tons from 1980 levels, Sen. Mitchell estimates. That year is used as a bench mark to measure the impact of all three bills.

Sen. Mitchell estimates the bill's other provisions would slash the nation's sulfur emissions by 2 million tons annually, for a total reduction slightly less than 50% of 1980 emissions.

• Sen. Proxmire's bill is weaker than either of the other bills in two critical ways. First, it would only limit utility emissions in 31 of the 50 states, exempting most of the western region of the country. Second, it would slash sulfur emissions in older plants only to 2.0 pounds a million Btus of heat used by 1993 and to 1.2 pounds a million Btus by 1997.

Ned Helme, executive director of the Alliance for Acid Rain control, estimated that the bill would slash 1980's sulfur emissions by about 10 million tons.

Proponents of the Mitchell bill hope that by setting standards so strict that utilities can only meet them by using scrubbers to clean up emissions, they can blunt opposition from legislators and industry groups representing producers of high-sulfur coal. They say that a bill like the Proxmire bill would hurt high-sulfur coal interests because utilities could comply simply by switching to low-sulfur coal, causing layoffs and economic hardship in high-sulfur coal producing regions.

Opponents of the Proxmire bill are said by opponents to hope to weaken opposition to controls by appealing to utilities in the 19 states that wouldn't be regulated, and by appealing to companies that produce low-sulfur coal. Proponents also contend that their bill will cost much less than Sen. Stafford's or Sen. Mitchell's, as little as \$3 billion a year. "Our bill is an economist's dream," Mr. Helme said.

All the bills contain provisions to limit emis-

sions of nitrogen oxide from cars and industrial sources. Nitrogen emissions are another cause of acid rain.

the difference in legislative climate between this year and last, when acid rain legislation came nowhere near passing, has little to do with any changes in the scientific consensus about acid rain. The two sides in the debate over acid rain have long since decided they're entitled to more than their own opinions: Each wants its own set of facts as well.

Industry blandly asserts that scientific evidence linking acid rain to damage to lakes, streams, forests, buildings and even human health is ambiguous at best and getting more so as new studies come out. Environmentalists calmly claim that the evidence is getting stronger by the month.

"It is becoming increasingly clear that the available scientific evidence used to justify an acid rain control program is either ambiguous or incomplete," Sen. Byrd said.

"Acid rain is associated with more — not less — damage to our health, aquatic life, forests and buildings that we had believed," Sen. Mitchell said in a speech last month. "As time has passed, the case for tough national acid rain controls is more, not less, convincing."

Two other central issues to the acid rain debate are also hardy perennials: Industry's claim that an acid rain bill will stop the development of clean coal technology in its tracks, and that the cost of complying with a bill would hurt U.S. industry's ability to compete with foreign goods.

Susan K. Roth, a spokeswoman for the Edison Electric Institute, said utilities can't afford to put smokestack gas scrubbers on more existing plants and still do research on advanced-technology for new plants that backers say will burn coal so efficiently scrubbers won't be necessary. "Utilities just don't have the money to go down both paths," she said.

The U.S. Department of Energy and several states are also funding initiatives to develop technology that may one day be grafted onto existing plants to remove sulfur from emissions more cheaply than scrubbers can, she said.

Aside from the capital costs of building scrubbers, which can cost \$100 million or more, the scrubbers eat up as much as 5% to 10% of the electricity a plant produces. "Scrubbers become the utility's largest customer," Ms. Roth said.

Those costs will inevitably get passed on to both commercial and residential ratepayers, she said. "We haven't seen any bill that's even workable, that wouldn't . . . hurt ratepayers and affect adversely the competitive position of U.S. business."

"They're always going to say it costs too much," said an aide to Sen. Stafford. "Business say that every time they face environmental legislation."

"The options that are here and are affordable aren't missing," Mr. Ayres said. "And the best way to stimulate innovation (in clean coal technology) is to stimulate demand. Entrepreneurs don't make products that they don't think they can sell."

While a few of either side's arguments are new, what has changed is the composition and the agenda of the Senate, which observers say

is likely to take the lead on debating emissions controls.

Sen. Byrd, a longtime critic of emissions control proposals, is now the majority leader. He has the power to say what bills are debated on the floor. And Sen. Stafford no longer chairs the Environment and Public Works Committee. Those changes are good for the coal industry.

But as many as eight new Democratic senators elected last fall are likely to favor some form or another of acid rain legislation and Sen. Mitchell is chairing the subcommittee that will do the nitty-gritty work of putting a bill together.

Sen. Burdick has said he will let the subcommittee take the lead in drafting an acid rain bill. Sen. Burdick, who backed a version of the Proxmire bill last year, has pledged "not to back any particular proposal, at least at the beginning" in 1987, Ms. Boeder said.

Another factor that will increase the pressure on the coal industry is that Congress has cleared up a backlog of environmental legislation that delayed action on acid rain last year. Congress has finished work on such major environmental laws as a renewal of the Clean Water Act and the reauthorization of the Superfund toxic waste cleanup program. That will clear the Environment and Public Works committee's calendar enough to let members work on acid rain in earnest this year, aides to committee members said.

Industry probably has a better chance for legislative victories on acid rain in the House than the Senate. Emissions control backers say the maneuverings of Energy and Commerce Committee chairman John Dingell, D-Mich., are likely to keep acid rain legislation bottled up in committee or even a subcommittee until the Senate acts.

No bill has been introduced in the House by Feb. 5, and an aide to House Health and Environment subcommittee chairman Henry Waxman said he didn't know when his boss would introduce a bill.

David Gardiner, legislative director of the Sierra Club, said Rep. Dingell is attempting to stack Rep. Waxman's subcommittee with emissions control opponents. The Waxman aide would not comment directly on that claim, but said the subcommittee is split almost down the middle on acid rain legislation. He said a new bill would be submitted only after Rep. Waxman and his staff confer with new subcommittee members.

Acid rain plans trouble for river cities, Byrd says

By George Embrey
Chief, Dispatch Washington Bureau

WASHINGTON — Senate Majority Leader Robert C. Byrd warned yesterday that acid rain cleanup proposals in Congress could make ghost towns out of coal towns and heavy-industry cities in the Ohio River region.

The best way for the government to cope with acid rain is to push for wider use of technology that allows factories and electric plants to burn Ohio Valley coal more cleanly, he said.

BYRD, D-W.VA, said competing acid rain bills expected to be supported by environmental groups this year would cause layoffs in the coal and steel industries but might not be effective in stopping acid rain.

Residential electricity customers would have to pay more to finance the acid rain cleanup, Byrd told the Chemical Forum of the American Chemical Society. "They'll have to dig deeper in their pockets, and many of those

pockets already have holes in them," he said.

The acid rain legislation Byrd opposes would require more smokesack scrubbers and other devices to clean acid-producing smoke caused by high-sulfur coal, like that found in Ohio.

THE CLEAN-COAL program supported by Byrd, the Reagan administration and industry groups would try to change the way coal is burned to eliminate the sort of smoke that requires

high-cost scrubbers and other anti-pollution devices.

"I am the daddy of that program," Byrd said of the \$750 million federal clean-coal technology effort. He said he is pleased at the way private industry has responded to it.

The program requires industries taking part in pilot projects to pay at least half the cost. Byrd said the first nine projects selected last year from among 59 proposals had more than 60 percent of costs met by private industry.

Conservation group going door-to-door

BOXFORD — Many residents are presently answering a knock or ring at the door to find someone talking about acid rain, toxic waste and clean water legislation.

These visitors are representatives of the League of Conservation Voters, a national non-partisan political committee that works to elect environmental leaders to public office.

"The league fills a unique niche in the conservation movement," said New England LCV political director, Sandra Ledbetter.

"Unlike lobbying groups, which work to influence politicians already in office, the league actively supports conservation-minded candidates during election years."

LCV also works to educate the public on current environmental issues. The group has recently organized grassroots campaigns to reauthorize a stronger Superfund bill for toxic waste cleanup, to enact national acid

rain reduction legislation and to publicize hearings on high-level radioactive waste siting in New England.

Another priority of the organization is to hold elected officials accountable for their votes on environmental legislation by publishing annual Voting Charts for all members of Congress and bi-annual Election Reports.

In 1984, Manchester, N.H. became the home of the league's first New England regional office. Its immediate success led to the establishment of a second regional office in Portsmouth, N.H.

The league was established in 1970 by Marion Edey, an energetic congressional aide who saw a need to counterbalance the greater influence of private interests when it came to environmental legislation.

Membership in the New England region alone tops 25,000 supporters.

ENVIRONMENT REPORTER

2-13-87

CLEAN AIR, ARCTIC REFUGE AMONG SIX ISSUES SIERRA CLUB PICKS FOR 1987-88 NATIONAL CAMPAIGN

Gaining the Clean Air Act's reauthorization and preventing oil and gas exploration in Alaska's Arctic Wildlife Refuge were among six conservation issues singled out by Sierra Club leadership as the focus of the 400,000-member organization's resources at its board meeting Feb. 1 and 2 in Washington, D.C.

According to Sierra Club documents, issues chosen by the board for its "1987-88 national conservation campaigns" were:

► Reauthorization of the Clean Air Act, the control of acid rain, smog, and air toxics, and the protection of the atmospheric ozone layer,

Issues Nominated by Members

Adrienne Weissman, a spokesman with the Sierra Club, told BNA Feb. 6 that the board pared the list of six from some 30 or 40 issues that were selected by regional and local Sierra Club leaders in an internal nominating process. She said that along with directing the work of the organization's seven Washington, D.C., lobbyists, the issues list would determine the grass-roots focus of the organization.

According to David Gardiner, the Sierra Club's legislative

director, between 300 and 500 volunteers were brought to Washington, D.C., last year to lobby on issues on the organization's legislative agenda. Weissman said the club plans to increase volunteer involvement in the upcoming session of Congress.

We're 'No. 1'

EDITORIAL

Perry Countians who care about the county's environment have good cause to sit up and take notice. The reason is Perry County has the most acidic precipitation of any county in Pennsylvania.

Acid rain here is so bad that in certain other states and nations where acid rain is similar, bodies of water are virtually lifeless. The acid has rendered the waters unfit for fish and tiny organisms to live.

Here in Perry, Laurel Run that flows out of the Tuscarora State Forest in Shaffer's Valley has for years been very acidic. No one knows quite why, although the cause often is linked with acid precipitation (snow and rain). Because of the run's low pH, caused by acid, the upper reaches have few native trout. Trout, particularly wild trout, can't survive in waters high in acid.

The situation at Laurel Run is not new. Neither is it news that Pennsylvania has the worse acid rain problem of any state in the country. The fact that the acid rain gauge located at Little Buffalo State Park registered precipitation lower in pH than other gauges in the state should come as no surprise, either. This newspaper reported years ago that acid rain here was as bad, if not worse, than other counties in Pennsylvania.

What is noteworthy (and mysterious) is the effects of acid rain in Perry County are apparently so subtle that no one notices them. There have been no unexplained fish kills; the

food chain that begins with microorganisms appears to be intact; trees and other plants including crops are growing; and so far as we know there has been no acid-rain damage to local manmade structures. Those are some of the adverse effects of acid precipitation in other places, including Europe.

Just because there are no easily recognizable ill effects of acid rain in this county is no reason to be complacent or, worse, forget about what is happening. The county's environment may eventually lose its ability to counteract excessive acid precipitation and begin to suffer.

Our elected officials in the state House and Senate are in positions to develop and approve laws that would reduce acid precipitation in not just this county but the rest of Pennsylvania and ultimately other states and nations. Acid precipitation that originates in our state contributes as much to the problem as that coming on the winds from industries located in the Midwest.

The recent study that pinpoints Perry County as being No. 1 in acid rain is nothing to be proud of. Sportsmen, conservationists, and farmers as well as legislators are encouraged to put acid rain on their list of priority problems to deal with. It could be that the county is suffering a lot more than we realize because we aren't paying close attention to the early warning signs.

D.R.T.

USA TODAY
February 9, 1987

Act now to prevent an acid rain crisis

The evidence has been piling up for years. Lakes are being destroyed in New York, trees in the Great Smoky Mountains, and buildings in Southern California. Even the once-pristine lakes of the Rockies and the Pacific Northwest are threatened.

The culprit is polluted air — "acid rain."

Most of us don't know about it, don't want to talk about it, and don't want to hear or read about it. We're disinterested. We're wrong.

The government is disinterested, too. In spite of all the studies and all the evidence, little has been done. For years, Congress has wrangled over how to pay for expensive preventive measures. And the Reagan administration has urged still more study. The time has come for action.

While we dally, the problem worsens.

New evidence submitted at a congressional hearing last week shows that acid rain not only harms our lakes and forests and buildings — it harms our people.

Health experts testified that acid air pollution causes respiratory problems and aggravates existing conditions in healthy adults. It particularly affects the most vulnerable in our society — children, the elderly, pregnant women, asth-

matias, and persons suffering from heart disease.

It also is increasing the acidity of our water. Acidic water delivered to home faucets can leach lead or copper out of water pipes and into the water glass.

If this continues, the cumulative effect can result in lead poisoning. The effects of that on children are well known — it can cause brain damage and even death. That's why we've concentrated on eliminating lead-based paint.

Researchers also suspect that acidic water, with higher levels of aluminum, may be linked to Alzheimer's disease.

Other researchers know that there is a danger of mercury poisoning from eating fish taken from acidic lakes.

We've studied enough. We know the sources of the pollutants that cause acid rain and acid fog — belching smokestacks from industrial plants, coal-fired utilities, and copper smelters, and emissions from the cars and trucks that clog so many of our highways.

These pollutants know no state or international boundaries. Industrialized areas spew their airborne garbage for hundreds of miles.

It's time to stop talking about this problem and act.

We must all share the cost of reducing this pollution. We must work with Canada and Mexico so acid rain is not exported or imported. We must persuade Mexico to put controls on two big smelters being constructed near the Arizona border. If not, western states will be gasping for breath.

Congress must pass comprehensive legislation that cuts noxious fumes. The administration must stop studying and start warning our citizens of the gravity of the problem, and work out agreements with our neighbors.

If we don't act together now, not only will we risk the health of our lakes, rivers, and forests, but the health of our children, too.

February 11, 1987

USXX

Mr. John C. Quinn
Editor
USA TODAY
1000 Wilson Boulevard
Arlington, VA 22209

Dear Mr. Quinn:

The rush to judgment on acid rain in the February 9, 1987, Opinion column ignores the scientific evidence that "has been piling up for years". It appears that USA TODAY did little research into the issue -- its causes, alleged effects, recent trends and confusion with other atmospheric phenomena.

Acid rain is a political issue and a topic of significant national concern. That is why Congress enacted the ten-year comprehensive research program on acid rain in 1980. The results of this effort are now beginning to be published and will continue to flow through 1989. Contrary to the conclusion of Opinion, the 100th Congress will most likely wait for science to guide public policy on acid rain. And they should.

Acid rain is the long-range transport of sulfur dioxide and nitrogen oxides which result in wet and dry acid deposition on resources of concern. It should not be confused with the cause and effects of other atmospheric phenomena such as the global warming or greenhouse effect, stratospheric ozone depletion, tropospheric ozone build-up or smog. Opinion managed to mix the effects of all of these phenomena (except the greenhouse effect) and concluded we have an acid rain crisis.

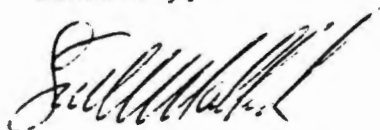
After years of debate, the case for acid rain controls has not been made. Under current requirements of the Clean Air Act, emission trends for nitrogen oxides are essentially level and there has been a significant reduction of sulfur dioxide emissions, yet the acidity of rainfall has not changed. We simply do not know if future emission reductions will measurably improve rain pH. We do know that trends established by recent research indicate the problem is stable and that we have time to let science guide the debate. There is no crisis.

Evolving scientific results are demonstrating that many allegations of adverse effects from acid rain were exaggerated, unsubstantiated or erroneous. The role of acid rain in the acidification of lakes has been exaggerated based on EPA's recent comprehensive lakes' survey. As one guest columnist noted, western high altitude lakes are sensitive bodies of water and no one would argue they should not be protected. Contrary to Opinion's statement, these lakes are still pristine and recent studies do not document a threat from acid rain. The original concern for forest damage may be erroneous in that other causes, not acid rain, appear to be the culprit. The effect on materials remains unsubstantiated and is thought to be from local sources of pollution -- not acid rain.

While research continues to document effects of acid rain, public health is not at issue. The National Ambient Air Quality Standards for acid rain precursors, sulfur dioxide and nitrogen oxide, have been set under the Clean Air Act to protect public health and are being met in virtually every part of the country. A careful reading of recent Senate testimony indicates the health effects mentioned do not relate to acid rain but rather to local pollution episodes, or to effects from exposure to sulfur dioxide well above the health-based standard. There is no basis to claim acid rain is a public health issue except for the potential problem of heavy metal release to the environment due to low pH, which is being studied.

The time to stop talking about acid rain is when we understand it, have determined its actual effects and know how to effectively control it to protect resources of concern. Before committing billions of dollars to acid rain controls, we have time to let good science answer these questions and guide public policy.

Sincerely,



Earl W. Mallick
Chairman
Clean Air Working Group

The EPA's end run

EDITORIAL

The Environmental Protection Agency is considering a new standard for release of sulfur dioxide into the atmosphere. The proposal points up the dangers of Congress permitting unelected agencies to write rules that have the full force of law. This can be convenient for members of Congress, who elude full responsibility for the effects of the bureaucratic follies thus perpetrated. It is seldom salutary for the people affected by regulation or for the oft-abused concept of the rule of law.

The new standard the EPA is considering is touted by some as acid rain control by the back door. Congress has been debating for years whether to impose sulfur dioxide emission controls on the electric utility industry that would cost \$8 billion to \$15 billion a year to implement. A bill in the last Congress attracted 150 sponsors. Control advocates base their arguments on the simplistic theory that sulfur dioxide emissions from Midwestern utility plants are creating acid rain in the Northeast that is killing lakes and forests.

Unfortunately, however many times you may hear it bandied about, there is scant scientific evidence for this theory: a good deal of evidence disputes it. For starters, there is little evidence that the acidity of the lakes in question has increased significantly in recent years. Their acidity can more likely be explained by geological factors; they are located in areas of weather-resistant granitic or silicious bedrock. Insofar as acidity has increased and can be attributed to human factors, the best scientific opinion is that most of it is caused by local pollution sources. But the desire to blame somebody else for your problems is ever present.

If an expensive sulfur dioxide con-

trol program were mandated, of course, it would settle the argument. There is no reason to conduct the experiment, however, at a cost of utility rate increases of 34 percent for residential customers and 44 percent for industries in Ohio, and similar increases in other states, when the bulk of the scientific evidence suggests that the controls would have zero impact on acid rain in the Adirondacks.

The EPA may have found another reason to impose controls, however. Here's the scam.

About 4 percent of the population is asthmatic. Atmospheric sulfur dioxide affects asthmatics more drastically than it does most people, and hits those who are exercising more quickly yet. Nobody knows exactly how many asthmatics exercise regularly, let alone during periods when especially heavy bursts of sulfur dioxide are emitted by power plants. But the EPA guesses that about 11 to 15 percent of asthmatics live close enough to power plants that they get an unacceptable exposure to sulfur dioxides about once a year. By requiring utilities to spend about \$5 billion and pass it along to their customers, the EPA figures it can get that once-a-year percentage down to about 4 percent. Pretty neat.

The Edison Electric Institute's Robert Beck says, "Every time we try to raise the issue with members, they say: 'Leave it to the EPA — get out of here.'" No wonder. Passing the buck is what politicians do best.

They shouldn't be permitted to do so this time. Congress, after what passes for debate in those hallowed halls, has declined to pass a sulfur dioxide control bill. It shouldn't permit the EPA to do so without any shred of accountability to the people.

FEDERAL ACID RAIN GROUP GIVES DINGELL ACTION SCHEDULE FOR 1ST ASSESSMENT

In response to an inquiry by House Energy & Commerce Committee chairman John Dingell (D-MI), the interagency coordinating group on acid rain has laid out a "firm schedule" for completion of the "first interim assessment" of the problem. In a Feb. 2 letter, National Acid Precipitation Assessment Program (NAPAP) director J. Laurence Kulp states that the long-awaited document will be "ready for distribution" by June 1. Kulp also answers questions about NAPAP's response to state calls for better coordination between federal and local acid rain researchers and air pollution regulators.

In a series of letters to Kulp, Dingell has expressed concern about lack of a concrete action plan for issuing the assessment document, which is widely viewed as the major project entrusted to NAPAP (Inside EPA, Jan. 23, p5). He also quizzed NAPAP about the group's relationship with state officials, some of whom have been dissatisfied with the interaction process (Inside EPA, Nov. 21, 1986, p1). Dingell last year asked the General Accounting Office to study NAPAP's progress over the past five years (Inside EPA, Nov. 28, 1986, p1).

Kulp offers the following schedule for completing the assessment document, which he explains has been devised following assurances by EPA chief Lee Thomas and other members of NAPAP's "joint chairs council" that "necessary agency support and rapid review could be assumed."

Phase I. "Initial drafts of chapter and iterative reviews within the Office of the Director of Research (ODR) leading to a draft of each chapter ready for peer review which has been approved by the ODR (completed by 2/28/87)."

Phase II. "Peer review and initial agency review of each chapter plus revisions to respond to the comments (complete 4/9/87)."

Phase III. "Final agency review and approval of each chapter plus revisions as needed (complete last chapter by 5/4/87)."

Phase IV. "Final agency review of integrated document (5/11/87)."

Printing. "Ready for distribution (6/1/87)."

Kulp says that as of Jan. 30, NAPAP was on schedule to meet the Feb. 28 deadline for completion of the first phase. The second phase "already has been initiated," he adds.

NAPAP is "rectifying" state concerns about communications, Kulp says, by employing "state liaison people" designated by the State & Territorial Air Pollution Administrators (STAPPA) to coordinate with all the NAPAP task groups. NAPAP is "requesting that they participate in our public peer review and research planning activities at the task group level," the letter explains. Kulp has also offered to place a state scientist on his direct staff "on a rotating basis." Further, the letter notes, state contacts are being put on the NAPAP mailing list for "newsletters, annual reports, [the] operating plan and assessments," as well as being involved in a "comprehensive inventory of the state research program" (Inside EPA, Nov. 21, 1986, p14).

2-16-87

An acid cure for acid rain

■ "Almost too simple to be true" is how its inventor describes it. But if a new antipollution technology does work out, the nitrogen oxides that diesel cars and trucks spew out could drop dramatically—and so could smog and acid rain.

Developed at Sandia National Laboratories in Livermore, Calif., the idea is that cheap, nontoxic cyanuric acid—used to stabilize chlorine in swimming pools—is injected into a diesel vehicle's exhaust system. The heat gasifies the granular catalyst and converts the nitrogen oxides into nitrogen, carbon dioxide, carbon monoxide and water.

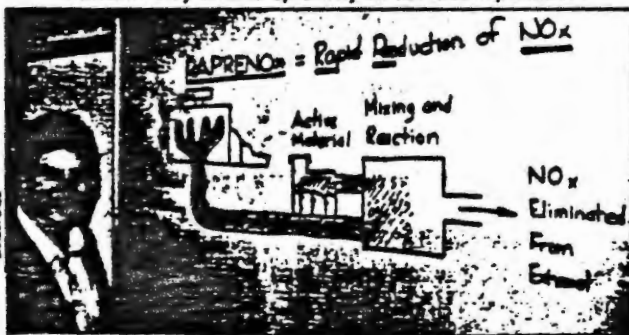
Diesel trucks, which produce high volumes of nitro-

gen oxides, would especially benefit. The system might even eliminate the need for "scrubbers" installed on the smokestacks of coal-burning factories to remove pollutants.

"We stumbled onto this," says Robert Perry, the Sandia chemist who made the discovery. Its pollution-controlling potential seemed obvious, and when Perry tried the idea out on a small diesel engine, it cut nitrogen oxides by 99 percent. Sandia officials say that up to five more years of

research will be needed. Perry is leaving Sandia to market his invention. But Richard Klimisch, General Motors' executive director of environmental activities, predicts that the process will be "cumbersome and unreliable" under actual driving conditions. "It is a long way," he says, "from the lab to the real world." ■

Robert Perry chalks up a way to cut diesel pollution



SANDIA LABS

Magic potion's success no laughing matter

On Wednesday, when George Bush and Brian Mulroney went trick-or-treating — historians will have to decide which — along Sussex Drive, Bill Haines would have loved to have been on the other side of one of the doors when the topic of acid rain came up.

"I wouldn't have given George Bush an earful," Haines says. "I'd have given him a jar full."

The jar would have contained Bill Haines secret formula, a mixture of silica, sodium, tree bark extracts and a few things he prefers to keep to himself, but which, all combined, he openly brags will cure everything from acid rain to — as of six weeks ago — baldness.

Haines invented his formula in 1977, when he was 66, and he has spent much of the decade since sitting in a charming stone farmhouse in Vankleek Hill, patiently waiting for the world to wake up.

And bit by bit, they are beginning to pay attention to a some of his claims.

He has demonstrated what his magic potion could do to save maple trees so effectively that maple syrup producers in Muskoka are beginning to buy in bulk.

So dramatic is some of the evidence, in fact, that MP Stan Darling — one of the most vociferous acid rain fighters in Parliament — has thrown his support behind Haines.

And he has so effectively shown that his silica mixture can strengthen the fibre in wood products such as cardboard that one of the largest paper producers in British Columbia is beginning a \$75,000 test run with Haines secret miracle.

Haines has also said his magic potion — with a few alterations — could convert pig manure, one of the world's superior polluters, into material nutritious enough that it could be fed back to the pigs and endlessly recycled — but so far, not even the pigs have bit on that one.



**MacGregor
at large**
Roy MacGregor

Bill Haines doesn't mind being laughed at — "If I had no sense of humor I'd have died long ago" — but he's beginning to lose any sympathy for people like Brian Mulroney and George Bush who continue to talk about how much they are talking about acid rain.

"It's madness," he says. "They're willing to spend millions of dollars on gypsy moths and spruce budworms, but they won't spend a cent on acid rain."

"Even if they cut down their damn emissions by 50 per cent, you're still going to lose your trees for 50 years."

Haines says this from Vankleek Hill without even knowing this argument echoes one Environment Canada has just decided to make. Cutting down on the smoke from coal plant and nothing else, says the report, "would appear to do little, in anything, to reduce the flow of transboundary air pollution from the United States into Canada."

After analysing the impact of \$6.8-billion worth of clean-coal technology research and proposed projects, the study predicts a reduction of a mere 2.5 per cent from the current totals.

"I could help reduce emissions better than that," Bill Haines says. "But when I took my stuff to this government energy expert in Hull, he wouldn't even look at it because, he said, I hadn't gone by the book, not accepted scientific procedure."

"I said 'Look — if I went by the book, I wouldn't have this!'"

Scholarly scientists tend to do that to Bill — he has no degree himself — and they laugh when

he points out, as he likes to, that "penicillin wasn't on the books either."

What he says back to them is that he can back every claim he makes for his potion, even if he can't always reproduce the chemical equations involved on a blackboard. If they don't believe he can stop acid rain from killing trees, they just have to drive to Muskoka where syrup producers like Harry Brown have been documenting evidence that Bill Haines' silica is, in Brown's considered opinion, "at least a stop-gap measure."

And if they refuse to take him seriously about the potion curing baldness — well, Bill Haines has been carrying his own proof around for the past six weeks.

"I just rubbed some of it on my top lip to see what it would do," he says. "It dried and I left it there and some fuzz started growing."

"So I slapped some of it on my forehead and hair started coming in. There's about an inch-and-a-half of it there."

"I'm telling you — this is miraculous stuff."

Considering what it does for upper lips and foreheads, one can only imagine what it might have done for George Bush if he'd been given an ear full.

Thompson, Earl visit officials in Washington

Sentinel Madison Bureau
and Sentinel Washington Bureau

Washington, D.C. — Wisconsin's new governor and immediate past governor both have been busy in the nation's capital this week — one paying calls at the Pentagon, the other lobbying against an acid rain bill introduced by one of Wisconsin's senators.

Gov. Thompson made "courtesy calls" at the Pentagon during a stop-over Thursday on an Air National Guard refueling mission.

Meanwhile, former Gov. Anthony S. Earl came to warn that an acid rain bill introduced by Sen. Robert W. Kasten Jr. (R-Wis.) could upset Wisconsin's law.

Thompson was accompanied by Air Force Major Gen. Raymond A. Matera, the Wisconsin adjutant general.

"We're looking for an opportunity for extra money for Volk Field and Fort McCoy, and for a chance to introduce ourselves to the people who control the purse strings."

Earl, chairman of the Alliance for Acid Rain Control, was in Washington Wednesday and met with Sen. William Proxmire (D-Wis.) and Sen. George J. Mitchell (D-Maine), said Ned Helme, executive director of the alliance.

State's senators clash on acid-rain bill

By JOHN W. KOLE
Journal Washington bureau

Washington, D.C. — Sens. William Proxmire (D-Wis.) and Robert W. Kasten Jr. (R-Wis.) are locked in a dispute over proposed acid-rain legislation.

Kasten supports a bill praised by most environmental groups, while Proxmire calls it too expensive for utilities, manufacturers and consumers.

Proxmire reintroduced his own acid-rain legislation Friday, and said it would do the job at only a fraction of the estimated \$22 billion a year cost of the bill introduced Monday by Sen. Robert Stafford (Vt.), the top Republican on the Senate Environment and Public Works Committee, with a bipartisan coalition of nine others, including Kasten.

Most of the sponsors are liberals who often differ with Kasten on a wide range of issues. The eight others are Democratic Sens. Edward Kennedy (Mass.), Patrick Leahy (Vt.), Daniel Patrick Moynihan (N.Y.), Max Baucus (Mont.) and Alan Cranston (Calif.), and Republican Sens. John Chafee (R.I.), Lowell Weicker (Conn.) and David Durenberger (Minn.).

Proxmire said his bill would cost only about \$3 billion a year, because it would not require utilities to install expensive scrubbers to reduce emission of sulfur dioxide. He said the reduction of 10 million tons a year in sulfur-dioxide emissions in two stages over several years would be sufficient to solve the problem in 31 Eastern, Southern and Midwestern states, including Wisconsin. A total of 17 Western states, along with Hawaii and Alaska, would not be covered.

Environmental groups contend that the Stafford bill is needed to reduce total emissions by 50% across the country, and that it is stronger in requiring tougher automobile emission standards and including the Western states, which they say are beginning to have acid-rain problems in their lakes.

Chris Ballantyne of Madison, Wis., Midwestern representative for the Sierra Club who handles nine states, estimated that the Proxmire

bill would reduce emission of sulfur dioxide about 40%, although he conceded that the figure could be somewhat higher than that in the 31 states that it covers.

Former Wisconsin Gov. Anthony Earl, who still is chairman of the Alliance for Acid Rain Control, a coalition of governors, corporate leaders, educators and public-interest groups until the end of February, is supporting Proxmire's bill.

Under this, Wisconsin utilities would not have to reduce their emissions below the levels required by a state law enacted with Earl's support last year.

Proxmire's co-sponsors are mostly conservatives. They include Republican Sens. Alan Simpson (Wyo.), Gordon Humphrey (N.H.), Alfonse D'Amato (N.Y.) and Rudy Boschwitz (Minn.), and Democratic Sens. Dennis DeConcini (Ariz.) and Harry Reid (Nev.).

"Plants could meet the new requirements through use of low-sulfur coal, energy conservation, coal cleaning or advanced fuel-burning technology such as a fluidized-bed system which the Wisconsin Electric Co. plans to install at two plants," Proxmire said.

"I look forward to working to fashion a winning coalition and a winning bill," Proxmire said, suggesting that the Stafford-Kasten measure was too expensive to pass.

Kasten was out of town Saturday and not available for comment. A staff member said there certainly would be changes in the legislation, but that the Stafford bill would be the leading piece of acid rain legislation considered by the senate.

New Hampshire Gov. John Sununu, vice chairman of the Alliance for Acid Rain Control, joined Earl in praising the Proxmire bill, arguing that it would "stop acid rain just as effectively as other Senate bills, but at one-seventh the cost of the most expensive proposal."

"This is the kind of legislation that electricity consumers will welcome," Sununu said.

But Ballantyne said most acid-rain experts did not consider it sufficient.

Continued

He praised Kasten for having the courage to back a tougher bill, even though it would have an impact on Wisconsin utilities, factories and consumers.

"Bob Kasten has done a good job on environment issues," Ballantyne said. "His record was not that good in his first two years in the Senate [1981 and 1982], but he has gotten progressively better. We think that was more than a re-election strategy for 1986. By sponsoring this tough acid-rain bill again he is surely off on the right foot this year."

Ballantyne conceded it would be tough to get the Stafford Bill through Congress, particularly since Rep. John Dingell (D-Mich.), a foe of tough acid-rain legislation, has strengthened his hand as chairman of the House Energy and Commerce Committee by getting three new members from coal-producing states.

And Ballantyne noted that Sen. Robert Byrd, the Democratic floor leader, was expected to try to protect his West Virginia coal interests.

"It's going to be tough in both houses now," Ballantyne said. "But I think the public momentum for acid-rain control is there. I hope we can get a good bill during the two years of the 100th Congress."

Acid rain studies brought a warning

EDITORIAL

Recent studies indicating that Washington State's pristine lakes in the Cascades have not been damaged by acid rain are heartening, but they also serve as a warning.

The studies, by the state Department of Ecology and by the Environmental Protection Agency, essentially gave a clean bill of health to the Cascade lakes. The lakes, enjoyed by many of this state's outdoor enthusiasts, have escaped the threat of industrialization — at least so far.

The Department of Ecology's three-year study of 14 Cascade crest lakes concluded that there was virtually no damage from acid rain. There are several reasons for this, including the distance of the lakes from pollution sources and the cleansing effect of heavy rains in the lowlands. In addition, two major producers of threatening chemicals have closed down in recent years: Tacoma's Asarco copper smelter and Mount St. Helens, both of which spewed out large amounts of sulfur dioxide.

The EPA study, which examined 159 lakes in Washington and Oregon, agreed the lakes are in great shape. But it noted that the Cascade lakes are particularly sensitive to acidity. They simply don't have the natural buffering that could neutralize acid rain. In other words, it wouldn't take much acid rain to inflict a great deal of ecological damage on these lakes.

The result, as evidenced by what has happened in some instances in the northeastern part of the U.S., could be the destruction of fish and other lake life.

Even though no damage from acid rain was detected by either the EPA or Department of Ecology studies, the threat to the Cascade high lakes remains. Automobiles are one of the major threats. In fact, scientists say autos produce more nitrous oxides, a key element of acid rain, than industry.

Even though the studies bring good news, they don't mean acid rain is no threat. The delicate vulnerability of our high lakes means that careful monitoring and vigorous air-pollution control are still needed.

ANTACID RAIN?

No acid-rain threat here, but controversy goes on

EDITORIAL

Acid rain is one of those frustrating environmental issues that have produced more sound and fury than clarity and understanding. The more scientists learn about it, the more complicated a phenomenon it seems — and the more difficult the decision of what to do.

Washington residents worried about acid rain had reason to cheer last week: The Department of Ecology, after a three-year study, said it had found no evidence of acid-rain damage in high Cascade lakes.

Antacid rain might be a better description of what happens around here, to oversimplify a bit. Heavy rains in the lowlands tend to wash pollutants from the air so that any precipitation is cleaner before it falls in the Cascades, the study found.

Fortunately, the state's two biggest producers of the sulfur dioxide that helps cause acid rain have been stilled in recent years: Tacoma's ASARCO smelter has closed down, and Mount St. Helens has settled down.

Motor-vehicle engines, which produce nitrous oxides, are the other major contributor to acid rain. That's a good reason why tight emission-control standards and auto-inspection programs should remain in effect.

Meanwhile, Congress and the Reagan administration are still arguing over what to do about acid-rain problems in the eastern United States and Canada. At least three different bills have been introduced, with annual price tags ranging from \$3 billion to \$20 billion.

But scientists studying acid rain continue to raise troubling questions. The American Paper Institute and the National Forest Products Association, with strong incentives to be concerned about potential forest damage, concluded after a worldwide study that the problem was greatly exaggerated.

That goes against the grain of conventional wisdom, but gives cause to doubt the wisdom of costly crash programs before the problem is fully understood.

ATTACHMENT G

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U.S. CLEAN COAL INVESTMENT EXPECTED TO TOTAL MORE THAN \$6 BILLION BY 1992, DOE REPORT SAYS

U.S. industry, states and the federal government will likely spend more than \$6 billion between 1986 and 1992 to develop and deploy advanced "clean coal" technologies.

That is the finding of a new Department of Energy report announced today by Energy Secretary John S. Herrington.

Speaking at the National Press Club in Washington, Herrington said the report, entitled "America's Clean Coal Commitment," shows "that the U.S. stands second to none in its commitment to an environmentally clean energy future powered, in large part, by our most abundant energy resource, coal."

According to an inventory of U.S. clean coal efforts contained in the 50-page document, the private sector is expected to commit nearly two-thirds of the total anticipated funding for technologies that control coal pollutants more efficiently and economically than today's conventional methods.

The federal contribution would amount to \$2 billion, including nearly \$750 million in the Energy Department's ongoing Clean Coal Technology program along with continued clean coal-related research and development. Two states -- Ohio and Illinois -- account for the remainder of the expected funding, although the report acknowledges that other states are also financing clean coal-related efforts.



Nearly \$5 billion of the funding would be used to construct and operate clean coal demonstration or test facilities. The report catalogs 37 such projects already underway or planned, including 29 projects in the northeastern U.S. that have a projected value of more than \$2.5 billion.

The report also calculates the investment made by electric utilities since the early 1970s to reduce sulfur emissions in response to the Clean Air Act. According to the study, approximately \$62 billion has been invested by utilities for required sulfur pollutant controls. Included in this total is \$11 billion for pre-combustion coal cleaning, \$34 billion in premiums for low-sulfur coal, and \$17 billion to install scrubbers in power plants.

The report draws on other studies, including data generated by the ongoing, multi-agency National Acid Precipitation Assessment Program, to show that sulfur emissions have dropped significantly as a result of the investment. Nationwide from all sources, the report states, sulfur pollutants declined 23 percent from their 31-million-ton-per-year peak in 1973 to 24 million tons in 1984. During that time, coal consumption increased steadily, rising 78 percent from 1973 to 1985.

Electric utilities were able to reduce their sulfur emissions by 11.4 percent from a high of 17.6 million tons in 1977 to an estimated 15.6 million tons in 1985. In the environmentally-sensitive northeast part of the U.S., utility sulfur emissions declined even faster, dropping 19 percent from 1977 to 1985.

According to the report, several emerging new coal technologies have the potential to continue reducing sulfur emissions more economically and effectively than is possible with today's conventional controls. Many also can reduce the release of nitrogen pollutants which are also thought to contribute to environmental problems such as acid rain.

Cited in the report are new technologies such as fluidized bed combustion, limestone injection, advanced coal cleaning and coal gasification combined cycle. Several of these concepts are now being demonstrated at near-commercial scale after a decade or more of development.

Many of the new technologies could be used to make existing coal-burning facilities cleaner and more efficient. Some of the concepts could also be used to help refurbish aging power plants, extending their lifetimes while reducing emissions and boosting power output.

Copies of the report, "America's Clean Coal Commitment," along with two accompanying appendices, can be obtained from the Office of Fossil Energy, U.S. Department of Energy, Washington, D.C. 20585.

JOURNAL OF COMMERCE 2-20-87

DOE: US Tops On Clean Coal

The United States stands second to none in its commitment to an environmentally clean energy future powered largely by coal, the Department of Energy said in a new clean coal report.

The report, a 50-page inventory of private and public sector clean coal-burning technology projects, was compiled in response to Canadian charges that the U.S. government isn't living up to its commitment to fight acid rain.

The Energy Department says \$6 billion will be spent in the United States between 1986 and

1992 to bring advanced coal-burning processes, such as fluidized bed combustion, limestone injection and others, into the marketplace.

The federal contribution will amount to \$2 billion, including \$750 million in the Energy Department's ongoing Clean Coal Technology program, along with continued clean coal-related research and development, the department reported.

CRS FINDS U.S. LACKS PROGRAM CAPABLE OF MEETING ENVOYS' CLEAN COAL GOALS

Congressional Research Service has released a new report finding that the U.S. is lacking the "integrated approach to clean coal technology demonstration" needed if the Reagan Administration hopes to fulfill the goals of the U.S.-Canadian agreement hammered out by the joint envoys on acid rain. Further, the CRS report concludes that the clean coal technology program underway at the Energy Dept. "does not represent a major down payment of the joint envoys' \$5-billion technology demonstration recommendation."

CRS reviews the government-endorsed report by U.S. envoy Drew Lewis and Canadian envoy William Davis (Inside EPA, March 21, 1985, p12; March 14, 1985, p1), the clean coal technology reserve (which funds DOE projects), and DOE's nine ongoing demonstration projects (Inside EPA, Feb. 6, p14). Each DOE project was further analyzed to show how it might reach the goals set out in the Lewis-Davis report, with CRS focusing on: "retrofitability," cost-effectiveness and a project's ability to reduce transboundary air pollution. The report was put together at the request of several members of the House and Senate who have been concerned with DOE's response to the envoys' recommendations (Inside EPA, Jan. 16, p1,16).

CRS maintains that in recommending a \$5-billion demonstration program, the joint envoys were "seeking a new initiative by the U.S. government to help remove a major impediment to an acid rain control program and to achieve some immediate SO₂ [sulfur dioxide] and NO_x [nitrogen oxides] reductions to begin mitigating transboundary pollution." The CRS study chides the Administration for instead trying to show how existing programs are achieving the envoys' goals, noting that "such goals as technology demonstration have been seen by the Administration as inappropriate targets for government programs" in the past. The clean coal technology program at DOE, CRS finds, "is not substantially focused on acid rain control."

CRS concludes that only two of nine DOE projects underway are likely to meet the envoys' criteria, and that a third, "very small," project "may" also. These projects are: 1. Babcock & Wilcox, OH, "pressurized fluidized bed combustion combined cycle utility retrofit"; 2. Energy & Environmental Research Corp., CA, "gas reburning and sorbent injection retrofit into three utility boilers"; and 3. Coal Tech Corp., PA, "slagging combustor with sorbent injection into combustor." The report finds that the total costs of these three projects is about \$52-million, only "one percent of the commitment recommended by the envoys."

Clean Coal Technologies Need Decade Of Federal Funding, Says Coalition

The coal industry needs a decade of federal funding to help it find cost-effective commercial applications for clean coal technologies, says a member of the industry's Clean Coal Technology Coalition. The group has not decided on how much money it needs, but it would be over and above the \$350 million that it is asking Congress to appropriate for clean coal technology development, Porter Womeldorff, chairman of the Coalition's Deployment Task Force, told a meeting in Washington on Wednesday. The \$350 million would be used for purely demonstration projects, primarily involving retrofit technologies, he said.

Womeldorff, a vice president of Illinois Power Company, said that the proposed federal-industry partnership for deployment technology is needed to develop a transition program "to take us from commercial demonstration to a mature technology that uses good business decision making." The problem with technology developed in demonstration programs is that

BY AVIVA FREUDMANN

"you really don't know how it's going to perform in the field," he told the meeting.

It will take about 10 years until clean coal technologies are fully matured and commercially viable, he said. Until then, "you are doing a boots and suspenders kind of routine, trying things out," he noted.

Federal funding is needed because of financial and regulatory risks to utilities, the Illinois Power executive continued. "Generally speaking, there is no reward to utilities for taking technological risks," he observed. "The uncertainties associated with clean coal technologies could decrease our assurance that these technologies could penetrate the market the way we want them to."

Federal money would be made available only at the end of responsible demonstration programs and "only to projects that are in the immature envelope of

technological development," Womeldorff added.

The Deployment Task Force is also recommending stepped-up lobbying "to eliminate disincentives to deployment," the utility executive said. In response to a question, he added that "the modesty of the proposals" might permit the issue to remain narrowly focused on deployment, rather than broadened during the legislative process to include a host of environmental issues related to coal.

Meanwhile, the Department of Energy said that it has completed negotiations with the sponsors of the first two of nine Clean Coal Technology projects. The two projects—the American Electric Power Service Corp.'s \$167 million pressurized fluidized bed combustion plant, and Merion, Penn.-based Coal Tech Corporation's \$785,000 advanced cyclone combustor—now await approval by Congress. After that, DOE can sign cooperative agreements with the sponsors.

JOURNAL OF COMMERCE 2-12-87

Utility Official Touts Program For Clean Coal

By TIM SANBURY
Journal of Commerce Staff

WASHINGTON — A national program must be instituted to bring clean coal technologies into the market place in the mid-1990s, a group of clean coal proponents say.

Speaking at the Washington Coal Club, Porter J. Womeldorff, vice president of Illinois Power Co., said the financial risks and environmental uncertainties facing the developers of new coal-burning technologies could be mitigated if a three-fold program were to be implemented.

A 10-year federal and private sector fund should be created with the bulk of non-risk funding for clean coal projects being borne by industry.

— Porter J. Womeldorff,
Vice President, Illinois Power Co.

Mr. Womeldorff, who chaired a clean coal technology deployment task force of the Clean Coal Technology Coalition, said that a 10-year federal and private sector fund should be created with the bulk of non-risk funding for clean coal projects being borne by industry.

He also said a national review must be made of regulatory disincentives to the use of clean coal technologies, such as fluidized bed combustion, flue gas scrubbers, coal washing, and blending coal with other fuels such as natural gas.

Federal policy-makers must consult with various states to form partnerships to implement clean coal programs at the state level.

Mr. Womeldorff said such a program would require national legislation in addition to Congress' continued funding of existing Department of Energy clean coal research work.

Coming Soon: Competitive Solar Power

Improved Panels Help To Cut Costs

By SCOTT BRONSTEIN

Even though the breakthrough is still several years away, new solar technologies are already beginning to move out of the laboratory and into commercial application. Several companies are finding ways to cut the cost and increase the production of photovoltaic panels, hastening the day when solar power will become practical on a large scale.

The City of Austin Electric Utility recently installed its first solar station, a \$3 million, 300-kilowatt photovoltaic plant designed to provide enough extra electricity during peak hours to power 100 to 200 homes.

The electricity it produces costs \$9 a watt, about twice the cost of energy generated by coal, gas, oil or even nuclear power plants. Yet officials of the Texas city's utility say the new facility was a wise investment because it will familiarize them with solar power systems, which they believe will play an important role in the city's power needs in just a few years.

"Photovoltaic solar energy has a chance, in fact a high probability, of becoming cost-effective at \$2 to \$3 per watt," said John E. Hoffner, program manager for alternative energy at the Austin utility company. "The plant we have now is preparing us for the time solar is cost-effective."

That time is rapidly approaching, according to Zoltan J. Kiss, president of the Chronar Corporation of Princeton, N.J., a leading manufacturer of photovoltaic hardware and systems. "In 1990 we will be able to install a solar power station between \$2.50 and \$3 per watt, and at that point photovoltaics are certainly cost-competitive with any other way of making electricity," Dr. Kiss said.

Although Federal funding has been cut to \$43 million a year, from \$150 million in 1980, immense progress has been made in photovoltaic research through the combined efforts of private industry, universities and Department of Energy programs like the one at Colorado's Solar Energy Research Institute.

Interest in photovoltaics is especially high in rural and remote areas of countries where electrical needs are rising, but where it is often im-

practical to extend the power grid. It is already common to find photovoltaic cells at work in remote areas as independent power sources for communications systems or as replacements for diesel and gasoline generators used to pump water or refrigerate food and medicine.

"In the coming year we'll see a large increase in the number of photovoltaic applications for a small source of power where an electric connection cable would be more hassle than it's worth," said Charles F. Gay, vice president of research and development at the ARCO Solar Inc. of Chatsworth, Calif. For example, he said, solar cells might be used to recharge the batteries of cordless drills, saws and other power hand tools.

Despite the higher current cost of solar energy, utilities are attracted to photovoltaics because they have no turbines or other moving parts, so maintenance is minimal; they are nonpolluting, silent, and can be operated unattended. A computer "awakens them" when the sun comes up and turns them off when the sun goes down or behind a cloud.

And above all, the fuel source is cheap and plentiful.

Photovoltaic cells are essentially semiconductor devices that convert light energy to direct-current electricity. A typical cell has two semiconductor layers. Sunlight passes through one layer and is reflected back and forth, dislodging electrons to form an electrical current.

Photovoltaic cells in the form of solar panels have long been used to

Maintenance is minimal and the fuel source is cheap and plentiful.

generate electricity for space stations and satellites, but the technology has been too expensive — initially nearly \$1,000 per watt, now down to about \$9 — to use effectively on earth.

One way to reduce the expense is to make the solar panels thinner, thus cutting the raw product and manufacturing costs. Indeed, some of the most interesting advances in solar cell technology are being made in an area called thin film.

"Thin films can absorb sunlight in a thickness that is 100 times less than previous technology," said Kenneth

Zweibel, manager of the polycrystalline thin films program at the Solar Energy Research Institute in Golden, Colo. "It's potentially 100 times cheaper for materials and manufacturing costs."

Three thin film technologies — amorphous silicon, copper indium diselenide and cadmium telluride — have made particular advances recently. Cells have been made using each of these materials as the semiconductor, and efficiencies have been achieved of just over 10 percent; that is, they are able to convert 10 percent of the solar energy they receive to electric energy.

The most efficient experimental solar cells now in the laboratories can convert more than 21 percent of solar energy to electricity, and 30 percent is a likely goal before the end of the decade. Some researchers say efficiencies of 70 or even 80 percent are conceivable.

Amorphous silicon, which differs from the crystalline silicon used in computer chips in that its atoms are arranged at random, instead of in a lattice structure, "has demonstrated the largest uniformity of any semiconductor technology," Mr. Zweibel said. Research teams in the United States, Japan and Europe, including ARCO, Chronar, Solarex of Rockville, Md., and Energy Conversion Devices of Troy, Mich., have succeeded in significantly lowering costs and improving efficiencies in amorphous silicon cells.

Most solar-powered consumer products, including watches, calculators and even tricycles, are made with small amorphous silicon cells. For commercial applications, such as the 100-kilowatt photovoltaic station that the Alabama Power Company plugged into its Birmingham grid last summer, the cells can be made into sheets as large as 2 feet by 4 feet.

Both Chronar and ARCO Solar have large-scale manufacturing facilities that coat glass with amorphous silicon, creating thin film solar panels. Chronar has facilities in Port Jervis, N.Y., Bridgend, Wales, and Lens, France. Each plant can coat about 300,000 square feet of glass per year, Dr. Kiss said. The company also plans to start plants in China and in Birmingham, Ala., by the end of the year. ARCO Solar has a similar facility in Camarillo, Calif.

"Once you have the thin film deposited on the glass, it's easy to build an integrated circuit out of the coating," said Dr. Gay of ARCO Solar.

Besides thin film technologies, several others have made progress in recent years.

Gains of particularly high efficien-

University of Delaware. Dr. Barnett said that researchers, particularly in Germany and Japan, were developing solar panels expected to be marketed in the next two years that "will have the advantages of reduced cost combined with truly increased performance."

cies have been made in the area of crystalline silicon, which is more efficient but also more expensive than amorphous silicon. "In the last few years, we have seen single crystal silicon efficiencies go from the mid-17 percent range to around 22 percent today," said Allan Barnett, professor of electrical engineering at the

US & CANADA, ACID RAIN/HODEL

Interior Secretary Hodel this week criticized Canada for making it "more costly and difficult to generate electricity in the US", in order to export more Canadian power to this nation. At a press conference, Mr. Hodel specifically referred to Canadian pressure for tighter US acid-rain controls and to Canadian objections to US oil development on Alaska's North Slope near the Canadian border.

"Canadians have "abused" their role, the secretary said, in the "furtherance of their own economic activity... I hope the US isn't so naive and foolish that we fall for that kind of 'doublespeak'".

President Reagan visits Canadian Premier Mulrooney in Ottawa Apr. 5-6 on a variety of issues, including acid rain policies.

WALL STREET JOURNAL 2-12-87

Hodel Assails Canada's Stance On Energy Issue

By ROBERT E. TAYLOR

Staff Reporter of THE WALL STREET JOURNAL
WASHINGTON — Interior Secretary Donald Hodel suggested that Canadians are advocating strong U.S. controls on acid rain and oppose oil development in an Alaskan refuge in order to make the U.S. more dependent on Canadian energy.

Mr. Hodel, meeting with reporters yesterday, called it "astonishing" that Canada had opposed oil exploration and development in the Arctic National Wildlife Refuge, adjacent to Canada on Alaska's North Slope. Canada's opposition, he said, continues a history in which "Canadians have abused" their influence in the U.S. "for what I think is the furtherance of their own economic activity."

The interior secretary's statements are likely to exacerbate tensions between Canada and the U.S. on international trade and environmental protection.

Last month, Vice President George Bush attempted to soothe those tensions in a visit with Canadian Prime Minister Brian Mulrooney in Ottawa. But relations are likely to remain strained as President Reagan prepares to make his own visit to Ottawa April 5 and 6.

Mr. Hodel called Canada's opposition to oil development on the Arctic refuge "absolutely an easy 'pro-environmental' position for them to take at no cost to them." Noting that Canada produces oil and natural gas, he added, "to the extent to which they persuade us to blindfold ourselves as to our own resources, they put us in a position where we will be more dependent upon their resources at a higher price."

The secretary described Canadians' pressure for tighter U.S. acid-rain controls as "their efforts to make it more costly and difficult to generate electricity in the U.S." Tough restrictions on U.S. electric plants, he said, would "have the effect, whether it was their intention or not, of increasing the potential market for excess Canadian electricity in the U.S."

"I hope," Mr. Hodel concluded, "that the U.S. isn't so naive and foolish that we fall for that kind of doublespeak." While serving as energy secretary, Mr. Hodel opposed Canadian electricity imports into the Northeastern U.S., but the sales eventually were approved.

Jim Wright, head of the environment section at the Canadian Embassy here, dismissed Secretary Hodel's comments as part of a "conspiracy theory." While calling the theory "ridiculous," he said "it is of concern to us when we hear it from senior representatives of the U.S. government."

Meanwhile, Canadians are complaining that the U.S. has failed to keep its commitments to fund clean coal-burning demonstration plants.

A report prepared by special envoys Drew Lewis of the U.S. and William Davis of Canada called for the U.S. to spend \$1 billion a year for five years on certain kinds of demonstration projects, with half of the money to come from the federal government. The Reagan administration claims the U.S. will spend that amount.

But the U.S. counts research unrelated to the clean-coal projects. For the clean-coal projects, which are aimed at reducing acid rain, the federal government plans to spend a total of only \$750 million. Canada contends that only \$1.7 billion has been slated by the U.S. government and private sector combined for projects that meet the criteria in the report.

THE ENERGY DAILY

February 17, 1987

Hodel's Charges Anger Canadians

BY JOHN McCAUGHEY

Suggestions by Interior Secretary Donald Hodel late last week that Canadians are advocating strong action by the U.S. on acid rain and opposing oil and gas exploration in Alaska's Arctic National Wildlife Refuge merely in order to make the United States more dependent on Canadian energy imports have drawn an immediate and sharp response from Allan Gottlieb, the Canadian Ambassador in Washington.

In a letter to Hodel last Thursday, Gottlieb said that he was most distressed by and strongly objects to Hodel's references to "double-speak" in the context of Canadian environmental and energy policies. Gottlieb sent copies of his letter to Secretary of State George Schultz and to Energy Secretary John Herrington.

No Canadian drilling in Arctic regions has ever endangered wildlife resources shared by the two countries, the letter insists. The Canadian government is concerned, Gottlieb continues, that oil and gas development in the Arctic Wildlife Refuge would affect the calving

Central Maine Plans to Buy \$15 Billion Of Electricity From Quebec-Owned Firm

By DAVID WESSEL
And ALAN FREEMAN

STAFF REPORTERS OF THE WALL STREET JOURNAL
Central Maine Power Co. said it signed a letter of intent to buy substantial amounts of electricity from Hydro Quebec beginning in 1992, both for its own use and for resale to other utilities.

Hydro-Quebec estimated the total value of the proposed sale at \$15 billion (Canadian) over its 29-year duration. It said the proposal calls for the delivery of a total of 122 billion kilowatt hours of electricity.

If completed, the contract would be among the largest power-sales agreements negotiated by the provincially owned electric company, which has been aggressively marketing its electricity for export.

Under the proposal, Hydro-Quebec would deliver 400,000 kilowatts of power to Central Maine beginning in 1992, and Central Maine would sell half of that to other utilities. Deliveries would increase to 600,000 kilowatts in 1995 and to 900,000 in 2000.

Firm Supplies

Central Maine said the average price of the electricity will be about 9.5 cents a kilowatt-hour, subject to adjustments for inflation. Unlike the terms of some earlier Hydro-Quebec sales, the price of the power won't vary directly with changes in the price of oil. The agreement anticipates firm supplies of power as opposed to power supplies that might be cut off if Quebec needed them.

"This alternative is far less costly and less risky than building a large central generating facility here," said John W. Rowe, president and chief executive officer of Central Maine. A spokesman for the Augusta, Maine-based utility said it expects electricity generated by newly built coal plants will cost about 12 cents a kilowatt-hour in the 1990s.

Central Maine and Hydro-Quebec will form a new company to build and operate a proposed transmission line and converter station from the Quebec border through Maine at a cost of \$200 million to \$250 million (U.S.). Central Maine will own 70% of the new concern and Hydro-Quebec 30%. In addition, it will cost Hydro-Quebec about \$200 million (Canadian) to build its own transmission line through Quebec to the Maine border.

Regulators' Approval Needed

Central Maine said it won't proceed with the agreement unless it finds buyers for the power and receives approval from both Maine utility regulators and the Maine legislature. The agreement also requires approval by federal authorities in Canada and the U.S.

Hydro-Quebec already sells large amounts of electricity to a pool of New England utilities and to New York state. But with the exception of one agreement with Vermont, those power sales aren't guaranteed on a year-round basis and can be interrupted for Quebec's own needs.

Hydro-Quebec began its first big sales of power to New England utilities last summer and supplied about 2.6% of the region's power last year. By 1990, Hydro-Quebec will be supplying about 10% of the region's power. New Brunswick and Ontario also supply electricity to New England.

Some Executives Concerned

Some New England utility executives worry about the region's increasing reliance on imported electricity. But James Schlesinger, a former U.S. secretary of energy and an adviser to Hydro-Quebec, dismissed those concerns. "The notion that we should treat limited dependence upon Canada for power as a national security threat is fundamentally preposterous. Power from Canada is different from oil in the Middle East," he said.

Central Maine, the largest utility in Maine, currently has about 1.6 billion kilowatts of capacity and estimates that it will need an additional 500,000 to 700,000 kilowatts by 2000.

Under pressure from state regulators, the company recently sold its 6% interest in the Seabrook 1 nuclear power plant in New Hampshire to Eastern Utilities Associates, a Boston-based utility. If Seabrook survives political opposition and goes into service, Eastern plans to sell the electricity to other New England utilities.

Proposed Power Project

A spokesman for Hydro-Quebec said the Central Maine contract will likely force the Canadian utility to advance plans to build its proposed LG-1 power project in the James Bay region of northern Quebec. "We'll have to find the power somewhere," the spokesman said.

Quebec Premier Robert Bourassa has been pushing increased electricity exports to the U.S. as a way of boosting the provincial economy. Mr. Bourassa, who was re-elected as premier in late 1985, argues that Quebec can supply the U.S. Northeast with low-cost power through massive hydroelectric development in northern Quebec.

When he was premier in the early 1970s, Mr. Bourassa launched the now-complete first phase of the James Bay hydroelectric project, which cost \$14.6 billion.



Gotlieb: "Conspiracy theories make attractive headlines..."

grounds of a major caribou herd that is vital to the subsistence economy of indigenous people on both sides of the border.

"I must reject out of hand," Gotlieb's letter adds, "your allegation that Canadians are trying to use the acid rain issue as a means both 'to make it more costly for the U.S.

to generate electricity in the United States' and, by extension, to increase the potential market for Canadian electricity in the U.S. While such conspiracy theories make attractive headlines in newspapers and are used by special interest groups who are unwilling to accept responsibility for acid rain-causing emissions from their factories, I am amazed that these views could be espoused by a Cabinet Secretary in President Reagan's Administration."

Gotlieb's letter denies hotly that there is any commercial linkage between his country's environmental and energy policies. "The simple fact," he tells Hodel, "is that Canadian electricity is attractive to U.S. consumers because the price is right! Canada is not looking for any special favors in the U.S. energy market, but we are looking for the opportunity to compete freely and fairly."

With the U.S. responsible for some 50 percent of the sulfur dioxide pollution falling on Eastern Canada, Washington "clearly has an obligation to reduce this trans-boundary flow of pollutants," the Canadian Ambassador concludes.

U.S. seen tough on SO₂

U.S. laws on SO₂ control are significantly more stringent than their Canadian counterparts, according to the National Coal Assn.

Declines in SO₂ emissions in Canada are a result of the shrinking of the smelter industry there, rather than effective controls on utility emissions, according to a statistical analysis by the coal industry group.

If Canadian industry had had to observe U.S. pollution laws between 1970 and 1980, their SO₂ emissions would have fallen by 250% more than they did under laxer Canadian law, NCA said. By contrast, if U.S. industries "had sealed for, or been allowed to accept, the performance of their Canadian counterparts, U.S. emissions would have been 20% higher in 1980, rather than 18% lower."

The rates of reduction of SO₂ emissions in the two countries have become a factor in the acid rain debate because Canada claims it is cutting emissions faster.

WASHINGTON
Post 2-19-87

Hodel Criticizes Canada On Energy, Environment Opposition to Arctic Oil Development Hit

By Cass Peterson
Washington Post Staff Writer

Interior Secretary Donald Hodel renewed an attack on Canadian environmental and energy policies yesterday, accusing Canada of opposing oil development in an Alaskan wildlife refuge in an effort to increase its energy exports to the United States.

Speaking on NBC's "Today" show, Hodel said Canada, in expressing concern about possible exploration in the Arctic National Wildlife Refuge, "can't be oblivious to the fact that if we are blindfolded to our resources . . . it just means that we are going to have to import more oil at a higher price, and Canada is an exporter."

The statement was the latest salvo in a skirmish between Hodel and Canadian officials that began last week when he accused Canada of "abusing" close ties with the United States "for what I think is the furtherance of their own economic activity."

The dispute is likely to strain tense relations between the two countries over international trade and environmental protection, certain to be major issues at the meeting of President Reagan and Prime Minister Brian Mulroney scheduled for Ottawa early in April.

Hodel leaped into the fray in speaking with reporters last Tuesday, accusing the Canadians of "doublespeak" in seeking tighter U.S. controls on acid rain while trying to increase sales of electricity to the northeastern United States.

Restrictions on coal-fired generation in this country, he said, would "have the effect, whether it was their intention or not, of increasing the potential market for excess Canadian electricity in the U.S."

Hodel also suggested that Canada's interest in the Arctic refuge stemmed from a desire to protect its oil market, rather than wildlife. Canadian officials and many U.S. environmental organizations have expressed concern that exploration in the area, as recommended by an Interior Department draft report,

would affect calving grounds of a major migratory caribou herd that spends part of its time on Canadian territory.

Hodel called the opposition "absolutely an easy pro-environmental position for them to take at no cost to them."

The remarks raised a furor in Canada and drew a sharp response from Ambassador Allan Gottlieb. In a letter to Hodel last week, Gottlieb called the comments "misguided" and said he was "amazed that these views could be espoused by a Cabinet secretary in President Reagan's administration."

In a response to Gottlieb, released yesterday, Hodel made clear that he does not plan to back down. The letter noted that Canada has drilled wells in calving areas of the same caribou herd and bisected the herd's migration route with a highway.

"I hope the government of Canada will review its position . . . in light of its own activities," Hodel wrote.

An embassy spokesman here said Canada has no immediate comment on Hodel's letter. "We stand by the ambassador's letter," he said.

Hodel has spearheaded the administration campaign to encourage U.S. oil exploration, in Alaska and off the California coast, to curb rising oil imports and reduce what many believe is an increasingly unhealthy reliance on imported oil.

In his televised remarks yesterday, Hodel said an energy crisis similar to the one that created gasoline lines in 1979 is "almost a certainty" within two to five years unless U.S. oil production rebounds.

However, Energy Secretary John S. Herrington disagreed, citing a national oil stockpile that did not exist in 1979 and advances in energy efficiency.

"I don't agree with him," Herrington said after an address at the National Press Club. "But I do agree that we need to be concerned."

Do caribou control our energy future?

area of escape from mosquitoes. The herd has grown from 3,000 in 1975 to more than 13,000 today.

JOHN CHAMBERLAIN

We are still haunted by energy policies that date back to the Jimmy Carter years. It seemed important then to substitute coal for oil and natural gas. So we had a Fuel Use Act designed to prohibit the use of oil or gas in new industrial boilers. In the 99th Congress an attempt was made to repeal the act, but the coal railroads and the United Mine Workers managed to sidetrack the bill. Now a new repeal effort has been launched by J. Bennett Johnston, the Louisiana Democrat who heads the Senate Energy and Natural Resources Committee.

What we will see is a tremendous battle of the pressure groups, with the coal industry lined up against the Natural Gas Association, the American Petroleum Institute, and the private utilities represented by the Edison Electric Institute. The consumer's interest naturally calls for decontrol of gas to complement the deregulation of oil. There is no possibility that coal will suffer unduly from the free competition of alternate fuels. Nuclear energy plants have become too costly to build, and the ones now in various stages of completion will hardly replace the older plants that will be going out of commission in the 1990s. There is plenty of import oil available at current \$18-plus-a-barrel, but the United States itself is not replenishing its oil reserves with new discoveries.

As for natural gas, discoveries here are linked to oil prospecting. Before rejecting coal for oil, American power companies must consider the probability that oil prices will rise again in the '90s as the reserves in Western nations decline and the OPEC nations of the Middle East become dominant again in supply.

If you are going to feel sorry for any domestic energy suppliers, it is the oil companies that deserve your tears. Oil production from the Alaskan North Slope is about to peak at 1.9 million barrels a day this year. If nothing is done to supplement a declining Prudhoe Bay production, our oil supply from Alaska will drop to 700,000 barrels a day by the year 2000.

What the environmentalists fail to recognize is that a few producing oil wells and a limited web of pipelines take up very little space in an 800-mile stretch of howling wilderness. Oil, unfortunately, is not to be found everywhere.

It is all the more important, then, for the United States to encourage oil production in the few places where it can be established. Secretary of the Interior Hodel has announced a plan to offer oil leases on 6.5 million acres off the California coast. He has had to go against the environmentalists even to make this modest proposal. The American Petroleum Institute is grateful for small favors. But it points out that Mr. Hodel's offer would defer large amounts of "very promising acreage from leasing until 1991."

The oil industry cannot afford such delays. Meanwhile coal is waiting in the wings, with new clean coal-burning techniques coming on the market every day.

Secretary of the Interior Don Hodel thinks there is a good prospect that a whole new field of supply waits under the ground of the Arctic National Wildlife Refuge, which has been off limits for prospectors. Michael Johnson of the Conoco company warns that even in the most propitious circumstances oil from the ANWR area will not be available for a full decade. What appalls Mr. Johnson is the prospect that the environmentalists, who like the Bourbons learn nothing and forget nothing, are prepared to fight the battle of the caribou all over again. They are claiming that oil drilling in the Arctic National Wildlife Refuge territory will disturb the calving of the local caribou herd.

As Yogi Berra once phrased it in a similar situation, this is *deja vu* all over again. The environmentalists delayed the building of the Alaskan pipeline for more than five years by their exploitation of the fear that the Central Arctic caribou herd in the Prudhoe Bay and neighboring Kuparuk and Milne Point oil fields would suffer from interference with their calving range. As it turned out, the Central Arctic caribou just loved the pipeline, which gave them an

Study Confirms Export Market For BC Hydroelectric Power

By BRIAN LEWIS

Journal of Commerce Special

VANCOUVER, British Columbia — An export market exists for the output of the proposed 900-megawatt Site C hydroelectric dam in the province, an eight-month study by public and private power interests in British Columbia, Washington state, Oregon and California said.

The dam would be built on the Peace River near Fort St. John in northern British Columbia.

The study was released in Vancouver at the weekend by Chester Johnson, chairman of British Columbia Hydro and of the study group. British Columbia Hydro is the provincial utility and a crown corporation.

Mr. Johnson said the Pacific Northwest and California markets would be available to the utility for at least 20 to 30 years after 1994.

That market, in fact, is six times greater than Site C's proposed annual generating capacity, according to the study, which also confirmed the project's technical feasibility.

It also detailed transmission facilities needed to deliver the power and regulatory requirements in Canada and the United States.

The study was undertaken last June to examine and assess the technical, legal and economic factors relevant to the generation,

The Pacific Northwest and California markets would be available to the utility for at least 20 to 30 years after 1994.

transmission and marketing of Site C power to the United States. British Columbia Hydro, the U.S. Bonneville Power Administration and nine Northwestern and California utilities took part in the study.

"This report indicates that Site C can be completed in time to serve the U.S. market," Mr. Johnson told a news conference in Vancouver. "Now we can start direct contract negotiations with the customers."

He also said the project's costs — about C\$3.4 billion in 1985 dollars — can be offset by the revenue it will produce. But the precise method of financing the construction and operation of Site C will be addressed during contract negotiations, he added.

The report underlines the vital importance of ensuring a willingness on the BPA's part to transmit the power from the Canada-U.S. border. Up to now the U.S. federal power agency has been reluctant to commit its north-south intertie to long-term

Canadian power sales since the BPA also sells to the California market.

Gary Fuqua, BPA assistant power manager, said in Seattle that it's too soon to say whether Northwest ratepayers will buy imported power from British Columbia on a firm basis since the power's price has not been established.

"The Canadians have to put a price on the table, otherwise there's not a lot to talk about," he said.

Mr. Johnson of British Columbia Hydro cautioned, however, that if the BPA won't wheel the power then other U.S. utilities could provide transmission access.

He also said that in order to meet a 1995 in-service date for Site C, British Columbia Hydro has until the end of this year to complete a range of critical contract negotiations and until the end of 1988 to secure regulatory approvals, allowing construction to begin in 1989. It would take about seven years to complete the dam.

The report also said that under the U.S. government's National Environmental Policy Act, the BPA will be required to undertake an environmental review process that will include preparation of an environmental impact statement. This could take between 20 and 26 months.

CANADIAN POWER IMPORTS/NERO

Importing electricity from Canada poses no more risk than buying foreign oil trying to transport coal cheaply, or owning a nuclear powerplant, New England Electric System Vice President Robert Bigelow said this week at the National Energy Resources Organization's conference on "Industrial Competitiveness and Electricity Policy in North America".

Canadian electricity sales to the US accounted for \$1-billion of the US trade deficit of \$141-billion in 1985, said experts at the conference, and the potential exists for Canada to sell an additional 64,000 MW of hydroelectric power in the future. Robert Cole of Kaiser Aluminum pointed out that Canada has the lowest-cost electricity among the western industrialized nations, at 26-mills per kwhr; the US is second highest, at roughly double the Canadian price. Mr. Cole attributed the differential to the abundance of hydroelectric resources in Canada, although questions of federal subsidies also were raised at the conference.

Mr. Bigelow defended his company's policy on imports by pointing out that Canadian power contributes to a diversified mix of sources. Furthermore, since Hydro Quebec (the supplier of NEES' electricity) is a winter-peaking utility and NEES experiences a summer peak, the two systems are a good match.

Current import levels do not constitute an overdependency on Canada, nor do they displace potential midwestern generation, because a transmission system to move midwestern power to the Northeast is unavailable, said Larry Hobart, APPA Executive Director. Imports have saved consumers hundreds of millions of dollars, he asserted, citing a GAO analysis.

Even if a transmission system were in place, politics would prohibit New England utilities, as well as those located in New York and New Jersey, from obtaining midwestern power, said Rhode Island PUC Chairman Edward Burke: "No imports from the Midwest will be expoused until acid rain is cleaned up. We (in the Northeast) are so concerned about acid rain that we even agreed to a surcharge on Quebec power in order to deal with it".

The relationship between acid-rain control and Canadian energy imports also was raised by Wilson Parasiuk, Manitoba Minister of Energy & Mines. He characterized comments by Interior Secretary Hodel that Canada is pushing for acid-rain legislation in order to promote exports as "out of line. Conspiracy theories make good headlines, but these statements have no basis in fact". The minister noted that Canada has set goals for SO₂ emission reductions of 50% by 1994.

The minister also emphasized that Canadian exports to the US are in no way displacing US power production, since they account for less than 2% of the power consumed in the US. Furthermore, since the majority of the exports will continue to be interruptible through the end of the century, these contracts will not allow US utility to avoid construction of plants for baseload demand. He also noted that DoE estimates US electricity demand growing at a rate of 2.3-3.1% per year through the end of the century, suggesting that 100 to 300 new plants will be needed, despite numerous regulatory hurdles impeding construction. "Canada cannot solve this long-term need", he said. "We can provide the time and flexibility for you to solve it".

Even House Energy Committee Chairman Dingell had little to say against the imports, although he has talked about trade issues and American competitiveness before they rose to the top of the congressional agenda this year. He questioned

whether the imports would be a source of stable, reliable power and whether they would remain reasonably priced. If they are, "they can certainly contribute to keeping American industrial products competitive in the world market", he said. "Canadians, meanwhile, can benefit from increased jobs that result from construction and operation of new powerplants".

"We cannot fault the Canadians for any disarray of our own market", Rep. Dingell continued. He spoke of the need to develop a domestic electricity policy to deal with regional surpluses, wide disparities in delivered price, jurisdictional conflicts among regulators, and, "exacerbating the problem", the generation of electricity by many industrial users. "In conclusion, the establishment of a reasonable trade policy on purchasing electricity from Canada and setting out a reasonable domestic policy on electricity, can have obvious benefits for industrial competitiveness in both Canada and the United States". The congressman expressed optimism that the regulatory system "will have the abilities to deal with imports" although he said he doubts legislation to increase the authority of regulatory bodies such as FERC to deal with the issue would be enacted.

Also speaking at the conference were EEI Chairman Jerry Geist and Judd Kessler of the Ad Hoc Coalition on International Electric Power Trade, a group comprised mostly of coal producers. Mr. Kessler charged that the low prices charged by the Canadians are a result of federal subsidies, and spoke of the need for countervailing duties. "Among the subsidies cited by Mr. Kessler were: the government guarantee of utility borrowings, lowering the cost of debt issues by 1.5-2%; a capital structure involving a level of debt so high that no US utility could hope to raise comparable amounts (e.g., 95% debt to 4% equity for Manitoba Hydro); and only an \$815-million grant in lieu of taxes on revenues of \$12-13-billion annually.

The session concluded with ELCON Director John Anderson and Eason Balch of Alabama Power debating the merits of mandatory wheeling.

E.P.A. Report Says Agency Is Focusing On Wrong Problems

By PHILIP SHABECOFF
Special to The New York Times

WASHINGTON, Feb. 18 — An internal report suggests that the Environmental Protection Agency may be concentrating on the wrong problems, such as hazardous wastes, rather than more serious threats posed by air pollution and depletion of the ozone.

The report, which was requested by Lee M. Thomas, Administrator of the agency, in an effort to review its priorities, was prepared by 75 of the agency's senior professional staff members.

The report found that the problems posing the greatest overall risk to human health and the environment in the United States included such conventional air pollutants as sulfur and lead, the destruction of ozone in the atmosphere by man-made chemicals and the risk from pesticides, especially pesticide residues on foods.

Other Health Hazards Cited

Other problems that had a particularly severe impact on health included radon and other indoor air pollution, toxic air pollutants, contamination of drinking water and exposure of workers to dangerous chemicals.

Such problems as the disposal of toxic waste or the cleanup of abandoned toxic waste sites and other causes of contaminated water presented a medium or relatively low level of overall risk, according to the agency's study.

"These rankings by risk do not correspond well with the E.P.A.'s current program priorities," the report said.

Mr. Thomas said in an interview today that the study of the relative risks of environmental problems could lead his agency to modify some of its priorities. He also said the study might persuade Congress to rethink how best to allocate "finite resources" to deal with environmental problems.

Major Restructuring Unlikely

But Mr. Thomas insisted that the study did not indicate that the agency had been on the wrong course or that there should be a major restructuring of its programs.

He suggested rather that the success of such programs as the handling of hazardous materials and the cleanup of toxic wastes might be one reason for the relatively low ranking they received in the agency's assessment of environmental risks.

The report said that areas of relatively high risk but low effort by the

agency include radon, a naturally occurring gas that accumulates in homes and can cause lung cancer; other indoor air pollution caused by heating appliances, formaldehyde and other sources; the destruction of the ozone layer that protects the earth's surface from dangerous ultraviolet radiation, and global warming caused by the buildup of carbon dioxide from fossil fuels and from other gases in the atmosphere, preventing the escape of infrared radiation from the sun.

Other areas where the report found high risks but relatively little regulatory effort by the environmental agency were runoff of polluted water from farms and city streets, exposure to pesticides, exposure of workers to toxic substances and accidental releases of poisonous chemicals.

'High Effort, Low Risks'

Areas of "high E.P.A. effort but relatively low risks" included management of hazardous wastes, the cleanup of chemical waste dumps, the regulation of underground storage tanks containing petroleum or other hazardous substances and municipal solid waste.

In recent years the agency has been expending a considerable effort on toxic waste problems; last year Congress renewed the toxic waste cleanup law, providing \$9 billion for the program over the next five years.

Mr. Thomas said that in recent years the agency started to move aggressively on many of the problems identified as presenting high risks, including pesticide contamination, stratospheric ozone and the ecological as well as the health consequences of pollution. He also said efforts to control conventional air pollution, identified as a high-risk

The report is a 'courageous thing to do.'

area, had been a focal point of the agency's efforts for 15 years.

Richard D. Morgenstern, director of the agency's office of policy analysis and coordinator of the report, said the report was "not an indictment of current programs but a forward look into the future."

Many factors other than relative risk determine agency policy on a given problem, he added. These factors include statutory requirements, public demands and economic and technological feasibility of efforts to deal with the problems.

Praise From Environmentalists

The study is drawing considerable praise from environmentalists and Congressional staff aides who know about it. For example, Terry Davies, executive director of the Conservation Foundation, called the report "an extraordinarily courageous thing to do," because it runs against the self-interest

of the agency's bureaucracy. Two Congressional aides also said it was highly useful but very unusual for a Federal agency to take stock of what it was doing.

Mr. Morgenstern and other agency officials emphasized that the report represented judgments of senior professionals, not any attempt at a scientific, quantitative weighing of relative risks.

In preparing the report, the officials looked at 31 major environmental problems the agency deals with and then examined the impact of those problems in causing cancer and other human health problems, damaging buildings and natural systems and diminishing visibility.

Cleaning Up the Wrong Stuff?

ENORMOUS AMOUNTS of energy and ink were spent on the Superfund bill in the last Congress. Now a large amount of money will be spent as well. Congress authorized \$9 billion over five years, and voted the taxes to match. This effort to clean up leaking industrial dumps is one of the largest programs the Environmental Protection Agency conducts.

Now comes a study from EPA suggesting that some of the effort may be misplaced. The study attempts to rank the various environmental risks that EPA is supposed to combat. The question is whether the government's limited resources in this field are being used in the most efficient way, whether the most attention is uniformly being paid to the greatest dangers. The answer is no.

The study was done by career civil servants; the goal was the opposite of political. The authors are quick to state the limitations of their work. Environmental risks are notoriously difficult to evaluate, much less to compare. If you live within leaching distance of an abandoned industrial dump, it doesn't matter to you that, for the population as a whole, the danger from such dumps may be relatively low. Nor, the authors carefully say, is it wrong for Congress to respond to public as opposed to supposedly expert opinion

in setting priorities; on the contrary, that is how our system is finally supposed to work.

Nevertheless the study suggests that there is a mismatch between EPA's budget and the tasks it faces. "Areas of relatively high risk but low EPA effort" include indoor radon gas, other indoor air pollution, depletion of the ozone layer, global warming, water pollution from so-called non-point sources—for example, pesticides washed off farms—and other pesticide exposure. By contrast, the great attention paid to dumps, including that under Superfund, is characterized among "areas of high EPA effort but relatively medium or low risks."

Environmentalists tend, if only for tactical reasons, to dismiss rankings such as these. They believe that all the established threats are great and therefore that all expenditures are important. Congress will always overreact to some issues and underreact to others. The environmental groups will take what they can get, and who's to blame them?

But a finite national agenda is needed in these matters, and the EPA study, rough though it is, does point the way. While Congress passed the Superfund bill last year, it killed a pesticide bill. You'd never know it from the press releases, but the less elaborate bill that was killed may have been the more important. We need to learn better how to make judgments like this.

REGION X REJECTS SECOND WASHINGTON STATE 'DISCLAIMER' TO RADON GUIDE

EPA Region X has rejected for the second time a "disclaimer" document proposed by Washington which attempts to dispute agency estimates of the radon problem nationwide. Officials from Washington's department of social & health services had previously blasted EPA estimates of lung cancer risks contained in the agency's pamphlet, *A citizens guide to radon* which EPA distributed after finding that high levels of the radioactive substance caused significant lung cancer risks.

Washington state was severely criticized by EPA for the tone of its first disclaimer published in the booklet, which maintained that EPA's studies appear inaccurate and incomplete, and show no sufficient link between radon and lung cancer risk (Inside EPA, Jan. 16, p4). State officials claim they published the original disclaimer because they did not want to unnecessarily alarm the public about radon.

In an attempt to smooth relations with EPA state sources say they agreed to draft a second, more detailed disclaimer which they have submitted to EPA Region X for review. Though EPA admits the second disclaimer is more accurate and less inflammatory than the first, sources say "any disclaimer provides a confused risk communication strategy." The five paragraph disclaimer (the original disclaimer was only one paragraph) states that much is unknown about radon, and that available data are inadequate to estimate an association between radon and lung cancer. Studies in progress will better assess the risk, the document continues, and in the meantime, the state will issue public health notices "if evidence is received indicating that specific residential concentrations are considered to be hazardous to the public."

EPA sources say they have several problems with the second disclaimer. Regional officials say it is inaccurate to say existing data do not demonstrate lung cancer risks. Though admitting that ongoing studies will better define the risk, EPA says that existing data are sufficient to proceed with remedial action. The agency is also objecting to a portion of the disclaimer which says that existing data do not demonstrate that observed household concentrations increase lung cancer rates. EPA counters that major exposure data shows lung cancer increases at concentrations below levels the agency has seen in homes. The agency also feels that Washington state's criticism of EPA methodology is not justified, and that EPA consulted many experts on the process. Said one source, "If the state feels the guide is insufficient, they [state officials] should do their own."

AIR/WATER POLLUTION REPORT 2-19-87

DIRTY FOG MORE HAZARDOUS TO HEALTH THAN AIR POLLUTANTS, SCIENTISTS SAY

Breathing dirty fog can be more hazardous to people's health than inhaling polluted air, scientists reported last week. The reason, they said, is because pesticides, airborne chemicals and vehicle exhaust fumes become concentrated in moisture droplets that form fog.

"There is a difference between inhaling vapors and inhaling concentrated particles. The particles stay in the lungs, whereas vapors can be exhaled," said one of the scientists, James Seiber, a professor of environmental toxicology at the University of California at Davis.

Seiber and scientists from the U.S. Department of Agriculture in Maryland reported the results of their fog studies in Nature, a British science journal. They conducted their research in Beltsville, Md., near Washington, D.C., and California's San Joaquin Valley, using a homemade "fog collecting machine" that condensed moisture from fog into "dirty brown water" which was then analyzed for its chemical content.

The researchers said they found higher concentrations of pesticides and chemicals in the fog samples than they did in rain water, adding that most of the chemicals were by-products of the manufacture of plastics. They also said that the health threat of fog is not clear because there is not enough data.

Coal News/February 9, 1987

GAO Report Critical of EPA 'Delays'

A new General Accounting Office report is critical of Environmental Protection Agency "delays" in setting ambient air quality standards and recommends EPA better identify its research needs.

The study says EPA completed only one of six reviews of the ambient standards by the end of 1980 as required by the Clean Air Act. Agency reviews of standards for two other pollutants were not finished until four years after the deadline and updates for three others are not expected to be finished before 1989, GAO said.

In 1982 the agency developed a five-year planning schedule that included milestones for reviewing and updating the standards. However, extended review times inside and outside EPA caused delays in the standard-setting process, GAO said.

Further delays resulted while the agency waited for the results of additional research. When the additional research was finished, still more reviews and comment periods were required, creating a new cycle of delays, GAO said.

EPA WORK ON UNIFORM RISK ASSESSMENT PRACTICES TAKING LONGER THAN EXPECTED

EPA progress in developing a system to make decisions about risk consistently has been slow, EPA sources say, though EPA chief Lee Thomas is expected within the month to review an initial plan to equip agency offices and regions with the expertise to make uniform risk assessment/management decisions.

These sources say that the agency is still grappling with the difficult issues of whether the risk assessment/management program should be "centralized," as some key agency officials devise a plan to ensure quality control is incorporated into the system (Inside EPA, Oct. 31, p9). One EPA source said that the process has been slow, offering only that the project is one that involves several different offices and EPA officials. Coordination has been complicated because EPA is attempting to include regional officials in the decisionmaking.

The overall effort to establish risk assessment management at the agency is seen as a top priority by the administrator, who began last summer reorganizing the risk management system under the Risk Management Council (RMC) that he heads. The RMC has made several policy calls in risk assessment decisions, which factors only risks associated human and wildlife health. Risk management decisionmaking involves all factors — health risks, benefits of a chemical's use, and the alternatives of reducing the risk.

The problems of developing and coordinating risk assessment practices within EPA headquarters have been compounded by drawing the regions into the system. Thomas has stressed, however, that EPA must move to train regional officials — or hire trained staff — maintaining that regional officials on a day-to-day basis make bottom-line decisions on environmental problems.

Sources say that Thomas has asked region officials how they "want to organize their program," and that a memo outlining their concerns is being drafted. According to sources, each region is likely to organize as it sees fit.

EPA sources say that the agency is, however, still looking for ways to build "technical uniformity" into the system, while addressing the question of which office would oversee risk assessment/management decisions, and how much training is needed and who should do it.

According to a draft from a recent meeting of the Risk Assessment Council, which is headed by Office of Pesticides & Toxics chief Jack Moore, current training efforts are weak in their treatment of non-cancer effects. One EPA source commented that since "no one office has broad enough vision to devise a training program," a subcommittee has been formed to design such a program.

According to sources, members of the subcommittee are developing a priority list of skills which "regional offices need to function effectively in the area of risk assessment." They would include: 1. identifying the major assumptions in a given risk assess to perform some sort of sensitivity analysis to gauge the effect of the assumption on the final assessment; and, 2. identifying latency/discounting needs

Sources say that a system to incorporate quality control into decisionmaking is being tested in a pilot program under Superfund. Sources indicate that the agency has not decided however, whether the system should be centralized, with headquarters taking the lead. Whether to centralize the program is expected to be discussed at the next RAC meeting, tentatively scheduled this week.

**WISCONSIN SAYS BORDER STATES GIVE OFF BAD AIR;
GAO INVESTIGATES ANGRY OFFICIALS' COMPLAINTS**

The General Accounting Office is investigating complaints by angry Wisconsin officials that the state is fighting a losing battle to comply with federal clean air standards by the Dec. 31 deadline because of wind-borne pollution that comes from two other states -- Illinois and Indiana. The study has just begun, a GAO spokesman said last week. The Wisconsin congressional delegation expects to receive a GAO briefing April 1.

"While Wisconsin has made substantial efforts at controlling its own pollution, we believe that the state should not be penalized for air pollution that results from sources beyond its control," the delegation told Comptroller General Charles Bowsher in a letter requesting the investigation last September.

States that fail to attain Clean Air Act ozone standards by year's end face Environmental Protection Agency sanctions that include reducing the number of vehicles on their highways and banning construction on new industrial plants.

EPA Chief Lee Thomas has said he would prefer to encourage states for attempting to reduce air pollution rather than impose sanctions on those that fail to meet clean air standards. Some 60 metropolitan areas are far below attainment standards and unlikely to meet them by year's end. For some cities like Los Angeles, Chicago and Dallas it will be virtually "impossible" to meet clear air goals, he also has said.

Economic Growth at Stake

Wisconsin is alarmed that sanctions would further limit its economic development, which suffered a setback two years ago when Forward Wisconsin, Inc., a quasi-public agency that promotes Wisconsin as a good place to do business, rejected a proposal to locate a General Motors Saturn automobile manufacturing plant in the southeastern part of the state. Forward Wisconsin determined that emissions of volatile organic compounds from the facility would "degrade the area's air quality to a level not allowed under federal and state law."

The state wants GAO to determine, among other things, whether EPA has been lax about enforcing Clean Air Act requirements in Illinois and Indiana. Those states do not have completely approved state implementation plans (SIPs) that demonstrate attainment of the ozone standard by year's end, the delegation charged. Wisconsin, however, has a fully approved SIP. State officials also want to know if EPA has sophisticated enough computer models to determine if air pollution in one state is coming from another state.

The congressional delegation also pointed out that SIPs must contain a prohibition against any stationary source emitting air pollutants "in amounts that will prevent attainment or maintenance by any other state of a national ambient air quality standard (NAAQS)."

GAO was asked to complete its study "as soon as possible in light of the 1987 deadline." A spokesman said it is not known when the study will be done.

Suit Planned Against EPA

In addition to asking for the GAO study, Wisconsin has filed a notice of intent to sue EPA for allegedly failing to require prompt action by Illinois and Indiana to curb their air pollution. "It is clear that Illinois and Indiana are violating the right of the people of southeastern Wisconsin to clean air," Atty. Gen. Donald Hanaway said in announcing the state's legal action Jan 22. "It is also clear that the ozone problem is hurting economic development in that part of the state," he said, adding, "we don't like suing, but we feel we have to in this case."

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Our Fragile Atmosphere: The Greenhouse Effect and Ozone Depletion

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WASHINGTON POST 2-15-87

Earth's Economic Growth Is Straining Environment

Worldwatch Institute Issues Gloomy Forecast

By Cass Peterson
Washington Post Staff Writer

A century of global economic growth has reached the point of diminishing returns and is creating environmental havoc that could eventually render the planet uninhabitable, a Washington-based research organization said yesterday.

In the fourth and gloomiest of its annual "State of the World" reports, the Worldwatch Institute said recent scientific disclosures suggest that human activities are pushing natural systems to the point of collapse, with potentially disastrous consequences for future generations.

"As currently pursued, economic activity could be approaching a level where further growth in the gross world product costs more than it is worth," the report said. "The scale of human activities has begun to threaten the habitability of the Earth itself."

The report, written by institute president Lester R. Brown and seven colleagues, cited recent trends in atmospheric degradation as evidence that natural systems are being pushed beyond their capacity to adjust.

In the last two years, atmospheric scientists have become increasingly concerned about a mysterious "hole" that appears each year in the Earth's protective ozone layer over Antarctica.

At the same time, meteorologists have confirmed a slight but troubling increase in global temperatures that some believe foreshadows a "greenhouse effect" and major climate changes.

Both phenomena have been linked to airborne pollutants from industrial activity. Worldwatch said they are evidence that "the negative side-effects of this century's twenty-fold expansion of economic activity are now becoming inescapable."

According to the report, gross world product has grown from roughly \$600 billion in 1900 to more than \$13 trillion in 1986, an increase fueled mainly by a twelve-fold increase in fossil fuel consumption.

But the rapid industrialization is exacting a price on the environment, it said, and is likely to affect the economy as well.

As an example, it cited forest damage from airborne pollution in West Germany. Damage was estimated at 8 percent in 1982. By 1984, surveys showed more than 50 percent of the forest damaged or dying, a major threat to the area's tourism and wood-products industries.

"As the natural systems that underpin economies deteriorate, actions that make good sense environmentally will begin to converge with those that make good sense economically," the report said. "But that convergence may only occur after irreversible changes have unfolded."

The report also questioned the future of modern agriculture, including the "Green Revolution" that it heralded as "the most successful achievement in international development since the Marshall Plan."

In developing countries, as in the United States, increased yields have largely stemmed from massive infusions of energy—fuel for tractors, electricity for irrigation pumps, fossil fuel-based fertilizers. The report said such energy-intensive practices have put the "Green Revolution" out of reach for scores of poorer countries and are a growing threat to agriculture in better-off nations as energy supplies diminish.

"By 1986, nearly half of all oil discovered had already been consumed," the report said. "In North America, which produces nearly one-fourth of the world's grain, four-fifths of all the oil discovered to date has already been burned."

The report said that recent environmental and economic trends are certain to be exacerbated by an increasing human population, which passed the 5 billion mark in 1986, double what it was in 1950, and is expected to pass 6 billion by 2000.

"If world food consumption grows 2 percent annually over this century's remaining 13 years—barely enough to maintain current consumption levels—food demand will rise by nearly one-third," the report said.

Many nations are grappling with crop surpluses now, but Worldwatch said that much of the production cannot continue indefinitely because it is being achieved by depleting soil and water resources. In the United States, it said, one-sixth of the annual grain crop is produced on highly erosive land or by depleting ground water for irrigation.

"Future improvements in living standards rest more heavily than ever on international cooperation," the report said. "And time has suddenly become one of the scarcest of all resources."

NEW YORK TIMES 2-15-87

MAN SAID TO TAX EARTH'S SYSTEMS

Report Says Environment May Have Reached Its Limits for Permanent Damage

By PHILIP SHABECOFF
Special to The New York Times

WASHINGTON, Feb. 14 — The pressures of population growth and economic expansion are starting to exceed the ability of the earth's natural systems to sustain such activity, a new report by the Worldwatch Institute warned today.

In its report, "State of the World 1987," the Washington-based research group said human use of the air, water, land, forests and other systems that support life on earth were pushing those systems over "thresholds" beyond which they cannot absorb such use without permanent change and damage.

The result has been declining food and fuel production in many parts of the world and, for the world as a whole, contamination of the atmosphere, climatic change, a mass extinction of plant and animal species and the long-term prospect of a decline in the quality of life, the report said.

"Many of these threshold crossings, which are making the earth less habitable for future generations, are taking society by surprise," said Lester R. Brown, president of the institute and director of the study.

Three Critical Areas

"The most threatening globally are the depletion of the ozone layer, climate change and the loss of biological diversity," Mr. Brown said.

The report said that "so many natural systems becoming unstable within such a short period of time" could result in economic and political pressures that "could overwhelm the capacity of governments and individuals to adjust adequately."

The report cited Central America as an area where high population growth, deforestation, soil erosion and high energy costs have led to political instability and social disintegration.

It said "a frustrating paradox is emerging" from global efforts to achieve economic growth. "Efforts to improve living standards," the report asserted, "are themselves beginning to threaten the health of the global economy. The very notion of progress begs for redefinition in light of the intolerable consequences as a result of its pursuit."

"A sustainable society satisfies its needs without diminishing the prospects of the next generation," the report said, adding, "By many measures, contemporary society fails to meet this criterion."

Damage From Fossil Fuels

The report noted that much of the world's economic growth over the last century has been based on the burning of fossil fuels such as coal and oil. But that activity, it asserted, was changing the atmosphere to the point where the global climate was expected to shift drastically in the next century, requiring vast adjustments in agriculture and other activities that will cost billions of dollars.

The report also said that although overall world agricultural production has been growing, it has been declining in many countries, particularly in Africa, because of soil erosion and the spread of deserts. Even in the United States, fully a sixth of the grain harvest comes from eroding lands or draws on diminishing sources of ground water for irrigation, and so cannot be sustained over the long run, according to the report.

The destruction of forests, in addition to accelerating the extinction of species, is having a heavy impact on underdeveloped countries such as India that depend on firewood for fuel, the report went on.

The report also addresses the future of nuclear energy in the wake of the explosion and fire last year at the Chernobyl power plant in the Soviet Union. The report concluded that the accident was pushing many countries to gradually phase out plans to rely heavily on nuclear power for future energy needs — a path some nations had embarked on even before the Chernobyl disaster.

It also said that the world was becoming divided along demographic lines, with the developed countries having stabilized population growth and most of the underdeveloped nations moving toward explosive expansion.

Mr. Brown said that the instability caused by many of these trends in areas such as Central America and Africa was of major political significance to the United States.

The report said the time has come for political leaders at the highest levels to address these problems. "The course corrections needed to restore a worldwide improvement in the human condition have no precedent," it said.

It added: "No generation has ever faced such a complex set of issues requiring immediate attention. Preceding generations have always been concerned about the future, but we are the first to be faced with decisions that will determine whether the earth our children inherit will be inhabitable."

TIME, FEBRUARY 16, 1987

An Ill Wind From the East

Millions of wheezing, watery-eyed, coughing West Germans have learned that they share more than a common border and language with East Germany. They also share pollution, notably the kind that comes from East German power plants, which burn lignite, a high-polluting form of coal. Last week a stagnant high-pressure system trapped foul East German air over West Germany for several days.

Hamburg officials ordered all cars off the road, while factories in Bremen and other cities were forced to reduce their output. West Berlin was the hardest-hit area. For two days pollution alerts were broadcast hourly on local radio and television stations, and some West Berliners looked like surgeons as they wandered along the fashionable Kurfürstendamm, the city's famed boulevard, wearing antismog masks.

Meanwhile, in East Germany, autos puffed exhaust into the East Berlin air as usual, and factories operated at full blast.

Toxic Fog Containing Farm Chemicals May Be Harming U.S. Forests

By Boyce Renaberger
Washington Post Staff Writer

Scientists have found that toxic fog, made up of microscopic water droplets containing unexpectedly high concentrations of pesticides, herbicides and many other chemicals, forms over at least some parts of the United States.

The scientists say that the fog may be among the causes of a mysterious decline of forests in the United States and Europe. They say that the chemical-laden fog, which was sampled in Beltsville, Md., and in California's San Joaquin Valley, could prove to be more of a health hazard than the air in which the fog forms. As yet, however, there is no evidence of human disease caused by the fog.

Writing in today's issue of *Nature*, the researchers say they have found that the fog samples bear concentrations of some toxic substances that are thousands of times higher than had been predicted by a widely used law of chemistry.

The research was done by Louis A. Liljedahl and Dwight E. Glotfelty of the Agriculture Department's Agricultural Research Service in Beltsville and James N. Seiber of the University of California at Davis.

Among the 16 toxic compounds identified so far are the insecticides diazinon, parathion and malathion and the herbicides simazine and alachlor. All were derived from vapors of agricultural chemicals that atmospheric chemists have long known were in the air but which were thought to exist in tolerably low concentrations. The new research shows, however, that fog droplets can concentrate the vapors to far higher levels than exist in the air.

"I think there is a very great potential for these water-borne organic compounds to damage crops and forests," Glotfelty said. Much of the forest decline seen in parts of the eastern United States and Western Europe has been attributed to acid rain, but many environmental scientists think that acid rain alone cannot account for the damage. "It could easily be toxic organics," Glotfelty said.

The scientists said their findings came as a surprise because the concentration of toxic compounds was much higher than had been predicted using Henry's Law, the 184-year-old standard formula for calculating how much of the airborne vapor of a substance can be dissolved in a liquid.

Henry's Law assumes that the fog droplets behave as an "ideal solution," meaning that the ability of any one vapor to dissolve into the droplet is not affected by any substance already in the droplet.

The new findings suggest that chemicals already in the droplet or on its surface can make it easier for the droplet to take up other substances. The phenomenon may be analogous to the way detergents increase water's ability to dissolve various substances.

As a result some toxic vapors considered nearly insoluble and virtually incapable of entering a droplet were able to do so and reach concentrations thousands of times higher than predicted by Henry's Law. Some fog samples contained pesticides that could not be detected as a vapor in the dry air surrounding the droplets.

The fog samples were collected with a custom-made fog extractor that uses a fan to suck in large volumes of fog and condense it into jugs of liquid.

Mounted on a pick-up truck, the extractor was driven through fogs occurring over agricultural fields at the Agricultural Research Service's Beltsville facility where a wide variety of experimental crops are grown and in the San Joaquin Valley where farmers raise cotton, citrus fruit, grapes and dairy cattle. The use of insecticides and herbicides is common in both regions.

After filtering out dust and other solids, the scientists found the fog liquids to vary in color from nearly clear to pale yellow. All the samples had a "foamy, soapy appearance" resembling descriptions of the infamous "killer fogs" of 19th-century London. Some were acidic, especially the Beltsville sample, which registered a pH of 2.42—almost as acidic as lemon juice.

The scientists say the existence of toxic compounds in fog is more worrisome than their existence as vapors in the air be-

cause the droplets can accumulate on the surfaces of leaves and lungs, making absorption far easier than if the vapors simply wafted by in moving air. As the droplets on leaves dry, they leave an even more concentrated film of pesticides.

Because many of the dissolved compounds are plant killers, Liljedahl said the findings "give scientists a more solid basis for attributing low-level crop damage" to toxic fog.

Because fog is simply a cloud that forms at ground level, the researchers said it is likely that similar mechanisms of pesticide concentration are occurring in rain clouds. Tests to confirm this, however, have not been done. And it is not known whether pesticide vapors at high altitudes are as great as they are near ground level.

Although raindrops would carry the clouds' pesticide burden to the ground, they would not be expected to absorb much more because they exist for only a few minutes before hitting the ground and have relatively little surface area for their volume of water.

SCIENTIST SEES CONFLICT OF INTEREST IN DOE'S FUNDING OF CO2 STUDIES

A university scientist whose projects are supported by DOE says funding for research on the environmental damage to the atmosphere caused by burning fossil fuels should be taken away from the department because of the conflict of interest involved.

"Carbon dioxide, the by-product from burning fossil fuels, is the main villain causing changes in the atmosphere and yet funds for researching the changes and the damages they cause come from the very agency that promotes fossil fuel use," Dr. Wallace Broecker, an expert on the greenhouse effect, told *Inside Energy/with Federal Lands* last week, after testifying before the Senate Environment and Public Works subcommittee on environmental protection. "The opposing characters of energy production and carbon dioxide regulation constitute a conflict of interest," he said.

Scientists know that increases of carbon dioxide in the atmosphere cause infrared rays to be trapped and reflected back down to earth, creating a global warming trend known as the greenhouse effect.

A spokesman for DOE said the agency funds about half of all research done on damage caused by carbon dioxide emissions. But Broecker, a professor of geochemistry at Columbia University, chided the director of DOE's carbon dioxide research division for eliminating all "effects" research. "They won't fund any projects that show the effects of burning fossil fuels," he said. "It's considered a no-no."

"DOE is the lead agency for carbon dioxide research programs, yet the division has managers who don't understand the subtleties of the subject," he told the subcommittee.

After the hearing, he said, "Even [Director of Energy Research Alvin] Trivelpiece considers the greenhouse effect yesterday's problem and not a high priority in the department."

He characterized DOE as short-sighted when choosing research projects to fund, and said it continually falls prey to the political demands of quick fixes. "DOE is not responding properly to this problem," he said. "Instead of funding long-term basic science research that is focused, they [DOE officials] fund useless projects like data banks that look good to political groups who want action, but they don't solve anything or answer any questions." He said Congress also is to blame for putting political pressure on the agency for quick answers.

Broecker would like to see a National Institute of Environment, structured along the lines of the National Institutes of Health, established to fund basic research but isolated from political pressures.

As a scientist, Broecker said he was not willing to speculate on policy changes necessary to deal with the use of fossil fuels as an energy source. "I'm not advocating the proliferation of plutonium over the adding of carbon dioxide to the air," he said. "It's not a simple question."

He said, though, that DOE never finished what it began in the 1970s. "The more efficiently we use our energy, the less problem we will have. But now the financial incentive to conserve is gone and DOE isn't pushing it." — *Mary Buckner Powers*

New York Earns High Rank on Environment

By PHILIP SHABECOFF

Special to The New York Times

WASHINGTON, Feb. 20 — New York, New Jersey and Connecticut rank among the top five states in establishing and enforcing programs to protect the environment, according to a private report issued today.

The report, prepared by the Fund for Renewable Energy and the Environment, said that many states were making progress with their environmental programs, but that there was "an overall stall in progress for a safe environment" because the Federal Government had retreated from its regulatory role under the Reagan Administration.

Tina Hobson, executive director of the fund, a nonprofit educational group, said that, because of Federal retrenchment, "the states have been left to struggle with both new and existing environmental hazards."

The report found that because of economic conditions and competing needs, environmental hazards have been ignored or action to correct them delayed in many states, particularly the poorest ones.

6 Areas Examined

The report did not measure the environmental quality in the individual states but rather the effectiveness of their programs to deal with the environment. It looked at state efforts in six areas — air pollution reduction, soil conservation, solid waste disposal and recycling, hazardous waste cleanup, groundwater protection and renewable energy and conservation — and ranked the relative strength of their programs in these areas.

New York State ranked first in groundwater protection and No. 5 in overall rankings among the 50 states.

New York's Commissioner of Environmental Conservation, Henry G. Williams, interviewed before today's news conference, said he hoped the recognition of New York's "significant per-

formance" would silence criticism that Governor Cuomo and he were not "sufficiently concerned with environmental protection."

During his first term, Mr. Cuomo was often criticized for giving short shrift to environmental issues and environmentalists have long been critical of the State Environmental Conservation Department and Mr. Williams.

The Governor has nominated him as a member of the Public Service Commission and, in a move that was applauded by many environmentalists, nominated Thomas C. Jorling, head of the Center for Environmental Studies at Williams College, to replace Mr. Williams.

New Jersey received the highest ranking in both the hazardous waste cleanup and solid waste disposal categories and was No. 3 on the overall list.

Connecticut, while not top-ranked in any single category, was No. 4 over all.

The top overall ranking among the states went to Wisconsin, with California second. The states ranked as having the weakest environmental programs included Mississippi, West Virginia, Wyoming, Utah, and North Dakota.

The report noted that many of the states with the highest rankings tended to be states with the severest environmental problems, such as New Jersey.

Many of the states on the bottom of the list were among those with low per-capita incomes and with insufficient resources to meet all the requirements of filling in the gaps in environmental, health, education and other social programs left by the Federal Government's transfer of responsibility for these programs to the states.

The report lists what it regards as defects as well as accomplishments by state environmental programs. In its report on New York, for example, it says the state has three counties that have deficient programs for carrying

out the Clean Air Act and that the Environmental Protection Agency has imposed sanctions, such as withholding Federal grants, as a result.

The report noted that New Jersey had 18 counties with inadequate programs to carry out the provisions of the Clean Air Act, although no Federal sanctions had been imposed. It also said that the state had no acid rain control program in place.

Connecticut also does not have an acid rain program in effect, although the state does conduct research into acid rain.

Respiratory Responses of Exercising Asthmatic Volunteers Exposed to Sulfuric Acid Aerosol

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Young asthmatic adult volunteers ($N = 27$) were exposed in an environmental chamber to sulfuric acid aerosol at concentrations near 0, 122, 242, and 410 $\mu\text{g}/\text{m}^3$, in purified background air at 22°C and 50 percent relative humidity. The polydisperse aerosol had a mass median aerodynamic diameter near 0.6 μm . Exposures occurred in random order at one-week intervals. Each lasted 1 h, during which subjects exercised (mean ventilation 42 L/min) and rested during alternate 10-min periods. Specific airway resistance and forced expiratory function were measured pre-exposure, after the initial exercise, and at end-exposure. Bronchial reactivity was determined by challenge with cold air immediately post-exposure. Symptoms were monitored during exposure for one week afterward. Exercise-induced bronchospasm was observed under all conditions. Physiologic and symptom changes possibly attributable to sulfuric acid exposure were small and not statistically significant. Our largely negative results contrast with positive findings elsewhere at lower acid doses. Possible explanations include different clinical characteristics of subjects and different routes of breathing.

Sulfuric acid (H_2SO_4) may be formed in the atmosphere by oxidation of sulfur dioxide (SO_2) emitted during combustion of coal or oil. Atmospheric concentrations of particulate sulfate, at least part of which may exist as H_2SO_4 , may be of the order of tens of $\mu\text{g}/\text{m}^3$ during typical pollution episodes. Much of this particulate matter is in the submicrometer size range, thus is readily deposited in the lower respiratory tract when inhaled.

Evidence concerning potential health risks from H_2SO_4 in ambient air has been reviewed by the Environmental Protection Agency.¹ Most controlled exposure studies of animals or human volunteers have shown measurable effects on respiratory mechanics only at concentrations well above 100 $\mu\text{g}/\text{m}^3$. We previously studied six healthy and six asthmatic adult subjects exposed to 75 $\mu\text{g}/\text{m}^3$ of H_2SO_4 aerosol with a mass median aerodynamic diameter (MMAD) of 0.5–0.6 μm at 40 percent relative humidity (RH), for 2-h periods with intermittent light exercise on two successive days.² No statistically significant group responses were observed; however, two asthmatics showed increased airway

resistance on both exposure days, relative to the clean-air control. Utell *et al.* reported airway constriction in asthmatic adults exposed to 450 $\mu\text{g}/\text{m}^3$ (MMAD roughly 0.8 μm at 25 percent RH) for 16 min at rest.³ No such effect was observed at 100 $\mu\text{g}/\text{m}^3$. Koenig *et al.* reported airway constriction in adolescent asthmatics exposed to 100 $\mu\text{g}/\text{m}^3$ (0.6 μm MMAD at 75 percent RH) during 30-min rest plus 10-min moderate exercise.⁴

These results suggest that increased ventilation due to exercise might enhance asthmatics' responses to H_2SO_4 , as is the case with SO_2 .⁵ To test this possibility further, we have measured physiologic and clinical responses of young adult asthmatic volunteers exposed to a range of H_2SO_4 concentrations—nominally 0, 100, 250, and 500 $\mu\text{g}/\text{m}^3$ —for 1-h periods including bouts of heavy exercise.

Methods

Exposure Facility and Air Monitoring

Exposures employed the Rancho Los Amigos environmental control cham-

ber and aerosol generation system, which have been described in detail previously.^{2,6,7} Purified background air, conditioned to 72°F (22°C) and 50 percent relative humidity, was supplied to the chamber at a rate of 14 air changes per hour (ach) without recirculation. Sulfuric acid aerosol, produced from aqueous solution by multiple Babington nebulizers, was injected into the chamber's purified-air inlet duct. Particle concentrations in the chamber were determined continuously by an optical counter and an electrical mobility analyzer. Conventional pollutant gas monitors were operated also, to verify normal operation of the chamber's air purification system. Total filter samples (collected with and without an upstream oxalic-acid-coated ammonia denuder) determined exposure concentrations of total suspended particulate matter (TSP), sulfate ion, and ammonium ion. An 8-stage cascade impactor was used to determine the chamber aerosol size distribution. Filters were analyzed gravimetrically and by ion chromatography.

Pilot studies determined the chamber's typical concentration of gaseous



Figure 1. Volunteer subject exercising in chamber during exposure.

ammonia (that which the purification system could not remove, plus that given off by subjects), and equivalent excess acid aerosol was added during exposures. Filters exposed concurrently with and without the ammonia gas denuder showed no meaningful differences in their concentrations of ammonium ion. This suggested that little or no ammonia was captured by the denuder, i.e. that ammonia in the chamber atmosphere was more or less completely consumed by the excess acid aerosol. Acid (i.e. hydrogen ions) remaining in the exposure atmosphere might have been entirely in the form of free H_2SO_4 , or (more likely) partly free acid and partly ammonium bisulfate (NH_4HSO_4). No method to distinguish between these possibilities was readily available. Thus, we made the simplifying assumption that all ammonia was fully neutralized, so that atmospheres contained only ammonium sulfate [$(NH_4)_2SO_4$] and H_2SO_4 . Reported exposure concentrations of H_2SO_4 then were calculated from the difference between measured sulfate and ammonium ion concentrations. If ammonium bisulfate was in fact present, the concentration of H_2SO_4 per se would have been reduced in chemical equivalence to the concentration of bisulfate, but the total hydrogen-ion exposure concentration should not have changed.

Exposure Protocol

All subjects were exposed to all four H_2SO_4 concentrations, in randomized order at 7-day intervals. Each subject initially rested in purified air for about 1 h. Pre-exposure lung function tests were then performed, always in purified air. Next, the subject rested in a separate medical office while the chamber was prepared with the appropriate exposure atmosphere. The subject then entered the chamber and remained for 60 min, alternating 10-min bouts of exercise on a constant-load bicycle ergometer (see Figure 1) with 10-min pe-

riods of rest and function testing. The ergometer workload, determined in a previous exercise stress test, was intended to produce a ventilation rate of 40 L/min. The actual mean ventilation rate for all subjects, as measured during the second exercise period, was 42 L/min. Early-exposure lung function testing was performed after the initial 10-min exercise period, as a test for immediate bronchoconstrictive effects such as occur with SO_2 exposure. Late-exposure lung function testing was per-

formed during the final rest period. Each lung function test session involved about 1 min rest in a pressure body plethysmograph, followed by four successive determinations of specific airway resistance (S_{Raw}) and thoracic gas volume (V_{Tg}) at functional residual capacity over a period of 4 min, followed by three or more maximal expiratory flow-volume maneuvers. A waterless electronic spirometer and on-line computer system were used to measure forced vital capacity (FVC), forced expired volume in 1 s (FEV₁), and maximal midexpiratory flow rate (MMFR), all expressed at 37° saturated (BTPS).

Questionnaire interviews to document lower-respiratory, upper-respiratory, and nonrespiratory symptoms likely to be induced by an inhaled irritant^{2,8} were administered before, during, 24 h after, and 7 days after each exposure. During exercise a discomfort meter^{9,9} provided a continuous readout of the subjects' overall respiratory symptom status.

Bronchial reactivity was assessed by cold air challenge immediately after exposure was completed. The challenge procedure began with measurement of FEV₁, employing a survey spirometer and microprocessor. The sub-

Table I. Subject characteristics.

ID #	Sex	Ht (in.)	Age (yr)	Bronchodilator use	Positive findings ^a
297	F	62	29	occasional inhaled	sk, IgE, s, c
518	M	76	24	occasional inhaled	ex, s, c
584	M	69	23	—	sk, ex, s, c
585	F	60	31	—	sk, s, c
608	M	68	23	—	sk, IgE, ex, s, c
611	F	65	22	occasional inhaled	IgE, ex, s, c
724	M	63	31	—	sk, IgE, s, c
726	M	72	24	occasional oral	sk, s, c
773	F	66	30	occ. inhaled & oral	sk, IgE, ex, s, c
776	M	70	21	^b	s
778	M	74	23	occasional oral	sk, ex, c
780	M	70	20	regular inhaled & oral (also inhaled steroid)	sk, IgE, ex, s, c
877	M	70	25	occasional inhaled	sk, IgE, s, c
879	M	69	21	occasional oral	sk, IgE, s, c
880	M	75	25	occasional inhaled	ex, s, c
881	M	71	22	—	sk, s
883	F	64	33	regular inhaled	ex, s, c
884	M	71	21	regular inhaled	sk, IgE, ex, s, c
885	M	69	34	regular inhaled	sk, IgE, ex, s, c
886	F	65	22	occasional oral	sk, IgE, s
888	F	62	21	regular inhaled	sk, IgE, ex, s, c
892	M	66	34	reg. inhaled & oral	sk, IgE, ex, s, c
893	M	71	22	occasional inhaled	sk, IgE, c
894	F	64	20	occasional oral	sk, s, c
895	F	63	18	occasional inhaled	sk, s, c
979	M	68	21	occasional inhaled	sk, c
980	M	68	19	regular inhaled	c

^a In screening examinations: sk = 2+ or greater response in allergy skin test(s); IgE = serum immunoglobulin E assay >180 units; ex = >50% increase in S_{Raw} after 10 min exercise, ventilation 40 L/min, in clean humid air; s = >50% additional increase in S_{Raw} when 0.75 ppm SO_2 breathed during above-mentioned exercise; c = >10% loss in FEV₁ after 3 min normocapnic hyperpnea with cold air at <-12°C. (Not all screening tests done on all subjects.)

^b History of emergency room treatment for asthma episode <1 yr ago; oral medication discontinued 1 mo later.

REQUEST FOR APPOINTMENTS

To: Officer-in-charge
Appointments Center
Room 060, OEOB

Please admit the following appointments on Wednesday, May 6, 1987
for Dr. Ralph Bledsoe of Domestic Policy Council (OCA).
(NAME OF PERSON TO BE VISITED) (AGENCY)

PLEASE SEE ATTACHED LIST. (Attendees needing clearance are highlighted in yellow.)
Thank you.

MEETING LOCATION

Building OEOB Requested by Mary Beth Riordan
Room No. 208 Room No. 200 Telephone x6640
Time of Meeting 2:00 p.m. Date of request May 5, 1987

Additions and/or changes made by telephone should be limited to three (3) names or less.

APPOINTMENTS CENTER: SIG/OEOB - 395-6046 or WHITE HOUSE - 456-6742

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1	LIST MEETING ATTENDEES	1	5/6/1987	B6

Freedom of Information Act - [5 U.S.C. 552(b)]

B-1 National security classified information [(b)(1) of the FOIA]

B-2 Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]

B-3 Release would violate a Federal statute [(b)(3) of the FOIA]

B-4 Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]

B-6 Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]

B-7 Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]

B-8 Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]

B-9 Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

UNEP OZONE LAYER PROTOCOL NEGOTIATIONS
INTER-AGENCY TRADE ISSUES GROUP
SUMMARY OF DISCUSSIONS AND RECOMMENDATIONS
ON DRAFT TRADE ARTICLE

The Inter-Agency Trade Issues Group strongly supported the progress made at the last UNEP negotiating session on the issue of trade between Parties and non-parties. It felt that the draft article developed at the last session (based largely on a U.S. proposal) provided a very good focus for further discussions at the upcoming session. It recommended that the U.S. actively support the draft article, but seek to strengthen and improve it, as noted below:

1. "Non-Party Compliers" exemption: The Trade Issues Group felt that the bracketed language in paragraphs 1-5, which allows a non-party otherwise in compliance to be exempted from the import restrictions, should be deleted. The Group's view was that it added unnecessary complexity to the Trade Article and might create a disincentive to membership in the Protocol.

Among the reasons that had initially been used by some in support of this provision were: (a) it would help to ensure that the Article was consistent with the GATT (which allows trade restrictions for environmental protection, providing such restrictions were nondiscriminatory); (b) the U.S. needed it in order for the protocol to be implemented wholly under the authority of the Clean Air Act; (c) it would encourage compliance by so-called "pariah" states (e.g., Taiwan, South Africa) which would not be able to join the protocol because they were barred from the UN.

On these points, the Group felt that: (a) membership in the protocol was the only way to ensure that a country was fully shouldering its responsibility to protect the ozone layer in a way that was comparable to the obligations in the protocol, and hence the exemption was not required to ensure consistency with GATT; (b) the language in the Clean Air Act was sufficiently broad so as to cover restrictions on non-party imports, without the exemption; (c) any state (e.g., South Africa) could legally become a Party to the protocol, and any entity which was not a state (Taiwan) would not be subject to the import restrictions in the protocol, but possibly could be covered by other arrangements (see, e.g., 4-15-87 USTR memo, attached).

2. Non-Party Export Restriction: The Group considered whether paragraphs 1 - 3 of the draft Trade Article should be broadened to include non-Party exports, a question that had been raised by the delegation of France at the last negotiating session. The Group concluded that paragraphs 1 - 3 should not also cover exports.

The group felt that banning or restricting non-Party imports already provided sufficient incentive for non-parties to join the protocol. Furthermore, since the adjusted production formula provides that only exports to Parties could be subtracted from a Party's annual emissions calculation, any exports to non-Parties would be counted in the exporting Party's annual limit (and

presumably the protocol is designed so that the sum of the national limits is at or below a level that adequately protects the ozone layer). Finally, restricting exports might, by cutting off supply, induce non-parties to begin producing CFCs on their own.

3. Imports of Products Containing CFCs: The Trade Issues Group recommended that paragraph 2 of the draft Trade Article be strengthened by having an annex developed now, containing a list of the primary products in this category. The Group felt that this paragraph should be amended so that Parties would ban products containing the controlled substances, including but not limited to those on this list. The protocol should then provide for Parties to periodically review and, if necessary amend, the annex. The Group recommended that the delegation table a draft annex at the upcoming session, which would include a list of products (illustrative list is attached, which should be discussed with U.S. industry and NGOs before discussing with other countries). The following definition of "products containing" should also be placed in the annex (or in the article on definitions):

An article of trade which contains any of the substances controlled by this protocol as an active or passive element in its operation [, function, or design] or which contains any of the controlled substances in its structure or matrix over [] by volume or [] parts per million by weight.

4. Products made with CFCs: While acknowledging that it still appears to be impractical to develop workable restrictions on imports for this product category, the Group felt that it would be useful to strengthen the wording of this paragraph by:

- (a) changing "study the feasibility" to "conduct a study to determine the feasibility";
- (b) giving the parties a deadline for making this determination (i.e., "Within [] years after entry into force of this protocol, the Parties shall..."); and
- (c) adding a sentence at the end of the paragraph obliging the Parties to make recommendations on whether to ban or restrict any products which they have determined to be feasibly banned or restricted, and to develop a list of such products in an annex.

5. Timing of import restrictions: The Group recommended that the U.S. delegation propose the following timing for paragraphs 1 - 3 of the trade article:

Bulk - same time as the freeze (U.S. position is for 1 year after entry into force);

Products containing - later than for bulk, but reserve position until the timing of the control article becomes clearer;

Products made with - allow 1 -3 years for Parties to determine the feasibility of restricting non-party imports of products in this category.

6. Technology export restrictions: The Group reaffirmed its previously held view that paragraph 4 would be difficult to enforce, given the nature of the technology, and that consequently the delegation should be instructed to trade this paragraph for something of higher priority. If this was not possible and the article remained, the group felt that the delegation should support retaining the verb "discourage" (one of the three bracketed choices in the text) and should support having this article apply only to non-parties.

However, the Group felt that paragraph 5 should be strongly supported, and should be generally applicable (i.e., not just restricted to non-parties).

7. Exemption from paragraphs 4 and 5: At the previous UNEP session an exemption to paragraphs 4 and 5 was proposed, to allow for the export of "good" technologies (i.e., those which do not contribute to a depletion of the ozone layer). The Group agreed with the rationale for this exemption (paragraph 6 of the trade article), but suggested that the language be tightened up. The Group therefore recommended that the delegation propose the following language for paragraph 6:

"The provisions of paragraphs 4 and 5 shall not apply to products, equipment, plants, or technologies which improve containment, recovery, recycling, or destruction of the controlled substances, or otherwise contribute to the reduction of emissions of these substances."

8. Definition of bulk: At the previous session, the delegation had been authorized to propose a definition on bulk trade, for the purposes of the trade article and the adjusted production formula (which the U.S. has proposed only count bulk exports and imports). As the delegation had not had the opportunity to propose a definition at that session, the Group felt that the delegation to the upcoming session should do so. The definition is as follows:

"bulk exports or imports means any export or import of a commodity containing [10 lbs.] or more of non-recycled substance(s) controlled by this protocol.

9. Non-compliance by Parties: The Group considered the question of whether non-complying parties should be treated as non-parties for the purposes of this article. If they are not, then the possibility exists of a nation joining the protocol for the sole purpose of avoiding the import restrictions, but with no intention of fulfilling its obligation under the control article. If they are, then the protocol would contain an element of "enforcement" which has heretofore been lacking.

The major problem which the Group identified of having the trade restrictions apply to non-compliers as well as non-Parties was how a non-complying Party would be identified. Some possibilities (which were not discussed in detail by the Group) include: (a) by the secretariat (for the simple case where a party's own submitted data show it to be out of compliance); (b) by a majority vote of the parties; (c) by having one or more parties submit an allegation of non-compliance to an arbitration panel, which would issue a finding.

The Group recommended that the delegation discuss this issue at the upcoming session. However, it felt that the issue had ramifications that went beyond the trade article, and that having general provisions on non-compliance in the protocol made more sense.

Drafted by:

Jim Losey
EPA/OIA (382-4894)
4/23/87

"PRODUCTS CONTAINING"
PROPOSED LIST

1) refrigeration equipment

auto air conditioners, building air conditioners,
refrigerators, freezers, dehumidifiers

2) rigid foam

insulation, packaging, food service

3) flexible foam

seating and padding cushions

4) fire fighting systems and products

portable fire extinguishers, fire systems,
recharge tanks

5) small containers

recharge and consumer products

LIST OF U.S. PARTICIPANTS AND OBSERVERS

CFC Protocol Negotiations
Geneva, April 27-30, 1987

I. U.S. Delegation

Richard E. Benedick, DAS/Environment, State
Bill L. Long, DAA/OIA, EPA
Daniel L. Albritton, Director, Aeronomy Laboratory, NOAA
Eileen Claussen, Director, OPD/OAR, EPA
Deborah Kennedy, L/OES
James A. Losey, EPA/OIA
Robert Reinstein, Director, Energy and Nat Res, USTR
Edwin B. Shykind, Science Advisor, DOC/ITA
Martin L. Smith, DAS/Policy and Budget, Interior
Robert Watson, Manager, Upper Atmosphere Research Program, NASA
Edward R. Williams, Director, Office of Env'tl Anal, DOE

John Hoffman, Stratospheric Protection Program, EPA/OAR
J.R. Spradley, Assistant to the Administrator, NOAA

II. Congressional Observers

Senate Committee on Environment and Public Works

Steven Shimberg, Staff
Ronald Cooper, Staff

House Environment and Commerce Committee

David Finnegan, Counsel
Theresa Gorman, Minority Economist
Gregory Wetstone, Counsel
Paul Smith, Minority Counsel

House Foreign Affairs Committee

Michael Finley, Deputy Chief of Staff
Kerry Bolognese, Staff

III. NGO's

Irving Mintzer, Senior Associate, Energy and Climate, WRI
Rafe Pomerance, Senior Associate, Policy Affairs, WRI
James Tripp, EDF
David Wirth, NRDC

IV. Industry

Kevin Fay, CFC Alliance
Gerald Stofflet, Motor Vehicle Mfrs Association
Joseph Steed, DuPont
Raymond Feder, Allied Signal
Peter McCarthy, Penwalt

W4306T

April 28, 1987 - 4:25 p.m.

Message for the Secretary from Bill Long, EPA (per his secretary, Debbie Good--382-4870)

Bill Long, EPA, Office of International Activities is attending a meeting in Geneva, Switzerland on Ozone Negotiations and asked his secretary to relay the following message to The Secretary, as well as the following individuals:

Lee Thomas, Administrator, EPA
John Negroponte, State Department
Anthony Calio, NOAA
James Miller, OMB
Jan Mares, The White House

On behalf of Senator Baucus, you are requested to appear before Senate Subcommittees on Hazardous Waste and Toxic Substances and on environmental protection, Wednesday, May 13 at 9:30 a.m. in Room 406, Dirksen, to discuss:

Status of international negotiations on protection of ozone layer;

U.S. position at said negotiations;

The role of your agency in the conduct of said negotiations;
and,

Your role in development/assessment of said U.S. position.

Contact staff members Cooper or Shimberg for details. Letter to follow.

As we have stated from the beginning of these negotiations, the United States has clear objectives but is flexible on putting together a package to achieve those objectives. A freeze and 20% reduction are acceptable as a first step, if the timetable is accelerated and if there is movement on other important elements. We continue to seek agreement on further steps, including reductions of up to 95% subject to scientific, economic and technical developments. We are not going to undercut the progress of the negotiations by discussing details of our negotiating position and strategy.

4334T
4/23/87