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**In Pursuit of Clean Air:
A Data Book of Problems and
Strategies at the State Level**

Supplement

D. B. Garvey, S. B. Moser, and D. G. Streets

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SUPPLEMENT

by

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August 1980

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PREFACE

The Clean Air Act Amendments of 1977 reaffirmed a national commitment to clean air and set rigorous requirements to achieve and maintain the National Ambient Air Quality Standards across the nation. The solutions to air quality problems, however, must take place at the state and local levels. The strategies adopted by the states concern the U.S. Department of Energy because it must identify possible conflicts between a national energy policy of increased coal use and the pursuit of clean air.

To summarize the state strategies, we prepared a five-volume report on air quality, nonattainment areas, and attainment strategies of each state, based in part on the revised State Implementation Plans (SIPs) submitted in accordance with the 1977 amendments. The report is entitled In Pursuit of Clean Air: A Data Book of Problems and Strategies at the State Level, Argonne National Laboratory Report ANL/EES-TM-90, Vols. 1-5 (February 1980).

This report, a supplement to the five-volume set, summarizes changes in the status of revised SIPs since the previous report. It also includes maps of nonattainment areas that have been redesignated between May 1979 and July 1, 1980. In addition, maps and data relating to county-level coal production, coal reserves, and coal quality are presented. Finally, state maps of PSD Class I areas complete the air quality data.

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LIST OF ABBREVIATIONS

Btu	British thermal unit
CO	carbon monoxide
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
EX-EX	expected exceedances
HC	hydrocarbons
I&M	inspection and maintenance
MPR	multipoint rollback
NAAQS	National Ambient Air Quality Standards
NO _x	nitrogen oxides
NSO	nonferrous smelter order
O ₃	ozone
PSD	prevention of significant deterioration
RACT	reasonably available control technology
SIP	state implementation plan
SO ₂	sulfur dioxide
TSP	total suspended particulates

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ABSTRACT

The Clean Air Act Amendments of 1977 and EPA regulations set stringent requirements for the control of emissions in areas where the National Ambient Air Quality Standards were being exceeded. This supplement updates a previous five-volume summary of nonattainment area designations and attainment strategies of the states as of July 1, 1980. It also contains maps of PSD Class I areas and additional information on coal production, coal reserves, and coal quality.

1 INTRODUCTION

The Clean Air Act Amendments of 1977 set rigorous requirements for the cleanup of those areas of the United States where the pollutants in the ambient air exceeded the levels set by the National Ambient Air Quality Standards. The legislation established December 31, 1982, as a deadline for attainment, with a possible extension to December 31, 1987, for two of the six criteria pollutants. To ensure that timely attainment would occur, Congress also set a deadline for the submission of state implementation plans (SIPs) to clean up nonattainment areas. These SIPs outlined additional controls for existing sources and the review procedures and emission limits for new sources. The state plans were to be submitted to the U.S. Environmental Protection Agency (EPA) by January 1, 1979, and to be approved by EPA and in effect by July 1, 1979. The consequences of missing the deadlines were restrictions on new source construction and the possible loss of certain federal funding. In addition, the law required EPA to promulgate regulations if states failed to adopt adequate implementation plans.

The EPA, charged with administering the 1977 amendments, set guidelines for the designations of nonattainment areas and for the contents of approvable SIPs. The states designated areas and then submitted plans for either different pollutants, different areas, or both. The EPA reviewed the designations and the SIPs, either approving or disapproving them. As of July 1, 1980, one year after the original deadline for approval, a number of SIPs for subcounty nonattainment areas are still not complete. Only two states -- Wyoming and Mississippi -- have complete, EPA-approved plans. The remaining states continue to redesignate nonattainment areas, submit partial plans, and correct deficiencies in conditionally approved plans.

The location of nonattainment areas and the SIPs for those areas are matters that directly concern energy policy makers. For example, any proposal to reduce oil consumption by converting existing oil-burning facilities to coal must address the effect of possible increased emissions on nonattainment areas and the likely restrictions the sources would face. To make this and similar tasks easier, we compiled a data book of nonattainment areas, SIP attainment strategies, and other air-quality policy data. This information was published in a five-volume report covering all 48 contiguous states.¹

This present volume supplements the earlier report by updating EPA regulations, nonattainment designations, and SIPs for nonattainment areas. Section 2 summarizes EPA regulatory actions between May 1979 and July 1980; Sec. 3 provides new maps of U.S. counties containing nonattainment areas as of July 1, 1980, and discusses changes in nonattainment designations; and Sec. 4 addresses new developments in SIP attainment strategies. Appendix A presents maps of the actual subcounty areas that have been redesignated as nonattainment since May 1979 (the date of material in the five-volume report). Appendix B provides state maps of coal production levels and coal quality at the county level, plus tables of coal reserves and additional coal production and quality data. In Appendix C, state maps illustrate the locations and sizes of all mandated Prevention of Significant Deterioration (PSD) Class I areas. Finally, Appendix D contains maps of the county names for all the states covered in Appendix B.

2 EPA REGULATORY ACTIVITIES

2.1 BACKGROUND

According to the 1977 Clean Air Act Amendments and subsequent EPA regulations, states were required to submit new state implementation plans for all nonattainment areas by January 1, 1979. The SIPs were to outline strategies and regulations necessary to attain the standards for the criteria pollutants -- sulfur dioxide (SO_2), nitrogen oxides (NO_x), total suspended particulates (TSP), carbon monoxide (CO), and ozone (O_3) -- by December 31, 1982. A five-year extension for attainment of the CO and O_3 standards to December 31, 1987, was possible if the SIP indicated that, despite the imposition of reasonably available control technology (RACT) on stationary sources of hydrocarbons (precursors of ozone), attainment could not be achieved by the earlier deadline. If a state failed to have an approved SIP in effect by July 1, 1979, EPA would impose sanctions on that state. No new major sources of a pollutant could be built in an area that was designated nonattainment for that pollutant, and federal funds for highway projects and sewage treatment plants could be restricted or withheld.

2.2 CONDITIONAL APPROVAL

Only one state -- Wyoming -- actually had an EPA-approved SIP in effect by the 1979 deadline. The EPA developed several administrative procedures to avoid imposing sanctions on many states. The agency accepted, reviewed, and approved submissions of partial SIPs (e.g., plans for an individual nonattainment area or plans for a particular pollutant) rather than holding up the process until states submitted SIPs for all nonattainment areas. Furthermore, EPA made possible the conditional approval of a revised SIP. If the SIP was substantially acceptable, with only minor deficiencies, approval was granted, based on the state's agreement to correct the deficiencies by an EPA-determined deadline. Sanctions were not imposed and the state was given time to complete the SIP.

Each conditional approval included a deadline (typically nine months from the action) for the state to submit a correction. In November 1979, EPA declared that conditional approvals would not be extended beyond the time originally given to correct the deficiencies.² It said that "a second conditional approval is not an available option." If a state failed to correct the deficiencies by the conditional approval deadline, EPA planned to simply declare the existing SIP disapproved and impose the restrictions on new sources in nonattainment areas.

By May 1980, six states (Colorado, Maine, Massachusetts, North Carolina, New Hampshire, and New York) missed deadlines for corrections of conditionally approved SIPs. The EPA considered reinstating the ban on new sources,³ but has not yet formally disapproved any conditionally approved SIP. (See Sec. 4.1 for a detailed discussion of states with conditional approvals and partial submissions.)

2.3 GUIDELINES FOR SIPS WITH EXTENSIONS

States that requested extensions of the deadline for O₃ and CO attainment are to submit further SIP revisions by July 1, 1982. These revisions must include strategies for attainment by December 31, 1987. The EPA expected that the states would collect the data needed to prepare the SIPs in 1980. Consequently, in 1979 the agency issued air quality and emission data requirements for models that could be used to project attainment.⁴ Different levels of ozone modeling were suggested for the major urban areas with deadline extensions, i.e., more-complex dispersion models for the areas with the most severe nonattainment (Boston; New York; Philadelphia; Baltimore; Washington, D.C.; Chicago; Houston; St. Louis; and Los Angeles). As of July 1980, EPA was still preparing criteria for SIPs for ozone and had not promulgated the requirements.

States also could have requested an 18-month extension of the deadline for submitting an SIP for the attainment of secondary standards. The extension was to be approved if the state could demonstrate that attainment would require emission reductions beyond those achievable with RACT applied to stationary sources. If an extension was granted, a revised SIP was to be submitted by July 1, 1980, and to be approved by January 1, 1981.

Secondary standards differing from primary standards have been set only for SO₂ and TSP. Only six areas in the nation violate the secondary SO₂ standards; secondary TSP violations are much more widespread. All of the extensions requested for secondary standards were for TSP. The states typically indicated that attainment would require control of nontraditional sources of particulates (for example, resuspended road dust, construction and demolition dust, tire particles, dust from unpaved roads). Control techniques for these nontraditional sources are not well developed and have not been covered in any EPA Control Guidance Document. The EPA, however, plans to enforce the deadline for SIP submissions.² The 1977 amendments did not establish any deadline for attainment of the secondary standards other than "as expeditiously as possible." Consequently, according to a recent EPA memo,⁵ the agency will not penalize new sources if an SIP for the attainment of the secondary standards is late.

2.4 IMPACT OF REVISED PSD REGULATIONS

The EPA's regulations for clean air areas (PSD regulations) were reviewed in the court case of Alabama Power et al. vs. Costle.⁶ Although the rules were for PSD areas, the definition of an emissions source subject to review and the geographic applicability of rules affect nonattainment regulations as well. Consequently, revised PSD regulations promulgated August 7, 1980, also addressed the requirements for nonattainment areas.

2.4.1 Definition of Major Source

Under the new PSD rules, new sources with the potential to emit more than 100 tons per year of a criteria pollutant will be reviewed for air quality impacts and operators of such sources will need a permit before beginning construction. "Potential to emit" is defined as the maximum design

capacity of the source, except as constrained by federally enforceable permit conditions. These permit conditions include emission limits, hours of operation, and type of fuel burned. This replaces the previous definition, which was the maximum design capacity of the source without the addition of control equipment. The new definition requires fewer sources to undergo new source review.

The definition of a source depends on its location. All major sources have the potential to emit more than 100 tons per year. In nonattainment areas, however, overall emissions from a "plant" are to be reviewed as well as emissions from each "installation" at a plant. In contrast, a major source in PSD areas is considered to be all the "pollutant-emitting activities" in the same industrial grouping or located contiguously. Similarly, in a PSD area, a plant that increases emissions will not be subject to new source review if it is accompanied by reductions elsewhere in the same plant so that no net increase in emissions results. In nonattainment areas, major new installations within a plant will be reviewed regardless of reductions in emissions elsewhere in the facility.

The EPA argues that this dual definition of source is necessary to reduce total emissions, require the lowest achievable emission rate, and attain NAAQS in nonattainment areas. Agency officials say that the dual definition will apply to only "about 1% of the nation's facilities," since most facilities are single installations, but "plant complexes where the dual definition would come into play represent roughly 10% of the nation's pollution."⁸

2.4.2 Geographic Applicability

The August 1980 rules clarified that new source review in PSD and nonattainment areas is to be pollutant-specific. If a major source of a pollutant is located in an area designated nonattainment for that pollutant, then the requirements of offsets and lowest achievable emission rate apply. Nonattainment review is meant to be an exception to PSD review. Thus the PSD rules apply to any new major source of a criteria pollutant when the source is located outside a nonattainment area.

2.4.3 Fugitive Dust

The court also decided that EPA's definition of fugitive dust was incorrect. Instead of being "particulate matter composed of soil which is uncontaminated by pollutants resulting from industrial activity," fugitive dust was simply a particular kind of fugitive emission. In response, EPA deleted the definition from PSD and nonattainment regulations. This deletion may seriously affect EPA policy toward rural fugitive dust as a cause of TSP nonattainment. Under that policy, states could redesignate areas as attainment if they could demonstrate that violations were the result of natural rural dust and not man-made industrial particles. Many states, especially in the arid West and Midwest farming regions, applied the fugitive dust exemption. Iowa, for example, used it to redesignate four nonattainment areas. The possible loss of this exemption could make TSP nonattainment a more serious, longer-term problem, although EPA has not yet made any policy statement on the exemption.

3 NONATTAINMENT AREAS

3.1 REDESIGNATIONS OF AREAS

Nonattainment areas for the criteria pollutants were initially designated in May 1978.⁸ Changes in designations have been proposed and some accepted and promulgated by EPA since that date. These redesignations are not necessarily to attainment status. More frequently, a state has successfully presented a case of inadequate or disputed monitoring data and requested a redesignation to unclassified. In addition, a number of redesignations have been proposed by the states and accepted by EPA, but are waiting out the required public-comment period for final promulgation. Only those redesignations listed as final rulings in the Federal Register are included in this report.

In our previous report, we provided maps of nonattainment areas as of May 1979. In this supplement, maps of U.S. counties containing nonattainment areas are current as of July 1, 1980 (Figs. 3.1-3.5). Figures 3.6-3.9 present maps of only those counties with areas that were redesignated between May 1979 and July 1980. In Figs. 3.6 and 3.7, the areas of TSP and SO₂ nonattainment are shaded to indicate the designation as of July 1980, without distinguishing the previous designation. For example, an area redesignated as TSP secondary nonattainment originally could have been an area of primary violation or of attainment. No areas have been redesignated for NO_x; consequently only one map (Fig. 3.5) is provided. Table 3.1 compares the number of counties in May 1979 and July 1980 that contain nonattainment areas for the primary standards, summed by federal region (Fig. 3.10 displays the federal regions).

In general, the number of counties containing nonattainment areas has been slightly reduced since May 1979. There have been no changes at all in Region VI and changes only for O₃ in Region II and SO₂ in Region X. Six counties contain nonattainment SO₂ areas that have been redesignated -- two in Region V and one each in Regions II, III, IV, and X. The total number of counties containing nonattainment areas for CO decreased by two. One county in Region I has become nonattainment, while redesignations to attainment or unclassified occurred in Regions IV and IX.

Ozone continues to be the most widespread nonattainment pollutant, with 524 counties containing nonattainment areas. The reduction from 571 in 1979 resulted when EPA relaxed the ozone standard.

Total suspended particulates remain the second most serious nonattainment problem, with 227 counties containing nonattainment areas for the primary standards in July 1980. This is a decrease of 21 counties from the May 1979 total. Most of these redesignations, however, have been changes to violations of the secondary standard, not redesignations to attainment. Regions II, VI, and X had no official redesignations for TSP. There were no additional primary TSP nonattainment areas designated, and only one new designation for secondary TSP nonattainment (in Illinois).

Fig. 3.1 U.S. Counties Containing Nonattainment Areas for SO₂ as of July 1, 1980

Fig. 3.2 U.S. Counties Containing Nonattainment Areas for TSP as of July 1, 1980

Fig. 3.3 U.S. Counties Containing Nonattainment Areas for CO as of July 1, 1980 .

Fig. 3.4 U.S. Counties Containing Nonattainment Areas for O_3 as of July 1, 1980

Fig. 3.5 U.S. Counties Containing Nonattainment Areas for NO_x
as of May 1979 and July 1980

Fig. 3.6 U.S. Counties Containing Redesignated Nonattainment Areas for SO_2 :
Changes between May 1979 and July 1980

Fig. 3.9 U.S. Counties Containing Redesignated Nonattainment Areas for O₃:
Changes between May 1979 and July 1980

Table 3.1 Number of Counties in Violation of Primary NAAQS.
Designations as of July 1, 1980, Compared to May 1979

Federal Region	Total No. of Counties ^a	Number of Counties in Nonattainment for: ^b				
		O ₃	TSP	CO	SO ₂	NO _x
I	67	63/56	12/11	14/15	2/2	0/0
II	83	83/51	3/3	40/40	1/1	0/0
III	248	90/90	31/24	8/8	11/10	0/0
IV	746	53/49	33/30	11/10	12/11	0/0
V	524	158/155	63/62	29/29	46/44	1/1
VI	496	39/39	16/16	6/6	1/1	0/0
VII	411	17/14	20/14	6/6	3/2	0/0
VIII	292	14/11	19/17	15/15	6/6	1/1
IX	89	45/45	37/36	29/27	8/8	5/5
X	119	9/9	14/14	11/11	3/2	0/0
Total	3075	571/524	248/227	169/167	93/87	7/7

^aDoes not include independent cities.

^b1979 data are presented first; 1980 data follow slash.

3.2 REDESIGNATIONS AT THE SUBCOUNTY LEVEL

The maps of counties containing nonattainment areas have been supplemented by maps of the actual subcounty areas. These subcounty maps are presented in Appendix A, along with tables that summarize air-quality changes for each state. If a state or area is not addressed in this supplement, then its attainment status has not officially changed since the preparation of the five-volume report.

3.2.1 Sulfur Dioxide

Sulfur dioxide areas were redesignated from nonattainment to attainment in Pennsylvania, Ohio, Kentucky, and Missouri. In Washington, the SO₂ nonattainment area was redesignated to unclassified, because EPA claimed that a copper smelter was using an unauthorized, supplementary control system. The smelter company claimed that the system was authorized. After considerable discussion, EPA agreed to designate the area as unclassified until the agency's nonferrous smelter order (NSO) regulations are complete. The smelter probably will be eligible for an exemption.

In all other redesignations, the source that caused the violation was brought into compliance with SIP emission limits or closed down. For example, Ohio redesignated an area in Trumbull and Mahoning Counties after Youngstown's Sheet and Tubing Co. closed its steel plant. In Kentucky, Greenup County reached attainment when a sulfuric acid plant complied with SIP emission limits. In Boyd County, Kentucky, additional controls on a refinery and the shutdown of a chemical plant brought attainment of the SO₂ standard. Missouri's Bixby County nonattainment area surrounded an out-of-compliance

primary metals facility. When the source complied, the area attained the standard. In the Allegheny air basin of Pennsylvania, part of the area around Pittsburgh's steel industry was redesignated from primary nonattainment to attainment, and another part of the air basin was newly designated as violating the secondary SO₂ standard. In general, the SIP attainment strategies for SO₂ seem to be working -- as sources achieve compliance or close down, the standard is attained.

3.2.2 Total Suspended Particulates

Most redesignations of TSP areas were from primary nonattainment to secondary and from secondary nonattainment to attainment or unclassified. In Pennsylvania, for example, seven primary nonattainment areas were reclassified as secondary nonattainment and two secondary nonattainment areas were redesignated as attainment. Similar patterns occurred in California, Colorado, Maine, and Iowa. Only in Missouri and Illinois have areas classified as primary nonattainment been redesignated directly to attainment. The Illinois SIP indicated temporary construction activity around Springfield was responsible for the violations; with the end of the construction, attainment was achieved. No information was available on the redesignation from primary nonattainment to attainment for the area around Madrid in Audrain County, Missouri.

3.2.3 Nitrogen Oxides

There were no changes in the designations for this pollutant. The Colorado SIP noted that the Denver area, contrary to its designation, was actually in attainment of the standards in 1979; however, the state has not yet requested redesignation.

3.2.4 Carbon Monoxide

One new nonattainment area has been designated for CO -- Nashua, New Hampshire, which was changed from unclassified. Florida's nonattainment area in Broward County (north of Miami, including Fort Lauderdale) and California's Tulare and Kings Counties have all been changed from nonattainment to unclassified.

3.2.5 Ozone

Ozone nonattainment areas were typically large geographic areas the size of counties or air basins. The entire states of New York and Vermont were initially designated as nonattainment. Redesignations have reduced the nonattainment area to about half of each state. Major redesignations were also made in Maine and New Hampshire. Florida, Iowa, Illinois, Kentucky, and Colorado each changed the nonattainment designations for several counties.

4 REVISED SIPS

4.1 OVERVIEW OF REVISED SIPS

Revised SIPS were to include the following data for the pollutant for which an area was designated nonattainment: an emission inventory; emission limit on existing sources; a procedure for new source review; and a strategy for making "reasonable further progress" toward attainment of the standard by the statutory deadline. The EPA regional offices reviewed the SIPS and recommended appropriate action -- approval, disapproval, request for more information and continued review, or, if a plan was judged to comply substantially with the regulations, conditional approval. Final promulgation of the ruling was made by EPA headquarters and published in the Federal Register.

As of July 1, 1979, only Wyoming had a complete, revised, EPA-approved SIP for nonattainment areas. One full year later, only Mississippi had joined Wyoming as a possessor of an approved, revised SIP. Both states had limited nonattainment problems. Wyoming has three source-specific TSP nonattainment areas and Mississippi has one TSP nonattainment area. Two states have had a nonattainment SIP disapproved -- South Dakota and Colorado. Although South Dakota has only one nonattainment area (for TSP), its SIP was disapproved because of deficiencies in its new source review procedures. Colorado's plan was disapproved because it failed to include an inspection and maintenance program, as required for SIPS requesting an extension of the CO or O₃ deadline.

Figure 4.1 displays the status of SIPS for nonattainment areas as of July 1, 1980. Fourteen states have had complete SIPS approved either conditionally or without reservation, 21 states have submitted complete plans, parts of which are still under review, and 10 state plans are still not complete. One state, North Dakota, has no nonattainment areas. The SIPS have been submitted piecemeal for specific areas and pollutants and EPA has acted on the SIPS in the same fashion. Consequently, the map is a significant simplification of the status of SIPS.

For an O₃ or CO nonattainment area, any SIP that included an extension of the attainment deadline to December 31, 1987, needed an inspection and maintenance (I&M) program for motor vehicles. Figure 4.2 displays the status of these I&M submissions on July 1, 1980, and indicates that six states have incomplete plans. Since that date, Colorado had a program approved (July 10, 1980) and the Ohio legislature passed the necessary laws. Indiana maintains that existing laws give the state the necessary enforcement power. The California legislature failed to pass the needed laws in the current session and so its I&M plan is still incomplete. New York's plan to improve public transportation was rejected by EPA as inadequate to attain the O₃ and CO standards. In Kentucky, two counties (Jefferson and Boone) are setting up an I&M program, while two other counties (Campbell and Kenton) needing the program have refused to comply. Officials in the noncomplying counties said that the area is willing to accept sanctions on funding since only one highway project will be affected. The I&M program, county officials said, was projected to reduce emissions by only 1%, and "the cost would not be justified economically or environmentally."¹⁰ As of November 1980, only California and the two counties in Kentucky still lacked an I&M program.

Fig. 4.2 Status of Inspection and Maintenance Programs as of July 1980

4.1.1 Detailed Status of SIPs

Table 4.1 presents the status of SIPs as of July 1980 on a state-by-state basis, organized by federal region. The table lists the SIP status by pollutant and by specific nonattainment area, if the EPA regional office has acted on individual areas. Data for the table came from the EPA headquarters in North Carolina and from conversations with staff members in EPA regional offices.

The classification "under review" covers cases where the SIP has recently been submitted (such as the TSP plan for Pocatello, Idaho, submitted in April 1980), as well as cases where the SIP had been submitted in 1979 (such as New York's CO/O₃ plan) but is still under review. We do not have adequate information to state how close these SIPs are to final EPA action.

Only 10 states have areas where no plan has been submitted. Some states, however, have submitted plans since July 1980, the date of the table. For example, Minnesota submitted plans in August and September 1980 for all areas except the TSP nonattainment area in International Falls. Pennsylvania has not yet submitted plans for Allegheny County (the area around Pittsburgh) because a modeling error delayed the analysis. Indiana has not completed TSP plans for the counties of Lake (Gary and Hammond), Vigo, and Clark. Ohio submitted a state plan for SO₂ that is still under review by EPA. However, the state plan is not necessary to comply with the Clean Air Act deadlines since the EPA is administering its own strategy for SO₂ in Ohio, developed in the absence of an approved state plan since 1970. State officials estimate the Ohio TSP plan is at least a year away from approval. Arizona withdrew its SIP for SO₂ pending resolution of a disagreement with EPA over appropriate modeling (see Sec. 4.2.1).

Table 4.2 summarizes the status of SIPs by pollutant. Twenty-four of the 48 contiguous states contained nonattainment areas for the primary SO₂ standard. As of July 1980, 6 complete state plans for SO₂ had been approved or conditionally approved; 5 states had received conditional approval of a portion of the SIP, and 12 states have plans either still being prepared or under review. Only one state has not submitted any plan at all; however, as noted above, this is Arizona's withdrawn plan. Thirty-nine states were required to prepare TSP plans. By July 1980, 15 complete plans were approved or conditionally approved, 8 states had part of their SIPs conditionally approved, 10 plans were partially under review or in preparation, and 4 states had failed to submit any plan at all. Of these last four, Minnesota has since submitted a plan, Kansas and Nebraska are still preparing SIPs but have limited nonattainment problems, and Ohio, according to state officials,¹¹ is more than a year away from approval.¹⁰ All 38 states needing a plan for CO attainment have submitted documents, although three plans are incomplete. Of the 43 states required to prepare SIPs for O₃ nonattainment, only Nebraska failed to submit any plan; 25 plans are approved; and 14 are still under review.

4.1.2 Sanctions

According to the 1977 Clean Air Act Amendments, any primary nonattainment area not covered by an EPA-approved, revised SIP by July 1, 1979, was

Table 4.1 Status of Revised SIPs for Primary Standard
Nonattainment Areas, as of July 1, 1980

Federal Region	State	Nonattainment Pollutant ^a					Areas Subject to Partial Action
		SO ₂	TSP	CO	O ₃	NO _x	
I	Conn.	X	CA, R	A	A	X	TSP: Waterbury (CA); Greenwich (CA)
	Maine	CA	CA	CA	CA	X	
	Mass.	X	CA, R	R	R	X	TSP: Worcester (CA)
	N.H.	CA	CA	CA	CA	X	
	R.I.	X	R	R	R	X	
	Vt.	X	X	CA	CA	X	
II	N.J.	X	X	CA	CA	X	
	N.Y.	CA	CA	R	R	X	
III	Del.	X	X	X	CA	X	
	Md.	X	R	R	R	X	
	Penn.	N, R	N, CA	CA	CA	X	SO ₂ : Allegheny Co. (N); other areas (R)
	Va.	X	X	R	R	X	TSP: Allegheny Co. (N); other areas (CA)
	W. Va.	R	R	X	R	X	
IV	Ala.	R	A	X	A	X	
	Fla.	CA	X	X	CA	X	
	Ga.	X	CA	CA	CA	X	
	Ky.	R	R	R	CA	X	
	Miss.	X	A	X	X	X	
	N.C.	X	X	CA	CA	X	
	S.C.	X	CA	CA	CA	X	
	Tenn.	A	A, N	A, CA, R	R	X	TSP: Bristol, Campbell, Anderson and Knox Cos. (A), Chattanooga, Memphis and Columbia (N)
							CO: Knoxville (A), Memphis (CA), Nashville (R)
V	Ill.	CA, R	CA	CA	CA	CA	TSP: All areas (CA) except those with iron and steel sources
	Ind.	R, N	R, N	R, N	R, N	X	SO ₂ : Lake, Laporte, Marion, Vigo Cos. (R), Wayne Co. (N)
							TSP: Marion, Dubois Cos. (R), Lake, Vigo, Clark Cos. (N)
	Mich.	A, R	CA, R	A, R	CA	X	CO and O ₃ : Marion Co. (N), other areas (R)
							TSP: All areas (CA) except those with iron and steel sources
							SO ₂ : Midland Co. (A), Ingham Co. (R)
	Minn.	R, N	N	R	A	X	CO: Saginaw (A), Detroit (R)
	Ohio	X	N	R	R	X	SO ₂ : Rochester (N), Twin Cities (R)
VI							SO ₂ : Nonattainment SIP not required, EPA cur- rently enforcing SIP
	Wis.	R	R	R	R	X	
	Ark.	X	X	X	CA	X	
	La.	X	X	X	CA	X	
	N.M.	CA, R	CA	CA, R	CA	X	SO ₂ : Grant Co. (CA), San Juan (R)
							CO: Las Cruces (CA), remainder (R)
	Okla.	X	CA	CA	CA	X	
	Texas	X	CA, R	A	CA	X	TSP: San Benito, Brownsville, Corpus Christi 1 and 2, Dallas 1 and 3, El Paso (CA)
VII	Iowa	R	CA	A	CA	X	TSP: Des Moines, Cedar Rapids, Davenport, Mason City (CA), other areas redesignated as secondary violations
	Kans.	X	N	N, R	N, R	X	CO and O ₃ : Wichita (N), Kansas City (R)
	Mo.	A	CA, N	CA	CA	X	TSP: St. Louis, Kansas City (CA), St. Joseph (N)
	Neb.	X	N	N, R	N	X	CO: Lincoln (R)

Table 4.1 (Cont'd)

Federal Region	State	Nonattainment Pollutant ^a					Areas Subject to Partial Action
		SO ₂	TSP	CO	O ₃	NO _x	
VIII	Colo.	X	CA	D	D	CA	CO and O ₃ : D as a result of failure to include I/M SO ₂ : Anaconda, Laurel Cos. (A) TSP: Columbia Falls (A), Colstrip, Missoula, Butte (CA) CO: Billings (CA), Missoula (D)
	Mont.	A, R	A, CA	CA, D	R	X	
	N.D.	X	X	X	X	X	
	S.D.	X	D	X	X	X	
	Utah	A, D	D	A, R	R	X	
	Wyo.	X	A	X	X	X	TSP: New source review procedures inadequate SO ₂ : Cedar City (A), Salt Lake and Tooele Cos. (D) CO: Bountiful (A), Ogden, Provo, Salt Lake City (R)
IX	Ariz.	N	R, N	R	R	X	SO ₂ : Pocatello (N), Silver Valley (R)
	Calif.	R	R	R	R	R	
	Nev.	R	R	R	R	X	
X	Ida.	N, R	N, R	R	X	X	SO ₂ : Pocatello (N), Silver Valley (R) TSP: Lewiston (N), Pocatello, Silver Valley, Soda Spring (R)
	Ore.	X	CA	CA	CA	X	
	Wash.	R	CA, R	A, CA, R	CA	X	
							TSP: Seattle-Tacoma, Vancouver, Spokane, Clarkson (CA), Yakima, Walla Walla, Richland (R) CO: Yakima (A), Seattle-Tacoma (CA), Spokane

^aKey -- X: no primary nonattainment area
A: approved
CA: conditionally approved
R: submitted, under review
N: not submitted
D: disapproved

Table 4.2 Summary of Status of Revised SIPs for Primary Nonattainment Areas, as of July 1980

Status	Number of States with SIP for Pollutant				
	SO ₂	TSP	CO	O ₃	NO _x
Approved or conditionally approved	6	15	15	25	2
Conditionally approved (partial)	5	8	6	-	-
Under review	8	7	13	14	1
Not submitted	1	4	-	1	-
Disapproved	-	2	1	1	-
Under review or not submitted	4	3	3	2	-
Total	24	39	38	43	3

to be subject to sanctions -- new sources were to be banned and federal funds for highway and sewage treatment plants were to be restricted. The sanctions were imposed, at least technically, as soon as the deadline passed.

The limit on federal funds for highways required an agreement on procedures between EPA and the Department of Transportation (DOT). The two agencies published an initial proposal in the Federal Register in June 1979¹² and jointly promulgated a final ruling in April 1980.¹³ The funding limits apply to nonattainment areas for CO and O₃ where transportation measures are needed as part of an attainment strategy. In both proposed and final rules, the EPA procedures are: (1) identify areas where an SIP with transportation measures is needed and where "reasonable efforts towards submittal" are lacking; (2) publish findings in the Federal Register 60 days later, if negotiation with the state fails; (3) allow a public comment period of 30 days; (4) notify DOT of the final ruling on federal funding limits; and (5) publish the ruling in the Federal Register. After the final ruling is published, the Federal Highway Administration will not approve any projects or award grants "... other than for safety, mass transit, and transportation projects related to air quality improvement."¹³ Similarly, EPA will not award any grants except for exempt activities. Whenever an EPA grant is denied, the agency will keep the grant money available for the applicant for one year.

In its first ruling, EPA decided that Colorado exhibited a lack of "reasonable effort" after the state legislature failed to pass the necessary I&M program in April, 1980. The state subsequently passed the legislation May 7, 1980, and Governor Lamm signed the bill into law on May 23. The EPA has initiated a review of the legislation as part of a revised SIP, and has begun action to rescind the sanction. No funding had actually been affected.

California's I&M program is still incomplete. The EPA declared the program inadequate and published its finding in the Federal Register on September 8, 1980.¹⁴ This first step in the procedure to cut off federal funds established a public comment period of 45 days. The notice of proposed rulemaking comments that "if finalized, this action may impact as much as \$850 million in federal assistance for the state of California in fiscal year 1981."¹⁴ The public comment period was not over as of this writing.

According to the Clean Air Act Amendments, an approved, revised SIP for a nonattainment area was a "precondition for the construction or modification of any major stationary source in any such area."¹⁵ On July 2, 1979, EPA clarified that the ban would apply only to permits submitted after June 30, 1979, for major sources of a pollutant in areas designated as nonattainment for that pollutant, and in areas where a revised SIP had not been approved or conditionally approved.¹⁶ Conditional approval would be granted only if an SIP complied substantially with the statutes and regulations. According to EPA Region V staff,¹⁷ conditional approval is recommended only if a revised SIP's new source review procedure and attainment strategy are acceptable and if deficiencies are minor. Under a conditionally approved SIP, new sources are allowed to begin construction unless an individual source is subject to a regulation that is conditional. (For example, TSP plans in Illinois and Michigan are conditionally approved, except for the iron and steel industry, for which emission limits are still being reviewed.)

In a Federal Register promulgation of September 1980,¹⁸ EPA discussed the imposition of a ban in a nonattainment area that covers several political subdivisions. If one subdivision implemented the SIP provisions and another did not, EPA ruled that the new source ban would not apply to the compliant subset of a nonattainment area. Several factors limit the number of sources affected by a ban on new sources -- the review of partial SIPs, the conditional and partial approval of SIPs by EPA, the small size of many nonattainment areas, and the ban's restriction to major sources.

As Tables 4.1 and 4.2 show, a number of revised SIPs have been conditionally approved, either wholly or in part. Conditional approval removes a new source ban, unless the conditions are not corrected by a deadline set by EPA in the ruling. Conditional or full approval for a pollutant in one area lifts the ban in that area; new source permits need not be held up until the entire state is covered by an approved SIP.

Nonattainment areas for SO₂ and TSP are small, subcounty areas. (See the maps in Appendix A, for example.) Consequently, a ban on new sources of these pollutants would have limited effect. Nonattainment areas for O₃, however, are typically much larger. Therefore, a ban accompanying an incomplete SIP for O₃ could have a much greater effect on hydrocarbon (HC) sources. The ban, however, is only to be imposed on major sources of the pollutant for which the area is designated nonattainment. The definition of a major source that resulted from the Alabama Power decision (see Sec. 2.4.1) has reduced the number of sources that might be subject to a ban.

The actual impact of the statutory ban on new major sources is difficult to ascertain. State and local agencies for air pollution control review the permit applications; consequently, there is no central information on sources denied permits. Officials from several states with significant portions of a revised SIP still under review or not submitted (Ohio, California, Indiana, and Pennsylvania, for example) indicated that, "to the best of their knowledge," no major source had been denied a permit as a result of the sanction. This, the officials explained, was because many applications for permits were submitted immediately before the deadline and are still under review; applications by smaller sources were deferred until the definition of source subject to review was decided; and the number of major new sources seeking to locate in a specific nonattainment area was limited. In Ohio, for example, permits for several HC sources were held up by the ban that accompanied the state's incomplete O₃ plan.¹¹ The sources are now minor, according to the most recent definition, and are no longer subject to the ban. In general, the state agencies believe that continued failure to have an approved SIP will affect new major sources soon. In particular, one or two sources of particulate matter in Ohio and of hydrocarbons in California may have permits delayed because of the sanction.

4.2 ATTAINMENT STRATEGIES

4.2.1 Sulfur Dioxide

Our earlier, five-volume report on SIPs concluded that the SO₂ attainment strategies called for:

- Bringing stationary sources that are out of compliance into compliance with SIP emission limits. This strategy is typical of the states in Region V and VI.
- Continuing use of lower-sulfur oil in Regions I, II, and III.
- Stating the emission limits for smelters needed to bring an area into attainment. Most SIPs did not address the impact of a nonferrous smelter exemption order (Arizona, Utah, Montana, Nevada, and New Mexico).
- Requiring the new-source review procedure outlined by the 1977 amendments and EPA regulations. In most cases, the regulations are simply copied from the requirements into the SIP.

Additional data on SIP approaches are summarized in the following sections.

Out-of-Compliance Sources. The previous report concluded that SO₂ nonattainment typically was caused by individual sources out of compliance with existing SIP emission limits. The 1977 Clean Air Act Amendments established substantial penalties for noncomplying sources. The penalty was to equal the dollars a facility saved by not investing in the controls needed to achieve compliance. In July 1980, EPA announced that 150-200 major sources would incur penalties on January 1, 1981.¹⁹ However, it is too soon to see how these fines affect compliance and attainment of SO₂ standards.

Ohio raised a significant issue about methods of determining compliance. The SIP proposed a 30-day average emission limit to allow for the varying sulfur content of coal, instead of a maximum 24-hour emission limit. In February 1980, the EPA ruled on the SO₂ emission limits and disapproved the 30-day average until Ohio provided technical documentation to prove that the standards would not be violated. The state subsequently submitted 37 volumes of such proof; EPA Region V is still reviewing the documentation.²⁰

The Ohio issue on averaging time has been addressed by several EPA promulgations. In a December 1979 memo, Walt Barber, director of EPA's Office of Air Quality Planning and Standards, proposed that the agency accept the state's method for calculating air quality impact. This alternative method, called expected exceedances or EX-EX, is not based on an assumption of constant, maximum emissions, but is based instead on statistical probability. The existing method assumes that the daily sulfur content of coal is always at the maximum level. In contrast, the EX-EX method takes into account daily variations in the sulfur content of a plant's coal supply and models the effect of varying emissions on air quality. Maximum allowable emissions become monthly averages under the EX-EX approach and are less restrictive than the current method.

In a Federal Register promulgation of February 1980,²¹ EPA announced plans to review SO₂ regulations for large coal-fired power plants. Ohio's SIP prompted EPA to review requirements for averaging time, dispersion modeling, and methods of compliance and enforcement for all power plants. An EPA contractor reviewed the EX-EX method and issued a report in August 1980.²²

Use of Clean Fuels. The states of the Northeast typically do not have nonattainment areas for SO₂. They achieve attainment by using low-sulfur oil and by adopting stringent sulfur-in-fuel restrictions. As the price of oil increases and availability becomes uncertain, however, these states are reviewing SIP requirements for SO₂.

Connecticut's SIP limits sulfur content of fuel to 0.5%. Recently, the state proposed a "Btu bubble"²³ that allows a source to apply the state limit of 0.55 lb SO₂/10⁶ Btu to its entire energy use, rather than to each stack individually. A total allowable level of SO₂ tons per year would be calculated for the facility, based on fuel consumption in 1972 (the year the sulfur-in-fuel limit was passed). With conservation and energy management, a facility could emit up to that level, using fuels with different sulfur contents. Officials of EPA Region I have required that the emissions from any source using a Btu bubble not exceed the PSD Class II increments. To meet this requirement, the state placed a cap of 2.2% on the sulfur content of all fuels. This Btu bubble plan, however, is not yet in effect.

Massachusetts does not have any SO₂ nonattainment areas and restricts the sulfur content of fuel according to air pollution control district. State regulations,²⁴ however, allowed the use of higher-sulfur fuel (up to 2.2%) in sources with heat input greater than 100 x 10⁶ Btu/hr, provided that the source received permission and that the resulting emissions would not violate any air quality regulation. Under the rule, a number of sources applied for permission to burn higher-sulfur fuel. For example, a variance for the Mt. Tom Generating Station in Holyoke was approved and one for Holyoke Gas and Electric denied, based on projected air quality impacts.²⁵ State regulations allowed exemptions up to July 1979. In June 1979, EPA proposed accepting Massachusetts' request to make the variance permanent.

Similarly, Washington, D.C., has received an extension of the variance from the 0.5% sulfur-in-fuel regulation to 1%.²⁶ This is the third extension Washington has received from EPA since 1976. The District wanted the sulfur-in-fuel regulation changed permanently but EPA approved the variance only through December 31, 1980.

Nonferrous Smelters. In the western United States, many SO₂ nonattainment areas are caused by primary metal smelters that are waived from compliance with SIP emission limits. The 1977 Clean Air Act Amendments authorized EPA to issue nonferrous smelter orders (NSOs) that allowed the ailing industry to delay compliance until 1983, with an option for an extension through 1988. In June 1980,²⁷ EPA promulgated rules for initial NSOs with January 1, 1983, as the deadline for compliance. The EPA has not yet developed rules to extend the deadline for compliance to January 1988. According to EPA, a smelter would be allowed to use interim controls and dispersion techniques (such as reduced operations when atmospheric conditions inhibit dispersal of emissions) to maintain the national standards instead of complying with SIP emission limits.

In Idaho, for example, an SO₂ nonattainment area surrounds a lead and zinc smelter in Shoshone County. The SIP projected the area would reach attainment in 1980, when the smelter was required to meet emission limits. Although the smelter is expected to receive an NSO, the NSO should not delay the area's attainment of the standards.

Copper smelters in Arizona are the primary cause of six SO₂ nonattainment areas. The state has proposed a new method for calculating maximum SO₂ emissions from the smelters. The new method, called multipoint rollback (MPR), is analogous to the EX-EX method proposed for calculating SO₂ emission limits for power plants. The current method for determining maximum emission rates for a smelter uses a single point and the worst meteorological conditions. Multipoint rollback is based on a statistical distribution of emissions that recognizes the variability of smelter operations. Using a year of actual air quality data, MPR determines an overall emission limit that allows a number of short-term exceedances of a single point limit. The EPA Region IX staff²⁸ said this model is being discussed at EPA headquarters. Arizona has withdrawn its SIP, pending the outcome of these discussions.

4.2.2 Total Suspended Particulates

Our previous report said that SIPs for TSP nonattainment areas included the following attainment strategies:

- Designate rural areas as attainment on the basis of the rural fugitive dust exemption;
- Draw all nonattainment areas as small as EPA will accept;
- Retain current SIP emission limits on particulate matter from stacks;
- Require RACT on fugitive industrial emissions;
- Develop controls for nontraditional sources of fugitive dust in urban areas; and
- Request an 18-month extension of the deadline for submitting a revised SIP for the secondary standards.

An update of changes in attainment strategies follows.

Fugitive Dust Exemption. A number of SIPs proposed some nonattainment areas be redesignated under the rural fugitive dust exemption. (See Sec. 2.4.3.) Iowa, for example, proposed that four areas be redesignated on the premise that dust from agricultural activity and unpaved roads caused the violations. The EPA agreed and redesignated these areas as nonattainment for the secondary TSP standard. Texas, Oklahoma, and several arid western states (e.g., Nevada and Arizona) included similar fugitive dust exemptions in their SIPs. The potential loss of this exemption will greatly increase the extent of TSP nonattainment.

Control of Nontraditional Sources. Although most SIPs for urban TSP nonattainment areas included plans to develop controls for fugitive dust from nontraditional sources, little progress has been made. However, EPA is planning to fund three demonstration projects of nontraditional particulate control in Portland, Oregon; Denver, Colorado; and Minneapolis/St. Paul, Minnesota.²⁹ Even more basic is a recent effort to estimate what percentage

of urban particulates come from nontraditional sources.³⁰ This study, based on 1975 data collected in Pittsburgh, estimated that a 25% decrease in annual traffic flow could cause a 20% decrease in annual average particulates. The study did not predict effects on the short-term TSP average, the standard most likely to be violated. It seems that TSP attainment will be difficult to achieve, especially in urban areas where nontraditional sources must be controlled.

4.2.3 Nitrogen Dioxide

The three NO₂ nonattainment areas planned to achieve attainment by:

- Relying on increased controls on motor vehicles required to attain the O₃ and CO standards; and
- Studying possible controls for stationary sources.

No areas have been redesignated and no new information on attainment strategies is available.

4.2.4 Ozone and Carbon Monoxide

The SIPs for these two transportation-related pollutants provided for:

- RACT on stationary sources;
- Transportation control measures that rely heavily on the reductions projected to result from the Federal Motor Vehicle Control Program; and
- Inspection and maintenance programs for motor vehicles in the 29 states requesting extension to 1987.

Since our earlier report, many O₃ nonattainment areas have been redesignated to attainment of the newer, less stringent standard. New attainment strategies have focused on inspection and maintenance programs.

REFERENCES

1. Garvey, D.B., and D.G. Streets, *In Pursuit of Clean Air: A Data Book of Problems and Strategies at the State Level*, Argonne National Laboratory Report ANL/EES-TM-90, Vols. 1-5 (Feb. 1980).
2. 44 FR 67182, SIPs: General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas -- Supplement (on the Aftermath of the Granting of Conditional Approvals for SIPs) (Nov. 23, 1979).
3. Bureau of National Affairs, *Current Developments*, Environment Reporter, p. 10 (May 2, 1980).
4. 44 FR 65687, Guide to Data Collection for 1982 SIP Revisions (Nov. 14, 1979).
5. U.S. Environmental Protection Agency, memo from Michael James to Richard Rhoads (Oct. 7, 1980).
6. U.S. District Court of Appeals for District of Columbia #78-1006, Alabama Power Co. et al. vs. D.M. Costle, U.S. Environmental Protection Agency, et al.
7. 45 FR 52676, Requirements for Preparation, Adoption and Submittal of Implementation Plans: Approval and Promulgation of Implementation Rules (Aug. 7, 1980).
8. *Inside EPA*, p. 3 (June 20, 1980).
9. 43 FR 8962, NAAQS: States Attainment Status (March 3, 1978).
10. Bureau of National Affairs, *Current Developments*, Environment Reporter, p. 23 (June 13, 1980).
11. Ohio Environmental Protection Agency staff, personal communication (Nov. 13, 1980).
12. 44 FR 33473, EPA Proposed Policy and Procedure for Applying Transportation Funding Limits (June 11, 1979).
13. 45 FR 24692, Federal Assistance Limitation Required by Section 176(a) of the Clean Air Act: Final Policy and Procedures (April 10, 1980).
14. 45 FR 59180, Federal Assistance Limitations, State of California (Sept. 8, 1980).
15. Clean Air Act Amendments of 1977, P.L. 95-95, Section 172(a)(1).
16. 44 FR 38471, Statutory Restrictions on New Sources for Nonattainment Areas (July 2, 1979).
17. U.S. Environmental Protection Agency, Region V staff, personal communication (Nov. 10, 1980).

18. 45 FR 62850, Approval and Promulgation of Implementation Plans: Statutory Restrictions on New Sources Under Certain Circumstances for Nonattainment Areas (Sept. 22, 1980).
19. *Inside EPA* (July 18, 1980).
20. U.S. Environmental Protection Agency, Region V staff, personal communication (Aug. 8, 1980).
21. 45 FR 9994, Regulation of Large Coal-Fired Boilers for SO₂ Emissions (Feb. 14, 1980).
22. U.S. Environmental Protection Agency, *The ExEx Method: Incorporating Variability in Sulfur Dioxide Emissions into Power Plant Impact Assessment*, prepared by SAI Inc. (Aug. 13, 1980).
23. Bureau of National Affairs, *Current Developments*, Environment Reporter, p. 1925 (Feb. 4, 1980).
24. State of Massachusetts, Air Pollution Control Regulations, Section 7.05.
25. 44 FR 37513, Approval and Promulgation of Implementation Plans: Massachusetts; Proposed Rulemaking Governing the Burning of Higher Sulfur Fuel in Four Air Pollution Control Districts (June 27, 1979).
26. 45 FR 1024, Approval and Promulgation of Implementation Plans: District of Columbia; Proposed Rulemaking Governing the Burning of Higher Sulfur Fuel (Jan. 4, 1980).
27. 45 FR 42514, Primary Nonferrous Smelter Orders: National Rules (June 24, 1980).
28. U.S. Environmental Protection Agency, Region IX staff, personal communication (Nov. 7, 1980).
29. Bureau of National Affairs, *Current Developments*, Environment Reporter (July 11, 1980).
30. Lincoln, David R., and E.S. Rubin, *Contribution of Mobile Sources to Ambient Particulate Concentrations in a Downtown Urban Area*, J. of Air Pollution Control Assn. 30(7):777 (July 1980).

APPENDIX A

MAPS OF DESIGNATED NONATTAINMENT AREAS
AS OF JULY 1, 1980

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APPENDIX A

MAPS OF DESIGNATED NONATTAINMENT AREAS AS OF JULY 1, 1980

The states typically designated small, subcounty areas as nonattainment for all pollutants except ozone. The usual method of displaying nonattainment areas as counties containing designated areas overstates the extent of nonattainment. To be more precise, the five-volume report included maps of the actual subcounty areas. This appendix contains new maps that update nonattainment areas and include any redesignations that have been promulgated in the Federal Register as of July 1, 1980. In addition, the state summaries of discrete nonattainment areas that appeared in the five-volume report have been updated to accompany the maps. Florida (CO), North Carolina (TSP), and Washington (SO₂) each had a single nonattainment area for the specified pollutant. Those areas have been redesignated as unclassified or attainment; therefore, maps are not necessary for the 1980 update. The state summaries, however, are included.

Table A.1 California: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	1	0
TSP	24 hr 1 yr	5	6
NO _x	1 yr	1	-
CO	8 hr	5	-
O ₃	1 yr	1/2 state	-

^aNonattainment area designations are as of July 1, 1980.

Fig. A.1 California: Areas Designated as Primary and Secondary TSP Nonattainment as of July 1980

Fig. A.2 California: Areas Designated as CO Nonattainment
as of July 1980

Table A.2 Colorado: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	0 ^b	0
TSP	24 hr 1 yr	4	1
NO _x	1 yr	1	-
CO	8 hr	4	-
O ₃	1 yr	1/16 state	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.3 Colorado: Areas Designated as Primary and Secondary TSP Nonattainment as of July 1980

Fig. A.4 Colorado: Areas Designated as O₃ Nonattainment as of July 1980

Table A.3 Florida: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	1	0
TSP	24 hr 1 yr	0	2
NO _x	1 yr	0 ^b	-
CO	8 hr	0 ^b	-
O ₃	1 yr	4	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.5 Florida: Areas Designated as O₃ Nonattainment as of July 1980

Table A.4 Georgia: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	0 ^b	0
TSP	24 hr 1 yr	3	0
NO _x	1 yr	0 ^b	-
CO	8 hr	1	-
O ₃	1 yr	2	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.6 Georgia: Areas Designated as Primary TSP Nonattainment as of July 1980

Table A.5 Illinois: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	2	0
TSP	24 hr 1 yr	8	24
NO _x	1 yr	1	-
CO	8 hr	2	-
O ₃	1 yr	7	-

^aNonattainment area designations are as of July 1, 1980.

Fig. A.7 Illinois: Areas Designated as Primary and Secondary TSP Nonattainment as of July 1980

Fig. A.8 Illinois: Areas Designated as O₃ Nonattainment
as of July 1980

Table A.6 Iowa: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	1	0
TSP	24 hr 1 yr	4	6
NO _x	1 yr	0 ^b	-
CO	8 hr	1	-
O ₃	1 yr	1	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.9 Iowa: Areas Designated as Primary and Secondary TSP Nonattainment as of July 1980

Fig. A.10 Iowa: Areas Designated as O₃ Nonattainment as of July 1980

Table A.7 Kentucky: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	7	0
TSP	24 hr 1 yr	13	1
NO _x	1 yr	0 ^b	-
CO	8 hr	1	-
O ₃	1 yr	5	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.11 Kentucky: Areas Designated as Primary SO₂ Nonattainment as of July 1980

Fig. A.12 Kentucky: Areas Designated as O₃ Nonattainment as of July 1980

Table A.8 Maine: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	1	0
TSP	24 hr 1 yr	0	3
NO _x	1 yr	0 ^b	-
CO	8 hr	2	-
O ₃	1 yr	1/4 state	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.13 Maine: Areas Designated as Secondary TSP Nonattainment as of July 1980

Fig. A.14 Maine: Areas Designated as O₃ Nonattainment
as of July 1980

Table A.9 Missouri: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	1	0
TSP	24 hr 1 yr	4	5
NO _x	1 yr	0 ^b	-
CO	8 hr	1	-
O ₃	1 yr	2	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.15 Missouri: Areas Designated as Primary SO₂ Nonattainment as of July 1980

Fig. A.16 Missouri: Areas Designated as Primary and Secondary
TSP Nonattainment as of July 1980

Table A.10 New Hampshire: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	1	0
TSP	24 hr 1 yr	1	1
NO _x	1 yr	0 ^b	-
CO	8 hr	2	-
O ₃	1 yr	1/3 state	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.17 New Hampshire: Areas Designated as Primary and Secondary TSP Nonattainment as of July 1980

CO NONATTAINMENT

Fig. A.18 New Hampshire: Areas Designated as CO Nonattainment as of July 1980

Fig. A.19 New Hampshire: Areas Designated as O₃ Nonattainment as of July 1980

Table A.11 New York: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	1	0
TSP	24 hr 1 yr	3	8
NO _x	1 yr	0 ^b	-
CO	8 hr	9	-
O ₃	1 yr	1/3 state	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.20 New York: Areas Designated as O₃ Nonattainment as of July 1980

Table A.12 North Carolina: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	0 ^b	0
TSP	24 hr 1 yr	0 ^b	0
NO _x	1 yr	0 ^b	-
CO	8 hr	1	-
O ₃	1 yr	1	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Table A.13 Ohio: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	18	2
TSP	24 hr 1 yr	26	14
NO _x	1 yr	0 ^b	-
CO	8 hr	7	-
O ₃	1 yr	2/3 state	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.21 Ohio: Areas Designated as Primary and Secondary SO₂ Nonattainment as of July 1980

Table A.14 Pennsylvania: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	7	2
TSP	24 hr 1 yr	6	9
NO _x	1 yr	0 ^b	-
CO	8 hr	2	-
O ₃	1 yr	whole state ^b	

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.22 Pennsylvania: Areas Designated as Primary and Secondary SO₂ Nonattainment as of July 1980

Fig. A.23 Pennsylvania: Areas Designated as Primary and Secondary TSP Nonattainment as of July 1980

Table A.15 Vermont: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	0 ^b	0
TSP	24 hr 1 yr	0	2
NO _x	1 yr	0 ^b	-
CO	8 hr	1	-
O ₃	1 yr	3/4 state	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

Fig. A.24 Vermont: Areas Designated as O₃ Nonattainment
as of July 1980

Table A.16 Washington: Air Quality Summary

Pollutant	Standard Averaging Period	No. of Discrete Nonattainment Areas ^a	
		Primary	Secondary
SO ₂	24 hr 1 yr	0 ^b	0
TSP	24 hr 1 yr	8	3
NO _x	1 yr	0 ^b	-
CO	8 hr	3	-
O ₃	1 yr	2	-

^aNonattainment area designations are as of July 1, 1980.

^bNo map included.

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APPENDIX B

COAL PRODUCTION, QUALITY, AND RESERVES

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APPENDIX B

COAL PRODUCTION, QUALITY, AND RESERVES

In this section, we present coal quality and production data for the coal-producing counties. Fuel-burning facilities may find these data helpful when forming policies to meet air pollution regulations.

The coal quality data for each state are presented in tables that include sulfur content (expressed as lb SO₂/10⁶ Btu), ash content, and heating value (Btu/lb) averaged for each coal-producing county. Also included are coal washability data presented as average sulfur removal (%) and average Btu loss (%).

State maps of average sulfur content of coal by county are also given. These data are presented in the following five ranges, with approximate equivalent percentages:

<u>lb SO₂/10⁶ Btu</u>	<u>% S</u>
0-1.2	0-0.75
1.2-3.2	0.75-2.0
3.2-5.6	2.0-3.5
5.6-8.0	3.5-5.0
>8.0	>5.0

Coal quality data are based on steam coal deliveries in 1979 as reported to DOE on Energy Information Agency (EIA) Form 423. Washability data came from characterizations of coal samples presented in Bureau of Mines Report RI 8118.

Coal production in 1979 is mapped by county for each state. In addition, a table lists, by county, production levels in 1979, projected production levels in 1985, and estimated reserves. The 1979 production levels are based on steam coal deliveries reported on the EIA form. The 1985 production levels were projected from individual mine-expansion plans reported by the National Coal Assn. and DOE's Western Coal Development Monitoring System. Estimated coal reserves were derived from Bureau of Mines Reports IC 8680 and IC 8693.

Coal quality data are available only for counties with current production. Some coal production data could not be assigned to specific counties. These data are classified as "various" and the state totals are adjusted to include them. Maps for Michigan, Oregon, and South Dakota were not available, but coal reserve data for these states are listed at the end of this appendix.

Table B.1 Alabama: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MSTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
BARBOUR	3.66	11.67	12198.	11.00	.88
BIBB	2.71	12.42	12203.	19.56	5.59
BLOUNT	3.15	13.42	12099.	25.68	2.07
CHEROKEE	3.44	11.25	12701.	26.05	9.70
CULLMAN	1.15	4.92	13179.	.95	.29
DEKALE	2.19	14.01	12157.	17.23	6.43
ETOWAH	3.79	13.56	12310.	11.42	.98
FAYETTE	3.60	13.09	11881.	24.82	7.53
FRANKLIN	1.91	13.69	11461.	12.43	3.01
JACKSON	1.36	16.78	11810.	12.27	3.96
JEFFERSON	2.79	11.37	12334.	8.83	2.47
MARION	2.12	11.47	11918.	9.76	.79
MORGAN	3.27	14.60	11909.	24.03	5.98
PICKENS	3.80	12.60	11855.	23.87	5.98
ST CLAIR	3.34	13.03	12143.	20.63	6.28
SHELBY	2.76	10.90	12581.	.47	.29
TUSCALOOSA	2.77	12.26	12232.	10.84	3.91
WALKER	2.18	13.91	11821.	11.85	3.18
WINSTON	1.99	9.10	12436.	17.36	5.19

Fig. B.1 Alabama: Average Sulfur Content of Coal

Table B.2 Alabama: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRDUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
BARBOUR	67.	0.	10.
BIBB	0.	0.	0.
BLCUNT	373.	640.	2.
CHEROKEE	11.	62.	0.
CHOCTAW	0.	0.	98.
COFFEE	0.	0.	98.
CRENSHAW	0.	0.	150.
CULLMAN	31.	0.	32.
DALE	0.	0.	5.
DEKALB	67.	227.	1.
ETCHAW	147.	0.	0.
FAYETTE	1311.	1704.	97.
FRANKLIN	60.	203.	0.
JACKSON	1074.	642.	31.
JEFFERSON	994.	1373.	798.
LAMAR	0.	69.	0.
MARENGO	0.	0.	500.
MARION	250.	1252.	124.
MORGAN	11.	0.	0.
PICKENS	11.	0.	0.
PIKE	0.	0.	90.
ST. CLAIRE	47.	101.	3.
SHELBY	16.	477.	4.
SUMTER	0.	0.	1.
TUSCALOOSA	1506.	4192.	162.
WALKER	5628.	7325.	682.
WILCOX	0.	0.	75.
WINSTON	331.	538.	8.
VARIOUS*	2654.	0.	0.
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TOTAL	14588.	16806.	2972.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.2 Alabama: Coal Production in 1979

Table B.3 Arizona: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
NAVAJO	.90	9.96	10839.	4.83	2.45

Fig. B.3 Arizona: Average Sulfur Content of Coal

Table B.4 Arizona: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
APACHE	0.	0.	21.
COCHISE	0.	0.	35.
NAVAJO	10109.	14866.	294.
VARIOUS*	381.	0.	0.

TOTAL	10490.	14866.	350.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.4 Arizona: Coal Production in 1979

Table B.5 Arkansas: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/HBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S FEMCVL	BTU LOSS (PERCENT)
JOHNSON	3.06	10.46	13060.	43.54	3.38
SEBASTIAN	3.14	10.57	12753.	19.98	3.64

Fig. B.5. Arkansas: Average Sulfur Content of Coal

Table B.6 Arkansas: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
BRADLEY	0.	0.	0.
CALHOUN	0.	0.	0.
CLARK	0.	0.	0.
CLEVELAND	0.	0.	0.
CRAWFORD	0.	0.	28.
DALLAS	0.	0.	5.
FRANKLIN	0.	114.	56.
GRANT	0.	0.	0.
GREENE	0.	0.	0.
HOT SPRING	0.	0.	0.
JOHNSON	0.	8.	138.
LOGAN	0.	10.	42.
NEVADA	0.	0.	0.
OUACHITA	0.	0.	5.
POINSETT	0.	0.	1.
POPE	0.	13.	10.
PULASKI	0.	0.	12.
SALINE	0.	0.	6.
SCOTT	0.	0.	17.
SEBASTIAN	10.	168.	339.

TOTAL	11.	313.	663.

Fig. B.6 Arkansas: Coal Production in 1979

Table B.7 Colorado: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
DELTA	.70	7.39	11195.	4.67	.87
EAGLE	.76	8.36	10188.	6.55	.10
FREMONT	1.04	20.00	9699.	7.59	3.13
GARFIELD	.95	12.52	11302.	6.92	2.54
GUNNISON	.99	9.88	12233.	.75	.59
JACKSON	.53	7.24	10744.	6.80	1.65
LAS ANIMAS	.95	16.87	10214.	10.60	4.29
MESA	.96	9.67	11479.	.36	.12
MCCFAT	.81	7.28	10272.	1.85	.58
MONTIZUMA	1.47	12.70	11418.	11.35	2.84
ROTT	.89	9.21	10952.	3.83	1.77

Fig. B.7 Colorado: Average Sulfur Content of Coal

Table B.8 Colorado: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ADAMS	0.	0.	123.
ARAPAHOE	0.	0.	70.
ARCHULETA	0.	0.	92.
BOULDER	0.	0.	163.
DELTA	764.	2264.	270.
DOUGLAS	0.	0.	5.
EAGLE	13.	0.	0.
ELBERT	0.	0.	249.
EL PASO	0.	0.	124.
FREMONT	167.	91.	178.
GARFIELD	4.	3501.	551.
GUNNISON	556.	3172.	943.
HUERFANO	0.	0.	276.
JACKSON	539.	3220.	949.
JEFFERSON	0.	0.	176.
LA PLATA	0.	17.	321.
LAS ANIMAS	36.	1200.	828.
MESA	7.	2457.	237.
MOFFAT	1892.	10357.	2841.
MONTENZUMA	120.	0.	19.
MONTROSE	0.	98.	203.
OURAY	0.	0.	763.
PARK	0.	0.	25.
PITKIN	0.	2090.	88.
RIO BLANCO	0.	0.	1061.
ROUTT	6245.	7047.	3824.
WELD	0.	67.	461.
VARIOUS*	820.	0.	0.

TOTAL	11162.	35581.	14839.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.8 Colorado: Coal Production in 1979

Table B.9 Georgia: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
DADE	1.27	5.64	13790.	.00	.00
WALKER	5.28	14.10	12000.	.00	.00

Fig. B.9 Georgia: Average Sulfur Content of Coal

Table B.10 Georgia: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
CHATTOOGA	0.	136.	0.
DADE	10.	0.	0.
WALKER	6.	0.	0.
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TOTAL	16.	136.	0.

Fig. B.10 Georgia: Coal Production in 1979

Table B.11 Illinois: Coal Quality Data

COUNTY NAMES	AVE. SO2 CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
BROWN	6.29	7.97	10549.	24.60	2.99
CHRISTIAN	6.93	10.24	10156.	.00	.00
CLINTON	6.33	9.16	10683.	.00	.00
CRAWFORD	5.76	14.04	10526.	38.74	3.60
DE KALE	4.56	14.04	11540.	15.23	1.34
DEUGLAS	5.17	12.66	10718.	35.92	3.64
FERD	6.29	8.30	10500.	.00	.00
FRANKLIN	3.93	10.25	11261.	2.54	.44
FULTON	4.90	7.74	10880.	.43	.11
GALLATIN	4.79	9.95	11822.	32.72	4.62
JACKSON	2.83	11.14	10768.	30.46	2.77
JEFFERSON	2.31	9.53	11168.	7.18	1.22
KNOX	5.06	9.56	10091.	.10	.03
MCLEAN	3.90	7.36	10103.	7.89	2.27
MACON	6.47	9.02	10521.	3.43	.70
MARION	3.50	8.50	11954.	1.48	.33
MCNTGOMERY	8.06	18.33	9357.	37.69	7.27
PEORIA	4.41	9.57	10532.	.00	.00
PERRY	5.61	9.86	11117.	8.47	1.36
POPE	3.06	8.39	11608.	19.42	2.80
RANDOLPH	5.64	11.00	10782.	4.34	.66
ST CLAIR	6.07	10.70	10693.	3.67	1.04
SALINE	3.82	8.81	12170.	8.79	.75
SANGAMON	3.03	14.35	10415.	38.18	4.11
VERMILION	5.81	13.31	10646.	13.07	3.12
WABASH	3.07	14.08	10448.	12.95	3.12
WARREN	4.04	7.90	11343.	2.73	.67
WHITESIDE	4.72	8.28	11925.	.00	.00
WILL	4.81	11.51	11483.	13.97	1.64
WILLIAMSON	5.04	11.94	11557.	.00	.00

Fig. B.11 Illinois: Average Sulfur Content of Coal.

Table B.12 Illinois: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)	COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ADAMS	0.	0.	68.	MADISON	0.	0.	1876.
BOON	0.	0.	1831.	MARION	2.	0.	421.
BROWN	2.	0.	83.	MARSHALL	0.	0.	474.
BUREAU	0.	0.	1250.	MENARD	0.	0.	1460.
CALHOUN	0.	0.	6.	MERCER	0.	0.	51.
CASS	0.	0.	116.	MENARD	0.	0.	7.
CHRISTIAN	2835.	3278.	3347.	MONTGOMERY	1935.	1784.	3906.
CLARK	0.	0.	168.	MORGAN	0.	0.	396.
CLINTON	1423.	3500.	1322.	MULTNIE	0.	0.	123.
COLES	0.	0.	90.	PEORIA	566.	717.	1711.
CRAWFORD	11.	0.	462.	PERRY	4899.	11379.	2172.
CUMBERLAND	0.	0.	4.	POPE	63.	0.	0.
DE KALB	53.	0.	0.	PUTNAM	0.	0.	588.
DOUGLAS	1565.	2777.	412.	RANDOLPH	8016.	8958.	629.
EDGAR	0.	0.	1749.	ROCK ISLAND	0.	0.	39.
EDWARDS	0.	0.	54.	ST CLAIR	730.	4621.	2108.
FAYETTE	0.	0.	1174.	SALINE	842.	5843.	2984.
FORD	45.	0.	0.	SANGAMON	303.	0.	3540.
FRANKLIN	4279.	8049.	3035.	SCHUYLER	0.	0.	202.
FULTON	1524.	3559.	2829.	SCOTT	0.	0.	166.
GALLATIN	1140.	1852.	1991.	SHELBY	0.	0.	725.
GREENE	0.	0.	475.	STARK	0.	298.	237.
GRUNDY	0.	0.	627.	TAZEWELL	0.	0.	167.
HAMILTON	0.	0.	2440.	VERMILION	79.	1279.	1897.
HANCOCK	0.	0.	28.	WABASH	1386.	4053.	286.
HENRY	0.	0.	409.	WARREN	15.	0.	19.
JACKSON	1036.	761.	524.	WASHINGTON	0.	2500.	1563.
JEFFERSON	2439.	3114.	1800.	WAYNE	0.	0.	89.
JERSEY	0.	0.	162.	WHITE	0.	0.	992.
KANAKEE	0.	0.	95.	WHITESIDE	19.	0.	0.
KNOX	642.	1534.	673.	WILL	2715.	0.	15.
LA SALLE	0.	0.	1243.	WILLIAMSON	0.	7291.	2099.
LAWRENCE	0.	0.	893.	WIGGINS	0.	0.	214.
LIVINGSTON	0.	0.	623.	VARIOUS*	7693.	0.	0.
LOGAN	0.	2500.	914.				
MCDONOUGH	0.	0.	47.				
MCLEAN	16.	0.	421.	TOTAL	49513.	86563.	65626.
MACON	2636.	0.	435.				
MACOUFIN	8.	6857.	3595.				

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.12 Illinois: Coal Production in 1979

Table B.13 Indiana: Coal Quality Data

COUNTY NAMES	AVE. SO2 CONTENT (LBS/HBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
CASS	3.16	7.53	11271.	.06	.00
CLAY	6.53	9.61	11110.	6.51	2.34
DAVISS	7.15	13.65	10609.	15.74	2.13
DUBOIS	3.96	9.83	11268.	6.91	2.55
FOUNTAIN	6.68	10.70	10631.	22.03	2.40
GIBSON	6.40	14.05	10447.	22.33	1.11
GRANT	5.11	13.36	10252.	37.38	6.62
GREENE	4.41	11.25	10810.	.24	.04
JASPER	3.82	9.00	11000.	32.66	1.91
KNOX	4.31	11.98	10658.	6.00	1.73
MARTIN	3.10	9.43	11084.	28.15	1.60
MONTGOMERY	6.88	16.54	9754.	37.96	5.93
PERRY	5.80	10.95	11056.	6.83	.77
PIKE	4.49	10.06	11007.	5.96	.65
SPENCER	4.75	9.88	11155.	30.44	3.99
SULLIVAN	3.05	9.86	10877.	.51	.04
VERMILLION	4.87	13.42	10201.	37.33	6.63
VIGO	6.86	11.44	10885.	43.56	8.30
WARREN	6.04	10.75	10846.	7.97	.78
WARRICK	5.65	10.51	11017.	35.17	2.52
WAYNE	5.76	10.36	11012.	11.76	1.46

Fig. B.13 Indiana: Average Sulfur Content of Coal

Table B.14 Indiana: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
CLAY	1582.	2324.	326.
DAVISS	299.	0.	187.
DUBOIS	595.	280.	8.
FOUNTAIN	1.	41.	47.
GIBSON	58.	419.	1301.
GRANT	421.	0.	0.
GREENE	1455.	2633.	409.
JASPER	6.	0.	0.
KNOX	540.	938.	1593.
MARTIN	712.	0.	21.
MONTGOMERY	1.	0.	0.
OWEN	0.	0.	23.
PARK	0.	0.	68.
PERRY	48.	41.	10.
PIKE	5458.	5821.	434.
POSEY	0.	0.	721.
SPENCER	918.	599.	19.
SULLIVAN	1618.	3356.	2238.
VANDERBURG	0.	0.	451.
VERMILLION	2010.	2695.	552.
VIGO	59.	26.	1354.
WARREN	7551.	0.	0.
WARRICK	607.	11450.	845.
VARIOUS*	1386.	0.	0.

TOTAL	25323.	30624.	10607.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Table B.15 Iowa: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MSTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
JASPER	10.39	15.13	9316.	41.37	6.53
MAHASKA	9.24	18.86	8946.	45.59	3.51
MARION	7.17	12.39	9792.	36.25	5.66
MCMROE	8.18	15.94	9533.	31.58	4.74

Fig. B.15 Iowa: Average Sulfur Content of Coal

Table B.16 Iowa: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
APPANCOSE	0.	0.	157.
BCONE	0.	0.	120.
CASS	0.	0.	0.
DALLAS	0.	0.	50.
DAVIS	0.	0.	37.
DECATUR	0.	0.	33.
GREENE	0.	0.	13.
GUTHRIE	0.	0.	5.
HAMILTON	0.	0.	9.
HARDIN	0.	0.	5.
HENRY	0.	0.	1.
JASPER	4.	0.	85.
JEFFERSON	0.	0.	49.
KEOKUK	0.	0.	78.
LEE	0.	0.	3.
LLCAS	0.	85.	134.
MAHASKA	106.	254.	325.
MARION	142.	51.	398.
MARSHALL	0.	0.	3.
MCKNOE	276.	221.	519.
POLK	0.	0.	492.
SCOTT	0.	0.	2.
STORY	0.	0.	34.
VAN BUREN	0.	0.	49.
WAPELLO	0.	2.	149.
WARREN	0.	0.	87.
WEBSTER	0.	0.	44.
VARIOUS*	11.	0.	0.
TOTAL	539.	613.	2880.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.16 Iowa: Coal Production in 1979

Table B.17 Kansas: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
CHASE	6.44	15.32	11706.	2.92	.75
CRAWFORD	5.83	11.50	12464.	1.27	.23
GEARY	2.22	7.00	13500.	32.29	4.98
NEMAH	6.69	18.98	10792.	20.72	6.26

lb SO₂/10⁶ Btu

1.2 - 3.2

5.6 - 8.0

Fig. B.17 Kansas: Average Sulfur Content of Coal

Table B.18 Kansas: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ATCHISON	0.	0.	6.
BOURBON	412.	392.	259.
BROWN	0.	0.	13.
CHEROKEE	0.	8.	236.
COWLEY	0.	0.	5.
CRAWFORD	133.	917.	300.
FRANKLIN	0.	0.	1.
LABETTE	0.	1500.	0.
LEAVENWORTH	0.	0.	19.
LINN	0.	0.	474.
NEMAHA	11.	0.	4.
OSAGE	0.	0.	70.
WILSON	0.	8.	0.
<hr/>			
TOTAL	557.	2825.	1386.

10^3 Tons

0 - 500

Fig. B.18 Kansas: Coal Production in 1979

Table B.19 Kentucky: Coal Quality Data

COUNTY NAMES	AVE. S02 CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
ACAIR	4.31	11.30	13000.	3.03	.46
ANDERSON	4.85	12.03	11810.	26.91	4.63
BELL	2.16	12.15	11903.	12.16	5.72
BOONE	1.29	6.60	13176.	.00	.00
BURBON	1.48	10.09	11922.	13.40	7.08
BOYD	2.27	14.00	11188.	17.60	6.12
BREATHITT	1.80	11.79	11631.	10.95	4.64
BUTLER	4.94	10.16	11374.	32.50	4.54
CALDWELL	3.81	12.46	11200.	30.40	5.84
CARTER	2.47	13.21	11210.	15.52	3.15
CASEY	1.31	11.09	11892.	7.97	1.47
CHRISTIAN	3.03	10.72	10889.	29.01	4.90
CLARK	1.23	7.54	12547.	.00	.00
CLAY	2.66	11.34	12137.	21.58	2.27
DAVISS	5.27	9.74	11100.	41.08	5.73
EGMONTSON	2.82	8.01	12024.	16.96	2.61
ELLIOTT	5.43	11.19	11142.	30.55	5.85
FLYNN	1.70	11.79	11881.	8.73	2.50
GALLATIN	5.08	11.70	11612.	12.06	2.71
GARRARD	4.66	10.30	10903.	7.03	1.22
GRANT	1.10	8.00	13259.	10.99	3.18
GREEN	3.32	11.12	11424.	32.49	5.48
HANCOCK	4.90	13.10	11000.	7.08	1.22
HARLAN	2.42	12.05	12099.	28.80	5.50
HART	2.13	11.90	12193.	26.90	2.55
HENDERSON	8.81	18.28	9923.	41.10	5.73
HENRY	2.11	12.60	12318.	.00	.00
HOPKINS	5.85	11.41	11442.	15.17	2.63
JACKSON	6.97	13.03	11257.	25.76	1.07
JOHNSON	1.86	12.40	11517.	22.04	4.43
KNOTT	1.92	12.51	11699.	20.36	2.11
KNOX	2.24	9.46	12447.	13.80	4.93
LAUREL	2.59	8.80	12445.	22.65	1.42
LAWRENCE	2.02	13.27	11125.	18.62	8.61
LEE	1.84	9.76	12237.	13.42	1.98
LESLIE	2.63	13.01	11885.	23.03	4.46
LETCHER	1.31	9.11	12561.	25.63	8.63
LEWIS	1.00	14.43	11993.	29.33	5.15
MCCRACKEN	5.00	13.14	11898.	31.17	4.76
MCCRACKY	5.66	14.12	11620.	21.41	2.07
MADISON	5.17	8.45	11676.	3.46	.44
MAGOFFIN	1.68	11.92	11699.	18.72	7.03
MARTIN	1.37	9.28	12300.	7.75	4.24
MONTGOMERY	1.10	15.05	11133.	26.90	2.57
MORGAN	1.83	13.60	11100.	4.22	.27
MUHLENBERG	6.99	14.62	10852.	22.17	3.20
OHIO	5.69	11.67	11206.	11.17	1.19
OWSLEY	1.83	10.05	12081.	16.71	3.23
PERRY	1.71	12.29	11806.	19.67	3.94
PIKE	1.39	10.96	12362.	14.13	2.17
PULASKI	3.73	12.91	11847.	26.59	2.56
ROCKCASTLE	2.26	12.86	11891.	13.36	5.40
SCOTT	3.15	13.70	12260.	28.74	5.15
SHELBY	.85	11.40	12414.	14.05	7.09
SFENCER	3.84	8.49	11095.	29.24	5.15
UNION	5.92	13.31	11286.	28.12	3.80
WAYNE	6.43	14.73	11532.	29.92	5.73
WEBSTER	6.26	13.08	11844.	12.70	2.48
WHITLEY	2.24	10.08	12221.	20.94	5.27
WOLFE	2.08	12.10	11850.	20.91	4.45

lb SO₂/10⁶ Btu

Fig. B.19 Kentucky: Average Sulfur Content of Coal

Table B.20 Kentucky: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)	COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ADAIR	3.	0.	0.	LEE	10.	277.	32.
ANDERSON	41.	0.	0.	LESLIE	2273.	4399.	784.
BELL	5229.	4658.	194.	LETCHER	1671.	2380.	898.
BOONE	79.	0.	0.	LICAN	127.	0.	0.
BURSON	89.	0.	0.	MCCRACKEN	590.	0.	0.
BOYD	1433.	267.	114.	MCCRERY	23.	607.	184.
BREATHITT	2962.	7373.	705.	MCLEAN	0.	751.	879.
BUTLER	582.	928.	242.	MADISON	42.	0.	0.
CALDWELL	14.	0.	0.	MAGOFFIN	1149.	3343.	311.
CARTER	1375.	334.	141.	MARTIN	10593.	9610.	450.
CASEY	17.	0.	0.	MENIFEE	0.	3.	4.
CHRISTIAN	25.	220.	29.	MONTGOMERY	11.	0.	0.
CLARK	89.	0.	0.	MORGAN	76.	604.	48.
CLAY	2359.	723.	182.	MUHLENBERG	11387.	25651.	1983.
CLINTON	0.	0.	5.	OHIO	8029.	10061.	857.
CRITTENDEN	0.	0.	14.	OWSLEY	36.	295.	2.
DAVIESS	850.	1005.	352.	PERRY	7485.	11709.	1012.
EDMONSON	5.	0.	46.	PIKE	7618.	14545.	2670.
ELLIOTT	3.	373.	58.	POWELL	0.	0.	1.
FLOYD	3729.	3732.	1115.	PULASKI	69.	601.	36.
GALLATIN	35.	0.	0.	ROCKCASTLE	1.	55.	25.
GARRARD	6.	0.	0.	SCOTT	19.	0.	0.
GRANT	1.	0.	0.	SHELBY	2.	0.	0.
GRAYSON	0.	11.	12.	SPENCER	5.	0.	0.
GREEN	251.	0.	0.	UNION	6366.	7632.	2030.
GREENUP	0.	92.	67.	WARREN	3.	15.	0.
HANCOCK	24.	131.	14.	WAYNE	3.	169.	23.
HARLAN	3612.	5739.	1767.	WEBSTER	2360.	2307.	1569.
HART	4.	0.	0.	WHITLEY	1126.	1439.	56.
HENDERSON	356.	973.	2007.	WOLFE	55.	0.	33.
HENRY	2.	0.	0.	VARIOUS*	11545.	0.	0.
HICKMAN	7168.	5981.	2568.				
JACKSON	21.	807.	91.				
JOHNSON	513.	4010.	181.	TOTAL	106738.	145442.	25490.
KNOTT	549.	4571.	1470.				
KNOX	2480.	1692.	100.				
LAUREL	129.	1205.	36.				
LAWRENCE	30.	1166.	92.				

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.20 Kentucky: Coal Production in 1979

Table B.21 Maryland: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
ALLEGANY	2.68	14.37	11841.	29.12	11.91
GARRETT	2.80	14.62	11915.	28.80	4.78
MONTGOMERY	2.13	10.50	12191.	12.57	2.69

Fig. B.21 Maryland: Average Sulfur Content of Coal

Table B.22 Maryland: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ALLEGANY	188.	953.	413.
GARRETT	1316.	1712.	631.
MONTGOMERY	4.	0.	0.
VARIOUS*	16.	0.	0.
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TOTAL	1524.	2665.	1044.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.22 Maryland: Coal Production in 1979

Table B.23 Missouri: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
AUDRAIN	8.76	14.56	10651.	37.91	6.93
BARTON	9.04	22.22	10597.	17.79	2.96
BOONE	7.56	12.36	10894.	37.05	9.39
CCCPEP	6.38	14.35	10183.	.06	.00
HENRY	11.46	22.13	9432.	30.48	4.86
HOWARD	7.86	14.54	10331.	33.63	7.80
MACON	8.10	12.52	10069.	1.02	.26
PUTNAM	6.29	10.48	9725.	13.04	3.02
RANDOLPH	9.61	17.14	9688.	42.93	9.28
VERNON	7.81	11.86	12071.	36.10	8.37

Fig. B.23 Missouri: Average Sulfur Content of Coal

Table B.24 Missouri: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ADAIR	0.	0.	515.
AUDRAIN	7.	0.	549.
BARTON	645.	550.	156.
BATES	1135.	1453.	442.
BOONE	61.	0.	274.
CALDWELL	0.	0.	129.
CALLAWAY	0.	0.	297.
CARROLL	0.	0.	196.
CASS	0.	0.	73.
CEDAR	0.	0.	21.
CHARITON	0.	0.	226.
CLAY	0.	0.	32.
COOPER	22.	0.	0.
DADE	0.	0.	20.
DAVIESS	0.	0.	74.
GRUNDY	0.	0.	31.
HARRISON	0.	0.	224.
HENRY	1373.	1713.	625.
HOWARD	357.	0.	235.
JASPER	0.	0.	61.
JOHNSON	0.	0.	457.
LAFAYETTE	0.	0.	60.
LINN	0.	0.	565.
LIVINGSTON	0.	0.	68.
MACON	620.	643.	642.
MERCER	0.	0.	589.
MONROE	0.	0.	34.
MONTGOMERY	0.	0.	148.
MCDOWAY	0.	0.	17.
PETTIS	0.	0.	36.
PUTNAM	297.	682.	473.
RALLS	0.	0.	15.
RANDOLPH	577.	989.	906.
RAY	0.	0.	126.
ST CLAIR	0.	0.	254.
SALINE	0.	0.	79.
SCHUYLER	0.	0.	77.
SULLIVAN	0.	0.	381.
VERNON	4.	36.	356.
WORTH	0.	0.	19.
VARIOUS*	395.	0.	0.
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TOTAL	5492.	6075.	9483.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Table B.25 Montana: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
BIG HORN	1.17	7.16	9163.	36.32	2.57
BLAINE	.84	4.62	9475.	35.73	2.27
CASCADE	.81	4.00	9629.	37.00	2.55
MUSSELSHEL	.70	4.86	9470.	37.06	2.54
RICHLAND	1.46	8.03	6502.	34.14	2.75
ROSEBUD	1.82	8.76	8746.	48.04	1.74

lb SO₂/10⁶ Btu

0 - 1.2

1.2 - 3.2

Fig. B.25 Montana: Average Sulfur Content of Coal

Table B.26 Montana: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1975) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
BIG HORN	10518.	46035.	38355.
BLAINE	2756.	0.	18.
BROADWATER	0.	0.	6.
CARBON	0.	0.	735.
CASCADE	0.	0.	309.
CHOUTEAU	0.	0.	1.
CUSTER	0.	0.	3684.
DAWSON	0.	0.	1102.
FALLON	0.	0.	150.
FERGUS	0.	0.	210.
GARFIELD	0.	0.	137.
GLACIER	0.	0.	25.
JUDITH BAS	0.	0.	30.
MCCONE	0.	3000.	1167.
MEAGHER	0.	0.	0.
MUSSELSHEL	0.	2019.	3467.
POWDER RIV	0.	2.	27813.
PRAIRIE	0.	0.	200.
RICHLAND	304.	302.	876.
ROOSEVELT	0.	0.	431.
ROSEBUD	12424.	23615.	26264.
SHERIDAN	0.	0.	454.
STILLWATER	0.	0.	8.
TREASURE	0.	0.	1304.
WIBAUX	0.	0.	1000.
YELLOWSTON	0.	0.	590.
VARIOUS*	1752.	0.	0.
<hr/>			
TOTAL	27754.	74973.	108395.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.26 Montana: Coal Production in 1979

Table B.27 New Mexico: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
CCLFAX	.79	14.49	12058.	8.55	2.21
MCKINLEY	.98	13.74	9870.	17.39	5.05
SAN JUAN	1.62	21.15	8905.	21.96	5.71

lb SO₂/10⁶ Btu 0 - 1.2 1.2 - 3.2

Fig. B.27 New Mexico: Average Sulfur Content of Coal

Table B.28 New Mexico: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT(1979) PRODUCTION (THOUSANDS)	PROJECTED(1985) PRODUCTION (THOUSANDS)	PESERVES (MILLIONS)
CCLFAX	419.	519.	1381.
LINCOLN	0.	0.	7.
MCKINLEY	4301.	19242.	363.
RIC ARriba	0.	0.	7.
SANDOVAL	0.	0.	52.
SAN JUAN	8026.	18572.	2545.
SANTA FE	0.	0.	11.
SCCORRO	0.	0.	28.
VALENCIA	0.	0.	0.
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TCTAL	12746.	38334.	4394.

10³ Tons

Fig. B.28 New Mexico: Coal Production in 1979

Table B.29 North Dakota: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
BCHMAN	2.26	7.33	6152.	43.92	1.11
BURKE	1.32	6.90	7186.	43.63	1.11
MCLEAN	1.97	8.32	6429.	44.28	1.11
MERCER	1.74	11.83	6739.	42.95	1.11
OLIVER	2.05	7.47	6712.	43.01	1.11
WARD	1.21	10.00	6559.	43.47	1.11

lb. SO_2 / 10^6 Btu

1.2 - 3.2

Fig. B.29 North Dakota: Average Sulfur Content of Coal

Table B.30 North Dakota: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ADAMS	0.	0.	163.
BILLINGS	0.	0.	1078.
BOWMAN	2477.	2982.	785.
BURKE	17.	496.	117.
BURLEIGH	0.	0.	156.
DIVIDE	0.	0.	137.
DUNN	0.	0.	2000.
GOLDEN VAL	0.	0.	278.
GRANT	0.	1900.	115.
HETTINGER	0.	0.	980.
MCHENRY	0.	342.	15.
MCKENZIE	0.	0.	825.
MCLEAN	1148.	12200.	1009.
MERCER	4721.	21145.	1984.
MORTON	0.	0.	342.
MCUNTRAIL	0.	0.	148.
OLIVER	4043.	4187.	629.
RENVILLE	0.	0.	8.
SLOPE	0.	0.	2326.
STARK	0.	590.	1275.
WARD	254.	0.	501.
WILLIAMS	0.	0.	1130.
VARIOUS*	256.	0.	0.
TOTAL	12915.	43842.	15999.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.30 North Dakota: Coal Production in 1979

Table B.31 Ohio: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
ATHENS	4.50	11.08	11811.	22.12	2.17
AUGLAIZE	7.03	14.30	11095.	16.77	3.95
BELMONT	5.93	15.07	11455.	21.33	4.61
BROWN	6.04	15.20	10929.	35.09	7.76
CARROLL	6.32	11.04	11906.	36.29	4.03
CLEFMCNT	5.40	16.70	11362.	29.63	8.39
CCLUMEIANA	4.45	10.90	12098.	35.28	3.50
COCHOCTON	7.99	13.13	11145.	37.85	4.47
CUYAHOGA	5.13	9.40	11000.	31.73	2.32
DEFIANCE	3.69	7.30	13000.	43.17	2.78
GALLIA	6.42	13.95	10759.	18.87	2.35
GREENE	2.55	9.50	12638.	31.80	2.75
GUERNSEY	6.89	16.00	10967.	27.89	5.29
HAMILTON	5.63	14.72	11936.	25.59	5.56
HARRISON	4.48	12.00	11988.	22.74	2.25
HIGHLAND	10.20	13.80	10944.	53.10	4.82
HOCKING	6.78	13.00	11065.	39.12	4.79
HOLMES	8.12	12.99	11077.	43.97	3.48
JACKSON	7.10	13.51	11108.	27.16	3.50
JEFFERSON	4.93	12.94	11935.	24.70	5.73
LAWRENCE	4.21	14.26	10954.	37.73	6.37
LICKING	2.61	12.55	11116.	53.15	4.72
LOGAN	2.67	10.30	12305.	.00	.00
MAHONING	7.31	12.96	11726.	30.85	2.78
MARION	5.90	10.66	12063.	35.22	3.85
MEIGS	7.82	22.36	9572.	42.55	9.56
MEFCER	6.83	12.90	11500.	16.96	3.97
MONROE	5.83	13.36	11738.	45.04	17.58
MONTGOMERY	5.26	14.55	11512.	30.83	7.09
MORGAN	10.38	20.36	10365.	31.46	10.05
MUSKINGUM	9.38	18.19	10661.	28.33	7.09
PERRY	4.71	11.63	11153.	10.77	1.39
STARK	6.14	10.61	11452.	44.43	4.46
SUMMIT	4.05	13.70	11366.	21.77	2.56
TRUMBALL	7.06	12.70	12179.	18.28	3.78
TUSCARAWAS	6.78	11.70	11457.	42.82	4.22
VINTON	6.99	12.72	11026.	28.37	3.83
WAYNE	5.06	10.88	11653.	33.33	5.54

lb SO₂/10⁶ Btu

Fig. B.31 Ohio: Average Sulfur Content of Coal

Table B.32 Ohio: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ATHENS	16.	94.	1477.
AUGLAIZE	1.	0.	0.
BELMONT	10331.	14528.	4217.
BROWN	0.	0.	0.
CARROLL	83.	287.	877.
COLUMBIANA	909.	1005.	876.
COSSHOCKTON	1531.	1724.	358.
CUYAHOGA	7.	0.	0.
DEFIANCE	8.	0.	0.
GALLIA	2018.	402.	493.
GREENE	24.	0.	0.
GLERNSEY	857.	706.	1236.
HARRISON	4742.	8402.	1743.
HIGHLAND	6.	0.	0.
HOCKING	277.	840.	221.
HOLMES	48.	559.	68.
JACKSON	279.	941.	354.
JEFFERSON	1528.	2679.	1692.
LAWRENCE	1057.	199.	594.
LICKING	1.	1.	0.
LOGAN	1.	0.	0.
MAHONING	45.	268.	342.
MARION	61.	0.	0.
MEIGS	3799.	3623.	485.
MERCER	5.	0.	0.
MCMROE	1610.	4715.	469.
MONTGOMERY	563.	0.	0.
MORGAN	453.	82.	513.
MUSKINGUM	3902.	6014.	931.
NOBLE	0.	247.	913.
PERRY	2047.	2275.	907.
SCIOTO	0.	0.	6.
STARK	205.	449.	526.
TUSCARAWAS	954.	1516.	1114.
VINTON	43.	2860.	410.
WASHINGTON	0.	84.	230.
WAYNE	2.	37.	5.
VARIOUS*	903.	0.	0.

TOTAL	38313.	54540.	21055.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.32 Ohio: Coal Production in 1979

Table B.33 Oklahoma: Coal Quality Data

COUNTY NAMES	AVE. SO2 CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
ADAIR	4.34	9.79	12425.	6.49	2.18
ATOKA	7.10	13.49	12666.	20.99	2.54
CRAIG	5.10	12.11	12089.	4.74	1.51
HASKELL	3.26	8.79	13122.	5.46	1.32
LATIMER	4.45	11.28	12582.	6.53	2.18
MUSKOGEE	5.35	12.70	12298.	4.49	.88
NOWATA	6.08	10.07	12366.	20.82	2.54
OKMULGEE	5.20	13.32	11551.	18.74	7.98
ROGER MILL	6.18	12.62	11798.	12.17	2.32
ROGERS	2.72	7.99	11585.	11.80	1.76
SEQUOYAH	6.67	15.20	11362.	20.90	2.55
WAGONER	2.86	7.98	12329.	30.71	3.69

Fig. B.33 Oklahoma: Average Sulfur Content of Coal

Table B.34 Oklahoma: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ADAIR	7.	0.	0.
ATOKA	25.	0.	15.
CCAL	0.	0.	56.
CRAIG	518.	2454.	238.
HASKELL	209.	600.	140.
LATIMER	40.	13.	84.
LEFLORE	0.	140.	316.
MCINTOSH	0.	0.	6.
MUSKOGEE	72.	172.	3.
NOWATA	49.	54.	78.
OKFUSKEE	0.	0.	2.
OKMULGEE	50.	481.	124.
PITTSEURG	0.	40.	156.
ROGER MILL	1024.	0.	0.
ROGERS	2.	250.	50.
SEQUOYAH	5.	0.	9.
TULSA	0.	0.	9.
WAGONER	232.	260.	4.
VARIOUS*	540.	0.	0.

TOTAL	2775.	4462.	1290.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Table B.35 Pennsylvania: Coal Quality Data

COUNTY NAMES	AVE. SO2 CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
ADAMS	1.34	27.10	10178.	54.66	12.90
ALLEGHENY	3.48	10.93	12459.	14.97	1.99
ARMSTRONG	3.22	12.55	12282.	31.85	5.86
BEAVER	4.80	11.90	11836.	35.61	3.20
BEDFORD 19	3.22	16.42	11934.	52.66	6.40
BERKS	1.56	20.05	10131.	22.53	7.01
BRADFORD	1.70	23.21	10869.	38.77	12.90
BUTLER	4.35	11.46	12115.	24.34	7.03
CAMBERIA	2.44	13.44	12463.	9.93	1.56
CARBON	1.25	34.74	7206.	59.54	15.48
CENTRE	3.39	14.36	12378.	23.79	4.76
CLARION	3.92	10.13	12605.	21.59	1.31
CLEARFIELD	3.07	12.49	12445.	33.44	3.94
CLINTON	2.00	13.06	12364.	3.10	.56
COLUMBIA	5.81	11.11	12566.	36.44	4.81
ELK	3.69	10.99	12592.	27.42	3.76
FAYETTE	3.90	13.88	11997.	20.20	8.67
FULTON	3.16	12.30	12244.	27.36	3.51
GREENE	3.33	16.57	11562.	9.53	3.05
INDIANA	3.56	18.57	11858.	28.09	5.01
JEFFERSON	2.87	10.32	12683.	18.54	2.35
LACKAWANNA	2.00	16.17	10928.	14.56	4.71
LANCASTER	6.90	14.30	11282.	38.80	6.13
LAWRENCE	4.46	11.89	11977.	31.96	4.46
LUZERNE	1.38	21.74	9011.	20.02	8.48
LYCOMING	1.64	23.08	10904.	35.79	11.16
MERCER	2.51	10.35	12197.	13.29	1.73
MIFFLIN	5.98	17.50	10995.	8.77	3.77
NORTHAMPTON	1.82	26.55	8682.	49.93	12.91
NORTHUMBER	3.45	11.20	12750.	14.76	3.03
SCHUYLKILL	1.64	24.03	9541.	41.74	10.33
SNYDER	1.15	19.18	10427.	31.81	9.69
SCHERSET	2.26	13.42	11977.	23.07	3.80
SULLIVAN	1.37	26.00	10186.	21.04	9.08
TIOGA	1.77	20.88	11180.	55.51	12.05
VENANGO	7.47	13.69	11933.	53.77	7.76
WASHINGTON	3.73	15.74	11842.	14.69	2.72
WESTMORELAND	2.32	13.73	12122.	22.19	5.72

lb SO₂/10⁶ Btu

Fig. B.35 Pennsylvania: Average Sulfur Content of Coal

Table B.36 Pennsylvania: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ADAMS	5.	0.	0.
ALLEGHENY	1213.	2467.	900.
ARMSTRONG	2130.	7302.	1183.
BEAVER	105.	188.	498.
BEDFORD 19	44.	104.	89.
BERKS	20.	0.	0.
BLAIR	0.	1.	19.
BRADFORD	131.	0.	12.
BUTLER	458.	1083.	1025.
CAMBRIA	4515.	947.	1512.
CAMERON	0.	0.	25.
CARBON	52.	0.	0.
CENTRE	1074.	1150.	230.
CLARION	2117.	4293.	760.
CLEARFIELD	8553.	8737.	1216.
CLINTON	58.	391.	43.
COLUMBIA	9.	0.	0.
ELK	152.	674.	87.
FAYETTE	609.	2884.	1077.
FULTON	3.	13.	10.
GREENE	2521.	5377.	6597.
HUNTINGDON	0.	4.	36.
INDIANA	13143.	11847.	1742.
JEFFERSON	2030.	2478.	456.
LACKAWANNA	30.	0.	0.
LANCASTER	7.	0.	0.
LAWRENCE	261.	690.	184.
LUZERNE	117.	0.	0.
LYCOMING	196.	427.	12.
MCKEAN	0.	0.	151.
MERCER	54.	319.	165.
MIFFLIN	6.	0.	0.
NORTHAMPTON	173.	0.	0.
SCHUYLKILL	737.	0.	0.
SNYDER	4.	0.	0.
SCHMIDT	1197.	4034.	1294.
SULLIVAN	2.	0.	0.
TIOGA	400.	630.	39.
VENANGO	627.	541.	57.
WASHINGTON	1368.	1979.	3649.
WESTMORELAND	767.	1429.	760.
VARIOUS*	2534.	0.	0.
<hr/>			
TOTAL	47421.	59987.	23827.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.36 Pennsylvania: Coal Production in 1979

Table B.37 Tennessee: Coal Quality Data

COUNTY NAMES	AVE. SO2 CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
ANDERSON	2.93	15.00	11842.	23.63	2.82
BENTON	5.19	17.20	11550.	28.66	3.24
BLEDSC	3.70	12.95	11941.	17.92	3.24
CAMPBELL	2.83	12.30	12081.	17.58	2.53
CLAIBORNE	1.46	10.63	12248.	6.51	1.12
CUMBERLAND	2.73	12.14	12281.	9.38	.87
FENTRESS	3.36	13.71	11820.	16.77	2.64
GRUNDY	3.96	13.73	12117.	9.38	1.20
HAWKINS	1.76	12.60	12533.	.00	.00
MARION	1.82	13.79	12071.	9.46	1.30
MORGAN	2.55	13.05	12205.	14.95	2.38
OVERTON	2.74	17.10	11700.	9.41	1.21
RHEA	1.74	16.03	11880.	16.45	3.44
ROANE	1.86	11.14	12554.	7.50	.90
ROBERTSON	4.10	14.70	11753.	9.58	1.20
SCOTT	2.61	12.42	12110.	7.97	.25
SEQUATCHIE	3.22	13.21	12458.	9.32	1.20
VAN BUREN	3.88	11.43	12078.	21.89	2.47

lb SO₂/10⁶ Btu

1.2 - 3.2

3.2 - 5.6

Fig. B.37 Tennessee: Average Sulfur Content in Coal

Table B.38 Tennessee: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ANDERSON	1671.	1670.	131.
BENTON	3.	0.	0.
BLEDSCOE	31.	148.	20.
CAMPBELL	1628.	1620.	267.
CLAIBORNE	1199.	1201.	50.
CUMBERLAND	25.	114.	30.
FENTRESS	207.	492.	50.
GRUNDY	53.	53.	9.
HAMILTON	0.	0.	58.
MARION	98.	538.	44.
MORGAN	530.	632.	88.
OVERTON	3.	33.	11.
PICKETT	0.	0.	0.
PUTNAM	0.	94.	22.
RHEA	19.	0.	13.
ROANE	1.	67.	1.
ROBERTSON	14.	0.	0.
SCOTT	1246.	1275.	92.
SEQUATCHIE	85.	791.	61.
VAN BUREN	32.	108.	18.
WHITE	0.	0.	10.
VARIOUS*	222.	0.	0.

TOTAL	7068.	8835.	976.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

10^3 Tons

0 - 500

500 - 1000

> 1000

Fig. B.38 Tennessee: Coal Production in 1979

Table B.39 Texas: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/HBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
FREESTONE	1.73	10.40	6923.	18.42	7.99
HOPKINS	1.96	14.30	6117.	18.42	7.99
PANOLA	2.66	10.00	6764.	18.85	7.99

Fig. B.39 Texas: Average Sulfur Content of Coal

Table B.40 Texas: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ANDERSON	0.	0.	86.
ANGELINA	0.	0.	20.
ATACOSA	0.	3000.	0.
BASTROP	0.	0.	209.
BEXAR	0.	0.	62.
BCWIE	0.	0.	58.
BRAZOS	0.	0.	11.
BURLESON	0.	0.	16.
CALDWELL	0.	0.	152.
CAMP	0.	0.	27.
CASS	0.	0.	72.
CHEROKEE	0.	0.	44.
FAYETTE	0.	4000.	108.
FRANKLIN	0.	0.	12.
FREESTONE	4652.	5301.	102.
GREGG	0.	0.	16.
GRIMES	0.	4000.	51.
HARRISON	0.	583.	124.
HENDERSON	0.	3500.	151.
HOPKINS	7301.	1136.	0.
HOUSTON	0.	0.	68.
LEE	0.	0.	25.
LEON	0.	0.	98.
MADISON	0.	0.	30.
MARION	0.	0.	44.
MILAM	0.	13665.	418.
MCCRIS	0.	0.	22.
NACOGDOCHE	0.	0.	18.
PANOLA	9493.	14040.	140.
RAINS	0.	0.	14.
ROBERTSON	0.	7000.	112.
RUSK	0.	0.	166.
SHELBY	0.	0.	74.
TITUS	0.	10066.	146.
TRINITY	0.	0.	24.
VAN ZANDT	0.	0.	277.
WALKER	0.	0.	32.
WASHINGTON	0.	0.	22.
WCOO	0.	0.	133.
VARIOUS*	1351.	0.	0.

TOTAL	22797.	66291.	3185.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.40 Texas: Coal Production in 1979

Table B.41 Utah: Coal Quality Data

COUNTY NAMES	AVE. SC2 CONTENT (LBS/MTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
CARBON	1.02	9.67	11731.	9.30	2.40
EMERY	.88	10.89	11742.	3.39	.72
SALT LAKE	.89	7.00	11708.	5.87	1.36
SEVIER	.85	9.64	11176.	10.29	2.62
UTAH	1.59	18.55	10170.	5.10	2.40

Fig. B.41 Utah: Average Sulfur Content of Coal

Table B.42 Utah: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
CARBON	2520.	15855.	767.
EMERY	3375.	16061.	87.
GARFIELD	0.	0.	1035.
IRON	0.	0.	5.
KANE	0.	0.	1914.
SEVIER	103.	6853.	152.
UINTAH	0.	0.	40.
UTAH	6.	0.	0.
WAYNE	0.	1000.	41.
VARIOUS*	964.	0.	0.

TOTAL	6968.	39769.	4041.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.42 Utah: Coal Production in 1979

Table B.43 Virginia: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
ALLEGHENY	1.69	12.16	11250.	16.95	4.74
BLAND	1.56	16.64	11645.	14.82	4.91
BUCHANAN	1.76	11.70	12432.	9.52	2.99
CAMPBELL	1.02	13.50	12560.	16.41	4.69
DICKENSON	2.32	13.93	12303.	17.70	5.62
FAIRFAX	1.67	12.00	12000.	16.66	4.66
GREENESVIL	1.55	10.54	12760.	.00	.00
LEE	1.99	13.29	12161.	15.57	4.50
RUSSELL	1.33	15.26	12163.	5.49	2.89
TAZEWELL	1.32	13.71	12269.	13.04	3.77
WISE	1.46	12.20	12329.	6.90	2.52

Table B.44 Virginia: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ALLEGHENY	0.	0.	0.
BUCHANAN	2479.	6910.	1073.
CAMPBELL	39.	0.	0.
DICKENSON	1450.	4270.	577.
FAIRFAX	0.	0.	0.
GREENESVILLE	17.	0.	0.
LEE	1415.	1300.	229.
MONTGOMERY	0.	0.	72.
PULASKI	0.	0.	65.
RUSSELL	1953.	1706.	455.
SCOTT	0.	13.	44.
TAZEWELL	88.	3508.	213.
WISE	5189.	10837.	907.
VARIOUS*	754.	0.	0.

TOTAL	13385.	28543.	3636.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.44 Virginia: Coal Production in 1979

Table B.45 Washington: Coal Quality Data

COUNTY NAMES	AVE. SO ₂ CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
LEWIS	2.19	15.95	8100.	.78	.30

Fig. B.45 Washington: Average Sulfur Content of Coal

Table B.46 Washington: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
KING	0.	22.	84.
KITTITAS	0.	0.	63.
LEWIS	400.	4087.	1470.
PIERCE	0.	0.	63.
THURSTON	0.	0.	193.
WATCOM	0.	0.	70.
VARIOUS*	4000.	0.	0.
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TOTAL	4400.	4109.	1943.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.46 Washington: Coal Production in 1979

Table B.47 West Virginia: Coal Quality Data

COUNTY NAMES	AVE. SO2 CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
BARBOUR	3.83	11.78	12535.	30.04	8.80
BOONE	1.36	12.61	12089.	9.66	2.34
BROOKE	6.65	20.42	10326.	26.26	9.38
CLAY	3.93	11.48	12444.	5.47	3.25
FAYETTE	1.96	12.57	12108.	17.66	7.30
GILMER	3.17	13.03	11741.	35.67	4.82
GRANT	3.64	19.70	11485.	21.18	5.12
GREENBRIER	3.55	16.83	11579.	8.40	.67
HAMPSHIRE	3.01	9.70	12895.	30.12	3.03
HARRISON	4.61	8.47	13036.	7.12	.64
KANAWHA	1.38	15.43	11488.	4.73	1.20
LEWIS	4.24	10.71	12660.	2.48	.36
LINCOLN	1.62	14.64	11562.	34.92	3.80
LOGAN	1.27	12.99	12034.	4.85	2.55
MCDOWELL	1.84	17.66	11507.	45.49	3.00
MARION	3.87	10.95	12732.	18.13	2.40
MARSHALL	7.22	14.01	11822.	12.07	5.41
MINERAL	2.59	19.49	11093.	18.49	3.03
MINGO	1.46	10.49	12380.	4.70	.94
MCNONGALIA	3.96	12.93	12310.	16.20	2.20
NICHOLAS	1.45	10.68	12593.	25.08	10.44
OHIO	4.62	10.78	12200.	12.29	3.78
PLEASANTS	4.91	13.19	12156.	38.94	6.46
PRESTON	2.89	12.74	12236.	28.46	3.08
PUTNAM	1.19	12.06	12151.	7.20	2.92
RALEIGH	1.45	11.82	12506.	3.63	.98
RANDOLPH	1.48	11.76	12580.	25.80	5.96
ROANE	4.30	11.92	12212.	38.37	7.35
TAYLOR	4.43	9.54	13082.	20.94	2.64
TUCKER	3.44	9.16	13323.	8.34	.67
TYLER	1.26	10.80	12414.	5.39	1.44
UPSHUR	2.31	11.59	12580.	14.69	3.02
WAYNE	1.98	10.55	11936.	14.96	1.77
WEBSTER	1.51	14.19	11863.	10.38	3.05
WYOMING	2.09	9.55	12902.	20.91	3.75

Fig. B.47 West Virginia: Average Sulfur Content of Coal

Table B.48 West Virginia: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
BARBOUR	2301.	3126.	1076.
BEGONE	5522.	14885.	2445.
BRAXTON	0.	177.	566.
BROOKE	543.	875.	200.
CABELL	0.	0.	22.
CALHOUN	0.	0.	4.
CLAY	72.	63.	842.
COODRIDGE	0.	0.	248.
FAYETTE	387.	438.	1066.
GILMER	2.	45.	169.
GRANT	2226.	1891.	327.
GREENBRIER	67.	750.	308.
HAMPSHIRE	4.	0.	0.
HANCOCK	0.	0.	141.
HARRISON	2344.	5161.	435.
KANAWHA	5013.	3946.	1682.
LEWIS	471.	382.	818.
LINCOLN	218.	972.	443.
LOGAN	3064.	1249.	3620.
MCDOWELL	380.	1846.	1228.
MARION	4645.	5213.	2710.
MARSHALL	5913.	5131.	3045.
MASON	0.	46.	119.
MERCER	0.	193.	61.
MINERAL	188.	359.	233.
MINGO	1615.	4292.	2327.
MUNONGALIA	5430.	10575.	3141.
NICHOLAS	936.	683.	1669.
OHIO	1040.	1502.	414.
PLEASANTS	4.	0.	0.
POCAHONTAS	0.	0.	162.
PRESTON	2010.	1980.	877.
PUTNAM	0.	0.	148.
RALEIGH	256.	1983.	1987.
RANDOLPH	486.	1054.	868.
ROANE	82.	0.	23.
SUMMERS	0.	4.	9.
TAYLOR	10.	227.	410.
TUCKER	34.	233.	129.
TYLER	19.	0.	80.
UPSHUR	462.	2588.	974.
WAYNE	32.	344.	484.
WEBSTER	302.	516.	1375.
WETZEL	0.	0.	846.
WYOMING	77.	2093.	1744.
VARIOUS*	2585.	0.	0.
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TOTAL	48722.	74822.	39476.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.48 West Virginia: Coal Production in 1979

Table B.49 Wyoming: Coal Quality Data

COUNTY NAMES	AVE. SO2 CONTENT (LBS/MBTU)	AVE. ASH CONTENT (PERCENT)	AVE. HEAT VALUE (BTU/LB)	WASHABILITY DATA	
				PERCENT S REMOVAL	BTU LOSS (PERCENT)
BIG HORN	1.01	4.68	9367.	6.18	.47
CAMPBELL	.94	5.41	8412.	10.21	1.24
CARBON	1.42	11.31	10174.	3.24	.47
CONVERSE	1.11	8.68	8050.	8.51	3.06
LINCOLN	1.09	5.20	9736.	21.64	.81
PARK	.85	5.15	8801.	1.80	.39
SWEETWATER	1.06	11.11	9368.	12.96	1.93

Fig. B.49 Wyoming: Average Sulfur Content of Coal

Table B.50 Wyoming: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
ALBANY	0.	0.	81.
BIG HORN	5813.	0.	3.
CAMPBELL	28051.	168332.	33604.
CARBON	10079.	29284.	2222.
CCNVERSE	3513.	13304.	1636.
CROOK	0.	0.	1.
FREMONT	0.	0.	51.
HOT SPRING	0.	602.	66.
JOHNSON	0.	0.	3327.
LINCOLN	2452.	7607.	1556.
NATRONA	0.	0.	35.
PARK	0.	0.	29.
SHERIDAN	0.	6889.	5282.
SWEETWATER	7009.	15888.	4741.
UINTA	0.	0.	627.
WASHAKIE	0.	0.	12.
WESTON	0.	0.	58.
VARIOUS*	10118.	0.	0.
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TOTAL	67035.	241906.	53331.

* THIS FIGURE REPRESENTS DATA NOT ASSIGNED TO A SPECIFIC COUNTY.

Fig. B.50 Wyoming: Coal Production in 1979

Table B.51 Michigan: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
BAY	0.	0.	56.
GENESSEE	0.	0.	7.
HURON	0.	0.	6.
SAGINAW	0.	0.	27.
SHIAWASSEE	0.	0.	2.
TUSCOLA	0.	0.	20.

TOTAL	0.	0.	118.

Table B.52 Oregon: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
CCOS	0.	0.	2.

TOTAL	0.	0.	2.

Table B.53 South Dakota: Coal Production and Reserves Tonnage

COUNTY NAME	CURRENT (1979) PRODUCTION (THOUSANDS)	PROJECTED (1985) PRODUCTION (THOUSANDS)	RESERVES (MILLIONS)
CORSON	0.	0.	30.
DEWEY	0.	0.	130.
HARDING	0.	0.	227.
PERKINS	0.	0.	40.
ZEIBACH	0.	0.	1.

TOTAL	0.	0.	428.

APPENDIX C

MAPS OF PSD CLASS I AREAS

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APPENDIX C

MAPS OF PSD CLASS I AREAS

The following maps present the boundaries of each mandatory prevention of significant deterioration Class I area, on a state-by-state basis. A cover sheet for each state lists the names of the Class I areas, their acreage, and their location on the map. Several Class I areas (e.g., Yellowstone National Park) have acreage in more than one state and appear on more than one map.

Table C.1. Alabama: PSD Class I Area

Location	Area Name	Acreage
1	Sipsey Wilderness	12,646

Fig. C.1 Alabama: PSD Class I Areas

Table C.2 Arizona: PSD Class I Areas

Location	Area Name	Acreage
1	Grand Canyon National Park	1,176,913
2	Sycamore Canyon Wilderness	47,757
3	Petrified Forest National Park	93,493
4	Pine Mountain Wilderness	20,061
5	Mazatzal Wilderness	205,137
6	Sierra Ancha Wilderness	20,850
7	Mount Baldy Wilderness	6,975
8	Superstition Wilderness	124,117
9	Galiuro Wilderness	52,717
10	Saguaro Wilderness	71,400
11	Chiricahua National Monument Wilderness	9,440
12	Chiricahua Wilderness	18,000

Fig. C.2 Arizona: PSD Class I Areas

Table C.3 Arkansas: PSD Class I Areas

Location	Area Name	Acreage
1	Upper Buffalo Wilderness	9,912
2	Caney Creek Wilderness	14,344

Fig. C.3 Arkansas: PSD Class I Areas

Table C.4 California: PSD Class I Areas

Location	Area Name	Acreage
1	Redwood National Park	27,792
2	Marble Mountain Wilderness	213,743
3	Lava Beds Wilderness	28,640
4	South Warner Wilderness	68,507
5	Thousand Lakes Wilderness	15,695
6	{ Lassen Volcanic National Park	105,800
	{ Caribou Wilderness	19,080
7	Yolla-Bolly-Middle-Eel Wilderness	109,091
8	Desolations Wilderness	63,469
9	Mokelumme Wilderness	50,400
10	Emigrant Wilderness	104,311
11	Hoover Wilderness	47,916
12	Yosemite National Park	759,172
13	Minarets	102,040
14	John Muir Wilderness	484,673
15	Kaiser Wilderness	22,500
16	Kings Canyon National Park	459,994
17	Sequoia National Park	386,642
18	Point Reyes Wilderness	25,370
19	Pinnacles Wilderness	12,952
20	Ventana Wilderness	95,152
21	Dome Land Wilderness	62,206
22	San Rafael Wilderness	142,722
23	San Gabriel Wilderness	36,137
24	Cucamonga Wilderness	9,022
25	San Geronio Wilderness	34,644
26	Joshua Tree Wilderness	429,690
27	San Jacinto Wilderness	20,564
28	Aqua Tibia Wilderness	15,934

Fig. C.4 California: PSD Class I Areas

Table C.5 Colorado: PSD Class. I Areas

Location	Area Name	Acreage
1	Mount Zirkel Wilderness	72,472
2	Rawah Wilderness	26,674
3	Rocky Mountain National Park	283,138
4	Flat Tops Wilderness	235,230
5	Eagles Nest Wilderness	133,910
6	Maroon-Bells-Snowmass Wilderness	71,060
7	West Elks Wilderness	61,412
8	Black Canyon of the Gunnison Wilderness	11,180
9	La Garita Wilderness	48,486
10	Weminuche Wilderness	400,907
11	Great Sand Dunes Wilderness	33,450
12	Mesa Verde National Park	51,488

Fig. C.5 Colorado: PSD Class I Areas

Table C.6 Florida: PSD Class I Areas

Location	Area Name	Acreage
1	Bradwell Bay Wilderness	22,000
2	St. Marks Wilderness	17,745
3	Chassahowitzka Wilderness	23,360
4	Everglades National Park	1,397,429

Fig. C.6 Florida: PSD Class I Areas

Table C.7 Georgia: PSD Class I Areas

Location	Area Name	Acreage
1	Cohotta Wilderness	33,776
2	Wolf Island Wilderness	5,126
3	Okefenokee Wilderness	343,850

Fig. C.7 Georgia: PSD Class I Areas

Table C.8 Idaho: PSD Class I Areas

Location	Area Name	Acreage
1	Selway-Bitterroot Wilderness	983,417 ^a
2	Hells Canyon Wilderness	83,800 ^b
3	Sawtooth Wilderness	216,383
4	Craters of the Moon Wilderness	43,243
5	Yellowstone National Park	31,488 ^c

^aSelway-Bitterroot Wilderness, 1,232,310 acres overall, includes an area in Montana.

^bHells Canyon, 192,700 acres overall, includes an area in Oregon.

^cYellowstone National Park, 2,219,737 acres overall, includes areas in Montana and Wyoming.

Fig. C.8 Idaho: PSD Class I Areas

Table C.9 Kentucky: PSD Class I Area

Location	Area Name	Acreage
1	Mammoth Cave	51,303

Fig. C:9 . Kentucky: PSD Class I Areas

Table C.10 Louisiana: PSD Class I Area

Location	Area Name	Acreage
1	Breton Wilderness	5,000 +

Fig. C.10 Louisiana: PSD Class I Area

Table C.11 Maine: PSD Class I Areas

Location	Area Name	Acreage
1	Moosehorn Wilderness	7,501
2	Acadia National Park	37,503

Fig. C.11 Maine: PSD Class I Areas

Table C.12 Michigan: PSD Class I Areas

Location	Area Name	Acreage
1	Isle Royale National Park	542,428
2	Seney Wilderness	25,150

Fig. C.12 Michigan: PSD Class I Areas

Table C.13 Minnesota: PSD Class I Areas

Location	Area Name	Acreage
1	Voyageurs National Park	114,964
2	Boundary Waters Canoe Area Wilderness	747,840

Fig. C.13 Minnesota: PSD Class I Areas

Table C.14 Missouri: PSD Class I Areas

Location	Area Name	Acreage
1	Mingo Wilderness	8,000
2	Hercules-Glades Wilderness	12,315

Fig. C.14 Missouri: PSD Class I Areas

Table C.15 Montana: PSD Class I Areas

Location	Area Name	Acreage
1	Glacier National Park	1,012,599
2	Cabinet Mountains Wilderness	94,272
3	Bob Marshall Wilderness	950,000
4	U.L. Bend Wilderness	20,890
5	Medicine Lake Wilderness	11,366
6	Mission Mountain Wilderness	73,877
7	Scapegoat Wilderness	239,295
8	Gates of the Mountain Wilderness	28,562
9	Anaconda-Pintlar Wilderness	157,803
10	Red Rock Lakes Wilderness	32,350
11	Yellowstone National Park	167,624 ^a
12	Northern Cheyenne Reservation ^b	444,157

^aYellowstone National Park, 2,219,737 acres overall, includes areas in Idaho and Wyoming.

^bNorthern Cheyenne Reservation has been redesignated Class I; it was not a mandatory Class I area.

Fig. C.15. Montana: PSD Class I Areas

Table C.16 Nevada: PSD Class I Area

Location	Area Name	Acreage
1	Jarbidge Wilderness	64,667

Fig. C.16 Nevada: PSD Class I Area

Table C.17 New Hampshire: PSD Class I Areas

Location	Area Name	Acreage
1	Great Gulf Wilderness	5,552
2	Presidential Range - Dry River Wilderness	20,000

Fig. C.17 New Hampshire: PSD Class I Areas

Table C.18 New Jersey: PSD Class I Area

Location	Area Name	Acreage
1	Brigantine Wilderness	6,603

Fig. C.18 New Jersey: PSD Class I Area

Table C.19 New Mexico: PSD Class I Areas

Location	Area Name	Acreage
1	San Pedro Parks Wilderness	41,132
2	Wheeler Peak Wilderness	6,027
3	Bandelier Wilderness	23,267
4	Pecos Wilderness	167,416
5	Bosque del Apache Wilderness	60,850
6	White Mountain Wilderness	31,171
7	Salt Creek Wilderness	8,500
8	Gila Wilderness	433,690
9	Carlsbad Caverns National Park	46,435

Fig. C.19 New Mexico: PSD Class I Areas

Table C.20 North Carolina: PSD Class I Areas

Location	Area Name	Acreage
1	Joyce-Kilmer-Slickrock Wilderness	10,201 ^a
2	Great Smokey Mountains National Park	273,551 ^b
3	Linville Gorge Wilderness	7,575
4	Shining Rock Wilderness	13,350
5	Swanquarter Wilderness	9,000

^aJoyce-Kilmer-Slickrock Wilderness, 14,033 acres overall, includes an area in Tennessee.

^bGreat Smokey Mountains National Park, 514,758 acres overall, includes an area in Tennessee.

Fig. C.20 North Carolina: PSD Class I Areas

Table C.21 North Dakota: PSD Class I Areas

Location	Area Name	Acreage
1	Lostwood Wilderness	5,557
2	Theodore Roosevelt National Park	69,675

Fig. C.21 North Dakota: PSD Class I Areas

Table C.22 Oklahoma: PSD Class I Area

Location	Area Name	Acreage
1	Wichita Mountains Wilderness	8,900

Fig. C.22 Oklahoma: PSD Class I Area

Table C.23 Oregon: PSD Class I Areas

Location	Area Name	Acreage
1	Mount Hood Wilderness	14,160
2	Hells Canyon	108,900 ^a
3	Eagle Cap Wilderness	293,476
4	Mount Jefferson Wilderness	100,208
5	Mount Washington	46,116
6	Three Sisters Wilderness	199,902
7	Strawberry Mountain Wilderness	33,003
8	Diamond Peak Wilderness	36,637
9	Crater Lake National Park	160,290
10	Kalmiopsis	76,900
11	Mountain Lakes Wilderness	23,071
12	Gearhart Mountain Wilderness	18,709

^aHells Canyon, 192,700 acres overall, includes an area in Idaho.

Fig. C.23 Oregon: PSD Class I Areas

Table C.24 South Carolina: PSD Class I Area

Location	Area Name	Acreage
1	Cape Romain Wilderness	28,000

Fig. C.24 South Carolina: PSD Class I Areas

Table C.25 South Dakota: PSD Class I Areas

Location	Area Name	Acreage
1	Wild Cave National Park	28,060
2	Badlands Wilderness	64,250

Fig. C:25 South Dakota: PSD Class I Areas

Table C.26 Tennessee: PSD Class I Areas

Location	Area Name	Acreage
1	Great Smokey Mountains National Park	241,207 ^a
2	Joyce-Kilmer-Slickrock Wilderness	2,832 ^b

^aGreat Smokey Mountains National Park, 514,758 acres overall, includes an area in North Carolina.

^bJoyce-Kilmer-Slickrock Wilderness, 14,033 acres overall, includes an area in North Carolina.

Fig. C.26 Tennessee: PSD Class I Areas

Table C.27 Texas: PSD Class I Areas

Location	Area Name	Acreage
1	Guadalupe Mountains National Park	76,292
2	Big Bend National Park	708,118

Fig. C.27 Texas: PSD Class I Areas

Table C.28 Utah: PSD Class I Areas

Location	Area Name	Acreage
1	Arches National Park	65,098
2	Capitol Reef National Park	221,896
3	Canyonlands National Park	337,570
4	Bryce Canyon National Park	35,832
5	Zion National Park	142,462

Fig. C.28 Utah: PSD Class I Areas

Table C.29 Vermont: PSD Class I Area

Location	Area Name	Acreage
1	Lyle Brook Wilderness	12,430

Fig. C.29 Vermont: PSD Class I Area

Table C.30 Virginia: PSD Class I Areas

Location	Area Name	Acreage
1	Shenandoah National Park	190,535
2	James River Face Wilderness	8,703

Fig. C.30 Virginia: PSD Class I Areas

Table C.31 Washington: PSD Class I Areas

Location	Area Name	Acreage
1	North Cascades National Park	503,277
2	Pasayten Wilderness	505,524
3	Glacier Peak Wilderness	464,258
4	Olympic National Park	892,578
5	Alpine Lakes Wilderness	303,508
6	Mount Rainier National Park	235,239
7	Goat Rocks Wilderness	82,680
8	Mount Adams Wilderness	32,356

Fig. C.31 Washington: PSD Class I Areas

Table C.32 West Virginia: PSD Class I Areas

Location	Area Name	Acreage
1	Otter Creek Wilderness	20,000
2	Dolly Sods Wilderness	10,215

Fig. C.32 West Virginia: PSD Class I Areas

Table C.33 Wisconsin: PSD Class I Area

Location	Area Name	Acreage
1	Rainbow Lake Wilderness	6,583

Fig. C.33 Wisconsin: PSD Class I Area

Table C.34 Wyoming: PSD Class I Areas

Location	Area Name	Acreage
1	Yellowstone National Park	2,020,625 ^a
2	North Absaroka Wilderness	351,104
3	Grand Teton National Park	305,504
4	Teton Wilderness	557,311
5	Washakie Wilderness	686,584
6	Bridger Wilderness	392,160
7	Fitzpatrick Wilderness	191,103

^aYellowstone National Park, 2,219,737 acres overall, includes regions in Idaho and Montana.

Fig. C.34 Wyoming: PSD Class I Areas

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APPENDIX D

**MAPS OF COUNTY NAMES FOR STATES
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Fig. D.1 Alabama: Key to Counties

Fig. D.2 Arizona: Key to Counties

Fig. D.3 Arkansas: Key to Counties

Fig. D.4 Colorado: Key to Counties

Fig. D.5 Georgia: Key to Counties

Fig. D.6 Illinois: Key to Counties

Fig. D.7 Indiana: Key to Counties

Fig. D.8 Iowa: Key to Counties

Fig. D.9 Kansas: Key to Counties

Fig. D.10 Kentucky: Key to Counties

Fig. D.11 Maryland: Key to Counties

Fig. D.12 Michigan: Key to Counties

Fig. D.13 Missouri: Key to Counties

Fig. D.15 New Mexico: Key to Counties

Fig. D.16 North Dakota: Key to Counties

Fig. D.17 Ohio: Key to Counties

Fig. D.18 Oklahoma: Key to Counties

Fig. D.19 Oregon: Key to Counties

Fig. D.20 South Dakota: Key to Counties

Fig. D.21 Pennsylvania: Key to Counties

Fig. D.22 Tennessee: Key to Counties

Fig. D.23 Texas: Key to Counties

Fig. D.24 Utah: Key to Counties

Fig. D.26 Washington: Key to Counties

Fig. D.27 West Virginia: Key to Counties

Fig. D.28 Wyoming: Key to Counties