

DRAFT: May 15, 1989

CLEAN AIR ACT OPTIONS PAPER: ACID RAIN

I. BACKGROUND

"Acid rain" is the common name for a phenomenon which occurs when sulfur dioxide (SO₂) and nitrogen oxide (NO_x) emissions undergo a chemical transformation in the atmosphere and return to the earth as acidic rain, fog, or particles.

There is continuing debate over the nature and extent of damage caused by acid rain.

The Science: NAPAP

The National Acid Precipitation Assessment Program (NAPAP) is an interagency scientific committee established by Congress in 1980, with a 10-year mission to study the causes and effects of acid rain. NAPAP recently (1989) reported that:

"The only benefits generally agreed to be expected from new acid rain controls will be improvements in acidic and sensitive lakes and streams..."

and that:

"There is no evidence of widespread forest damage from acid rain, with the possible exception of mountain-top exposures to acidic clouds."

With respect to health risks, NAPAP stated:

"Possible health risks associated with the acid rain pollutants are currently being evaluated."

NAPAP will have spent about \$500 million to study acid rain by the time its final report is released in 1990.

Competing views:

On the other hand, the World Resources Institute (1988) has reported that:

"acid deposition and ozone are important contributors to the decline of several tree species in the East."

and the Congressional Office of Technology Assessment (OTA) reported in 1984 that:

"Acid deposition may be adversely affecting a significant fraction of Eastern U.S. forests, ... [and] ... Fine particles such as sulfates reduce visibility and have been linked to increased human mortality in regions with elevated levels of air pollution."

Sources of Acid Rain-Causing Emissions:

About 20 million tons of SO₂ are emitted annually in the U.S. This represents a reduction of 25% since peak emissions in 1973, despite a near doubling of coal consumption during that period.

Roughly three quarters of these emissions result from the burning of fossil fuels by electric utilities. Another 20% comes from various, more widely dispersed (and thus more difficult to regulate) industrial sources, and 5% comes from transportation sources.

New sources of SO₂ emissions were regulated by the Clean Air Act, first passed in 1971 and strengthened in 1977. Because of this, the source of most emissions -- and thus the focus of most legislative proposals -- is a relatively small number of old plants (pre-1971) not subject to the Act's "new source performance standards." For example, the 50 largest emitting plants are responsible for 50% of the SO₂ emissions in the country.

NO_x emissions are also about 20 million tons per year -- with transportation sources accounting for about half. The level has been fairly steady in recent years (only a 2 million ton increase since 1980), but without further controls, NO_x emissions will begin to increase in the mid-1990s.

Commitments by the President

During the campaign, then Vice President Bush said:

"On the question of acid rain, the time for study alone has passed. We know enough now to begin taking steps to limit future damage ... As President, I will ask for a program to cut millions of tons of sulfur dioxide emissions by the year 2000, and to reduce significantly nitrogen oxide emissions as well."

He followed up on that with the following statement in his February 9th statement to the Joint Session of Congress:

"I will send to you shortly legislation for a new, more effective Clean Air Act. It will include a plan to reduce, by date certain, the emissions which cause acid rain -- because the time for study alone has passed, and the time for action is now."

The book, Building a Better America, said:

"The Administration's program will include market-based approaches, supplementing and modifying the traditional command-and-control approaches. The goal is to get the Federal government out of the detailed regulation of industry decisions and reduce the need for elaborate EPA-approved, State-prepared emission reduction plans ... The legislation will provide flexibility to states and industry to adopt least cost compliance strategies (and) incentives for the early deployment of innovative emission reduction techniques."

Costs of Controlling Acid Rain:

Since 1970, the U.S. has spent over \$225 billion to control emissions of sulfur dioxide and nitrogen oxides. Current estimates are that American industry spends about \$33 billion per year on air pollution control -- and EPA estimates that the electric utility industry now spends about \$10 billion a year for such controls under the existing Clean Air Act.

On the other hand, Americans spend over \$160 billion per year on electricity -- and any of the legislative approaches currently under consideration would cost less than 5 percent of that.

According to EPA, a "least cost" strategy for reducing SO₂ emissions from utilities by 7 million tons from 1980 levels and NO_x emis-

sions by 2 million tons from current levels would be between \$2.0 and 2.4 billion per year (in 1988 dollars). Raising the required SO₂ emission reduction to 9 million tons raises the cost to between \$3.6 and 4.0 billion annually.

For discussion purposes, these two alternatives translate into bills which would reduce SO₂ emissions by 8 and 10 million tons respectively, because smelters and other industrial sources have already reduced emissions by 1 million tons since the commonly-used 1980 baseline date. At the same time, electricity demand is expected to grow, causing additional emissions which will have to be offset with further reductions. The exact amount of projected growth is open to some question, with EPA projecting 1.2 million additional tons of SO₂ emissions, and others projecting less.

To the extent that utilities are allowed to decide freely how to achieve the required reductions, or trade "emissions credits" with other utilities or industrial emitters, the cost goes down. Further, to the extent that clean coal technologies prove to be lower cost alternatives to utilities' generation needs, the costs of SO₂ reductions go down.

Contentious Issues:

Historically, two major issues of contention have caused a stalemate on acid rain control legislation.

First is the impact such legislation might have on high-sulfur coal producers and coal mining employment. To the extent that utilities choose to switch to other fuels (natural gas, low-sulfur coal), high-sulfur coal mining jobs will be lost -- although ICF estimated that under a full freedom of choice bill introduced in the last session the impact would be 16,800 high-sulfur coal mining jobs lost. It should be noted that these losses would be offset by job gains in low-sulfur coal mining (plus 18,000 jobs under the same ICF estimate). It should be noted that some of the job gains would be in the same states -- albeit in different regions -- as the job losses. Northern West Virginia, for example, could be expected to lose 1,200 high-sulfur coal mining jobs, but southern West Virginia could gain 4,000 low-sulfur coal mining jobs.

EPA feels that under a full freedom of choice bill which requires a 10 million ton SO₂ reduction, the total high sulfur coal mining job loss (including non-coal mining jobs in high sulfur coal mining com-

munities) could be between 20,000 and 50,000 jobs. These would, as noted, be at least partially offset by gains elsewhere.

In any event, options which are designed to increase the use of scrubbers or encourage the deployment of clean coal technology will mitigate the effect of reductions on these high-sulfur coal mining communities. Scrubber technology, however, is quite costly.

The second oft-discussed issue is the impact that any acid rain control program will have on electricity rates in affected states. In general, most Congressional proposals to date would raise national average electricity rates by about 2% after the year 2000. For the legislative proposal which mandated the most costly approach, scrubbers on specifically named plants, the rate increases in the two most severely impacted states (Indiana and Ohio) would be about 7% -- although without trading it would be higher for individual utilities.

What follows is a brief discussion of the major decisions to be made in crafting an acid rain reduction bill, with options presented to resolve each choice. To the extent possible, the costs associated with choosing these options -- as measured from the two base cases discussed above -- are identified. Because there is significant variability in possible true future costs, the cost estimates listed will be the mid-point of the range provided by EPA estimates.

1987 Air Toxics Inventory
Top 25 Toxic Pollutants By Pounds Emitted Per Year

	Pollutant	M Lbs./Yr Emitted	Percent of Total	Cumulative Percent
*	1. Toluene	236	9.8%	9.8%
	2. Ammonia	233	9.7%	19.6%
	3. Acetone	186	7.8%	27.3%
	4. Methanol	183	7.6%	35.0%
	5. Carbon Disulfide	137	5.7%	40.7%
	6. Trichloroethane	131	5.5%	46.1%
	7. Methyl Ethyl Ketone	125	5.2%	51.4%
*	8. Xylene	120	5.0%	56.4%
**	9. Dichloromethane	112	4.7%	61.0%
	10. Chlorine	103	4.3%	65.3%
	11. Aluminum Oxide	73	3.0%	68.4%
	12. Ethylene	54	2.3%	70.6%
	13. Hydrochloric Acid	50	2.1%	72.7%
	14. Freon 113	49	2.0%	74.8%
*	15. Trichloroethylene	47	2.0%	76.7%
	16. Propylene	37	1.5%	78.3%
	17. Glycol Ethers	32	1.3%	79.6%
	18. Tetrachloroethylene	28	1.2%	80.8%
	19. M-Butyl Alcohol	27	1.1%	81.9%
	20. Methyl Isobutyl Keto	25	1.0%	82.9%
**	21. Benzene	25	1.0%	84.0%
	22. Styrene	25	1.0%	85.0%
**	23. Chloroform	24	1.0%	86.0%
	24. Chloromethane	21	0.9%	86.9%
	25. Carbonyl Sulfide	20	0.8%	87.7%

* Denotes known neurotoxin.

** Denotes known carcinogen.

ANNUAL RISK OF DEATH FROM CERTAIN ACTIVITIES AND CAUSES
Actual U.S. Deaths in 1983

Cause	Annual Deaths
Heart Disease	733,235
Malignant Neoplasms (Cancer)	403,395
Smoking	337,000
Cerebrovascular Disease (Stroke)	169,488
Motor Vehicle Accidents	53,524
Drowning	6,872
Fires	5,991
Construction Work	2,100
Agricultural Work	1,800
Emissions from Cars & Trucks	1,220
Boating	1,178
Major Stationary Sources	750
Appendicitis	682
Electrocution	500
Weather (tornadoes, floods, lightning)	440
Hunting	290
Snowmobiling	60
Bee Stings	40
Water Skiing	32
Hang Gliding	13
Football	9
Measles	6
Amusement Park Rides	6
Baseball	5
Ingestion of Toothpicks	1

Emissions: Conventional Pollutants

TOTAL EMISSIONS

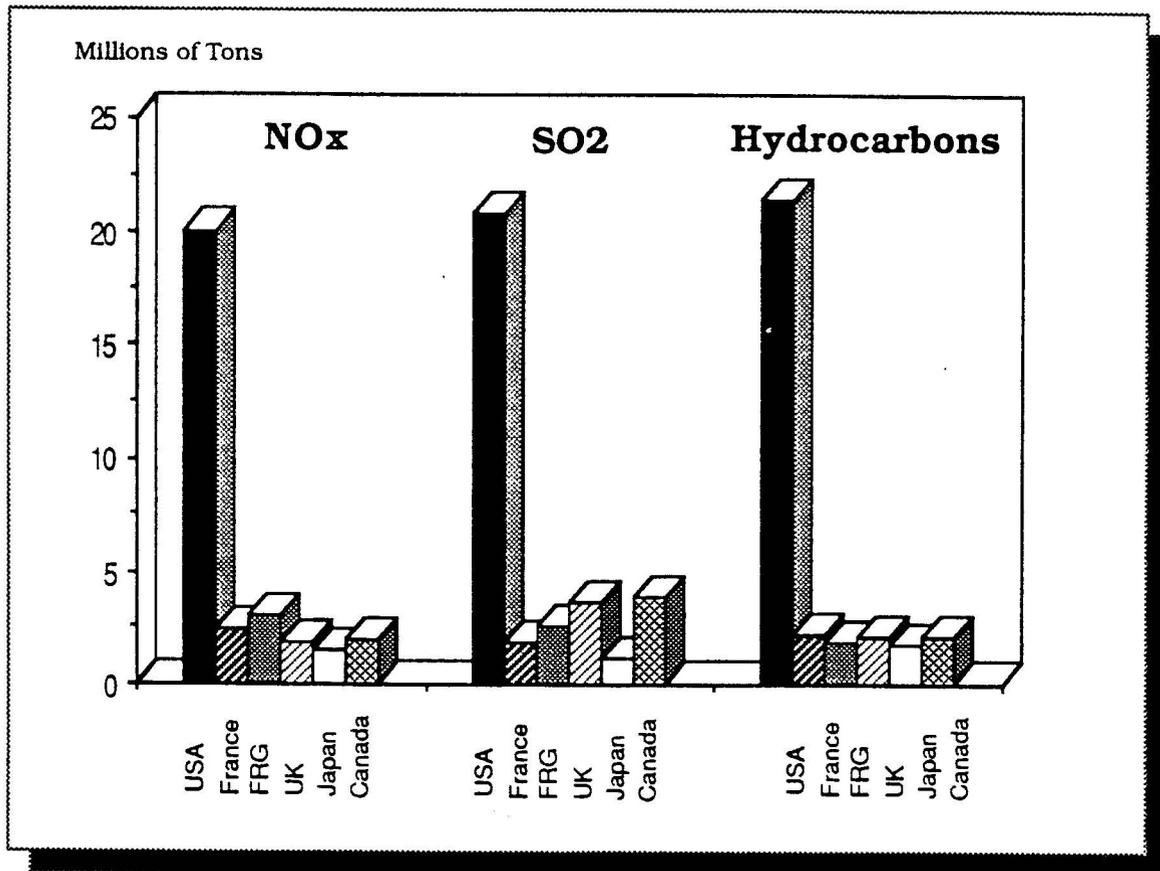
	<u>NOx</u> <u>(Million Tons)</u>	<u>SO2</u> <u>(Million Tons)</u>	<u>Hydrocarbons</u> <u>(Million Tons)</u>
US	20.0	20.7	21.3
FRANCE	2.4	1.8	2.2 *
WEST GERMANY	3.0 +	2.6 +	1.8 +
UNITED KINGDOM	1.8	3.6	2.1
JAPAN	1.4 ++	1.1 ++	1.7 **
CANADA	1.9 +	3.9 +	2.1 *

Note:

All NOx, SO2 and Hydrocarbon emissions figures are for the year 1985, except those marked with + (1984), ++ (1983), * (1980) or ** (1975). Hydrocarbon totals reflect non-methane man-made emissions.

Conventional Air Pollutants

1985 Emissions*



*1985 Except: FRG 1984

Japan NO_x & SO₂, 1983; Hydrocarbons, 1975

Canada NO_x & SO₂, 1984; Hydrocarbons, 1980

US Environmental Protection Agency





THE PRESIDENT

from near Iowa
on Friday 11-2

Bill -

I read your Clean
Air Memo (10-30) I
am delighted to have it
and I'm glad you
feel this step is

FROM
THE WHITE HOUSE
WASHINGTON, D.C.

Honorable William K. Reilly
Administrator
U.S. Environmental Protection Agency
Washington, D.C. 20460

PERSONAL

as significant as
you do.

Of course I'll be
signing it. Well Done
But wishes

GB

FROM
THE WHITE HOUSE
WASHINGTON, D.C.

Honorable William K. Reilly
Administrator
U.S. Environmental Protection Agency
Washington, D.C. 20460

PERSONAL

EPA

Environmental News

ACID
RAIN

TUESDAY, OCTOBER 29, 1991

EPA ANNOUNCES PLANS TO CUT ACID RAIN EMISSIONS IN HALF

Dave Ryan (202) 260-2981

The U.S. Environmental Protection Agency today proposed innovative, market-based rules to cut annual emissions of sulfur dioxide (SO₂) 10 million tons by the year 2000 -- virtually halving 1980 utility emissions of this major contributor to acid rain. The reduction will come primarily from electric utilities, which account for 70 percent of the nation's SO₂ emissions. To preserve the reduction, EPA will set a permanent national cap on annual SO₂ utility emissions of just under nine million tons.

"Today's proposal breaks new ground in harnessing the power of the marketplace to improve the environment," said EPA Administrator William K. Reilly. "Market incentives and tradeable allowances will be used to cut acid rain emissions. The Bush administration believes that the economic incentives in this rule have significant advantages over traditional 'command and control' regulations in bringing about the most cost-effective pollution reductions possible."

The SO₂ reduction will be accomplished in two phases: Phase I begins in 1995 and affects 110 of the biggest power plants, mostly coal-burning utilities in 21 eastern and midwestern states; Phase II, which begins at the turn of the century, further reduces emissions for the 110 large plants and sets equally stringent restrictions on about 700 smaller plants.

To achieve the emission reductions, EPA is proposing a market-based "allowance" trading system. This innovative approach was the centerpiece of the clean air legislative package proposed by President Bush in 1989, and adopted as part of the Clean Air Act Amendments of 1990.

One allowance gives a utility unit the authority to emit one ton of SO₂ during or after a given year. Under the proposal, EPA would allocate allowances to existing utility units based on a

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formula consisting of a specified emission rate multiplied by the unit's average fuel consumption from 1985 - 1987. A fundamental requirement of the proposal is that a utility unit must hold enough allowances to cover its total annual SO2 emissions.

Allowances, once allocated, are transferrable, allowing market forces to set their price. If a facility reduces its SO2 emissions below its level of allowances -- in other words, does better than it has to under the law -- it will have left-over emission credits it can sell to another utility or can bank for future use. By allowing utilities which can achieve emission reductions at lower costs to sell excess allowances to utilities with higher control costs, total emission reductions can be achieved in the most cost-effective manner.

Today's proposal supplements rules proposed last May, under which EPA would set aside, for EPA-sponsored auctions and direct sales, up to 2.8 percent of the total allowances that would otherwise be available to existing utility sources each year. Any private citizen, broker, utility or environmental group may acquire allowances from auctions and direct sales and profit from the trading system. One important aspect of the auctions and sales is that they will provide an opportunity for new utilities to purchase allowances. New utilities are not automatically allocated allowances under the new Clean Air Act.

As a result of these proposals, allowances will be bought, sold or banked like other commodities. EPA is encouraged by the fact that a number of utilities have already begun discussions among themselves on allowance trading. The Chicago Board of Trade recently expressed its interest in developing a "futures" market in allowances.

The key to the market-based allowance system is the ability to monitor emission reductions accurately. Today's proposal requires utilities to install and operate highly accurate, continuous emission monitoring systems and report results to EPA every three months. This ensures plant compliance and instills confidence in the market-based approach by certifying the existence and quantity of the allowances being traded.

In addition, the proposed rules provide great flexibility in permit requirements, allowing each source to tailor its emission reduction strategy to suit its specific needs. For instance, to reduce SO2 emissions a plant may switch from high-sulfur coal to cleaner-burning low-sulfur coal, or shift some of its energy production capacity from dirtier units to cleaner ones.

Finally, the proposal calls for an excess emissions penalty of \$2000 for every ton of SO2 emissions that exceed a plant's allowances. This penalty, which EPA estimates to be two to three times the estimated value of an allowance, will provide a strong incentive for self-enforcement.

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As a result of compliance with the proposal, EPA expects utility rates after the year 2000 to rise by a national average of .5 to 1.2 percent.

EPA Assistant Administrator for Air William G. Rosenberg praised the Acid Rain Advisory Committee, an independent advisory group which includes representatives from utilities, environmental groups, public utility commissions, state air agencies, academia and the pollution control equipment industry, for playing a significant role in crafting today's proposal in a manner likely to be acceptable to a wide spectrum of interests.

"We formed the Acid Rain Advisory Committee last year to promote collaboration and consensus-building in implementing the acid rain provisions of the new Clean Air Act," Rosenberg said. "The Committee convened six public meetings attended by hundreds of participants who provided valuable advice. Their input has unquestionably helped EPA propose a more cost-effective, workable approach.

"In addition," Rosenberg continued, "The Office of the Vice President helped bring all the involved agencies of government together to close on this rule. Their efforts in ensuring we meet the statutory deadlines of the Act were essential."

Today's proposal will appear soon in the Federal Register.

For those seeking technical information only, please contact Mia Zmud, EPA/OAIAP/Acid Rain Division (ANR-445), 401 M St., S.W., Washington, D.C. 20460, or phone 202-260-2550.

R-203

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Glenn R. Schleede
President

November 6, 1989

The Honorable Elizabeth Hanford Dole
Secretary of Labor
200 Constitution Avenue, N.W.
Washington, D. C. 20210

Dear Secretary Dole:

An October 12, 1989 letter from the House Energy and Commerce Committee asks that you undertake certain actions with respect to potential adverse job impacts of the President's acid rain proposals. This letter, in brief:

- . Provides information that should be useful to you in your study, including some data indicating that proposed sulfur dioxide (SO₂) emission limits may result in a net gain in coal miner employment.
- . Urges that your study and response be comprehensive, specifically taking into account:
 - . The adverse employment impact throughout the U.S. of alternatives to the President's proposal, such as the tax on electric customers that has been proposed to raise money for subsidies to high emitting utilities to install scrubbers.
 - . The real national cost per job saved if such a tax and subsidy program were established.

ADDITIONAL DATA ON SO₂ EMISSIONS AND COAL MINING EMPLOYMENT.

As you proceed with your analysis, several points with respect to the issue of potential job loss as a result of measures to reduce sulfur dioxide (SO₂) emissions should be of interest:

1. Ten states are the principal sources of SO₂ emissions. There is no question that the largest quantities of remaining SO₂ emissions are coming from utilities burning relatively low cost high sulfur coal. NAPAP data indicate that about 70% of SO₂ emissions in 1985 came from electric utilities.
 - a. Some states have cleaned up and paid costs. During the past 20 years, some states and utilities have reduced SO₂ emissions, either by switching to low sulfur fuel or installing "scrubbers." Electric customers in these areas have paid billions to accomplish the reductions. They will be paying more in those states that have recently established tighter emission limits (e.g., Massachusetts,

New Hampshire, Minnesota, Wisconsin and New York), and they will be paying even more when new Federal acid rain legislation takes effect and the prices of low sulfur fuel are bid up.

- b. Ten states account for the majority of remaining SO2 emissions. In fact, National Coal Association (NCA) data on 1987 emissions from coal-fired power plants indicate that 10 states accounted for over 70% of all SO2 emitted from coal-fired power plants (10.4 million out of 14.8 million tons). Ten utility systems, often using low cost high sulfur coal, accounted for over 50% of SO2 emissions from coal-fired plants. (Attachments 1 and 2).

The NCA has not yet released its analysis of 1988 SO2 emissions from coal-fired power plants, but it appears that such emissions increased by some 400,000 tons, largely in high emission states.

In short, there are more states and utility systems with low SO2 emissions than high SO2 emissions.

- c. Estimates differ on potential coal mining job losses and gains. The data provided by EPA are but one set of estimates of the potential coal mining job losses and gains that might result from acid rain controls. Such estimates are highly dependent upon assumptions about feasibility, difficulty and cost of installing scrubbers; availability and future cost of high and low sulfur coal; and future cost of coal transportation.

Valid studies of coal mining job impact point out that losses in one area will be offset in whole or in part by gains in other areas.

Attachment #3 is an analysis of coal mining job losses and gains released in April 1989 by Energy Ventures Analysis, a group of coal experts located in Arlington, Virginia. This analysis identifies areas, makes estimates of losses and gains, and explains why its estimates differ from others, including those being used by EPA.

It's important to note that the EVA study estimates a net gain in coal mining jobs as a result of acid rain legislation. The largest gains would come in Central Appalachian regions.

- d. Coal mining job losses are principally due to productivity gains. As you study the coal mining job issue, it is important to recognize a large number of coal mining jobs (perhaps 100,000) have been eliminated because of substantial coal industry productivity improvements. Potential job gains and losses due to acid rain controls, while important, will be smaller than the numbers affected by productivity improvements.
- e. Job impacts of proposed tax and subsidy programs should also be taken into account. The principal option offered to date by those expressing concern about possible mining job losses is a nationwide tax on electricity generation and imports (e.g., HR 2909 and HR 1470.) The revenue would be used to provide subsidies to high

TABLE 1-1

1987 SULFUR DIOXIDE EMISSIONS, EMISSION RATES AND COAL CONSUMPTION BY STATE
 Coal-fired powerplants of 50 megawatts or more

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 27-Mar-89

STATE	SO2 EMISSIONS			EMISSION RATES	COAL CONSUMPTION	
	EMIS. RANK 1987	THOUSAND TONS	% OF U.S. TOTAL	LBS EMITTED PER MMBTU	THOUSAND TONS	% OF U.S. TOTAL
OHIO	1	2,182.3	14.68%	3.88	47,304.7	6.61%
INDIANA	2	1,314.0	8.84%	3.28	36,787.0	5.14%
PENNSYLVANIA	3	1,197.6	8.06%	2.37	41,207.4	5.75%
WEST VIRGINIA	4	925.4	6.23%	2.43	30,605.3	4.27%
GEORGIA	5	908.3	6.11%	2.75	27,128.4	3.79%
MISSOURI	6	879.2	5.92%	3.61	22,893.5	3.20%
ILLINOIS	7	878.6	5.91%	2.87	28,760.1	4.02%
TENNESSEE	8	818.2	5.50%	3.30	20,696.8	2.89%
KENTUCKY	9	758.8	5.11%	2.30	28,536.0	3.98%
ALABAMA	10	574.2	3.86%	2.26	20,744.8	2.90%
TOP 10		10,436.6	70.22%		304,664.0	42.54%
FLORIDA	11	525.9	3.54%	1.87	22,598.3	3.16%
TEXAS	12	458.1	3.08%	0.81	78,802.1	11.00%
MICHIGAN	13	427.7	2.88%	1.21	30,605.8	4.27%
NORTH CAROLINA	14	312.2	2.10%	1.44	17,255.3	2.41%
WISCONSIN	15	283.3	1.91%	1.68	17,498.0	2.44%
MARYLAND	16	234.5	1.58%	2.25	8,227.8	1.15%
NEW YORK	17	208.1	1.40%	2.08	7,827.7	1.09%
IOWA	18	188.7	1.27%	1.60	12,924.9	1.80%
SOUTH CAROLINA	19	166.9	1.12%	1.46	9,018.8	1.26%
KANSAS	20	151.3	1.02%	1.16	14,925.5	2.08%
SECOND 10		2,956.7	19.89%		219,684.2	30.68%
TOP 20		13,393.3	90.11%		524,348.2	73.22%
VIRGINIA	21	147.1	0.99%	1.38	8,297.3	1.16%
MISSISSIPPI	22	114.6	0.77%	1.99	4,557.8	0.64%
NORTH DAKOTA	23	110.1	0.74%	0.96	17,434.3	2.43%
WYOMING	24	98.9	0.67%	0.51	22,047.8	3.08%
MASSACHUSETTS	25	98.4	0.66%	1.76	4,267.0	0.60%
OKLAHOMA	26	88.3	0.59%	0.78	12,860.5	1.80%
ARIZONA	27	85.0	0.57%	0.63	12,706.3	1.77%
MINNESOTA	28	75.8	0.51%	0.66	13,235.5	1.85%
NEW JERSEY	29	75.3	0.51%	1.89	3,006.1	0.42%
LOUISIANA	30	70.6	0.48%	0.86	10,028.7	1.40%
COLORADO	31	70.4	0.47%	0.51	14,007.2	1.96%
ARKANSAS	32	66.3	0.45%	0.65	11,763.8	1.64%
WASHINGTON	33	66.0	0.44%	1.49	5,468.4	0.76%
DELAWARE	34	55.9	0.38%	1.32	3,236.4	0.45%
NEVADA	35	51.5	0.35%	0.68	6,806.7	0.95%
NEW HAMPSHIRE	36	49.4	0.33%	3.17	1,163.2	0.16%
NEW MEXICO	37	42.1	0.28%	0.32	14,316.1	2.00%
NEBRASKA	38	39.6	0.27%	0.71	6,428.0	0.90%
UTAH	39	27.2	0.18%	0.21	11,165.6	1.56%
MONTANA	40	20.4	0.14%	0.32	7,529.7	1.05%
SOUTH DAKOTA	41	9.1	0.06%	2.15	698.4	0.10%
CONNECTICUT	42	7.5	0.05%	0.73	786.9	0.11%
REMAINING 22		1,469.8	9.89%		191,811.8	26.78%
TOTAL		14,863.1	100.00%		716,160.2	100.00%

There were no coal-fired powerplants of 50 MW or more burning coal in eight states during 1987: Alaska, California, Hawaii, Idaho, Maine, Oregon, Rhode Island and Vermont

TABLE 1-2

		1987					CUMULATIVE DATA STARTING WITH LARGEST SO2 EMITTERS - 1987						
RANK	UTILITY	ST.	NAMEPLATE		TONS	PERCENT OF U.S. TOTAL	CUMULATIVE CAPACITY		CUMULATIVE COAL CONSUMPTION		CUMULATIVE SO2 EMITTED		
			PLANT	MW	COAL		SO2 EMIT.	MW	% OF U.S. TOTAL	TONS	% OF U.S. TOTAL	TONS	% OF U.S. TOTAL
			(000'S)	(000'S)	(000'S)		(000'S)	TOTAL	(000'S)	TOTAL	(000'S)	TOTAL	
1.0	DETROIT EDISON CO (THE)	MI.	8	8,239	20,151.0	258.05	1.737%	120,845	38.632%	242,521.9	34.060%	8775.66	59.072%
2.0	VIRGINIA ELEC & POWER CO	VA/WV	6	4,647	9,958.7	249.89	1.682%	125,492	40.118%	252,480.6	35.458%	9025.55	60.754%
3.0	TEXAS UTILITIES ELEC CO	TX.	4	6,135	31,917.0	227.64	1.532%	131,627	42.079%	294,397.6	39.941%	9253.18	62.287%
4.0	CENTRAL ILL PUBLIC SER CO	IL.	5	2,903	4,460.1	210.20	1.415%	134,530	43.007%	288,857.7	40.567%	9463.39	63.702%
5.0	DAYTON PWR & LGT CO (THE)	OH.	3	3,521	8,339.6	204.92	1.379%	138,051	44.133%	297,197.3	41.738%	9668.30	65.081%
6.0	TAMPA ELECTRIC CO	FL.	2	3,093	6,903.8	192.99	1.299%	141,144	45.122%	304,101.1	42.708%	9861.30	66.380%
7.0	COMMONWEALTH EDISON CO.												
8.0	COMMONWEALTH EDISON CO	IL.	7	7,829	11,267.5	190.80	1.217%						
9.0	COMMONWEALTH ED CO IND	IN.	1	614	1,024.9	6.46	0.043%						
				8,443	12,292.4	187.25	1.260%	149,587	47.821%	316,393.5	44.434%	10048.55	67.331%
10.0	POTOMAC ELECTRIC PWR CO	VA/MD	4	3,082	6,128.0	184.53	1.242%	152,569	48.806%	322,521.5	45.295%	10233.08	68.377%
11.0	NORTHERN IND PUB SERV CO	IN.	4	3,769	4,840.1	177.03	1.192%	156,438	50.011%	327,361.6	45.975%	10410.12	70.075%
12.0	KENTUCKY UTILITIES CO	KY.	4	3,304	5,627.7	176.94	1.191%	159,742	51.067%	332,989.3	46.765%	10587.05	71.255%
13.0	DUKE POWER CO	NC/SC	8	7,573	8,782.5	161.76	1.089%	167,315	53.488%	341,771.8	47.998%	10748.81	72.785%
14.0	CAROLINA POWER & LIGHT CO	NC/SC	8	5,545	8,913.7	160.39	1.080%	172,860	55.261%	350,685.5	49.250%	10909.20	73.474%
15.0	KANSAS CITY PWR & LGT CO	KS/MO	4	3,382	8,512.5	159.47	1.073%	176,242	56.342%	359,198.0	50.446%	11068.65	74.505%
16.0	CINCINNATI GAS ELEC CO	OH/KY	3	3,269	6,072.6	151.41	1.019%	179,511	57.387%	365,270.6	51.299%	11220.08	75.527%
17.0	BIG RIVERS ELECTRIC CORP	KY.	4	1,995	4,948.3	145.63	0.980%	181,506	58.025%	370,218.9	51.994%	11365.71	75.597%
18.0	PACIFIC POWER & LIGHT CO	WA/WY	4	4,446	18,102.8	143.70	0.967%	185,952	59.446%	382,321.7	54.536%	11509.41	77.475%

George Bush Library Photocopy

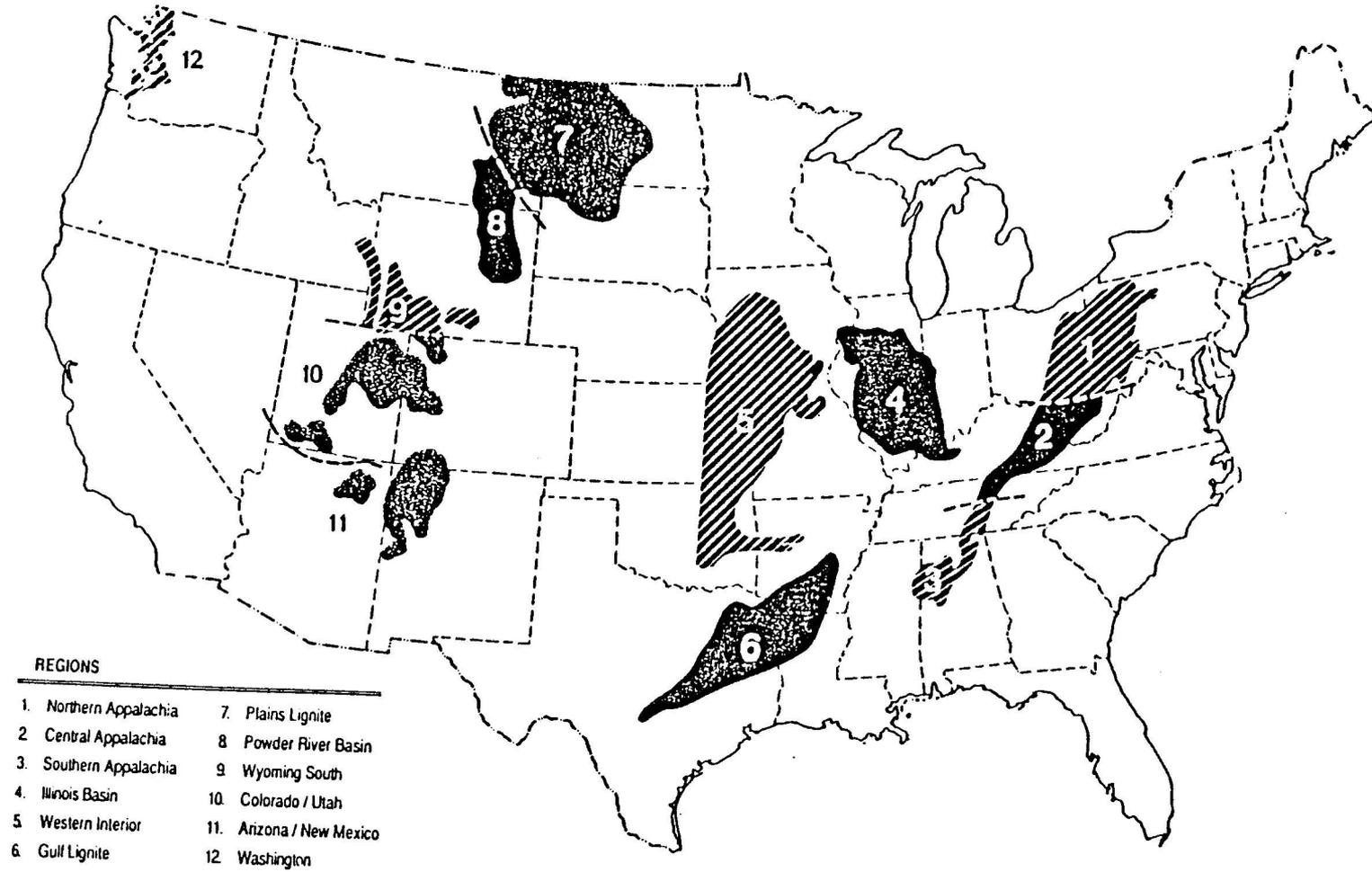


Figure 4-2 Coal Supply Regions

America repaying debt to damaged environment



By George Bush
SPECIAL TO THE WASHINGTON TIMES

In the late 1960s, a polluted American river literally caught fire, whole cities were blanketed in clouds of industrial air pollution, and raw sewage was discharged directly into our rivers. We were squandering our natural inheritance. But Native Americans have an old saying: "We don't *inherit* the earth from our *parents*. We *borrow* it from our *children*."

Twenty years ago today, Americans started calling in the debt. Earth Day was a phenomenon that

was both the culmination of much that had come before the beginning of a new and sustained effort. Those who worry about our environment today sometimes forget how far we've come not only as a *people* but as a *planet*.

The Earth Day tradition that began in 1970 has grown into a worldwide environmental movement, a movement born in the U.S.A., a movement nurtured by two decades of American leadership.

The change in attitude has been both fundamental and pervasive. In the late 1960s many otherwise responsible citizens roared across the landscape, their cars pumping invisible toxics into the air, carelessly littering country roads and city streets.

On Earth Day 1970, students in Lake Ozark, Mo.,

collected refuse along a stretch of U.S. Route 54, producing five piles along the roadside, each more than 10 feet high. In West Virginia, a five-mile span of U.S. Route 50 yielded 5 tons of trash. About a year later, on June 5, 1971, 3.5 million Americans worked with the Boy Scouts and the Keep America Beautiful campaign to conduct what was probably the largest one-day litter cleanup project in history.

Today, America's roadways are vastly improved, ranking among the most beautiful in the world. True, government action helped spur this change. But the real change came about because of a new awareness, new environmental ethos.

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And just as America's roadways have improved, so have the oceans of air that float above them. Automobile emission controls, first mandated in 1970, have today resulted in a generation of new cars that emit only 4 percent as much pollution as the typical 1970 model. Over the past two decades, America cut airborne particulates by 60 percent, airborne carbon monoxide by about 40 percent. Airborne lead has all but disappeared from the American landscape. Factory smoke levels are down, as are emissions of sulfur and some of the prime ingredients of urban smog.

This nation has made solid headway toward our goal of clean air for every American. But many tough challenges remain. The United States still produces too much waste and wastes too many material resources. And as I said in Germany last year, whether it's Chernobyl's radioactive steam or the acid rain that's killing Europe's Black Forest, "environmental destruction respects no boundaries." A global problem demands global attention.

This can be done, however, without going to the extreme — without throwing men and women out of work into wholesale unemployment. We must not let the extremes dominate the debate.

Part of the solution lies in Ameri-

ca's technological and legislative leadership. Automobile emissions standards, pioneered here in the early 1970s, will go into effect in the European Community in 1992. And Europe is now re-tooling to copy the technological innovations that gave America the world's cleanest cars.

Unfortunately, American breakthroughs, and the kind of environmental progress we've seen in Western Europe, are far from widespread in the developing world, or in the Eastern European environments that were ravaged by decades of official neglect.

During America's own development from an agrarian culture to an industrialized country, the United States suffered many decades of environmental destruction, often unintentionally, often in ignorance. For instance, the DDT designed to protect against pests nearly destroyed our national symbol, the bald eagle.

As we have learned the hard way in America, developing nations must find a responsible balance between quality of life, a sound environment, and a sound economy. And in the developing world, "quality of life" often means *life itself*. There's no more hostile environment than the one in which people are without food, shelter, or jobs. Maintaining quality of life, which in the developing world often means *life itself*, requires maintaining a strong economy. Poverty does not allow the luxury of the long view. Yet we must make the investments vital to maintaining our beautiful planet.

Overseas, America is offering technical assistance, such as through the new, U.S.-led environment center in Budapest, Hungary. We've also embarked on a plan to stop hazardous wastes from being indiscriminately exported to foreign countries — and thrown U.S. support behind a U.N. convention to help achieve this goal. And we've offered to host a landmark meeting designed to bring about the framework for an international agreement on research and other efforts on climate change.

Back at home, America has continued to lead by example.

The clean air initiative we kicked off in the Grand Tetons last summer is an ambitious, aggressive piece of legislation. It will help bring into compliance 100 or more cities that have failed to meet national standards for carbon monoxide and ozone. It includes the first acid rain control program in the U.S. and powerful new incentives for burning cleaner fuel. Where once environmental forces were harnessed to boost the economy, today we are harnessing economic forces to boost the environment.

And it's not only good for the environment — it's also good for the economy. We should never lose sight of the benefits of environmental cleanup — benefits that range from economic savings in health care costs and lost productivity to the opportunity for increased enjoyment of outdoor activity and the beauty of nature.

Working with the White House, the Senate has now passed a clean air bill. This is a bill that was gridlocked through the 1980s. It's been 13 years coming. But no American should have to wait another day for clean air. The House should move promptly to produce a bill consistent with the principles I have stated are necessary for an environmentally strong and economically sound new Clean Air Act.

The House also has been the battleground for our campaign to elevate the Environmental Protection Agency to the highest level of the federal government — the Cabinet level. The American people want this done. But they also want it done *right*. They want it done *responsibly*.

What the EPA needs is new *clout* — not a new *bureaucracy* loaded down with management directives from the U.S. Congress. EPA deserves a seat at the table. Let's get it done without changing its mission.

The campaign to protect the environment is a *marathon*, a race for life for all Americans, a race in which the final triumph will ultimately belong to the long distance runner.

But it's needed a jump start. And during its first year in office, our administration has:

- Asked Congress for nearly half a billion dollars to expand new land for national forests, parks and wildlife refuges, and other public lands.
- Launched an ambitious \$1 billion a year research program on climate change.

• Proposed a significant increase for the EPA.

• Concluded a historic, international conference on climate change at the White House this week.

• Worked to protect the ozone layer by backing a worldwide phase-out of CFCs, which will help reduce greenhouse warming potential.

• Outlawed virtually all uses of asbestos.

• Began developing policies to implement our goal of "no-net-loss" of wetlands — a policy first for America — and for the world.

• Barred all African elephant ivory imports to the U.S.

• Added three quarters of a billion dollars this year alone to clean up hazardous waste at federal facilities.

• Targeted the Superfund toward faster cleanup and better enforcement at hazardous waste sites — an effort now being copied in Italy and West Germany.

Programs like the Superfund, aimed at cleaning up the problems of the past, are important. But there's also an emerging new philosophy in fighting pollution — *pollution prevention*. Whereas Earth Day 1970 was devoted to cleaning up the mess, Earth Day 1990 is aimed at stopping it at the source.

But of course, it's not enough to prevent environmental damage. Our mission is not just to defend what's left but to take the offensive and *improve* our environment. Nature has powerful rejuvenative forces, but we need to help them along. We need to reforest this bountiful land.

Renewing my call for every American to get involved, we have launched a program to encourage an even greater degree of voluntary tree planting nationwide, with a target of 1 billion trees planted a year. Trees are the oldest, cheapest, and most efficient air purifier on Earth. They can help clean the air by absorbing carbon dioxide, a gas that contributes to possible greenhouse warming. Trees can reduce the heat of a summer's day, quiet a highway's noise, feed the hungry, and provide shelter from the wind. And every tree planted is a compact between generations.

About a year after the first Earth Day, Dr. Seuss introduced America's kids to the fable of a lakeside forest and the brave little man who defends it. "I am the Lorax," he says. "I speak for the trees."

But at the end of his story, no trees remain. Gross ecological mismanagement leaves the forest leveled, the air unbreathable, the water choked with dying fish. And all that's left is a pile of barren rocks, and the Lorax's one-word warning: "UNLESS."

Today the Earth Day kids have grown up. But the message of the Lorax still rings true. Unless every business, every community, and every family — in this nation and in every nation — pauses to consider what they can do to fight pollution, our dream of a return health, productive global environment will remain elusive. The race to protect the environment is not a spectator sport.