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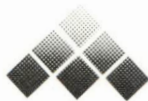
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Folder Title:
Grand Canyon 9/18/91 [OA 8328] [2]

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PINNACLE WEST
CAPITAL CORPORATION

9-10-91

Tony —

Here's a nice photo,
or two from President's Box.
A great photographer, I'm not.

Take care —

Robbie Fiker

P.S.

I've enclosed a few clips
regarding the Grand Canyon Agreement.
Ask Tom Kreuhan or Bill Rosenberg
about the role Mark De Michele
played in gaining
support for the Administration.
Cof Arizona Public
Service Co.

— Robbie

Trust technology, EPA chief advises

Environmental solutions 'scientific'

By Jonathan Sidener
The Arizona Republic

The same technology that made possible the Earth's environmental problems also will provide a solution, the head of the U.S. Environmental Protection Agency told a gathering of ASU students Wednesday.

EPA Administrator William Reilly said the agency has made great strides toward implementing those solutions in the two decades since the agency was created.

"Over the last 20 years, we have embarked on a major and unprecedented public-policy commitment to restoring the environment," Reilly said. "We have reduced sulfur dioxide in our air. We have reduced carbon monoxide. We have reduced particulates."

While Reilly praised his agency's accomplishments, he conceded that there is a long way to go.

The EPA chief said the remaining challenges are substantial, and will require scientific, not political, solutions.

Reilly, in Arizona to meet with Arizona Public Service Co. officials, made a stop at ASU to address several hundred students about environmental concerns.

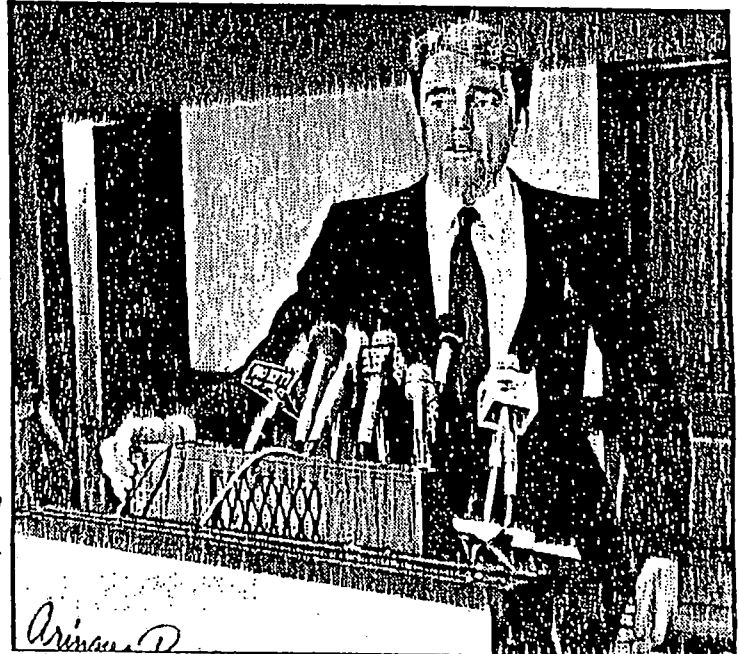
Earlier in the day, he held closed-door discussions with APS officials over the proposed cleanup of exhaust from the Navajo Generating Station, which has been blamed for some of the winter haze at the Grand Canyon.

Officials of the Salt River Project, major owner and general manager of the Navajo power plant, did not attend the meeting. Reilly said he would be willing to sit down with SRP officials as well.

APS owns 15 percent of the generator. Reilly said he spoke with APS officials because they had expressed a willingness to negotiate with the EPA.

The SRP has opposed an EPA proposal to add pollution-control equipment, and disputes the need for alterations to the plant.

Last week, Reilly proposed regula-



Toni Story/The Arizona Republic

William Reilly, administrator of the U.S. Environmental Protection Agency, holds a press conference in Phoenix.

tions that would require 70 percent reductions in the plant's sulfur emissions. A public hearing on the proposed regulations is scheduled for March 18 in Phoenix.

"I believe this will result in a significant reduction in the canyon haze," he said. "You're going to be

able to see farther in the canyon. You're going to be able to see more clearly. You're going to be able to see the stars at night.

"The Grand Canyon is our crown jewel. It's what people in other countries think of when they think of America."

DAILY MEDIA REVIEW

EPA: Canyon's view outweighs additional cost to taxpayers

PHOENIX (AP) — A chance to improve the view at the Grand Canyon is worth the cost both to customers who get electricity from a coal-fired power plant near Page and motorists in Los Angeles, Environmental Protection Agency Administrator William K. Reilly says.

"If you're going to see farther and more clearly, if you're going to see stars at night over the Grand Canyon, I think that's worth a great deal," Reilly said Wednesday during a press conference.

He denied that his agency was concentrating on the Navajo Generating Station run by the Salt River Project. The EPA has proposed making the plant reduce sulfur-dioxide emissions between 50 and 80 percent between 1995 and 1999.

SRP and its partners, including the U.S. Interior Department's Bureau of Reclamation, the Los Angeles Department of Water and Power, Arizona Public Service Co., Nevada Power, and Tucson Electric Power, maintain that smog from Southern California contributes the canyon haze.

The EPA is seeking an 85 percent reduction in Los Angeles-area air pollution, Reilly said.

"I think we will be just as attentive to those problems, and you will see a reduction," he added.

He predicted the 1990 Clean

Air Act would be viewed in years to come as "the major milestone not just of the Bush administration but of the past decade."

Reilly said the EPA would set the Navajo plant's emissions-cleanup goal after public hearings, including one scheduled March 18 in Phoenix. The EPA has suggested a 70 percent reduction at the power plant, which began operation in 1976.

SRP spokeswoman Tari Morris said her utility hoped Reilly would give proper attention to the utility's studies about the plant's contribution to the canyon haze.

The plant is 16 miles east of Grand Canyon National Park, and the prevailing winds blow west to east for all but 12 to 20 days a year, SRP has argued.

Additionally, the utility says, a haze over the canyon is a natural phenomenon — mentioned as long ago as 1882 — and is most noticeable during the summer, when the canyon receives the bulk of its visitors.

Mr. Morris said the utility estimates it would cost up to \$1 billion to install the scrubbers and other anti-pollution equipment needed to remove 90 percent of the sulfur dioxide and \$830 million to meet the 70 percent level.

The EPA has estimated the cost at \$92 million to \$128 million, and Reilly said that figured

out to about \$2.30 a month per customer.

Reilly discussed solid waste as well as air quality, noting that despite intense opposition from environmentalists, an ENSCO waste-incineration complex under construction about 40 miles southwest of Phoenix may be important to the EPA's regional scheme.

Arizona, which generated 81,000 tons of hazardous waste in 1989, must shoulder its share of the disposal burden, he said. Reilly added that he doubts a proposed state law prohibiting interstate waste shipments into Arizona would withstand a legal challenge.

Reilly also met with senior management of APS in what he said was "a new spirit of cooperation" between government and industry and spoke at Arizona State University in suburban Tempe.

He announced that APS Chief Executive Mark De Michele had been appointed to an advisory board to implement the Clean Air Act.

"I think it is somewhat rare for the EPA administrator to come and sit down with the CEO of a major power company ... and discuss a range of environment and energy issues," Reilly said. "I think this meeting represents a new spirit of cooperation and direct participation by the EPA and the leaders of American industry."

METRO

THURSDAY, FEBRUARY 14, 1991

EPA chief offers talks with SRP

Utility denies allegation of lack of cooperation

By David Hoya
THE PHOENIX GAZETTE

Environmental Protection Agency chief William Reilly hinted Wednesday that he would rather negotiate than fight with Salt River Project officials over pollution from the Navajo Generating Station.



■ REILLY
environment.

Reilly spent the day giving speeches around Phoenix, talking up what he called "a new spirit of cooperation" among the EPA and leaders of American industry. He believes such cooperation is necessary to clean up the

environment. After a morning meeting with Mark De Michele, chief executive officer of Arizona Public Service Co., Reilly said, "I think it's somewhat rare for the EPA administrator to come and sit down with the CEO of a major power company and discuss a range of environment and energy issues."

Reilly added that officials at SRP have not been as cooperative — a statement that a SRP spokeswoman was quick to take issue with.

Later, before a speech at Arizona State University, Reilly said: "I would be very happy to meet with the SRP officials. I hope they will understand that we're as open as we say we are to this kind of conversation. I think it's in everybody's interest that we sit down and talk."

The EPA has recommended that SRP's coal-fired plant near Page install expensive air scrubbers by 1999, reducing its emissions by up to 70 percent and helping cut haze over the Grand Canyon.

The requirement could cost up to \$128 million annually, when figured in 1988 dollars, and could add about \$2.30 to monthly bills for customers of SRP, the EPA has estimated.

SRP, which operates the plant on behalf of a variety of owners, including APS, has yet to accept the idea because it maintains that canyon pollution comes from a variety of sources.

Federal officials are taking public comment on their proposal and expect to issue a final decision this year on whether SRP should cut plant emissions by 50 percent, 70 percent or 90 percent. The latter level is preferred by environmentalists.

SRP officials, meanwhile, are reserving comment until they have had time to review the results of their own canyon pollution study and the EPA's proposal.

SRP spokeswoman Teri Morris refused to rule out litigation to settle the issue, but she said she expected it would be negotiated amicably. She pointed out that SRP officials have had numerous meetings with federal officials.

But Reilly told reporters, "We have not had the kind of indication from SRP that they want to sit down and negotiate this with us, and talk about it."

"I want to look ahead. I very much hope they'll see the kinds of conversations we're having with De Michele and others."

Morris said she was baffled by such comments because the utility has been speaking with the EPA all along.

"We've offered to meet with them as recently as January 10," she said. "At this point we really anticipate we're going to be able to sit down with EPA. We haven't ruled anything out, but we do want to sit down and work out the most reasonable solution."

"I think it's been perceived that we've been fighting this. All we've had are some disagreements on technical issues."

SRP has disputed the results of an air quality study upon which EPA based its recommendation. It maintains that the study was flawed and that pollution controls on its Page facility would do little to improve visibility over the Grand Canyon.

If forced to cut emissions, Morris said, "I'm not sure the average (Grand Canyon) visitor will be able to detect a change."

De Michele said that if SRP would agree to the EPA proposal, it could help quiet demands by environmentalists that the plant spend millions of additional dollars to reduce emissions by 90 percent.

"They're a powerful lobby," he said of the environmentalists. "If there could be agreement (among utilities), obviously that solidifies EPA's position and it makes it a stronger case because they've got support for it."

Mesa Tribune

Thursday, February 14,

Canyon haze to cost SRP customers

By Clint Williams
Tribune writer

Improving the view at Grand Canyon National Park will cost Salt River Project customers an extra \$2.30 a month, but it is a price worth paying, the head of the U.S. Environmental Protection Agency said Wednesday.

The Grand Canyon "is an emblem of our culture," EPA Administrator William Reilly said during a press conference at Arizona State University. "The Grand Canyon is what people in other countries think of when they think of the United States."

The EPA on Jan. 31 proposed a 70 percent reduction of sulfur-dioxide emissions by 1999 at the coal-fired Navajo Generating Station near Page. The final amount — somewhere between 50 percent and 90 percent — will be set after public hearings, including one scheduled for March 18 in Phoenix.

SRP, which operates the plant, has disputed the findings of a National Park Service report that the plant is a major contributor to Canyon haze.

The plant is 16 miles east of Grand Canyon National Park, and the prevailing winds blow west to east for all but 12 to 20 days a year, SRP has argued.

Reducing the amount of sulfur-dioxide emissions will cost \$96 million to \$128 million a year, Reilly said. SRP customers — which include most homeowners and businesses in the East Valley — will have to pay about \$2.30 more a month for electricity, he said.

The EPA figures "are probably in the ballpark," said SRP spokesman Larry Crittenden.

"An average figure like \$2.30 a month can be a little tricky because we have trouble identifying the average customer," Crittenden said.

SRP estimates call for a 2 percent to 3 percent rate increase, he said.

By reducing the pollution from the power plant, Reilly said, "people will see farther,

clearer, more distinctly the colors and shadows of the Grand Canyon. They will see more stars at night."

Additionally, Reilly said, the 1990 Clean Air Act will attack the Grand Canyon visibility problem not only by reducing emissions from the Navajo plant but by cleaning smog that drifts eastward from Southern California.

Reilly told reporters an ENSCO waste-incineration complex under construction about 40 miles southwest of Phoenix may be important in the EPA's regional scheme.

Arizona, which generated 31,000 tons of hazardous waste in 1989, must shoulder its share of the disposal burden, he said. Reilly added that he doubts a proposed state law prohibiting interstate waste shipments into Arizona would withstand a legal challenge.

In his first visit to Arizona as EPA chief, Reilly also announced that Arizona Public Service Co. Chief Executive Mark De Michele had been appointed to an advisory board to implement the Clean Air Act.

"I think it is somewhat rare for the EPA administrator to come and sit down with the CEO of a major power company ... and discuss a range of environment and energy issues."



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DAILY MEDIA REVIEW

EPA chief eyes improving Grand Canyon view

By MEL REISNER

Associated Press Writer

PHOENIX (AP) — A chance to improve the view at the Grand Canyon is worth the cost both to customers who get electricity from a coal-fired power plant near Page and motorists in Los Angeles, Environmental Protection Agency Administrator William K. Reilly says.

"If you're going to see farther and more clearly, if you're going to

stars at night over the Grand Canyon, I think that's worth a great deal," Reilly said Wednesday during a press conference.

He denied that his agency was concentrating on the Navajo Generating Station run by the Salt River Project. The EPA has proposed making the plant reduce sulfur-dioxide emissions between 50 and 90 percent between 1995 and 1999.

SRP and its partners, including

the U.S. Interior Department's Bureau of Reclamation, the Los Angeles Department of Water and Power, Arizona Public Service Co., Nevada Power, and Tucson Electric Power, maintain that smog from Southern California contributes to the canyon haze.

The EPA is seeking an 85 percent reduction in Los Angeles-area air pollution, Reilly said.

"I think we will be just as attentive to those problems, and you will

see a reduction," he added.

He predicted the 1990 Clean Air Act would be viewed in years to come as "the major milestone not just of the Bush administration but of the past decade."

Reilly said the EPA would set the Navajo plant's emissions-cleanup goal after public hearings, including one scheduled March 18 in Phoenix. The EPA has suggested a 70 percent

See VIEW, Page 8

VIEW

From Page 1

reduction at the power plant, which began operation in 1976.

SRP spokeswoman Teri Morris said her utility hoped Reilly would give proper attention to the utility's studies about the plant's contribution to the canyon haze.

The plant is 16 miles east of Grand Canyon National Park, and the prevailing winds blow west to east for all but 12 to 25 days a year.

SRP has argued. Additionally, the utility says, a haze over the canyon is a natural phenomenon — mentioned as long ago as 1982 — and is most noticeable during the summer, when the canyon receives the bulk of its visitors.

Morris said the utility estimates it would cost up to \$1 billion to install the scrubbers and other anti-pollution equipment needed to remove 90 percent of the sulfur dioxide and \$830 million to meet the 70 percent level.

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that he doubts a proposed state law prohibiting interstate waste shipment into Arizona would withstand a legal challenge.

Reilly also met with senior management of APS in what he said was "a new spirit of cooperation."

He announced that APS Chief Executive Mark De Michele had been appointed to an advisory board to implement the Clean Air Act.

I. INTRODUCTION

- Thanks to all; beautiful view; just visited some of the visibility monitoring equipment; look forward to hike this afternoon.

II. PROTECTING THE GRAND CANYON

- One of America's greatest natural treasures, the crown jewel of our national park system, and a source of pride and enjoyment for millions of Americans. But over the years, the Grand Canyon has been subjected to pollutants from many sources that increasingly befoul its air -- and that obscure and diminish its magnificent vistas.
- Today we have come to make amends, to reverse this wrong, and to return this precious natural resource to its original state. We are here to begin the process of cleaning up the air in the Grand Canyon. And I am proud to say that we are taking this major step as a result of a remarkable agreement among industry, government, and the environmental community.
- Unparalleled agreement resolving over a decade of legal battles, should serve as a model. Opposing parties came to the bargaining table, honestly and openly discussed their differences, and found solutions that protect the environment at a cost that all can afford.
- These parties included John McNamara of Salt River Project, Ed Norton of Grand Canyon Trust, and Bob Yuhnke of the Environmental Defense Fund -- and assisted by other leaders, such as Mark DeMichele of the Arizona Public Service Company. Their efforts were facilitated by Bill Reilly and his staff at EPA, and their agreement was endorsed by many in the environmental and industrial community. To all of you, my thanks and the thanks of your countrymen.
- It is worth noting that Federal clean air laws are explicitly written, not just to protect the health of the American public, but also to promote visibility. It's been the law for some time now, but this Administration is making it happen.
- And so to our critics who ask, "Where's the vision of the Bush Administration?," I say, "Come to the Grand Canyon." And I ask them, "How's this for vision?" We are the Administration that, quite literally, is going to insure that you can see better and farther in this great national park than at any time in recent history. I'm talking about real improvements in vision and

visibility, a bluer, clearer sky, and more stars at night.

- But protecting the Grand Canyon requires more than controlling the emissions of one power plant. Urban smog -- coming over the mountains from Los Angeles -- nearby industries, and automobiles all contribute to the Canyon's haze.
- Our program, under the new Clean Air Act, will address all of these problems:
 - * Autos: clean cars, clean fuels, and better maintenance; we will soon be announcing a new proposal on reformulated gas, also developed through a negotiation process, that will greatly reduce the pollution from Los Angeles that now contributes to the Grand Canyon haze.
 - * Urban smog: joint effort by EPA, States, industries, and the public to ensure steady progress toward meeting all air quality standards
 - * When we're finished, this Clean Air program will reduce the amount of pollution entering the air every year by 52 billion pounds -- 224 pounds per year for every man, woman, and child
- The Clean Air Act will also make the nation safe for industrial growth. It will get business "off the hook," and off the defensive, and allow for good and healthy growth.

III. THE CLEAN AIR ACT IN ACTION

- Summarize CAA regulations already released
- Keys to our success:
 - * Developing regulations by consensus: The vote to enact the Clean Air Act of 1990 was overwhelming in both Houses. It reflected a national consensus. This Administration has built that consensus right into its regulatory decision-making process in two landmark regulations (Navajo and Reformulated Gas).
 - * I should emphasize here that The Bush Administration believes in rigorous enforcement of environmental laws. Our numbers show a record level of enforcement activity. But we also believe in searching for alternatives to confrontation. This Navajo/Grand Canyon agreement is a product of that search -- and a payoff for those efforts. It

clearly shows that consensus building can be the best way to make environmental programs work.

- Market-based regulations:

- * Reduce cost and achieve more environmental protection: We will propose next week Acid Rain rules that will make it possible to reduce the cost of environmental controls at the Navajo plant by several hundred million dollars.
- * Unleash American ingenuity and know-how from all sectors of the economy, large and small:
 - Ethanol derived from American grain and methanol from natural gas to control carbon monoxide in cities like Denver
 - ARCO's new clean gasolines in California
 - Monsanto, the St. Louis-based chemical company, voluntarily reducing air toxic emissions by 90 percent.

- It's a "regulatory revolution" and there's more to come. I compliment the key actors: business for recognizing that the Clean Air Act reflects the deeply held aspirations of the American people, environmentalists for recognizing that there are sometimes better alternatives for faster progress than confrontation and litigation, and especially our own EPA for breaking with traditional regulatory approaches, and taking the risks of opening up its processes -- consulting, listening, and leading to results that benefit everyone. Everybody wins, especially the American people!

IV. CONCLUSION:

- Every American has the right, not only to breathe clean, fresh air, but to experience the mysteries of the heavens on a starry night, and to enjoy the full magnificence of this majestic canyon on a bright summer's day -- and every other day of the year.

*** Implementing regulations released thus far:**

- **Key regulations implementing the acid rain program; these proposed rules, when finalized, will remove 20 billion pounds of pollutants from the Nation's air every year**
- **Final rule on automobile emission standards released on schedule; proposals for 16 more automotive rules released requiring cleaner fuels, cleaner cars, and better maintenance of engines and pollution control equipment. These rules together will achieve total pollutant reductions of over 13 billion pounds every year**
- **Final rule and three proposed rules to phase out production and use of chemicals that damage the Earth's ozone layer. This program will eliminate over one billion pounds of ozone-depleting chemicals each year**
- **Final rules on toxic emissions from industrial equipment and municipal waste incinerators, and a proposed rule on early voluntary reductions of toxic emissions, which together will reduce toxic emissions by almost one billion pounds**
- **Together, these regulations released to date will reduce pollution by over 35 billion pounds, almost two-thirds of the total we expect to be achieved by the Clean Air Act of 1990. We have moved quickly, and we will shortly propose the remainder of the implementing rules to get the rest of those promised reductions**
- **The market-based features of these rules will save over one billion dollars every year in compliance costs, compared to the cost of comparable command-and-control regulations**

GRAND CANYON VISIBILITY RULEMAKING: History of Discussions

BACKGROUND:

- o Over 10 years of litigation to improve regional visibility.
- o Early studies attributing a portion of the Grand Canyon visibility impairment to the Navajo Generating Station.
- o National Academy of Science reviews study; concludes Navajo causes some of the visibility impairment; difficult to quantify degree of impact.

ADMINISTRATION'S PROPOSAL:

- o On February 8 1991, Administration proposes a 70% reduction in SO2 emissions; 30-day averaging period over which 70% reduction must be met; phased implementation by 1995, 1997, 1999.
- o Administration conducted a well-attended, opinionated public hearing in April. Committed to initiating a full and open dialogue.
- o Convened a 2-day science review with all of the parties to expand areas of scientific agreement.
- o Broad set of comments to proposal; Navajo owners submitted new study showing lower visibility impact by plant; environmental community submitted new study showing year-round (not just winter-time as shown in previous studies) impact on the Grand Canyon and other regional parks.

DISCUSSIONS:

- o EPA held over 7 days of meetings with the representatives of Salt River Project (also representing the other NGS owners), Grand Canyon Trust, Environmental Defense Fund, and State of Arizona.
- o Open, honest sharing of information and priorities enabled the crafting of an agreement among the parties.
- o Endorsed by the management of all of the plant owners, Grand Canyon Trust, Environmental Defense Fund, Wilderness Society, National Wildlife Federation, and the Sierra Club.

AGREEMENT:

- o 90% control, annual average, 1997, 8,9 phase-in, winter maintenance.
- o Placed signed agreement and all of the meeting notes and materials in the public docket. Reopened comment period for 30 days to solicit reaction to the agreement.
- o Responded to all public comments received during comment period; determined that the agreement represented appropriate approach; drafted consistent regulation.

**GRAND CANYON NATIONAL PARK
VISIBILITY PROTECTION:
FACT SHEET**

- To address a portion of the visibility impairment in the Grand Canyon National Park; impairment attributed to Navajo Generating Station
- Navajo Generating Station
 - 2250 MW power plant
 - Presently emits up to 1.0 lbs of sulfur dioxide (SO₂)/million British thermal units (MMBtu) (12-13 tons/hour)
 - Located in Page, Arizona; 15 miles from Park
- Final Rule
 - New limit 0.10 lbs/MMBtu (approximately 90 percent reduction in SO₂ emissions)
 - Compliance determined on a plant-wide, annual average basis
 - Phased installation of control equipment in years 1997, 1998, and 1999
 - Scheduled maintenance shifted to the winter months
- Cost of Rule (Salt River Project Estimates in \$1992)
 - Capital investment: \$430 million
 - Total levelized annual cost: \$89 million (i.e., capital carrying, operating, and maintenance costs)
- Impact of acid rain marketable allowances under new Clean Air Act
 - Value of each ton removed \$430 to \$590
 - Available credits from the actual reduction and other credits total 71,000 tons/year
 - Could reduce cost up to \$37 million per year
 - Assuming \$570/ton value (projected value in 2005), NGS' approximate cost with Acid Rain Allowances would be \$50 million per year

- Benefits of 0.10 lbs/MMBtu limitation (90 percent reduction)
 - Increased average visibility during 150-day winter season of 6 to 8 percent from current distribution. Significant improvements (up to several times existing visual range) expected for certain days when pollutants are trapped below the rim of the canyon during strong local inversions.
 - Improvements during season other than winter and at other Class I areas are expected
 - Estimated value to average American household of visibility improvement (1992 dollars, wintertime improvements at Grand Canyon only)
 - In 2000, \$0.75 - \$1.75/household/year (nationally \$90-200 million/year)
 - Benefits increase over time
- Impact on Salt River Project customers, in 1992 dollars: 2.1% increase (SRP estimate)
 - Electric Rate

-- Current	7.66¢/KWH
-- Increase	<u>0.16¢/KWH</u>
-- Total	7.82¢/KWH
 - Average monthly bill

-- Current	\$81.83
-- Increase	<u>\$ 1.72</u>
-- Total	\$83.55
- Impact on Nevada Power Company
 - Electric Rate

-- Current	5.90¢/KWH
-- Increase	<u>0.16¢/KWH</u>
-- Total	6.06¢/KWH
 - Monthly bill

-- Current	\$58.00
-- Increase	<u>\$ 1.57</u>
-- Total	\$59.57

**GRAND CANYON NATIONAL PARK
VISIBILITY PROTECTION:
FACT SHEET**

Background

Section 169A of the Clean Air Act sets as a national goal "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution." Mandatory class I Federal areas are certain national parks, wildernesses, and international parks. In response to Section 169A, Environmental Protection Agency (EPA) promulgated the required visibility regulations on December 2, 1980. In broad outline, the visibility regulations require the 36 States which have mandatory class I Federal areas, including Arizona, to: (1) coordinate State implementation plans (SIPs) development with the appropriate Federal land managers (FLM), (2) develop a program to assess and remedy visibility impairment from new and existing sources, (3) develop a long-term (10 to 15 years) strategy to assure reasonable progress toward the national goal, (4) develop a visibility monitoring strategy to collect information on visibility conditions, and (5) consider in all aspects of visibility protection any "integral vistas" (important views of landmarks or panoramas that extend outside of the boundaries of the Class I area) identified by the FLM as critical to the visitors' enjoyment of the Class I areas. The affected States were required to submit revised SIPs satisfying these provisions by September 2, 1981.

In December 1982, environmental groups, including the Environmental Defense Fund, filed a citizens' suit in the United States District Court for the Northern District of California alleging that EPA had failed to perform a nondiscretionary duty under section 110(c) of the Act, to promulgate visibility Federal implementation plans (FIPs) for the 35 States¹ that, at that time, had failed to submit SIP's to EPA as called for by the 1980 visibility regulations, EDF v. Reilly, No. C82-6850 RPA (N. D. Cal.). The State of Arizona was one of the 35 States that failed to submit a revised SIP to EPA.

The EPA and the plaintiffs negotiated a settlement agreement to remedy the States' failure to submit the necessary SIPs by replacing the original regulatory deadlines for visibility SIP provisions with a new rulemaking schedule agreed to by the parties and approved by the court. This schedule required EPA to review the existing SIPs to determine any deficiencies, allow the States to cure those deficiencies, and to promulgate FIPs on a specified schedule for those States that still did not submit visibility SIP revisions to EPA. By 1990, EPA completed all of the necessary parts of the agreement except for the plans to address the visibility impairment in Grand Canyon National Park (GCNP) which is attributed to Navajo Generating Station.

¹The State of Alaska had submitted a SIP which was approved on July 5, 1983.

Action on Navajo Generating Station (NGS)

The NGS is a 2250 megawatt (MW) coal-fired power plant located near Page, Arizona, approximately 20 kilometers from the northern boundary of the GCNP. The NGS is a baseload generating station consisting of three 750 MW units which became operational between 1974 and 1976. The Salt River Project (SRP) is the operating agent for NGS which is jointly owned by the U.S. Bureau of Reclamation, the SRP, the Los Angeles Department of Water and Power, the Arizona Public Service Company, the Nevada Power Company, and the Tucson Electric Power Company. On March 24, 1986, the Department of the Interior sent letters to EPA which supplemented its earlier certification of visibility impairment. The letter addressed the GCNP and identified the NGS as a probable source of impairment in this Class I area.

During January and February 1987, the National Park Service (NPS) in cooperation with EPA, NGS, and others conducted the winter haze intensive tracer experiment (WHITEX). This study used a unique tracer which was injected into the emissions of NGS and monitored at several locations on the Colorado Plateau. Using the NPS WHITEX report², EPA on September 5, 1989, preliminarily attributed a significant portion of wintertime visibility impairment to emissions from the NGS. The EPA solicited comments on the merits of its preliminary attribution finding.

²Malm, et al., "The National Park Service Report on WHITEX Draft Final Report" (April 7, 1989)

On February 8, 1991, EPA proposed to revise the visibility FIP for Arizona to include emission limits to address the visibility impairment observed in GCNP. The EPA proposed to adopt a continuous SO₂ emission limitation of 0.30 lbs/MMBtu. Compliance would be determined on a 30-day rolling average and would be phased in by unit in 1995, 1997, and 1999.

Because of the differences in views of the data and analyses submitted to EPA during the comment period, EPA sponsored a technical review meeting on April 25 and 26, 1991. The EPA invited the NGS owners and the environmental groups to send technical representatives to the meeting to discuss the interpretation of the available data.

After the comment period closed on April 19, 1991, at the recommendation of EPA, representatives of SRP, Grand Canyon Trust, and EDF met to discuss alternative approaches to EPA's February 8, 1991 proposal. In August 1991, the parties reached agreement and together recommended that EPA adopt an alternative control for NGS consisting of a 0.10 lb/MMBtu SO₂ emission limitation (approximately a 90 percent emission reduction) based on a rolling annual average and phased in by unit in November 1997, November 1998, and August 1999. In addition, under the agreement, NGS would shift its maintenance schedule such that six unit-weeks of planned maintenance would occur between November 1 and March 15 each year. Representatives of EPA participated in many of the meetings with the parties and provided technical assistance. Representatives of the State of Arizona also

attended several of the meetings and provided additional technical support.

The parties memorialized their agreement in a Memorandum of Understanding (MOU) which they submitted to EPA along with recommended regulatory requirements for EPA's final rulemaking action. The SRP estimated (in 1992 dollars) a capital cost of \$430 million and a total levelized annual cost of \$89.6 million for this alternative. The SRP also estimated a capital cost of \$510 million and total levelized annual cost of \$106 million to meet alternative EPA proposed in February 1991. Noting that the alternative incorporated in the MOU would provide more visibility protection for the GCNP at a lower cost for NGS and its customers, EPA, on August 8, 1991, reopened the comment period on its proposed action until September 9, 1991.

The EPA is promulgating a final determination on the attribution to NGS of visibility impairment in GCNP and is promulgating revisions to the visibility implementation plan for Arizona to address that impairment. EPA has concluded that some visibility impairment of GCNP is "reasonably attributable" to NGS and that NGS is a significant contributor to certain visibility episodes. The EPA also concluded that a 0.10 lb/MMBtu SO₂ emission limitation based on a rolling annual average and phased in by unit in November 1997, November 1998 and August 1999 is an appropriate action to meet the overall requirements of controlling this existing source of visibility impairment and to making progress toward the national goal. In addition, scheduled

winter maintenance at NGS will further reduce the effects of plant emissions on winter visibility impairment episodes. This broad approach affords greater visibility improvement than the alternative advanced in EPA's February 1991 proposal because it will reduce by two-thirds the amount of pollution allowed under the proposed rule. In addition, EPA expects that the final rule will be significantly less costly than the proposal. Consequently, EPA further concluded that the final action will provide a greater degree of "reasonable progress" toward the national goal of remedying such impairment than would be provided by the February 1991 proposal.

The EPA agrees that the SRP cost estimates of \$430 million for capital cost and \$89.6 million for total levelized annual cost are reasonable. Although not considered in these cost estimates, EPA expects that NGS will be able to recoup a portion of its cost by the sale of excess marketable allowances which it will receive as part of the allowance trading program that EPA is establishing under Title IV of the Act. Using the data collected all studies as well as other monitoring information at GCNP from long-term monitoring, EPA concludes that reducing SO₂ emissions from NGS to 0.10 lbs/MMBtu would improve the winter seasonal average visibility above the rim of the canyon approximately 6 to 8 percent. Analyses of peak in-canyon sulfate levels during winter inversion episodes have led EPA to conclude that reductions in NGS SO₂ emissions may well contribute to greater than a 6 to 8 percent improvement in the seasonal average

visibility below the rim of the canyon. However, EPA did not quantify the expected visibility improvement below the rim of the canyon due to the limited amount of data and understanding of the air transport mechanisms below the rim of the canyon. As a check of the reasonableness of its approach, EPA evaluated and considered the benefit analysis developed as a part of the regulatory impact analysis. Due to the uncertainty inherent in estimating monetary benefits of goods not sold in conventional markets, a range of benefit estimates were presented.

As noted above, EPA estimated reducing SO₂ emissions from NGS to 0.10 lbs/MMBtu would improve the seasonal average visibility above the rim of the Canyon between 6 and 8 percent. Using the same approach to estimating monetary benefits as was used in the February 1991 proposal, EPA estimated the average United States household in 2000 would be willing to pay on the order of \$0.75 to \$1.75 per year.³ National total benefit estimates in 2000 range from \$90 million to \$200 million. Benefits are expected to increase over time due to increasing population and income. For instance, in 2005 national total benefit estimates range from \$125 million to \$235 million.

The actual monetary benefits of reducing SO₂ emissions from NGS may well be greater than the above ranges. If improvements in in-canyon sulfate levels during winter inversion episodes contribute to greater than a 6 to 8 percent improvement in the

³The estimated benefits were updated to 1992 dollars to be consistent with the estimated cost figures.

seasonal average visibility below the rim of the canyon, monetary benefits would increase. In addition, the monetary benefit estimates omit the value of visibility improvements at the Grand Canyon in the non-winter months, or of any visibility improvements at other nearby Class I areas.

TO: BOB SIMON

FROM: TIM SIMONSON

SUBJECT: SPEECH ACKNOWLEDGEMENTS FOR GRAND CANYON

2 PAGES

STAFF OFFICE GRAND CANYON

Grand Canyon Arizona Speech
Wednesday, September 18, 1991
9:45 am
Speech Acknowledgements:

On-stage:

Governor Fife Symington, Gov. of Arizona

Secretary Manuel Lujan

EPA Administrator William Reilly

In audience:

Senator John McCain

Senator Dennis DeConcini

Members of the Arizona Congressional Delegation

Representatives of:

Grand Canyon Trust

Environmental Defense Fund

Arizona Public Service

Salt River Project

City of Los Angeles Dept. of Water and Power

Southern California Edison

Nevada Power

Tucson Electric Power

Handwritten: ~~Reilly~~, Stump

Individuals the President should invite up at the end of his
speech to witness the signing of the EPA Agreement by
Administrator Reilly.

Something to the effect of the following would fit well as we see
it from the field:

" Thank you, and now I'd like to invite representatives from
the Grand Canyon Trust, Environmental Defense Fund, Arizona
Public Service and the Salt River Project to join me in
witnessing EPA Administrator Bill Reilly sign this outstanding
agreement."

Grand Canyon ack.

Thank you Gov. Symington for that introduction. I want to salute two members of my Administration: Secretary of the Interior Manuel Lujan and EPA Administrator Bill Reilly. Sen. McCain, Sen. DeConcini and Rep. Bob Stump flew out on Air Force One with me today, and I'm glad they could be here.

ALBUQUERQUE,

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their people. I
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the fields and
will work and
any other Amer-

ican citizen. Of course I will do as every President must do, I will stand for his rights with the same jealous eagerness that I would for the rights of any white man. I am glad to see the Indian children being educated as these are educated so as to come more and more into the body of American citizenship, to fit themselves for work in the home, work in the fields, for leading decent, clean lives, for making themselves self-supporting, for being good providers and good housekeepers; in other words, for becoming American citizens just like other American citizens.

Theodore Roosevelt

AT GRAND CANYON, ARIZONA, MAY 6, 1903

Mr. Governor, and you, my Fellow-Citizens:

I am glad to be in Arizona to-day. From Arizona many gallant men came into the regiment which I had the honor to command. Arizona sent men who won glory on fought fields, and men to whom came a glorious and an honorable death fighting for the flag of their country. As long as I live it will be to me an inspiration to have served with Bucky O'Neill. I have met so many comrades whom I prize, for whom I feel respect and admiration and affection, that I shall not particularize among them except to say that there is none for whom I feel all of respect and admiration and affection more than for your Governor.

I have never been in Arizona before. It is one of the regions from which I expect most development through the wise action of the National Congress in

passing the irrigation act. The first and biggest experiment now in view under that act is the one that we are trying in Arizona. I look forward to the effects of irrigation partly as applied by and through the government, still more as applied by individuals, and especially by associations of individuals, profiting by the example of the government, and possibly by help from it—I look forward to the effects of irrigation as being of greater consequence to all this region of country in the next fifty years than any other material movement whatsoever.

In the Grand Canyon, Arizona has a natural wonder which, so far as I know, is in kind absolutely unparalleled throughout the rest of the world. I want to ask you to do one thing in connection with it in your own interest and in the interest of the country—to keep this great wonder of nature as it now is. I was delighted to learn of the wisdom of the Santa Fe railroad people in deciding not to build their hotel on the brink of the canyon. I hope you will not have a building of any kind, not a summer cottage, a hotel, or anything else, to mar the wonderful grandeur, the sublimity, the great loneliness and beauty of the canyon. Leave it as it is. You can not improve on it. The ages have been at work on it, and man can only mar it. What you can do is to keep it for your children, your children's children, and for all who come after you, as one of the great sights which every American if he can travel at all should see. We have gotten past the stage, my fellow-citizens, when we are to be par-

doned if we treat any part of our country as something to be skinned for two or three years for the use of the present generation, whether it is the forest, the water, the scenery. Whatever it is, handle it so that your children's children will get the benefit of it. If you deal with irrigation, apply it under circumstances that will make it of benefit, not to the speculator who hopes to get profit out of it for two or three years, but handle it so that it will be of use to the home-maker, to the man who comes to live here, and to have his children stay after him. Keep the forests in the same way. Preserve the forests by use; preserve them for the ranchman and the stockman, for the people of the Territory, for the people of the region round about. Preserve them for that use, but use them so that they will not be squandered, that they will not be wasted, so that they will be of benefit to the Arizona of 1953 as well as the Arizona of 1903.

To the Indians here I want to say a word of welcome. In my regiment I had a good many Indians. They were good enough to fight and to die, and they are good enough to have me treat them exactly as squarely as any white man. There are many problems in connection with them. We must save them from corruption and from brutality; and I regret to say that at times we must save them from unregulated Eastern philanthropy. All I ask is a square deal for every man. Give him a fair chance. Do not let him wrong any one, and do not let him be wronged.

I believe in you. I am glad to see you. I wish you well with all my heart, and I know that your future will justify all the hopes we have.

AT BARSTOW, CALIFORNIA, MAY 7, 1903

My Fellow-Citizens:

This is the first time I have ever been to California, and I can not say to you how much I have looked forward to making the trip. I can tell you now with absolute certainty that I will have enjoyed it to the full when I get through.

I have felt that the events of the last five or six years have been steadily hastening the day when the Pacific will loom in the world's commerce as the Atlantic now looms, and I have wished greatly to see these marvelous communities growing up on the Pacific Slope. There are plenty of things that to you seem matters of course, that I have read about and know about from reading, and yet when I see them they strike me as very wonderful.

One thing that impresses me more than anything else as I go through the country—as I said I have never been on the Pacific Slope; the Rocky Mountain States and the States of the great plains I know quite as well as I know the Eastern seaboard; I have worked with the men, played with them, fought with them; I know them all through—the thing that impresses me most as I go through this country and meet the men and women of the country, is the essential unity of all Americans. Down at bottom we

are the same people, with a unity of sentiment, good fortune, relationship, in many men of faith is firm through our difficulties the average American prime thing is other average that the other the problems.

I thank you and wish you well.

AT SAN JOSE

*Mr. Chairman,
Citizens:*

It is half a century ago that I came to this place anywhere, it is the Pacific Slope and in directly to the heart of miracles and So it is difficult for the things, the things that region round years travelers

Nature's Heritage

There is still much that man can learn from nature if the great outdoor laboratories can be preserved unimpaired. And there is much that man can learn about himself. We are told that human judgment is based upon comparisons. Therefore, judgment can be no better than the experience upon which it rests. If man is deprived of the opportunity to witness natural beauty, observe native plants and animals, study undisrupted geologic features and processes, breathe clear air, and drink unpolluted water, then how valid will his judgment of such things be?

Americans of today must provide the coming generations with opportunities to experience nature. We are obligated to preserve natural wonders such as Grand Canyon for the people of the entire world. This wonderful heritage of ours involves great responsibilities toward people of the

future as well as great opportunities for us today.

You have seen Grand Canyon with your mind as well as your eyes, but this is an opportunity to use your other senses as well.

Go out along the canyon rim alone to watch dark shadows climb the colored walls as the sun drops to the horizon. Think about the eons of time represented by rock formations exposed to your view and the fossil record of life through the ages they contain. Feel the bite of the wind on your cheeks and listen for the sound of distant rapids on the river far below. Finally, dwell for just a moment on thoughts about yourself and the role you play on this earth. If you don't come away from such an interlude with a better understanding of nature and yourself, you will miss a large part of the precious gift that your national parks have preserved for you.



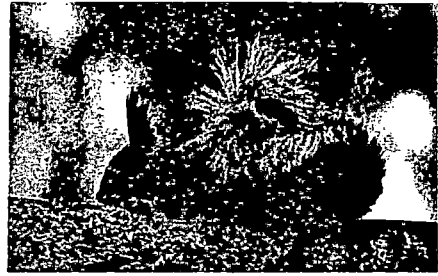
JIM TALLON

A fleecy blanket of fog from the valley of the Little Colorado River flows over Grand Canyon's rim and dissipates as it meets warm air rising from the canyon floor. PHOTO BY JIM TALLON

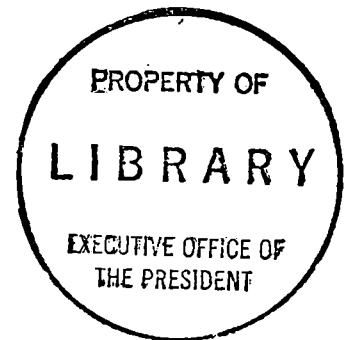
Books in this series: Grand Canyon, Zion, Yosemite, Canyon de Chelly, Dinosaur, Capitol Reef, Death Valley, Theodore Roosevelt, Virgin Islands, Petrified Forest, Shenandoah, Hawaii Volcanoes, Mount Rushmore, Yellowstone, Mount McKinley, Grand Teton, Everglades, Haleakala, Acadia, Statue of Liberty, Great Smoky Mountains, Lake Mead-Hoover Dam, Sequoia-Kings Canyon, Bryce Canyon

Back cover: Toroweap in the western portion of Grand Canyon overlooks wilderness solitude and an unparalleled panorama of the Colorado River 3,000 feet below. PHOTO BY DAVID MUENCH

*This book is dedicated to all who find Nature
not an adversary to conquer and destroy, but a storehouse*



*of infinite knowledge and experience linking man to
all things past and present. They know conserving the natural
environment is essential to our future well-being.*



GRAND CANYON

THE STORY BEHIND THE SCENERY®

by Merrill D. Beal

Edited by Gweneth Reed DenDooven

Merrill (Dave) Beal is a career professional of the National Park Service and has been active since 1943 in the protection and interpretation of our natural wonders and historic places. He is well acquainted with Grand Canyon National Park, having formerly served there for many years as chief park naturalist. A graduate of Idaho State University and of Utah State University, with major studies in zoology and resources management, Dave has a broad natural-history background and is known and respected for his work in this field.

Cover: Grand Canyon sunset; photo by Ray Atkeson. Inside cover: Mount Hayden, North Rim; photo by David Muench. Title page: Kaibab squirrel; photo by Dave Beal.

Book Design by K. C. DenDooven

Twelfth Printing, 1981

GRAND CANYON: THE STORY BEHIND THE SCENERY. PUBLISHED BY KC PUBLICATIONS, P. O. BOX 14883, LAS VEGAS, NEVADA 89114. © 1978 KC PUBLICATIONS. L. C. NO. 75-14775. ISBN: 0-916122-06-9 PAPER, 0-96122-31-X CLOTH

"You cannot see the Grand Canyon in one view, as if it were a changeless spectacle from which a curtain might be lifted, but to see it you have to toil. . .through its labyrinth. . .if strength and courage are sufficient for the task, by a year's toil a concept of sublimity can be obtained never again to be equalled on the hither side of Paradise."

"The glories and the beauties of form, color, and sound unite in the Grand Canyon--forms unrivaled by even the mountains, colors that vie with sunsets, and sounds that span the diapason from tempest to tinkling raindrop, from cataract to bubbling fountain. But more: it is a vast district of our country. Were it a valley plain it would make a state. It can be seen only in parts from hour to hour and from day to day, from week to week, and from month to month. A year scarcely suffices to see it all. It has infinite variety, and no part is ever duplicated."

John Wesley Powell, 1895

Canyons of the Colorado, revised version of 1875 report

"One might imagine that this was intended for the library of the gods; and so it was. The shelves are not for books, but form stoney leaves of one great book. He who would read the language of the universe may dig out letters here and there, and with them spell words, and read, in a slow and imperfect way, but still so as to understand a little, the story of creation."

John Wesley Powell, 1875

(cited in An Introduction to Grand Canyon Geology by Michael Collier.)

"The wonders of the Grand Canyon cannot be adequately represented in symbols of speech, nor by speech itself. The resources of graphic art are taxed beyond their powers in attempting to portray its features. Language and illustration must fail. The elements that unite to make the Grand Canyon the most sublime spectacle in nature are multifarious and exceedingly diverse."

John Wesley Powell, 1875

Canyons of the Colorado, revised version of 1875 report



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK
P.O. BOX 129
GRAND CANYON, ARIZONA 86023-0129

Date: 9/10/91

2:30 p.m.

Time: _____

Number of pages to follow: 2

To: Bob Simon, White House (202) 456-6218

From: Valerie Meyer, Librarian, Grand Canyon National Park

Subject: Quotes by John Wesley Powell

T. R. Roosevelt (unable to locate any quotes by

Franklin D. Roosevelt)

Remarks: Any additional information needed, please call (602) 638-7768

IF THERE IS A PROBLEM, CALL FTS 765-7720 (MAGNAFAX NUMBER 765-7797)

"Sun, Goldwater, conservatism, and Arizona have become synonymous."

Neal R. Peirce
The Mountain States of America
1972

* * *

"[Barry Goldwater's] world is the world of desert illumination, like his Arizona—black and white, blazing sun cut sharp by slanting dark shadows."

Theodore H. White
The Making of the President
1964

CITIES, TOWNS AND REGIONS

The Grand Canyon

"The scene is so weird and lonely and so incomprehensible in its novelty that one feels that it could never have been viewed before."

Frederick S. Dellenbaugh
Quoted in *The Grand Canyon*
R. Wallace *et al*
1972

* * *

"We drifted on, up that miraculous valley. On either side of us were hills from 1,000 or 1,500 feet high, wooded from crest to heel. As far as the eye could range forward were columns of steam in the air, misshapen lumps of lime, mist-like preadamite monsters, still pools of turquoise-blue stretches of blue cornflowers, a river that coiled on itself 23 times, pointed boulders of strange colors, and ridges of glaring, staring white."

Rudyard Kipling
American Notes
1891

* * *

[On the need to gradually become accustomed to the canyon]: "After a few [such] days well but quietly spent, one begins to lose the sense of unreality and to come to terms with a scale of magnitude and of distance which could not at first be taken in. And it is only then that the spectacle, even as mere spectacle, makes its full impression or that one begins to have some dim sense of what the geologists mean when they talk of the millions of years during which the canyon was cut and of the billions during which the rocks were prepared for the cutting."

Joseph Wood Krutch
Grand Canyon
1957

* * *

"At first glance the spectacle [the Grand Canyon] seems too strange to be real. . . . We are so accustomed to thinking of skyscrapers as high and of St. Peter's or the Pentagon as massive that we can hardly help misinterpreting what the eye sees; we cannot realize that the tremendous mesas and curiously shaped buttes which rise all around us are the grandiose objects they are. For a time it is too much like a scale model or an optical illusion. One admires the peep show and that is all. Because we cannot relate ourselves to it, we remain outside, very much as we remain outside the frame of a picture."

Joseph Wood Krutch
Grand Canyon
1957

* * *

"The canyon . . . is the most revealing single page of earth's history anywhere open on the face of the globe."

Joseph Wood Krutch
Grand Canyon
1957

* * *

"No matter how far you have wandered hitherto, or how many famous gorges and valleys you have seen this one, the Grand Canyon of the Colorado will seem as novel to you, as unearthly in the color and grandeur and quantity of its architecture, as if you had found it after death, on some other star."

John Muir
Quoted by Milton Goldstein
The Magnificent West
1973

* * *

"The grandest and most boldly stated fact on earth . . . through the beholder surges a sense of the power of divine will. The Grand Canyon is a sight with the impact of revelation."

Donald Culrose Peattie
Quoted in *Reader's Digest*
1973

* * *

[The Grand Canyon]: "The walls now are more than a mile in height—a vertical distance difficult to appreciate. Stand on the south steps of the Treasury building in Washington and look down Pennsylvania Avenue to the Capitol; measure this distance overhead, and imagine cliffs to extend to that altitude, and you will understand what is meant; or stand at Canal Street in New York and look up Broadway to Grace Church, and you have about the distance; or stand at Lake Street bridge in Chicago and look down to the Central Depot, and you have it again. A

thousand feet of this is up steep slopes and perpendicular to the summit. T below, red and gray and angular projections many places by side of wilderness of rocks. Do depths we glide, ever li

"Those who have not a possible description. That it cannot be described Canyon is a sort of land: not a showplace, a beautiful Colorado River made it there that God gave the tions."

Quoted in

"There goes God with

"Colorado's canyons are with their inhuman scale, inhuman geological time. Even here, in this inhospitable place where the earth is deep bone, people have. The chasm that dismays front yard."

"The reactions of dogs [Canyon] on the rim are way of reasserting their the shakes. Poets begin words, and thus make can understand."

"The discoveries to be worth the efforts required those red walls exist in

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 and look up Broadway to
 ve about the distance; or
 n Chicago and look down
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thousand feet of this is up through granite crags; then
 steep slopes and perpendicular cliffs rise one above
 another to the summit. The gorge is black and narrow
 below, red and gray and flaring above, with crags
 and angular projections on the walls, which, cut in
 many places by side canyons, seem to be a vast
 wilderness of rocks. Down in these grand, gloomy
 depths we glide, ever listening. . . ."

John Wesley Powell
Canyons of the Colorado
 1895

* * *
 "Those who have not seen it will not believe any
 possible description. Those who have seen it know
 that it cannot be described. . . . In fact, the Grand
 Canyon is a sort of landscape Day of Judgment. It is
 not a showplace, a beauty spot, but a revelation. The
 Colorado River made it; but you feel when you are
 there that God gave the Colorado River its instruc-
 tions."

J. B. Priestley
 Quoted in *Scenic Wonders of America*
 1973

* * *
 "There goes God with an army of banners."

Carl Sandburg
 "Many Hats"
 1927

* * *
 "Colorado's canyons at first appall and oppress us
 with their inhuman scale and their message from
 inhuman geological time, but in the end reassure us.
 Even here, in this inhospitable rock desert, in this
 place where the earth is gashed open to the dark mile-
 deep bone, people have made marks, even homes.
 The chasm that dismays me was once some Indian's
 front yard."

Wallace Stegner
The Grand Colorado
 1969

* * *
 "The reactions of dogs and poets [viewing the Grand
 Canyon] on the rim are suggestive. Dogs, having no
 way of reasserting their doggish scale, very often get
 the shakes. Poets begin at once to put the canyon into
 words, and thus make it behave in a way that poets
 can understand."

Wallace Stegner
The Grand Colorado
 1969

* * *
 "The discoveries to be made within this canyon are
 worth the efforts required to get down. . . . Within
 those red walls exist innumerable little worlds, sur-

prising worlds, and hundreds of hidden paradises.
 . . ."

Ann and Myron Sutton
The Wilderness World of the Grand Canyon
 Quoted in *The Grand Canyon*
 R. Wallace et al
 1972

Phoenix

"The cleanest city I saw in America was Phoenix.
 . . ."

John Gunther
Inside USA
 1947

* * *
 "Arizonans have been busy denying their parentage.
 According to the dominant myth, Phoenix rose from
 the desert by a mystical exercise of frontier spirit and
 Christian capitalism, unhindered by government."

Andrew Kopkind
New Republic
 Nov. 6, 1965

* * *
 "Phoenix is now somewhat in a golden era like San
 Francisco of the late 19th century. The mood is here;
 the word is out; this is the place. The city is going
 somewhere, and it is attracting [a] more than average
 share of people who want to go somewhere with it."

Neil Morgan
Westward Tilt
 1963

* * *
 "Beyond the garish plastic signs hawking
 Kingburgers and Big Whoppers you can still see
 graceful palms, stark mountains, brilliant skies—and
 it does the soul good."

Steven V. Roberts
New York Times
 Feb. 24, 1970

Scottsdale

"Every new house in the gilded suburb of Scottsdale,
 Arizona, is built with a 'family room.' Family rooms
 are almost as popular in Scottsdale as high school
 basketball—and flagpoles. Scottsdale, which bills
 itself as 'The World's Most Western Town,' (the
 slogan is emblazoned on the town's official station-
 ery), may have more flagpoles than any suburb in the
 country."

Stephen Birmingham
The Golden Dream
 1978

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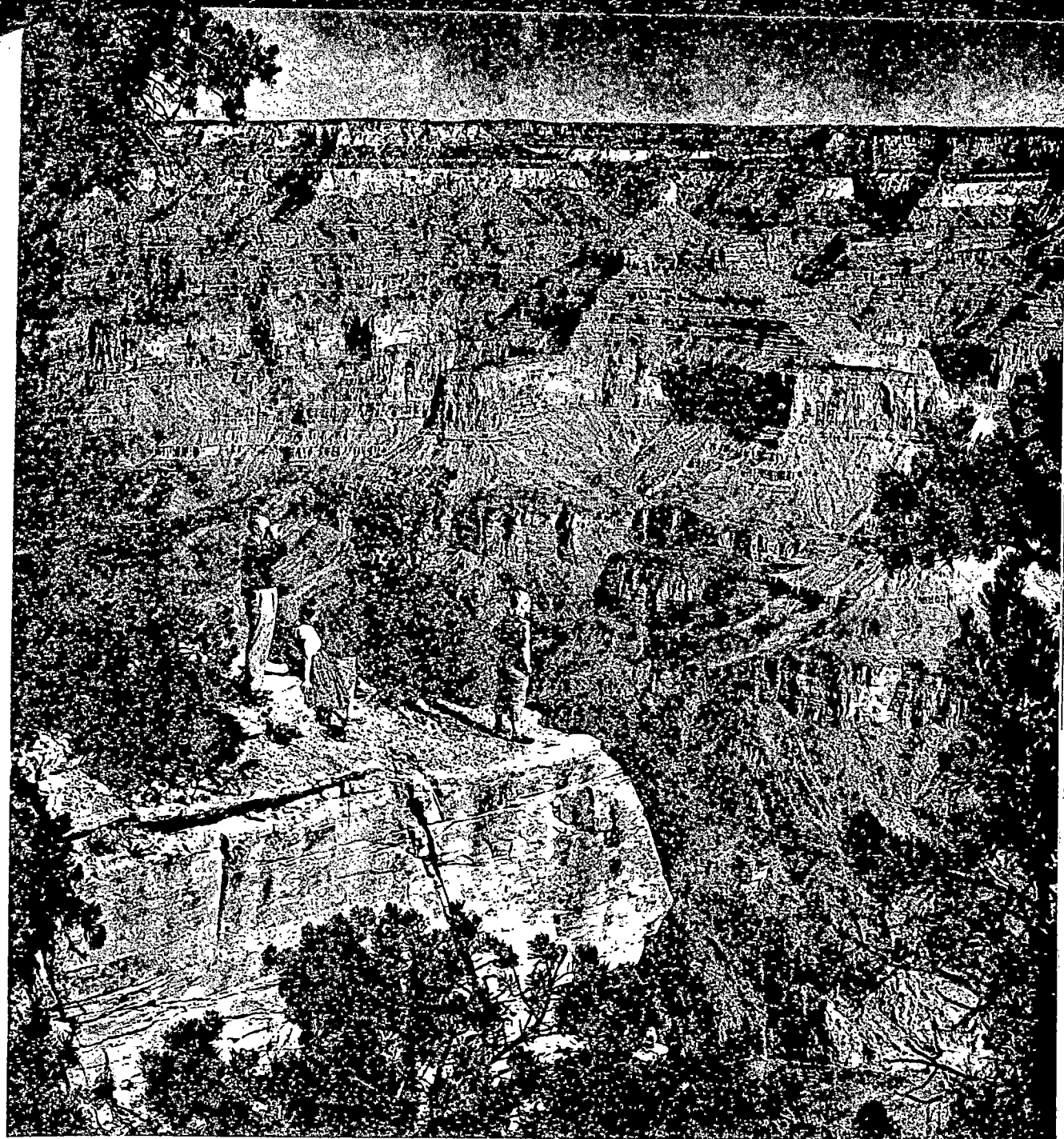
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JOSEF MUENCH

GRAND CANYON'S enormous gulf, broken by myriads of colored rock buttes and pinnacles, is an awesome spectacle. This view looks northward from Yavapai Point.

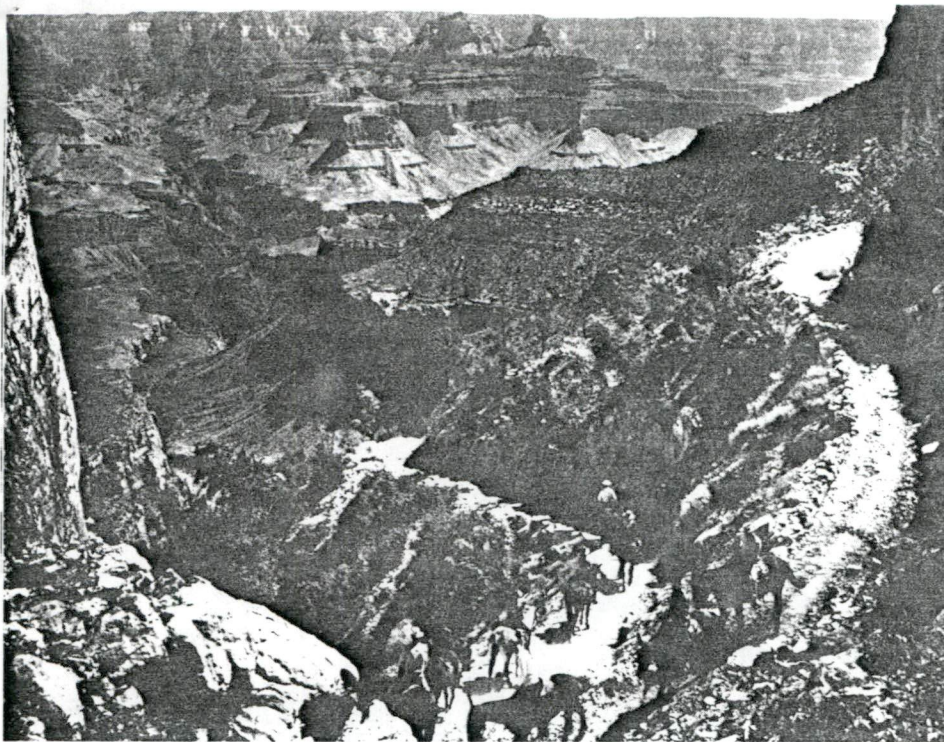
GRAND CANYON, in Arizona, the deepest and most spectacular of the many canyons carved by the Colorado River on its 1,400-mile (2,250-km) course from the snowfields of Wyoming and Colorado to the Gulf of California in Mexico. Incised into the Colorado Plateau in Coconino and Mohave counties, Ariz., the Grand Canyon extends 217 miles (350 km) east to west from the juncture of the Little Colorado River with the Colorado to Hoover Dam on the Nevada border. Its width ranges from 4 to 18 miles (6.5-29 km); its maximum depth is about 5,700 feet (1,740 meters).

Much of the Grand Canyon area, not only the canyon itself but also numerous tributary valleys—a few to the south and many to the north—is under the control of the federal government. This area includes Grand Canyon National Park and Grand Canyon National Monument.

The canyon is one of the scenic wonders of the world. The view from points along the north or south rim or from the base of the canyon never appears exactly the same. Each hour of the day brings fascinating shifts of light and shadow.

Within the canyon's vast gulf, erosion has created a multiplicity of colored rock buttes and pinnacles, especially north of the Colorado River bed. Some are named for ancient gods and heroes: Diana Temple and Wotan's Throne. Other names come from Indian sources: Pima Point and Shinumo Amphitheater; and others from their shapes: Great Thumb Mesa and Steamboat Mountain.

How the Canyon Was Formed. Formation of the Grand Canyon took place in two major steps: the deposition of the beds that were later eroded into a gorge—a process lasting considerably more than one billion years—and erosion of the canyon



JOSEF MUENCH

BRIGHT ANGEL TRAIL is a steep switchback track from the south rim of the canyon to the river level. Muleback is the usual means of making the trip.

proper, which required not more than 10 million years. The bottom of the canyon, which is being deepened by the Colorado River, is carved into Archean metamorphic rocks, characterized by the Vishnu Schist and associated granitic intrusions, which themselves have a radioactive age of 1.3 billion years.

No evidence of life has been found in the Vishnu Schist. Resting unconformably upon it are Algonkian limestone and shale (more than 600 million years old), containing clear evidence of primitive algae. These old rocks were extensively folded and faulted in Precambrian time, then eroded to a relatively flat surface, upon which a thick series of Paleozoic limestones, sandstones, and shales, representing a time interval of about 300 million years, were deposited. Missing from the sequence are Ordovician, Silurian, and Pennsylvanian beds that are now represented by unconformities. The sequence shows transitions during Paleozoic time from land to shallow sea to deep sea and back again.

Caprock, commonly forming the plateau surface on both rims, is the Permian Kaibab limestone. A thin modern soil profile covers this locally, and a few miles southeast of the canyon cinder beds and lava flows, a part of the San Francisco volcanic field, of late Tertiary and Quaternary ages, are found. The last eruption of Sunset Crater, near Flagstaff, occurred in 1065 A. D. A thick sequence of Mesozoic rocks deposited in the Grand Canyon area has been completely eroded away but is present northward in the Markagunt Plateau of Utah, containing Zion Canyon.

Fossil shells, bones, and tracks show increasing complexity of life forms from early to late Paleozoic. The Cambrian Bright Angel Shale, for example, contains only shells, skeletons of crab-like animals, and worm borings whereas the Permian Coconino Sandstone contains tracks of at least 27 species of 4-footed animals of various sizes. The Paleozoic rocks also furnish a clear ancient climatic record: the Mississippian Red-wall Limestone was formed in a large quiet sea whereas the Permian Coconino Sandstone represents fossil sand dunes.

Largely prior to erosion of the canyon the entire Paleozoic series was faulted, moderately folded, and uplifted more than 20,000 feet (6,100 meters). Neither the modern Colorado River nor the Grand Canyon existed before the Miocene-Pliocene transition, roughly 10 million years ago. The ancestral Colorado, which flowed from the north, emptied into the Bidahochi Basin, a large lake about 50 miles (80 km) north of Winslow, Ariz. The lake bed contains numerous fish fossils. Simultaneously, in northwestern Arizona there developed the small Hualapai drainage system that initially flowed into the Willow Springs sink near Peach Springs. Not much more than 10 million years ago but not much less than 2.6 million years ago—approximately in Middle Pliocene time—these two drainage systems joined, and the present course of the Colorado was roughed out, eventually extending from the Rocky Mountains to the Gulf of California.

With repeated minor uplifts the Colorado canyon deepened rapidly during later Pliocene time, but since 1.2 million years ago, as determined by radioactive dating of temporary lava dams, downward cutting has been slight. Many present canyon details are eroded along fault lines transverse to the river. Steep gradients of tributary valleys, usually carrying ephemeral streams, lead to rapid localized lateral erosion.

Still geologically unevaluated are the local karst features, characterized by sinkholes and caverns on both canyon rims and by karst outlets, such as Roaring Springs, deep within the canyon. Likewise, the relationships between canyon cutting, the nearly contemporaneous building of the San Francisco volcanoes, and the anomalous drainage patterns south of the canyon remain to be worked out.

Park and Federal Reservations. Federal control of the canyon area has assured preservation of its unique scenic features. Most of the canyon in Coconino county was designated a national monument by President Theodore Roosevelt in 1908; it became a national park by act of Congress in 1919. Just within the western park boundary is the Havasupai Indian Reservation, a small enclave wholly below the south rim. It is

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Grand Canyon

inhabited by the Yuman-speaking Havasupai Indians, who were well established there long before the United States was founded in 1776. Farther west, in Coconino and Mohave counties, is Grand Canyon National Monument, which was established in 1932. West of the national monument, to and beyond Hoover Dam—in Mohave county, Ariz., and Clark county, Nev.—is the Lake Mead National Recreation area.

The national park is noted for its scenic beauty and abundant wildlife. More than 200 species of birds, resident and migratory, 60 species of mammals, and 15 species of reptiles and amphibians have been reported. Between the canyon floor at Phantom Ranch and the San Francisco Peaks, 60 miles (96 km) southeast and 11,400 feet (3,475 meters) higher, are found the same differences in plant life that occur between subtropical and Arctic latitudes.

Tourist accommodations are excellent but insufficient on both rims of the canyon. The more accessible south rim, 87 miles (150 km) northwest of Flagstaff by road, 6,900 feet (2,100 meters) above sea level, is open all year. The north rim, 8,100 feet (2,470 meters) above sea level and subject to heavy snowfall, is closed in winter. Although the north and south rims are only 10 airline miles (16 km) apart, travel between them requires 21 miles (34 km) by trail or 214 miles (343 km) by road. Museums and campgrounds are operated by the National Park Service on both rims. Improved roads connect principal viewpoints. The north rim is densely forested due to heavy rainfall, and it has large herds of deer.

How to Reach the Park. From Flagstaff and Williams, Ariz., local connecting buses operate over excellent roads to the south rim of the canyon. An improved highway also reaches the south rim from Flagstaff via Cameron on the Little Colorado River. Charter air service to, into, and across the canyon is available. Buses run from Cedar City, Utah, to the north rim, and excellent highways connect the north rim with Zion National Park and Bryce Canyon.

History. Pueblo Indians occupied more than 700 sites in the Grand Canyon for about four generations around 1200 A.D. The first white men to see the canyon were in the Colorado Expedition led by Capt. García López de Cárdenas, in 1540, seeking the Seven Cities of Cibola. Fray Francisco Hermenegildo Garces, O.F.M., visited the Havasupai Indians in their canyon dwellings in June 1776. The first recorded American exploration was by the fur trapper James O. Peattie, who traveled along the south rim in 1826. Lt. Joseph C. Ives led the first government expedition to the region in 1858. Maj. John Wesley Powell, later a founder and head of the U.S. Geological Survey, made the first descent of the Colorado by boat in 1869, obtaining a wealth of scientific information.

Tourist travel to the canyon began about 1890 and increased rapidly after the building of a hotel on the south rim in 1897. By the 1980's the number of tourists had grown to more than two million per year.

RONALD L. IVES
Northern Arizona University

Further Reading: Collings, Randy, *Grand Canyon: Shrine of the Ages* (A. R. Collings 1985); Fletcher, Colin, *The Man Who Walked Through Time* (1968; reprint, Random House 1972); Wallace, Robert, *The Grand Canyon* (Time-Life Bks. 1985); Whitney, Stephen, *A Field Guide to the Grand Canyon* (Morrow 1978).

GRAND COULEE DAM, kōō'lē, located on the Columbia River about 90 miles west of Spokane, Wash., is the largest concrete structure in the world. It contains 10,585,000 cubic yards (8,093,000 cu meters) of concrete. Grand Coulee is a gravity dam 550 feet (168 meters) high, with a crest length of 4,173 feet (1,272 meters). The dam creates a reservoir, named Franklin D. Roosevelt Lake, with a storage capacity of 9,402,000 acre-feet (11,597 million cu meters). The reservoir, which extends 151 miles (243 km), reaches the Canadian border.

Construction of the dam began in 1933 and was completed in 1942. The dam provides large quantities of electric power to industries; flood control; and an irrigation water supply to 1,029,000 acres (416,333 hectares) of land previously used only for dry farming and grazing.

Grand Coulee's hydroelectric capacity, located in three power plants, is about 6,263,000 kilowatts—the largest capacity in the United States. The first power plant, opened in 1941, and the second, opened in 1951, together contain 18 turbine-generator units. The third power plant, which began to operate in 1975, contains six turbine-generator units of 600,000 kilowatts each—among the largest in the world. With an ultimate capacity of 10,080,000 kilowatts, Grand Coulee is one of the largest hydroelectric power installations in the world.

See also DAM.

T. W. MERMEL
Chief, General Engineering Division
U. S. Bureau of Reclamation

GRAND FALLS is a town in central Newfoundland, Canada, on the Exploits River, about 300 miles (480 km) west of St. John's. It is a manufacturing center for newsprint, which is shipped for export to the port of Botwood, 25 miles (40 km) to the northeast.

The pulp and paper mill was constructed in 1905 by Lord Northcliffe, British newspaper proprietor, and his brother, Lord Rothermere, and began production in 1909. Its daily capacity is more than 600 tons of newsprint. There is an important hydroelectric station on the river. Lumbering and farming are the principal occupations of the area. Population: (1981) 8,765.

GRAND FORKS, a city in eastern North Dakota, the seat of Grand Forks county, is on the Red River of the North, 80 miles (128 km) north of Fargo and 90 miles (144 km) south of the Canadian border. It is the principal trade center for the Red River valley, an agricultural area that produces many small grains, potatoes, sugar beets, and all types of livestock. Grand Forks has many industries associated with agriculture, such as sugar refineries, grain mills, feed mills, fertilizer plants, potato-processing plants, and creameries.

The city is also an important railroad and highway center, and its municipal airport is an international port of entry.

The establishment of the Grand Forks Air Force base, 15 miles (24 km) west of the city, has greatly aided its growth. The University of North Dakota and School of Mines is in the city. Other institutions in Grand Forks are the state rehabilitation center, the state public health laboratories, a federal meteorological station, and a lignite research laboratory of the U.S. Bureau of Mines.

William K. Reilly

Facing Facts on the Environment

Washington Post
8/20/91

A recent poll by the Roper Organization on "Environmental Protection in the 1990s" shows that environmentalism tops safe sex, patriotism and "The Simpsons" for what's "in" in 1991. That's heady company, and I hope the environment continues to keep it. It is good news for those of us in the business of protecting it.

But evidence suggests the environment's high standing reflects growing concern over risks large and small, and a feeling that there is no risk so small—and none so expensive—that government should not work to eliminate it.

Until recently we have made little effort to assess our overall environmental quality objectives, to target our laws and scarce resources to reduce the greatest risks to human health and natural systems. Now I think we've got to. There simply are more anxieties than we can possibly create laws to alleviate, and far more risks than resources to eliminate them. Determining which risks need a full-scale response by government and which do not is a value-laden task. If there is a source of trustworthy information that can lend authority and coherence in helping characterize and even rank risk, it is good science.

In my opinion, the environmental debate has long suffered from too little science. There has been plenty of emotion and politics, but scientific data have not always been featured prominently in environmental efforts, and have sometimes been ignored even when available. As major new environmental problems arise, I propose we approach them as scientifically as possible, asking: "How much do we know? What are the critical

questions to which we need answers? Are we organizing to get key information? What do the data tell us about the seriousness of the problem and the magnitude of the appropriate response?

Suppose we apply this to the Kuwait oil fires. I traveled to Kuwait at the request of the president to assess the environmental threats from the fires and to observe firsthand both the containment and cleanup efforts and the environmental monitoring work of an interagency team of U.S. scientists and technical experts. Two concerns are uppermost: impacts on global climate and short- and long-term health effects.

Both a U.S. interagency team and another team of federally funded scientists operating under the auspices of the National Science Foundation—as well as British scientists from the Royal Meteorological Society—believe global climatic effects from the fires are unlikely. The plumes generally rise to between 10,000 and 12,000 feet, with the highest readings to date taken at around 20,000 feet. This suggests they will not reach heights of 38,000 to 40,000 feet, at which altitude we might see the plumes distributed around the globe by the stream.

So, regarding the risk to the global environment, there is emerging scientific consensus that the volcanic eruptions at Mount Pinatubo in the Philippines—which do reach the upper altitudes—pose a greater threat worldwide to the atmosphere.

And what of risks to public health? Our air monitoring data and those of the Kuwaitis thus far show significant levels of toxic gas-

es—sulfur dioxide or hydrogen sulfide, for instance—that would have meant acute effects for those living in the region. Particulates are heavy—but our initial analyses did not reveal heavy metals, hydrocarbons or volatile organics that would mean problems. We are still studying the samples, and we are mounting a more extensive monitoring effort, so we may yet find something troubling.

We have urged Kuwait to link air monitoring and weather reports, and issue daily air quality advisories. And the World Meteorological Organization is overseeing a long-term monitoring plan at the request of the Saudi Arabian and Kuwaiti governments. These efforts should provide real-time air alerts and establish with some certainty what's happening. Coupled with the work of the World Health Organization, the air monitoring also should begin to give us a picture of any potential for long-term, chronic health effects on the people living in the Persian Gulf countries. Our Department of Defense is monitoring the health of U.S. troops—those who served and those still there.

I caution—as I've made clear all along—that our findings are preliminary and may change as results of ongoing scientific assessments come in, as Kuwait's full monitoring system comes on line, or as the wind and weather patterns shift. It runs counter to experience to see pollution on the scale encountered in Kuwait without also seeing impacts on health, particularly affecting asthmatics and others with lung disorders. Nevertheless, thus far, hospital admissions for respiratory disorders are no greater this

year than in prior years. Much of the most polluted area is uninhabited desert or water.

To date, the risk to public health in no way compares to the deadly London fog of 1952, in which almost 4,000 people died, or to the dense fog of 1948 in Donora, Pa., in which 10,000 people were overcome and 20 died. These were acute episodes in heavily populated areas—with clear but immediate evidence of health effects.

Despite the recent U.S. findings, some refuse to believe the data. The Bush administration is committed to environmental policies that are grounded in science. In the matter of the Kuwaiti oil fires—as I hope in all other environmental matters before us—we are prepared to subject our work to the review of outside experts, to be inclusive in the fact-finding process as possible, and to be open always to revising our opinions and strategies in the light of new information. I invite anyone with hard information from Kuwait that contradicts our preliminary findings to get it to us as quickly as possible.

We will continue to monitor the environment of Kuwait, to analyze pollution samples and to calculate risks and advise on any protective policies needed. But we also need to recall that to equate every incident, every problem, with a major risk undermines our ability to focus on the most significant risks. Nothing is 100 percent safe. Neither are all risks equal. That is as true in the United States as it is true in Kuwait.

The writer is administrator of the Environmental Protection Agency.

section of Arizona. The town is named for John D. Lee, who began operating a ferry here in 1872. In 1877 Lee was executed by a firing squad for his part in the Mountain Meadows Massacre of 1857, in which a force of Mormons and Indians slaughtered the non-Mormon members of a wagon train in southern Utah. The ferry continued to operate until the **Navajo Bridge**, a graceful span that crosses the Colorado River 467 feet above the water, was completed five miles downstream in 1929.

PIPE SPRING NATIONAL MONUMENT

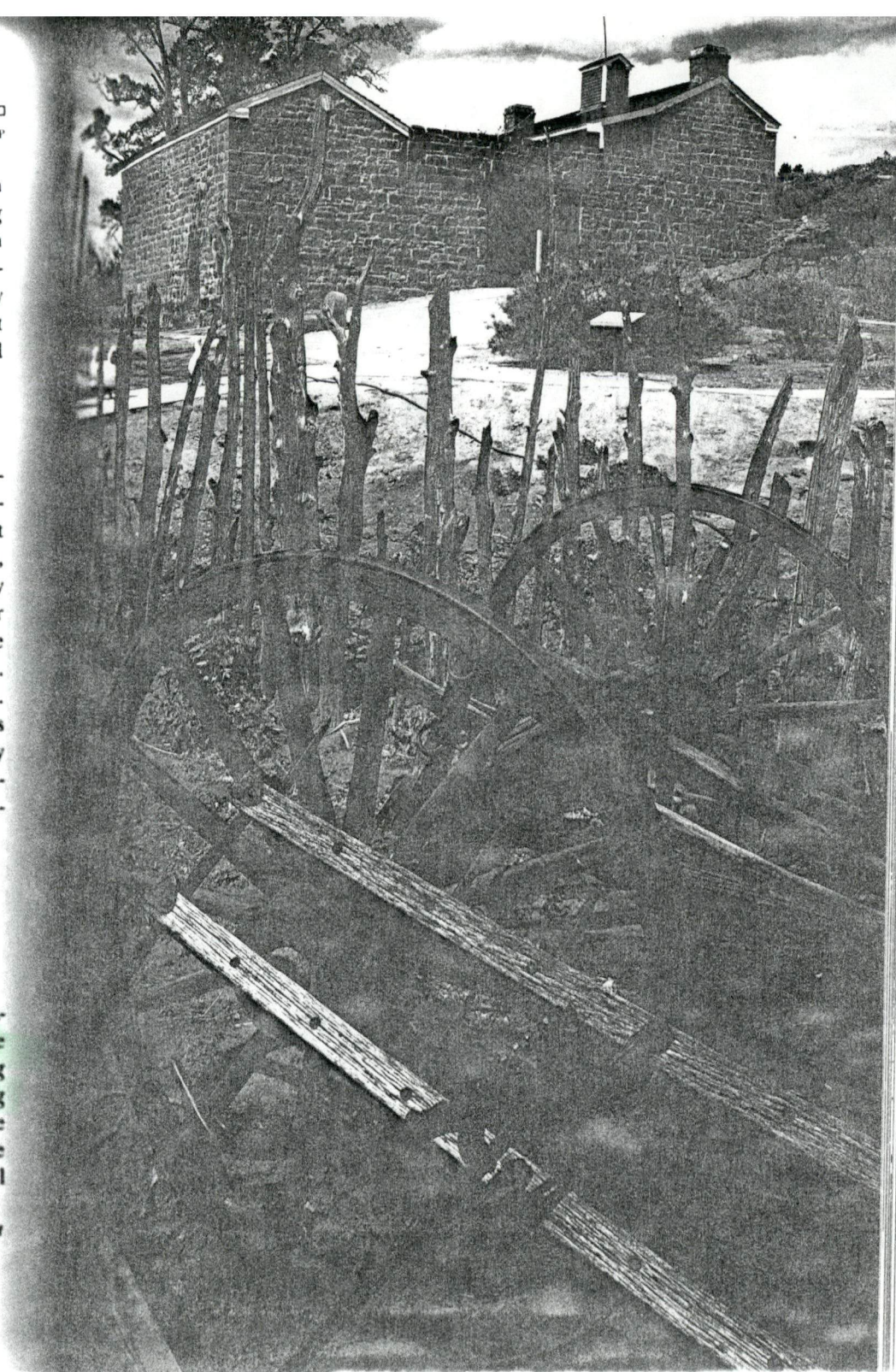
Pipe Spring got its name when William Hamblin shot out the bottom of a companion's pipe in an extraordinary feat of marksmanship. The Mormons tried to settle Pipe Spring as early as 1863 but were driven off by the Navajo. After peace was established in 1870, the Mormons built a fortified ranch house over the springs, possibly to prevent Indians from using the water. Called Winsor Castle, after the ranch superintendent Anson P. Winsor, the structure—two stone houses connected by high stone walls—forms a fortified courtyard. Arizona's first telegraph office opened in Winsor Castle in 1871. The first operator later married David King Udall; their grandsons are the Arizona politicians Stewart and Morris "Mo" Udall. Today the ranch house has been restored, and pioneer crafts are demonstrated on the grounds and in the outbuildings. There is also a visitor center with exhibits on the history of the ranch.

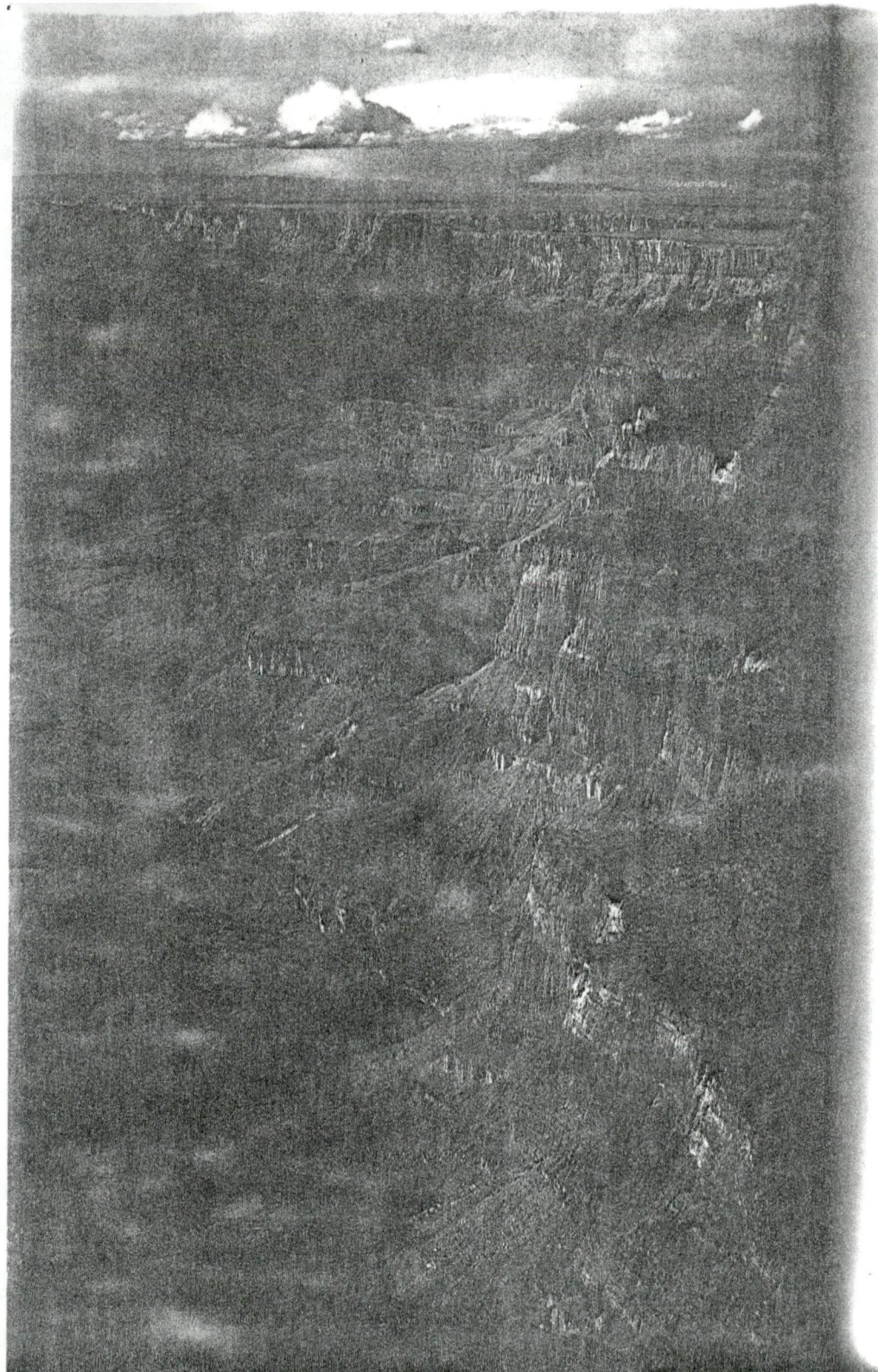
LOCATION: Off Route 389, 14 miles west of Fredonia. HOURS: 8–4:30
Daily. FEE: Yes. TELEPHONE: 602–643–7105.

GRAND CANYON NATIONAL PARK

With its ever-shifting hues and its layers of cliffs, valleys, and pinnacles laid bare to the eye, the Grand Canyon is a geological spectacle caused by the mighty Colorado River cutting through the rising Colorado Plateau. Its size alone is awe-inspiring; over 200 miles long and, on the average, 10 miles wide and a mile deep. Although the Anasazi lived in and around the Grand Canyon as early as the twelfth century, it was unknown to European-Americans until

OPPOSITE: Winsor Castle, a fort built by the Mormons to protect the water supply at Pipe Spring.





Indians led a party from Coronado's expedition there in 1540. In 1776 the explorer and priest Francisco Garcés spent several days in a Havasupai village in the canyon. He wrote: "I am astonished at the roughness of this country, and at the barrier which nature has fixed therein." A few trappers hunting beaver traversed the canyon's rim in the 1820s, and in 1857 Lieutenant Joseph C. Ives traveled up the Colorado River from the Gulf of California in a small steamer. He was shipwrecked at Black Canyon, near the present site of the Hoover Dam, and proceeded with his party overland to the western part of the canyon. Ives was unimpressed by what he saw: "Ours has been the first and will doubtless be the last party of whites to visit this profitless locality."

Ives's prediction held for about twelve years, until the one-armed Civil War hero John Wesley Powell led a party of nine down the Green and Colorado rivers in 1869. The men spent most of the month of August navigating the uncharted rapids of the Grand Canyon. Before they began their descent, Powell wrote, "We are now ready to start on our way down the Great Unknown. . . . We have an unknown distance yet to run; an unknown river to explore. What falls there are, we know not; what rocks beset the channel, we know not; what walls rise over the river, we know not." He led a second expedition down the Colorado in 1871 with the mission of mapping the Colorado Plateau for the federal government.

Prospectors attracted by the mineral potential of the canyon in the 1880s soon found tourists more profitable than mining. A few primitive hotels were built, and a trail down into the canyon opened. Tourism increased markedly in 1901 when the Santa Fe Railroad built a spur line from Williams, Arizona, to Grand Canyon Village, and in 1905 the Fred Harvey Company opened the rustic but elegant El Tovar Hotel. When President Theodore Roosevelt visited the Grand Canyon in 1903, he said: "You can not improve on it. The ages have been at work on it, and man can only mar it." Roosevelt created the Grand Canyon National Monument in 1908; it became a national park in 1919. Since then the park has been enlarged and adjacent areas protected, but maintaining the Grand Canyon from man's incursions is a task requiring constant vigilance. Over 3 million tourists a year visit the park, creating traffic jams,

OPPOSITE: Desert View is the highest point on the southern rim of the Grand Canyon.

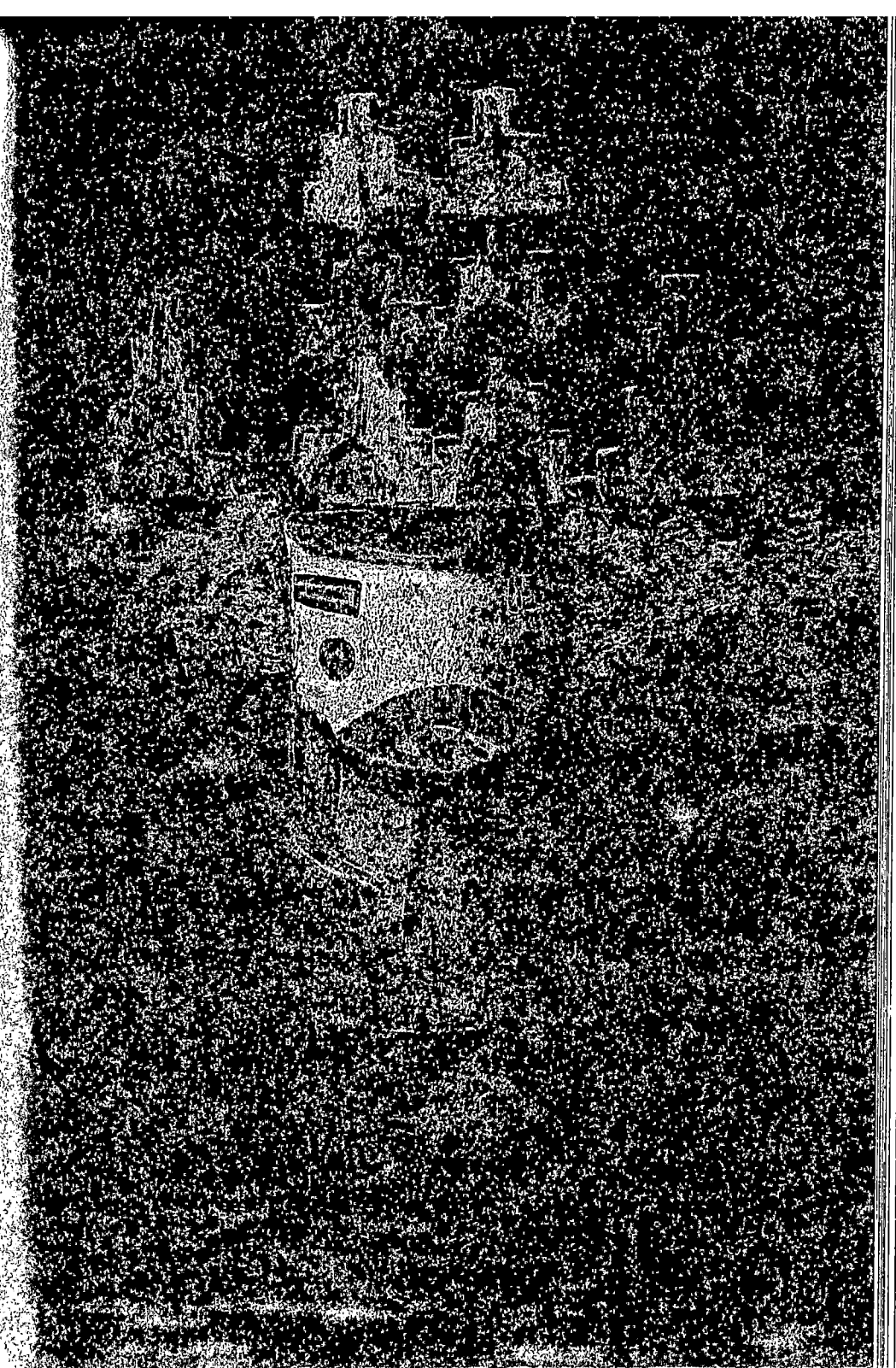
wear and tear on the facilities, and ecological damage. As late as 1963, conservationists had to fight a government plan to build two dams across the Colorado and flood over 150 miles of the canyon.

Although few visitors to the canyon pay much attention to **Grand Canyon Village**, it is an official historic district, and many of its buildings tell the story of the area's development. In particular the **El Tovar Hotel**, named for an officer in Coronado's expedition, is by itself a worthy destination; the naturalist John Burroughs wrote of meeting a woman there who "thought that they had built the canyon too near the hotel." Built by Hopi workers with local limestone blocks and logs from Oregon, the hotel was designed as a combination "Swiss chalet and Norway villa," and the amenities included meticulous service, Craftsman furniture in every room, and fresh flowers—grown in the hotel's own greenhouse—on every table. Nearby is the **Hopi House**, designed by the Fred Harvey Company architect, Mary Jane Colter, as a place for Hopi artisans to produce and sell their work. The pueblo-style building is based on the Hopi village of Old Oraibi.

Among the earliest entrepreneurs to settle on the rim of the canyon were the photographers Ellsworth and Emery Kolb, who began building the **Kolb Studio**, a log-and-shingle building that hangs over the edge of the canyon rim, in 1904. Here the enterprising brothers sold scenic views, showed a film of their 1911 trip down the Colorado River, operated a soda fountain, held Wednesday night dances, and resisted all attempts to remove them. Emery Kolb continued to operate the studio, which is closed, until he died in 1976. The studio is located at the head of **Bright Angel Trail**, once a toll path into the canyon controlled by another early promoter, Ralph Cameron. Cameron and his brother staked mining claims along the rim and the trail, thereby controlling some of the canyon's most desirable building sites.

In 1914 the Fred Harvey Company built the **Lookout Studio** on the rim to compete with the Kolbs. This unobtrusive, aesthetically pleasing building of rough-cut limestone still operates as a tourist shop. Other historic structures include the **Buckey O'Neill Cabin**, now part of Bright Angel Lodge. This simple log cabin, the oldest surviving structure on the rim, was built in the 1890s by O'Neill, the

OPPOSITE: *Male kachina doll, circa 1880, carved from the root of a cottonwood tree and sewn with sinew.*



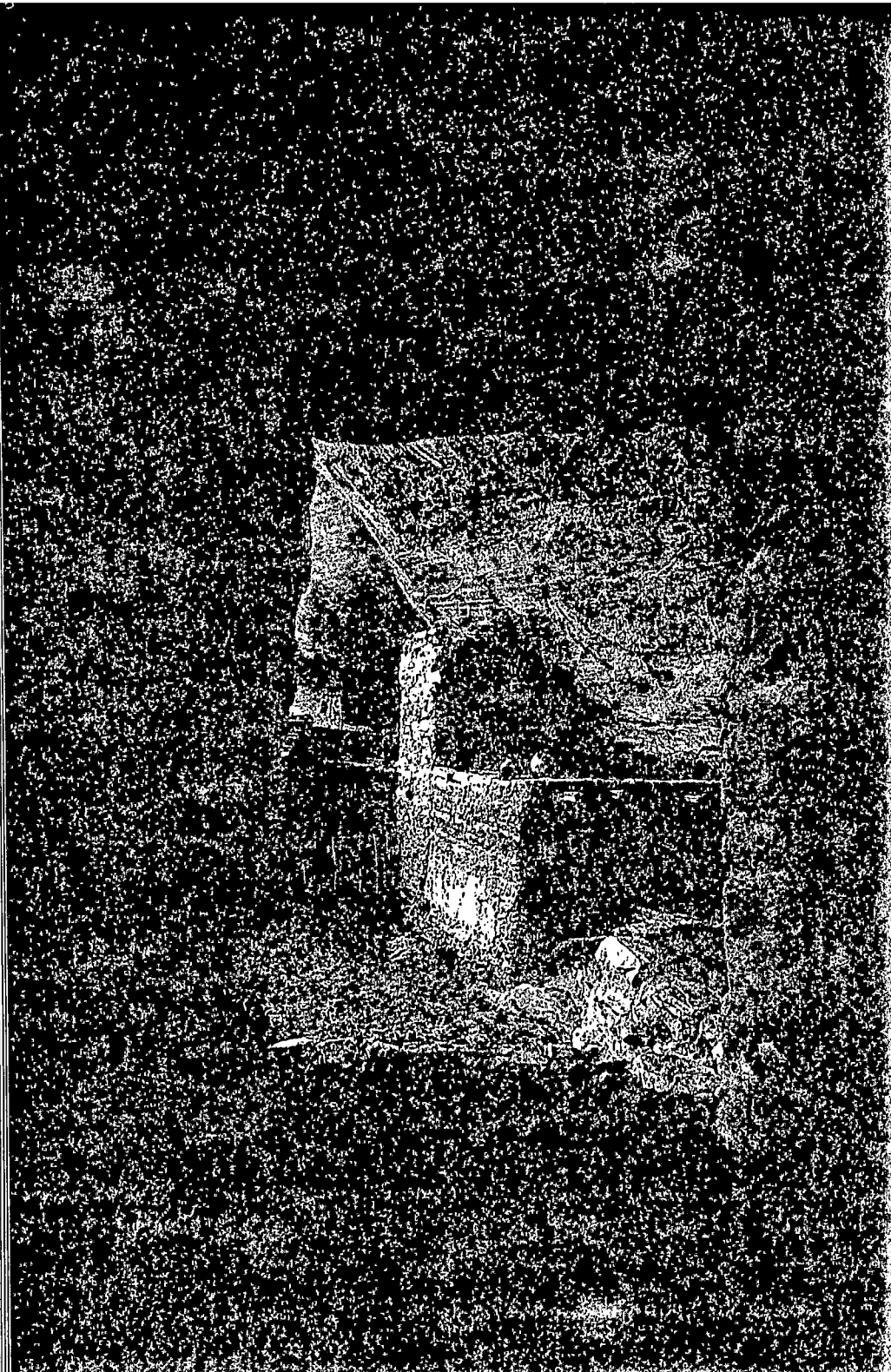
Prescott mayor and Roughrider who was killed by a sniper in Cuba. O'Neill was part owner of a copper mine near the canyon. The log-and-shingle **Santa Fe Railroad Station** was built by the railroad in 1909 and closed when service ended in 1968. Nearby, the **First National Park Service Administration Building**, built of stone and rough-cut pine in 1921, is a fine example of the style that came to be known as "rustic." Near the east entrance of the park, the unusual seventy-foot **Desert View Watchtower** was built by the Fred Harvey Company in 1932. At 7,500 feet, Desert View is the highest point on the South Rim and offers spectacular views of the canyon and the Painted Desert to the east. Farther west on East Rim Drive is the prehistoric **Tusayan Ruin**, an Anasazi site that was occupied by some twenty inhabitants for about twenty-five years starting in 1185. The remains of some of its fifteen rooms can be seen from a self-guided trail. The ruins are not as spectacular as other prehistoric sites in the region, but they are an important reminder that the canyon had been home to native peoples for centuries before European-Americans discovered it.

LOCATION: *North Rim entrance:* Route 67; *South Rim entrances:* Route 180/64 and Route 64. HOURS: 24 hours Daily; North Rim closed mid-October through mid-May. FEE: Yes. TELEPHONE: 602-638-7888.

THE NAVAJO RESERVATION

The Navajo, who speak a language closely related to that of the Apache, migrated from the Great Plains to the Southwest in the sixteenth century. After they acquired horses in the early seventeenth century, they expanded their territory, often at the expense of their neighbors, particularly the Hopi and Zuni. (In 1837 they raided the Hopi village of Oraibi and killed many inhabitants.) The Navajo were a loosely knit people; even after some tribes made peace with the United States, others continued raiding white settlements. In 1863 Colonel Kit Carson led an expedition that penetrated the Navajo stronghold at Canyon de Chelly and persuaded many Navajo to surrender. Early the next year more than 8,000 of them were forced on

OPPOSITE: *Keet Seel was once the largest Anasazi village in Tsegi Canyon.*



01 Pearls before swine.

Dorothy Parker (1893–1967) US writer. Clare Booth Luce, going through a door with her, said, 'Age before beauty'. *You Might As Well Live* (J. Keats)

02 You know, she speaks eighteen languages. And she can't say 'No' in any of them.

Dorothy Parker Speaking of an acquaintance. Attrib.

03 Where does she find them?

Dorothy Parker In reply to a remark, 'Anyway, she's always very nice to her inferiors'. *Lyttelton Hart-Davis Letters*

04 It is with narrow-souled people as with narrow-necked bottles: the less they have in them, the more noise they make in pouring it out.

Alexander Pope (1688–1744) British poet. *Thoughts on Various Subjects*

05 Dinner at the Huntercombes' possessed 'only two dramatic features – the wine was a farce and the food a tragedy'.

Anthony Powell (1905–) British novelist. *A Dance to the Music of Time: The Acceptance World*, Ch. 4

06 I remember coming across him at the Grand Canyon and finding him peevish, refusing to admire it or even look at it properly. He was jealous of it.

J. B. Priestley (1894–1984) British novelist. Referring to George Bernard Shaw. *Thoughts In the Wilderness*

07 My god, they've shot the wrong person!

James Pryde (1866–1941) British artist. At the unveiling of a statue to Nurse Edith Cavell. Attrib.

08 Not a gentleman; dresses too well.

Bertrand Russell (1872–1970) British philosopher. Referring to Anthony Eden. *Six Men* (A. Cooke)

09 He had a smile like a razor-blade.

Anthony Sampson (1926–) British writer and journalist. *The Changing Anatomy of Britain*

10 Thou whoreson zed! thou unnecessary letter!

William Shakespeare (1564–1616) English dramatist. *King Lear*, II:2

11 You are not worth the dust which the rude wind Blows in your face.

William Shakespeare *King Lear*, IV:2

12 I enjoyed talking to her, but

considered her 'a beautiful little knitter'.

Edith Sitwell (1887–1964) British poet and writer. Referring to Virginia Woolf. Letter to G. Singleton

113 I do not want Miss Mannin's feelings to be hurt by the fact that I have never heard of her. . . . At the moment I am debarred from the pleasure of putting her in her place by the fact that she has not got one.

Edith Sitwell Referring to the novelist Ethel Mannin. *Façades* (J. Pearson)

114 It proves what they say, give the public what they want to see and they'll come out for it.

Red Skelton (Richard Bernard Skelton; 1913–) US actor and comedian. Said while attending the funeral in 1958 of Hollywood producer Harry Cohn. It has also been attributed to Samuel Goldwyn while attending Louis B. Mayer's funeral in 1957.

115 He has occasional flashes of silence, that make his conversation perfectly delightful.

Sydney Smith (1771–1845) British clergyman and essayist. Referring to Lord Macaulay. *Memoir* (Lady Holland)

116 Okie use' to mean you was from Oklahoma. Now it means you're scum. Don't mean nothing itself, it's the way they say it.

John Steinbeck (1902–68) US novelist. *The Grapes of Wrath*, Ch. 18

117 I cannot but conclude the bulk of your natives to be the most pernicious race of little odious vermin that nature ever suffered to crawl upon the surface of the earth.

Jonathan Swift (1667–1745) Irish-born Anglican priest and writer. *Gulliver's Travels*, 'Voyage to Brobdingnag', Ch. 6

118 There is a certain class of clergyman whose mendicity is only equalled by their mendacity.

Frederick Temple (1821–1902) British churchman. Remark at a meeting of the Ecclesiastical Commissioners. *Years of Endeavour* (Sir George Leveson Gower)

119 It's too late to apologize.

Arturo Toscanini (1867–1957) Italian conductor. Retort to the insult 'Nuts to you!' shouted at him by a player he had just ordered from the stage during rehearsal. *The Humor of Music* (L. Humphrey)

120 He is an old bore; even the grave yawns for him.

Herbert Beerbohm Tree (1853–1917) British actor and theater manager. Referring

121 Forty years ago he was Slightly in Peter Pan, and you might say that he has been wholly in Peter Pan ever since.

Kenneth Tynan (1927–80) British critic. Referring to Noel Coward. *Curtains*

122 A diplomat these days is nothing but a head-waiter who's allowed to sit down occasionally.

Peter Ustinov (1921–) British actor and dramatist. *Romanoff and Juliet*, I

123 A triumph of the embalmer's art.

Gore Vidal (1925–) US novelist. Referring to Ronald Reagan. *The Observer*, 26 Apr 1981

124 A typical triumph of modern science to find the only part of Randolph that was not malignant and remove it.

Evelyn Waugh (1903–66) British novelist. Remarking upon the news that Randolph Churchill had had a noncancerous lung removed. Attrib.

125 Simply a radio personality who outlived his prime.

Evelyn Waugh Referring to Winston Churchill. *Evelyn Waugh* (Christopher Sykes)

126 You're a fine woman, Lou. One of the finest women that ever walked the streets.

Mae West (1892–1980). US actress. *She Done Him Wrong*, film 1933

127 Every other inch a gentleman.

Rebecca West (1892–1983) British writer. Attrib.

128 Perhaps not, but then you can't call yourself a great work of nature.

James Whistler (1834–1903) US painter. Responding to a sitter's complaint that his portrait was not a great work of art. *Whistler Stories* (D. Seitz)

129 I do not mind the Liberals, still less do I mind the Country Party, calling me a bastard. In some circumstances I am only doing my job if they do. But I hope you will not publicly call me a bastard, as some bastards in the Caucus have.

Gough Whitlam (1916–) Australian statesman. Speech to the Australian Labor Party, 9 June 1974

130 Dear Frank, we believe you; you have dined in every house in London – once.

Oscar Wilde (1854–1900) Irish-born British dramatist. Interrupting Frank Harris's inter-

Table 39 (continued).--U.S. emissions of criteria air pollutants, by source, 1940-1989.
(million metric tons)

Year	Carbon monoxide					Total
	Transportation	Fuel combustion	Industrial processes	Solid waste	Miscellaneous	
1940	28.3	15.9	6.6	3.3	26.5	81.6
1950	43.6	11.4	10.5	4.3	16.5	86.3
1960	57.0	7.0	9.3	5.1	10.0	88.4
1970	74.4	4.5	8.9	6.4	7.2	101.4
1975	85.0	4.3	6.9	3.1	4.8	94.1
1976	84.3	4.7	7.1	2.7	7.1	85.9
1977	81.0	5.1	7.3	2.6	5.8	81.8
1978	83.1	5.9	7.2	2.5	5.7	84.4
1979	58.1	6.7	7.1	2.3	8.5	81.7
1980	58.1	7.4	6.3	2.2	7.6	78.6
1981	55.4	7.7	5.9	2.1	6.4	77.4
1982	52.9	8.2	4.3	2.0	4.9	72.4
1983	52.4	8.2	4.3	1.9	7.7	74.5
1984	50.6	8.3	4.7	1.9	6.3	71.8
1985	47.9	7.5	4.4	1.9	7.9	69.5
1986	44.6	7.5	4.2	1.8	5.9	64.0
1987	43.3	7.6	4.3	1.8	7.2	64.2
1988	41.2	7.6	4.6	1.7	9.9	65.0
1989	40.0	7.8	4.6	1.7	6.7	60.9

(thousand metric tons)

Year	Lead					Total
	Transportation	Fuel combustion	Industrial processes	Solid waste	Miscellaneous	
1970	163.6	9.6	23.9	6.7	0.0	203.8
1975	122.6	9.3	10.3	4.8	0.0	147.0
1976	132.4	8.3	8.1	4.3	0.0	153.1
1977	124.2	7.2	5.7	4.1	0.0	141.2
1978	112.4	6.1	5.4	4.0	0.0	127.9
1979	94.6	4.9	5.2	4.0	0.0	108.7
1980	59.4	3.9	3.8	3.7	0.0	70.6
1981	46.9	2.8	3.0	3.7	0.0	56.4
1982	46.9	1.7	2.7	3.1	0.0	54.4
1983	40.8	0.6	2.4	2.6	0.0	46.4
1984	34.7	0.5	2.3	2.6	0.0	40.1
1985	15.5	0.5	2.3	2.6	0.0	20.9
1986	3.5	0.5	1.9	2.6	0.0	8.4
1987	3.0	0.5	1.9	2.6	0.0	8.0
1988	2.6	0.5	2.0	2.5	0.0	7.6
1989	2.2	0.5	2.0	2.3	0.0	7.2

Source: U.S. Environmental Protection Agency. 1991. National Air Quality and Emissions Trends Report, 1989. EPA-450/4-91-003. Research Triangle Park, NC.

Table 40.--National ambient concentrations of criteria air pollutants, 1975-1988.

Year	Sulfur dioxide		Carbon monoxide		Ozone		Nitrogen dioxide		TSP
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ug/m3)	
1975	0.0154	11.98	0.153	0.029	0.153	0.029	0.029	61.9	1
1976	0.0158	11.32	0.153	0.029	0.153	0.029	0.029	62.8	1
1977	0.0138	10.66	0.155	0.029	0.155	0.029	0.029	62.9	1
1978	0.0128	10.07	0.156	0.029	0.156	0.029	0.029	62.4	1
1979	0.0120	9.07	0.134	0.028	0.134	0.028	0.028	63.1	0
1980	0.0109	8.52	0.136	0.025	0.136	0.025	0.025	64.2	0
1981	0.0104	8.25	0.127	0.025	0.127	0.025	0.025	60.3	0
1982	0.0098	7.86	0.125	0.024	0.125	0.024	0.024	50.1	0
1983	0.0092	7.77	0.137	0.024	0.137	0.024	0.024	49.7	0
1984	0.0094	7.72	0.124	0.024	0.124	0.024	0.024	51.2	0
1985	0.0088	7.03	0.123	0.024	0.123	0.024	0.024	48.8	0
1986	0.0085	7.00	0.118	0.024	0.118	0.024	0.024	48.8	0
1987	0.0083	6.64	0.125	0.024	0.125	0.024	0.024	49.7	0
1988	0.0084	6.58	0.136	0.024	0.136	0.024	0.024	50.5	0

Source: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1990. National Air Quality and Emissions Trends Report, 1988. EPA-450/4-90-003. Research Triangle Park, NC.

Notes: ppm=parts per million. ug/m3=micrograms per cubic meter. mg/m3=milligrams per cubic meter. TSP=total suspended particulates. Sulfur dioxide and nitrogen dioxide records are arithmetic means. Carbon monoxide and ozone records are second maximum readings over 8- and 24- hour periods, respectively. TSP records are geometric mean. Lead records are maximum quarterly recordings. Data represent composite averages from all sites in the nationwide monitoring network.

Table 41.--Wet deposition of selected pollutants, 1982-1987.

(kilograms per hectare)

Year	Hydrogen ion		Sulfate ion		Nitrate ion		Ammonium ion		Calcium ion	
	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)
1982	0.41	23.17	13.54	3.03	1.90					
1983	0.35	21.63	13.26	3.00	2.04					
1984	0.38	22.69	14.63	3.15	2.06					
1985	0.37	21.95	14.51	2.92	1.81					
1986	0.37	21.26	13.89	2.80	1.60					
1987	0.34	19.85	13.62	2.89	1.65					

Source: Sisterson, D.L. et al. 1990. Deposition Monitoring: Methods and Results. NAPAP SOS/T State of Science and Technology Report 8. IN: National Acid Deposition Assessment Program, State of Science and Technology, vol. 1, table 6-22, p. 14. Washington, D.C.

Note: Data represent the summary of 1982-1987 trend sites (n=148) annual deposition by year. Means are reported.

Table 39.—U.S. emissions of criteria air pollutants, by source, 1940-1989.

(million metric tons)

Year	Sulfur dioxide					Total
	Transportation	Fuel combustion	Industrial processes	Solid waste	Miscellaneous	
1940	2.9	11.0	3.7	0.0	0.5	17.8
1950	2.3	12.9	4.6	0.0	0.5	19.8
1960	0.4	14.0	5.3	0.0	0.5	19.7
1970	0.6	21.3	6.4	0.0	0.1	28.3
1975	0.6	20.3	4.7	0.0	0.0	25.6
1976	0.7	20.9	4.6	0.0	0.0	26.2
1977	0.8	21.5	4.7	0.0	0.0	26.9
1978	0.8	19.9	4.3	0.0	0.0	25.0
1979	0.9	19.5	4.4	0.0	0.0	24.8
1980	0.9	18.7	3.8	0.0	0.0	23.4
1981	0.9	17.8	3.9	0.0	0.0	22.6
1982	0.8	17.3	3.3	0.0	0.0	21.4
1983	0.8	16.7	3.3	0.0	0.0	20.7
1984	0.8	17.4	3.3	0.0	0.0	21.5
1985	0.9	17.0	3.2	0.0	0.0	21.1
1986	0.9	16.9	3.2	0.0	0.0	20.9
1987	0.9	16.6	3.2	0.0	0.0	20.7
1988	0.9	16.6	3.4	0.0	0.0	20.9
1989	1.0	16.8	3.3	0.0	0.0	21.1

Nitrogen oxides

Year	Nitrogen oxides					Total
	Transportation	Fuel combustion	Industrial processes	Solid waste	Miscellaneous	
1940	2.2	3.4	0.2	0.1	0.9	6.8
1950	3.5	4.7	0.3	0.2	0.6	9.3
1960	4.9	6.7	0.5	0.3	0.4	12.8
1970	7.6	9.1	0.7	0.4	0.3	18.1
1975	8.9	9.4	0.7	0.1	0.1	19.2
1976	9.3	10.0	0.7	0.1	0.2	20.3
1977	9.5	10.4	0.7	0.1	0.2	20.9
1978	10.3	10.3	0.7	0.1	0.2	21.7
1979	10.1	10.5	0.7	0.1	0.2	21.6
1980	9.8	10.1	0.7	0.1	0.2	20.9
1981	10.0	10.0	0.6	0.1	0.2	20.9
1982	9.4	9.8	0.5	0.1	0.1	20.0
1983	8.9	9.6	0.5	0.1	0.2	19.3
1984	8.8	10.2	0.6	0.1	0.2	19.8
1985	8.9	10.2	0.6	0.1	0.1	19.8
1986	8.3	10.0	0.6	0.1	0.1	19.1
1987	8.1	10.5	0.6	0.1	0.2	19.4
1988	8.1	10.9	0.6	0.1	0.3	20.0
1989	7.9	11.1	0.6	0.1	0.2	19.9

continued

Table 39 (continued).—U.S. emissions of criteria air pollutants, by source, 1940-1989.
(million metric tons)

Year	Reactive volatile organic compounds					Total
	Transportation	Fuel combustion	Industrial processes	Solid waste	Miscellaneous	
1940	5.2	4.7	3.3	0.9	4.6	18.8
1950	7.9	3.1	5.4	1.0	3.8	21.0
1960	11.1	1.9	6.3	1.4	3.1	23.8
1970	12.4	1.1	8.9	1.8	3.3	27.5
1975	10.3	1.0	8.1	0.9	2.5	22.8
1976	10.4	1.2	8.7	0.8	2.9	24.0
1977	10.0	1.4	9.0	0.8	2.8	24.2
1978	8.6	0.8	8.9	0.8	2.7	22.8
1979	8.0	0.9	8.9	0.7	2.9	22.4
1980	9.0	0.9	8.2	0.6	2.9	22.7
1981	8.9	0.9	8.3	0.6	2.5	21.3
1982	8.3	1.0	7.5	0.6	2.2	19.5
1983	8.2	1.0	7.9	0.6	2.7	20.3
1984	8.1	1.0	8.8	0.6	2.7	21.1
1985	7.6	0.9	8.5	0.6	2.6	20.2
1986	7.2	0.9	8.1	0.6	2.3	19.1
1987	7.1	0.9	8.3	0.6	2.5	19.4
1988	6.9	0.9	8.1	0.6	2.9	19.5
1989	6.4	0.9	8.1	0.6	2.5	18.5

Total suspended particulates

Year	Total suspended particulates					Total
	Transportation	Fuel combustion	Industrial processes	Solid waste	Miscellaneous	
1940	2.7	7.5	8.7	0.5	3.7	23.1
1950	2.1	7.0	12.7	0.6	2.5	24.9
1960	0.7	5.7	12.5	0.9	1.8	21.8
1970	1.2	4.6	10.5	1.1	1.1	18.5
1975	1.4	2.7	5.0	0.6	0.7	10.6
1976	1.4	2.5	4.4	0.4	1.0	9.7
1977	1.4	2.5	4.0	0.4	0.8	9.1
1978	1.4	2.5	4.0	0.4	0.8	9.1
1979	1.4	2.5	3.8	0.4	0.9	8.9
1980	1.3	2.4	3.3	0.4	1.1	8.5
1981	1.3	2.3	3.0	0.4	0.9	8.0
1982	1.3	2.2	2.6	0.3	0.7	7.1
1983	1.3	2.0	2.4	0.3	1.1	7.1
1984	1.3	2.1	2.8	0.3	0.9	7.4
1985	1.4	1.8	2.8	0.3	1.1	7.3
1986	1.4	1.8	2.5	0.3	0.9	6.8
1987	1.4	1.8	2.5	0.3	1.0	7.0
1988	1.5	1.7	2.7	0.3	1.3	7.5
1989	1.5	1.8	2.7	0.3	1.0	7.2

continued

September 10, 1991

MEMORANDUM FOR TONY SNOW

FROM: BOB SIMON

SUBJECT: GRAND CANYON

This article, which appears in the Grand Canyon Guide, is a good explanation of why the NPS and EPA decided to act against Navajo Generating Station. Note some of the made:

- o "On the days with the worst visibility, sulfates were responsible for 73% of the visibility reduction from manmade sources." (my emphasis) In other words, natural sources also reduce visibility.
- o Navajo's contribution to poor visibility was between 40 and 75%, but only on days when there was an atmospheric inversion trapping local sources of pollution. This condition only occurs 30% of the time in the winter, according to historical weather data.
- o The WHITEX study was a small sample over six weeks in 1987.

In sum, the worst case is that Navajo is responsible for 40%-70% of the visibility problem on 30% of the days between November and March when the park has its fewest visitors.

U.S. ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Assistant Administrator
For Air and Radiation

Christina

Attached is a set
of amendments for inclusion
in the Sept 18
Grand Canyon Speech.

Tom K.



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*** Implementing regulations released thus far:**

- **Key regulations implementing the acid rain program; these proposed rules, when finalized, will remove 20 billion pounds of pollutants from the Nation's air every year**
- **Final rule on automobile emission standards released on schedule; proposals for 16 more automotive rules released requiring cleaner fuels, cleaner cars, and better maintenance of engines and pollution control equipment. These rules together will achieve total pollutant reductions of over 13 billion pounds every year**
- **Final rule and three proposed rules to phase out production and use of chemicals that damage the Earth's ozone layer. This program will eliminate over one billion pounds of ozone-depleting chemicals each year**
- **Final rules on toxic emissions from industrial equipment and municipal waste incinerators, and a proposed rule on early voluntary reductions of toxic emissions, which together will reduce toxic emissions by almost one billion pounds**
- **Together, these regulations released to date will reduce pollution by over 35 billion pounds, almost two-thirds of the total we expect to be achieved by the Clean Air Act of 1990. We have moved quickly, and we will shortly propose the remainder of the implementing rules to get the rest of those promised reductions**
- **The market-based features of these rules will save over one billion dollars every year in compliance costs, compared to the cost of comparable command-and-control regulations**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 6 1991

THE ADMINISTRATOR

MEMORANDUM

TO: Phil Brady
Dave Demarest
Bob Grady
Boyden Gray
Roger Porter
Tony Snow

SUBJECT: President's Grand Canyon Remarks, September 18

Attached is a redrafted outline for the President's speech that includes some new language.

In my view, this event and the President's remarks afford us the opportunity to obtain significant credit for the Administration's environmental record.

A handwritten signature in dark ink, appearing to read "Bill Reilly".

William K. Reilly

2000

2000

I. INTRODUCTION

- Thanks to all; beautiful view; just visited some of the visibility monitoring equipment; look forward to hike this afternoon.

II. PROTECTING THE GRAND CANYON

- One of America's greatest natural treasures, the crown jewel of our national park system, and a source of pride and enjoyment for millions of Americans. But over the years, the Grand Canyon has been subjected to pollutants from many sources that increasingly befoul its air -- and that obscure and diminish its magnificent vistas.
- Today we have come to make amends, to reverse this wrong, and to return this precious natural resource to its original state. We are here to begin the process of cleaning up the air in the Grand Canyon. And I am proud to say that we are taking this major step as a result of a remarkable agreement among industry, government, and the environmental community.
- Unparalleled agreement resolving over a decade of legal battles, should serve as a model. Opposing parties came to the bargaining table, honestly and openly discussed their differences, and found solutions that protect the environment at a cost that all can afford.
- These parties included John McNamara of Salt River Project, Ed Norton of Grand Canyon Trust, and Bob Yuhnke of the Environmental Defense Fund -- and assisted by other leaders, such as Mark DeMichele of the Arizona Public Service Company. Their efforts were facilitated by Bill Reilly and his staff at EPA, and their agreement was endorsed by many in the environmental and industrial community. To all of you, my thanks and the thanks of your countrymen.
- It is worth noting that Federal clean air laws are explicitly written, not just to protect the health of the American public, but also to promote visibility. It's been the law for some time now, but this Administration is making it happen.
- And so to our critics who ask, "Where's the vision of the Bush Administration?" I say, "Come to the Grand Canyon." And I ask them, "How's this for vision?" We are the Administration that, quite literally, is going to insure that you can see better and farther in this great national park than at any time in recent history. I'm talking about real improvements in vision and

visibility, a bluer, clearer sky, and more stars at night.

- But protecting the Grand Canyon requires more than controlling the emissions of one power plant. Urban smog -- coming over the mountains from Los Angeles -- nearby industries, and automobiles all contribute to the Canyon's haze.
- Our program, under the new Clean Air Act, will address all of these problems:
 - * Autos: clean cars, clean fuels, and better maintenance; we will soon be announcing a new proposal on reformulated gas, also developed through a negotiation process, that will greatly reduce the pollution from Los Angeles that now contributes to the Grand Canyon haze.
 - * Urban smog: joint effort by EPA, States, industries, and the public to ensure steady progress toward meeting all air quality standards
 - * When we're finished, this Clean Air program will reduce the amount of pollution entering the air every year by 52 billion pounds -- 224 pounds per year for every man, woman, and child
- The Clean Air Act will also make the nation safe for industrial growth. It will get business "off the hook," and off the defensive, and allow for good and healthy growth.

III. THE CLEAN AIR ACT IN ACTION

- Summarize CAA regulations already released
- Keys to our success:
 - * Developing regulations by consensus: The vote to enact the Clean Air Act of 1990 was overwhelming in both Houses. It reflected a national consensus. This Administration has built that consensus right into its regulatory decision-making process in two landmark regulations (Navajo and Reformulated Gas).
 - * I should emphasize here that The Bush Administration believes in rigorous enforcement of environmental laws. Our numbers show a record level of enforcement activity. But we also believe in searching for alternatives to confrontation. This Navajo/Grand Canyon agreement is a product of that search -- and a payoff for those efforts. It

clearly shows that consensus building can be the best way to make environmental programs work.

- **Market-based regulations:**

- * **Reduce cost and achieve more environmental protection:** We will propose next week Acid Rain rules that will make it possible to reduce the cost of environmental controls at the Navajo plant by several hundred million dollars.
- * **Unleash American ingenuity and know-how from all sectors of the economy, large and small:**
 - Ethanol derived from American grain and methanol from natural gas to control carbon monoxide in cities like Denver
 - ARCO's new clean gasolines in California
 - Monsanto, the St. Louis-based chemical company, voluntarily reducing air toxic emissions by 90 percent.

- It's a "regulatory revolution" and there's more to come. I compliment the key actors: business for recognizing that the Clean Air Act reflects the deeply held aspirations of the American people, environmentalists for recognizing that there are sometimes better alternatives for faster progress than confrontation and litigation, and especially our own EPA for breaking with traditional regulatory approaches, and taking the risks of opening up its processes -- consulting, listening, and leading to results that benefit everyone. Everybody wins, especially the American people!

IV. CONCLUSION:

- Every American has the right, not only to breathe clean, fresh air, but to experience the mysteries of the heavens on a starry night, and to enjoy the full magnificence of this majestic canyon on a bright summer's day -- and every other day of the year.



1ST STORY of Level 1 printed in FULL format.

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November 29, 1989, Wednesday, Final Edition

SECTION: Part F; COMMENTARY; Pg. F1

LENGTH: 960 words

HEADLINE: Making \$3 billion vanish in a breeze

BYLINE: Warren Brookes; THE WASHINGTON TIMES

BODY:

The National Park Service, which let 1 million acres of Yellowstone National Park go up in dense, choking smoke in 1988 is suddenly worried about "visibility" at the Grand Canyon.

So much so, they are about to force electric power consumers of Arizona, Nevada and California to pay almost \$3 billion (\$144 million a year for 20 years) to increase average wintertime visibility in the Canyon from 148 miles to 155 miles. Even eagles will not notice that.

NPS and the Environmental Protection Agency will require the Navajo Generating Station of Page, Ariz., one of the cleanest coal-burning plants in the world (0.5 percent sulphur vs. 4 percent in the Midwest) to install costly limestone scrubbers.

Since the prevailing winds over the canyon are from the south and west through most of the year, and the NGS plant is 100 miles northeast of the Grand Canyon visitors center, neither the EPA nor the NPS say NGS contributes anything to summer Canyon haze.

But that's when the haze is the greatest, and when 95 percent of the visitors come. Wintertime visibility, already the highest of the year, has also been improving. From 1985-87 its 261-kilometer (148-mile) average was 5 percent higher than the 248 kilometer average from 1979-81, even though power generation was almost 12 percent higher. (See table.)

Furthermore, the total Canyon visitors in the December through February winter season was only 300,000. Since only 30 percent of the days are "visually impaired," the cost per visitor aided is \$1,600.

This didn't faze EPA's David Stonefield, who told us: "We're only talking about 5-7 mils-per-kilowatt-hour on the electric bill to ensure that visitors who pay thousands of dollars to come from around the world don't have their view impaired."

The problem is that from 1984-1988 there was absolutely no statistical correlation between the varying winter visibility at the Canyon and the varying output of the NGS plant, with visibility rising during peak power output and falling during low power output.

Mr. Stonefield said "I am not familiar with that data," but in fact the data is the product of an extensive five-year study called SCENES, which is in



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part funded and run by the EPA.

In spite of this, last September the NPS and EPA put out a highly deceptive videotape, shown on U.S. network television, claiming NGS was destroying the views at the Grand Canyon, even using summertime footage, when NGS has no impact at all.

The entire basis for this scurrilous tape is a single 60-day "study" called the Winter Haze Intensive Tracer Experiment (WHITEX). Deuterated methane gas was injected as a tracer into the smoke plume at the NGS plant. Collectors at the canyon found traces on 18 days out of 60.

At this point, even though less than 30 percent of the test had been analyzed, NPS and EPA stopped the analysis and made a conclusive blame-attribution of 38-68 percent to NGS, even though the study did not have attribution as its purpose.

Mr. Stonefield admitted that was the case, but said "the evidence of NGS attribution was so clear we felt we could act on it. Why didn't we analyze the other 70 percent of samples? We didn't have the funds to do it. It costs \$400 to analyze each sample."

Those familiar with the incredibly bad science routinely used by both NPS and EPA were not surprised. NGS consultant Dr. Jerry Shapiro said, "We thought we were participating in a scientific experiment to test methodology. Instead we had high-pressure science-abuse from beginning to end. To start with, the collection canisters may already have been contaminated when they were stored, incredibly, at the Page plant!

"It was downhill from there. There was insufficient data, inadequate study methods, and not nearly enough time. Numbers were massaged to make them conform to their own model.

"The claims were so extravagant as to be ludicrous. If 38-68 percent of the haze in winter was due to NGS, you would certainly see that in the five-year correlative data, but you don't."

Mr. Shapiro's lengthy formal critique, along with others, were submitted (as required by law) to a supposedly "independent" consultant, Ronald Henry, a paid contractor for NPS!

Even so, Mr. Henry's report "agreed with the facts presented by [NGS] and its contractors." He said "It is regrettable that regulatory pressures do not allow for full and leisurely consideration of the WHITEX data in the scientific literature before any attribution is attempted. . . . The WHITEX report is not a scientific document. It is an attempt to make the most sense out of the data that can be made in a limited amount of time."

Why is there such a rush to judgment on a problem that really doesn't exist?

"If you were to shut NGS down completely in the winter," Mr. Shapiro said, "you would not be able to see any difference at the Canyon. The only ones who'll notice are the ratepayers."



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The answer can be found in the stupidity of Congress, which in the 1977 Clean Air Act, ordered EPA to remediate any sources that produce "impaired visibility" in the parks. By not defining "impaired," the act could require remediation of the loss of visibility of 1 foot or less! In 1982, the Environmental Defense Fund took advantage of that open-ended language to go to court and force the EPA to set a deadline for determining all "plume blight" cases in which visual impairment can be traced to a single source.

That court order is now driving NPS and EPA to the obscene decision to waste \$3 billion of consumers' money to appease the EDF. It would be better to spend such money trying to fix up NPS' own well-documented ecological mismanagement.

Warren T. Brookes is a nationally syndicated economics columnist.

GRAPHIC: Illustration, NO CAPTION, By David Clark/Special to The Washington Times; Chart, GRAND CANYON VISUAL RANGE, By The Washington Times



28TH STORY of Level 1 printed in FULL format.

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March 4, 1991, Monday, Final Edition

SECTION: EDITORIAL; PAGE A12

LENGTH: 525 words

HEADLINE: 'The Ultimate Pay Per View'

SERIES: Occasional

BODY:

Last year, The Post's ombudsman, Richard Harwood, warned of the dangers of "Science in Washington."

" 'Scientific findings,' with heavy 'media' promotion and federal hype can have significant financial effect," he wrote in his June 6 column. "The public's consideration of these and other scientific issues is often contaminated (and often with help from the media) by politicians and their powerful allies among the special interests."

In light of these warnings, the editorial regarding EPA's proposal to improve Grand Canyon visibility ["The Ultimate Pay Per View," Feb. 16] was particularly ironic. It overlooks some important issues and appears to have been misled by the heavily promoted and questionable "scientific" assertions of the EPA and the National Park Service.

The editorial states that "On some days, visitors at the Grand Canyon can barely see its opposite rim." While it is true this natural phenomenon occasionally occurs -- especially during inclement weather -- this has been the case since the Grand Canyon was discovered hundreds of years ago.

More than a decade of government and industry research has shown that clouds, dust, forest fires, pollen and humidity are the dominant factors contributing to this natural phenomenon.

Man-made sources such as auto exhaust from the Los Angeles basin and copper smelters in New Mexico and Mexico account for about one-third of the haze. Power plants in the six-state Southwest region contribute just 6 percent. A single power plant like the Navajo Generating Station has been found to have little impact on visibility.

Also contrary to the editorial, a report by the National Research Council does not support EPA's proposal to install stringent 70 percent scrubbers at the clean-coal fired Navajo Generating Station.

This NRC report was merely a scientific critique of the controversial National Park Service's WHITEX experiment used by the EPA to cite the Navajo Generating Station as the major contributor to wintertime haze in the canyon.

Highlighting several deficiencies in the WHITEX experiment, the NRC concluded that EPA's evidence failed to show how much or how often the plant's emissions affect visibility in the Grand Canyon.



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While the NRC report states the Navajo Generating Station plant can have a "significant" contribution at times to haze, the report concludes the plant only makes a significant contribution when its emissions are mixed with extensive cloud cover. The report verifies that in the absence of clouds, aerosols from the station should have little effect on Grand Canyon visibility.

Unfortunately, the editorial ignores the data from the most extensive visibility study conducted in the United States, which clearly found that weather and humidity in the region are the main factors in visibility impairment -- not emissions from the plant.

Before endorsing a \$ 2.3 billion bill for electric customers in the West, The Post might first heed its own caution against "Washington science" and provide its readers with both sides of the issue.

D. MICHAEL RAPPOPORT Assistant General Manager, Government Affairs Salt River Project Phoenix

TYPE: LETTER



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February 16, 1991, Saturday, Final Edition

SECTION: OPINION EDITORIAL; PAGE A26

LENGTH: 438 words

HEADLINE: The Ultimate Pay Per View

SERIES: Occasional

BODY:

ON SOME DAYS, visitors at the Grand Canyon can barely see its opposite rim. In part that's because the canyon acts as a gathering point for pollution-laden winds from sites as distant as Southern California and northern Mexico. During much of the year, this makes it difficult to determine the amount of pollution that comes from particular locations. But in winter, the winds come from the northeast. It's then that one northern Arizona power plant accounts for significant amounts of the haze, according to the Environmental Protection Agency and the National Park Service.

In what would be the first use of federal law to protect the scenic vista of a national park, EPA Administrator William K. Reilly has proposed that the Navajo Generating Station should reduce sulfur dioxide emissions by 70 percent, at a cost of as much as \$ 2.3 billion. Over the years, however, the EPA had dragged its feet. In 1982 the Environmental Defense Fund sued to force the EPA to uphold provisions of the 1977 Clean Air Act that enforced "visibility standards" in national parks. The Defense Fund won in 1984, and as part of a court order, the EPA undertook a pollution study at the Grand Canyon.

Other federal officials are also on both sides of this fence. The National Park Service supports the EPA's call for a forced cleanup of emissions at the plant. The federal Bureau of Reclamation actually owns a 24 percent share in the generating plant, with the rest owned by a consortium of public and private utilities. Those owners say that the pollution studies are flawed and that the plant is not a primary factor. But the Navajo plant is one of the largest coal-fired plants in the West and one of the biggest producers of sulfur dioxide, releasing 12 to 13 tons of that pollutant every hour.

The EPA's proposal is also supported by two scientific studies. After the plant's owners questioned a 1987 analysis of canyon pollution, a second analysis was performed by the National Research Council, an affiliate of the National Academy of Sciences. That study said the Navajo plant contributes significantly to the haze that affects Grand Canyon views.

If the EPA proposal stands, the costs of the cleanup would be ultimately borne by taxpayers and the customers of the Navajo Generating Station. In the past, such costs have generally been justified in terms of health benefits and prevention of damage to the economy. This would mark the first time that such standards would be applied for purely aesthetic purposes. If there is one place in the United States where an investment in cleaner air is justified, it's the Grand Canyon.



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TYPE: EDITORIAL

SUBJECT: PARKS AND WILDERNESSES; POLLUTION CONTROL AND ABATEMENT; AIR
POLLUTION; ELECTRICITY GENERATION; ARIZONA

ORGANIZATION: GRAND CANYON; ENVIRONMENTAL PROTECTION AGENCY; NATIONAL PARK
SERVICE; NAVAJO GENERATING STATION

NAMED-PERSONS: WILLIAM K. REILLY

THE WHITE HOUSE

Office of the Press Secretary
(Grand Canyon, Arizona)

For Immediate Release

September 18, 1991

REMARKS BY THE PRESIDENT
IN ADDRESS TO GRAND CANYON COMMUNITY
IN EPA AGREEMENT SIGNING CEREMONY

El Tovar Hotel
Grand Canyon, Arizona

9:50 A.M. PDT

THE PRESIDENT: Thank you, Governor Symington. And thank all of you here for the warm welcome. And let me just salute the two members of the administration that are with me on the platform here: our Secretary of the Interior Manuel Lujan and, of course, the man you just heard from, our able EPA Administrator Bill Reilly. I particularly want to thank the members of Congress from Arizona that are with us today: Senator McCain, Senator DeConcini over here, and, of course, Representative Stump and Representative Kyl, also greeting us here today. So we have a good turnout. I'm glad you all are seated. And I wish you all were, but I will -- this isn't the shortest speech I've ever given either, so -- (laughter.)

But, look, I love coming back to this general area, though this will be my first trip down inside the Canyon. This spot where I was sitting reminds me of that old political adage: Never move backward. (Laughter.) It kind of reminds me of -- looks like something that started out in Washington as a trench and went over budget. (Laughter.) I love the outdoors. I hope that's clear to the America people by now -- the sports and the recreation and the sheer beauty of it.

Let me tell you, I've been privileged to travel all around the world, and I don't believe that anywhere you can find a better outdoor attraction than this. Many times what you don't see is as impressive as what you do. Here, as we look over the South Rim of the world's greatest natural wonder, we see Arizona skies, a kaleidoscope of beauty of the Grand Canyon, we see a place that has made even the most calloused observer gasp with awe.

We don't see smog, today. But sometimes smoke and fumes obscure this lovely view. And we're here to say today: no more.

The Navajo visibility rule, the rule that we will sign today, honors Teddy Roosevelt's admonition about the Grand Canyon. Here was his words -- they apply to today: "Leave it as it is. You cannot improve on it. The ages have been at work on it, and man can only mar it. What you can do is to keep it for your children, your children's children, and all who come after you, as one of the great sights which every American -- if he can travel at all -- should see."

Well, the visibility rule will help ensure cleaner skies and more breathtaking vistas for visitors. It helps preserve the spectacular treasure without shutting down the electricity-generating industry, and without forcing people to choose between environment and their jobs.

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If people think the revolution in the Soviet Union was spectacular, they ought to come here. Who ever thought that we'd be able to get the Grand Canyon Trust, the Environmental Defense Fund, the Salt River Project and the Arizona Public Service Company to share the spotlight. (Laughter.) But it's so good that they did. It is so wonderful that they are cooperating in this forward-looking manner -- partners in an historic agreement.

And so many people here deserve a hand -- Bill Reilly singled out some. I want to just mention, again, Governor Symington, the representatives of the environmental community and of the utility industry as well. I think we owe a special thanks to Bill Reilly of the EPA, our Administrator.

He has tried to promote a series of cooperative ventures based on the common-sense view that you can get further by seeking people's help than suing them. And the EPA's Green Lights program encourages the voluntary use of energy efficient lighting. Green Lights promotes energy conservation, which saves electricity and cuts down on pollution.

Our voluntary program to reduce toxic emissions has enlisted more than 200 companies, who together have promised to cut toxic emissions by more than 200 million pounds a year.

And today's agreement offers further proof that Bill's own brand of shuttle diplomacy has helped eliminate environmental gridlock and produce the kind of consensus that enables us to take care of our planet and our economy.

These agreements illustrate a crucial element of our administration's vision for America's future. Before I go further, I just have to ask some of the critics out there: How's this for the vision thing? (Laughter.)

Today's event celebrates the kind of civility and cooperation that our administration has tried to promote for our entire society. For too many years, Americans have divided into feuding camps -- people sparring over causes; special interests battling it out against special interests and so on. We have overlooked the fact that most Americans share a broader set of goals and beliefs, which I think we would all call the American Dream. We need to revive that dream and invite people to join us in pursuing it -- regardless of their party, their background or their ideology.

Most of us want a lot of the same things. Around here, for instance, everyone wanted to preserve the Canyon, and the local economy. And no one wants an environmental policy that permits the wanton destruction of our natural treasures. And nor can we afford a policy that makes the American worker an endangered species. Our policies should promote economic growth; create new jobs -- and still let everyone enjoy the grandeur of the outdoors. And, believe me, it can be done. It is being done.

We can achieve our most important goals only by working together -- taking advantage of our diverse skills, abilities, commitments and passions. And if we divide up like the Hatfields and the McCoy's, we don't accomplish anything worthwhile. We just destroy ourselves and those causes that we hold dear.

Ten years ago, I was Chairman of the Presidential Task Force on Regulatory Relief, then Vice President. And I called for greater use of informal negotiation techniques -- instead of litigation -- and for market-based approaches to controlling pollution. And this agreement shows that those innovations work. And so does the landmark Clean Air Act, which I signed last year -- and in the process broke a logjam that had prevented progress for a dozen years.

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Our administration has crafted a new, common-sense approach to environmental issues -- one that honors our love of the environment and our commitment to growth. And in just the last year, we've signed bills to prevent oil spills, protect the Antarctic. We've initiated a program to plant a billion trees a year around the country. And it's going well. We've launched a massive effort to protect our public lands.

And our cooperative efforts still go further. Just this summer the EPA and key environmental groups and the petroleum industry reached an extraordinary agreement on reformulated gasoline -- another giant step toward cleaner air -- and another step toward improving visibility right here at the Grand Canyon.

Recent world events make it clear that free markets and economic growth provide the firmest foundations for effective environmental stewardship. People tend to forget that environmental stewardship is a high-tech business, and it requires great ingenuity and insight. Science and technology give us tools for cleaning up our environment and keeping it clean. They help us identify our problems precisely, and develop efficient solutions.

Our genius will open up new frontiers of clean energy: nuclear power, solar power, geothermal power, and others that exist only in the imagination of our dreamers and innovators.

It's no surprise that the poorest nations -- those not blessed with prosperous, growing economies -- suffer the worst, most sweeping environmental degradation.

It's also natural that nations weighed down by these centrally-planned economies -- nations that don't enjoy free markets -- would experience horrendous pollution. Take a look at Eastern Europe. Or as we get a bigger window into the Soviet Union, take a hard look at the Soviet Union. The whole former socialist world: Clean air and water have been more scarce than consumer goods.

And in contrast, our economic expansion of the '80s was accompanied by an unprecedented improvement in air quality. Statistics -- I don't want to bore you with statistics -- but here are some EPA figures. Sulphur dioxide levels fell 24 percent in the '80s; carbon monoxide levels dropped 25 percent; suspended particulate emissions decreased 15 percent; and we had 87 percent less lead in our air at the decade's end than we did in 1980. And I promise you: We must and we will do even better in the '90s. Today's agreement represents a good start. And it will reduce sulfur dioxide emissions from the Navajo generating plant by 90 percent.

And in years to come, we will face tougher challenges, and our administration has taken steps to meet them. We've devoted significant resources to gathering crucial data about global warming, deforestation, ozone depletion and the polar icecaps -- all elements of global change.

And we've begun using satellites to develop subtle, sophisticated and useful models for studying our planet, for determining just what problems exist, and suggesting ways in which we can address them. And that is the key to sensible solutions. The space shuttle Discovery just this week, just back, placed in orbit a satellite that will measure ozone depletion. This launch got our mission to planet Earth off the ground, so to speak.

And the National Space Council, chaired by the Vice President, has pushed for ways to get space-based environmental research going now, not ten years from now, so we won't have to wait for these answers.

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We want to use science to help us solve our chief environmental problems. And Bill Reilly put it best in a recent newspaper piece that he wrote: "The environmental debate has long suffered from too little science. There has been plenty of emotion and politics, but scientific data have not always been featured prominently in environmental efforts, and have sometimes been ignored even when available." That was his quote, and I believe he is 100 percent on target. Good science hastens our progress toward a cleaner environment, and we ought to use it to our best advantage.

But we also must put our money where our mouth is. And in this year's budget alone, I asked for nearly \$1 billion for acquiring park land, protecting wetland and endangered species and enhancing recreation. But Congress has tentatively cut this budget by more than \$200 million.

And today I'd like to call on the United States Congress to join me in a crusade to preserve America's outdoors. On this year, the 75th anniversary of our Park Service, politicians shouldn't fund special interest projects at the expense of such national treasures as the Grand Canyon.

But after we talk about toxins and taxes, expenditures and innovations, we owe it to ourselves to stop and remember just why we're here -- we care.

Dave Beal, for many years the Chief Naturalist of the Grand Canyon National Park, has offered us all some simple advice: "Go out along the Canyon rim alone to watch dark shadows climb the colored walls as the sun drops to the horizon. Think about the eons of time represented by rock formations exposed to your view and the fossil record of life through the ages. Feel the bite of the wind on your cheeks and listen for the sound of distant rapids on the river far below. And finally, dwell for just a moment on thoughts about yourself and the role you play on this Earth." Real, philosophical, practical, wonderful words.

A wise environmental policy enriches everyone. And that's what so many of you here today have done. You've enriched the American people with your coming at it from a cooperative side of business; whether you've dedicated your life to the environment through one of these environmental organizations represented today; or whether you're part of the marvelous public servants that serve the parks of this country. This park, and this nation, and certainly, this President, owe all of you a great debt of thanks. And thank you all.

And now, I'd like to ask the representatives of the Grand Canyon Trust, the Environmental Defense Fund, the Salt River Project and the Arizona Public Service Company to witness Bill signing this historic agreement. And isn't this a fitting, wonderful time to say may God bless the United States of America. Thank you very, very much. (Applause.)

(The Agreement is signed.)

END

10:05 A.M. PDT