DOE/EIA-0529(92)
Distribution Category UC-98

U.S. Coal Reserves:
An Update by Heat and Sulfur Content

February 1993

Energy Information Administration
Office of Coal, Nuclear, Electric and Alternate Fuels
U.S. Department of Energy
Washington, DC 20585

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Preface

Section 205(a)(2) of the Department of Energy Organization Act of 1977 (Public Law 95-91) requires the Administrator of the Energy Information Administration (EIA) to carry out a central, comprehensive, and unified energy data information program that will collect, evaluate, assemble, analyze, and disseminate data and information relevant to energy resources, reserves, production, demand, technology, and related economic and statistical information.

As part of the EIA program to provide information on coal, this report, *U.S. Coal Reserves: An Update by Heat and Sulfur Content*, presents detailed estimates of U.S. coal reserves, as well as descriptions of the data, methods, and assumptions used to develop such estimates, which are basic to the analysis and forecasting of future coal supply. This report provides technical documentationfor specific revisions and adjustments to the demonstrated reserve base (DRB) of coal in the United States and for coal quality and reserve allocations and makes the resulting data available for general use by the public.

The legislation that created the EIA vested the organization with an element of statutory independence. EIA's responsibility is to provide timely, high-quality information and to perform objective, credible analyses in support of deliberations by both public and private decisionmakers. EIA does not take positions on policy questions. Accordingly, this report does not purport to represent the policy positions of the U.S. Department of Energy or the Administration.

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Executive Summary

Coal currently satisfies 23 percent of domestic energy demand and fuels 55 percent of the Nation's electric power generation. Nevertheless, there is continuing debate over the future contributions of coal to the U.S. economy due to the possible impacts of continued coal production and use on the environment. It is essential that a comprehensive data base that characterizes U.S. coal reserves be available for use in evaluating the advantages and disadvantages of future coal mining and coal consumption. To that end, this report provides new data on coal resources and reserves in the United States, with estimates of its heat content—measured in British thermal units (Btu)—and sulfur content— measured in pounds per million Btu.

Because of the technical nature of this subject, it is important to understand several geological terms. **Coal resources** are naturally occurring deposits of coal in the Earth in forms and amounts for which economic extraction is potentially feasible. That portion of known in-ground coal resources that meets certain geologic reliability and economic minability criteria is called the **demonstrated reserve base** (DRB) of coal. "**Recoverable coal reserves**," also known as "coal reserves," is the portion of the DRB that can be economically recovered after considering environmental, legal, and technologic constraints.

The DRB is the starting point for most coal supply analyses and forecasts of future cost and availability of coal in the United States. Estimates of the DRB aggregated at State and national levels, are updated and published annually by the Energy Information Administration (EIA). To arrive at its DRB estimates, the EIA selects and compiles, from publicly available resource studies, the most reliable estimates of the quantities of coal that are generally well suited for commercial mining, based on standard coalbed thickness and depth ranges. Because the DRB is traditionally based on sources that do not include precise information on the variable heat and sulfur content of the component coal deposits in the field, ranges of Btu and sulfur content have previously been estimated by indirect methods.

Resource estimates were correlated with coal quality data from other sources, then statistically allocated to Btu and sulfur categories, and these results were then modified with supplementary information, using professional judgment.

This publication reports on the first results of the EIA's new Coal Reserves Data Base (CRDB) program, which is intended to bring together the best available coal resource data and coal quality data, and to use the skills of appropriate experts to analyze the data and develop internally correlated data bases. As part of the CRDB program, pilot studies have been completed under two cooperative agreements, one between the EIA and the Ohio Geological Survey, the other between the EIA and the Geological Survey of Wyoming.

The Ohio study produced a new State DRB estimate of 23.9 billion short tons—5.4 billion short tons more than the previous estimate. Almost all of the increase was in coal resources that are potentially exploitable by underground mining methods. The resulting new estimate of Ohio's recoverable coal reserves (the portion of in-ground coal resources that can be economically extracted or produced) is 11.8 billion short tons. Of this quantity, 10.2 billion short tons, or 86 percent, is high-sulfur[1] coal (containing 1.68 pounds or more sulfur per million Btu).

Wyoming surface mining is currently the Nation's leading source of inexpensive, low-sulfur coal. The Wyoming study was designed to reevaluate the fundamental coal quality allocations for the State's coal resources that are exploitable by surface mining. The study resulted in an increase of 6.0 billion short tons, or 32 percent, in the estimate of Wyoming's low-sulfur recoverable coal reserves. The increase resulted primarily from a reallocation of previous coal resource estimates to lower sulfur ranges and an upward revi-sion of the assumed net recovery of the resources.

In addition to the data from the Ohio and Wyoming studies, this report presents revised EIA estimates of

[1]The ranges of sulfur contents for low-, medium-, and high sulfur coals are discussed in Appendix B, “Coal Quality,” and Table B3. Sulfur content values of coal are considered low, medium, or high in relation to the potential of the coal, when burned, to produce sulfur dioxide emissions below, near, or above increments allowed by the U.S. Environmental Protection Agency under the Clean Air Act, New Source Performance Standards for fossil-fueled boilers.

in-ground resources and of reserves that could be recovered from Pennsylvania anthracite. Also, allocations are presented for Btu and sulfur content for coal in 11 areas not previously analyzed by the EIA. Finally, data for all States included in the DRB have been further analyzed and adjusted for production and mining losses through January 1, 1992, and are presented in this report.

The estimates presented in this report are inherently uncertain. Although the EIA and others have under-taken to improve the accuracy of the estimates, there are still limitations to both the procedures used and the data available for much of the estimation, attributable to the age of many of the geological estimates of coal resource quantities and to the paucity of available information on coal quality for many of the resource areas included in the DRB. Many economic factors, such as coal ash contents, ash melting temperatures, and sodium contents, along with regulatory constraints, land-use conflicts, and spoiling of reserves by nearby mining, may curtail coal reserve development in the long term. Therefore, the EIA cautions against projecting the number of years of future production for which these estimated reserves will last.

The detailed estimates of U.S. coal resources and recoverable coal reserves presented in this report by State, method of mining, Btu content, and sulfur content should be useful for analyses of issues related to the coal industry and coal consumers, especially in evaluating various coal use scenarios evolving from the Clean Air Act Amendments of 1990. These estimates are the result of the EIA's best efforts to compile, from available data, information on U.S. coal resources and reserves on a uniform, nationwide basis. The data, methodologies, and assumptions used to develop these estimates will be updated as new information becomes available.

Highlights of the current EIA estimates are as follows:

- Nearly 169 billion short tons, or more than one-third of all in-ground coal resources included in the DRB, consist of low-sulfur coal, containing 0.6 pounds or less sulfur per million Btu of heat content (Table ES1). Low-sulfur coal emits 1.2 pounds of sulfur dioxide or less per million Btu of heat produced when it is burned, thus meeting the 1971 New Source Performance Standards for power plants without scrubbers.[2]

Table ES1. Estimates of the Demonstrated Reserve Base of Coal in the United States by Btu/Sulfur Ranges and Regions

(Million Short Tons Remaining as of January 1, 1992)

Region[b]	Summary Sulfur Content Categories[a] (Pounds of Sulfur per Million Btu) ≤ 0.60 (Low Sulfur)		0.61-1.67 (Medium Sulfur		≥ 1.68 (High Sulfur)		Total	
Appalachia	26,916.8	(16.0)	37,136.2	(26.6)	43,533.6	(26.0)	107,586.6	(22.6)
Interior	1,162.2	(0.7)	21,338.7	(15.3)	111,049.0	(66.4)	133,549.9	(28.1)
West	140,459.0	(83.3)	81,315.8	(59.2)	12,686.4	(7.6)	234,461.2	(49.3)
U.S. Total	168,538.0	(100.0)	139,790.6	(100.0)	167,269.	(100.0)	475,597.7	(100.0)

[a]For detailed analyses, the EIA uses six sulfur content ranges. For general discussion and summary data, however, those six ranges are combined into the three qualitative ratings of low-, medium-, and high-sulfur content coal presented here. See also Appendix B, Table B3.

[b]States with qualified resource or reserve data in each region: **Appalachia**—Alabama, Georgia, eastern Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia. **Interior**—Arkansas, Illinois, Indiana, Iowa, Kansas, western Kentucky, Louisiana, Missouri, Oklahoma, Texas. **West**—Alaska, Arizona, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming.

Notes: Numbers in parentheses are percentages of the U.S. totals. Btu = British thermal units.

Source: Energy Information Administration estimates.

[2]This assumes that 100 percent of the sulfur in the coal is converted to sulfur dioxide and none is retained in the ash.

- Most of the low-sulfur coal included in the DRB (83 percent of the total) is in the West, 16 percent of the total is in Appalachia, and less than 1 percent is in the Interior Region (Table ES1).

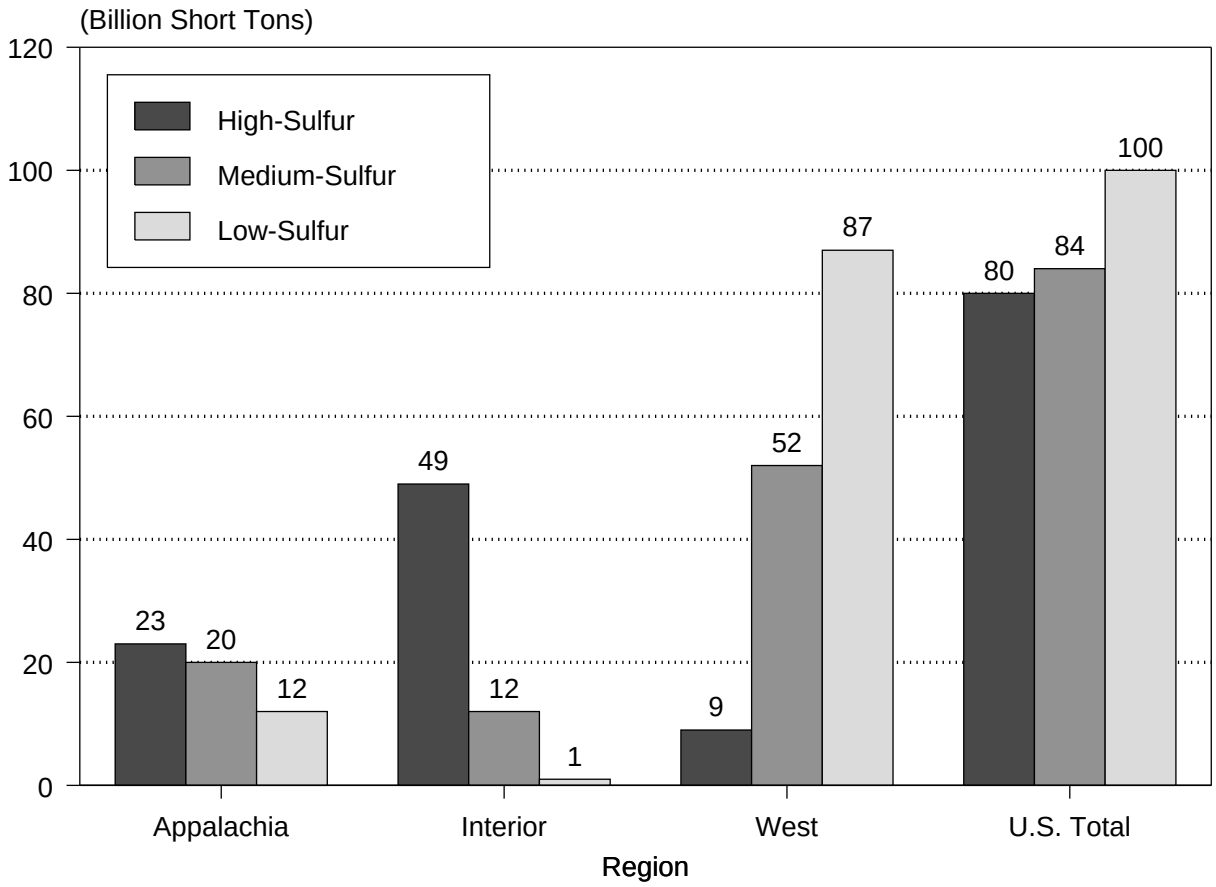
- About 140 billion short tons, or 29 percent of the total DRB, are medium-sulfur coal, containing between 0.61 and 1.67 pounds of sulfur per million Btu. Of this amount, approximately 59 percent is in the West, nearly 27 percent in Appalachia, and 15 percent in the Interior Region.

- About 167 billion short tons, or 35 percent of the total DRB, consists of high-sulfur coal, containing 1.68 pounds or more sulfur per million Btu. Two-thirds of this amount is in the Interior Region.

- After accounting for coal that is inaccessible or illegal to mine, and for expected recovery rates, recoverable coal reserves in the United States amount to 265 billion short tons, or 56 percent of the total DRB (Figure ES1).

- Low-sulfur recoverable coal reserves in the Uni-ted States are estimated at 100 billion short tons, 87 percent of which is in the West, 12 percent in Appalachia, and less than 1 percent in the Interior Region.

Figure ES1. Estimates of Recoverable Coal Reserves in the United States by Sulfur Content and Region as of January 1, 1992



Source: Energy Information Administration estimates.

1. Introduction

EIA Coal Reserve Data

The coal industry is currently the largest energy-producing industry in the United States, accounting for about 32 percent of U.S. energy production.[1] Coal also accounts for about 23 percent of all energy consumed domestically; it is the Nation's third largest source of energy. (Although coal's share of domestic energy production is the largest, its share of total consumption is not. This is because net imports account for 43 percent of the petroleum consumed domestically, while about 13 percent of domestic coal production is exported.) Due to the prominent role of coal in domestic energy markets, it is essential for the Federal Government, coal-producing and consuming industries, the public, and other interested parties to know, with some degree of certainty, the quantity and quality of the coal avail-able use in the future.

Detailed information on coal supplies is needed because: (1) coal is not a homogeneous commodity—it varies considerably in characteristics that affect its use and value; (2) the cost of extracting coal depends on how it is deposited and what mining method can be used to extract it; and (3) coal is widely distributed geographically.

To varying degrees, those factors are accounted for in the EIA's estimates of recoverable coal reserves. These data are the estimated quantities of coal in known coal deposits in the ground that could be economically recovered, considering environmental, legal, and tech-nologic constraints. Estimates of recoverable coal reserves are based on the EIA's demonstrated reserve base (DRB) of in-ground coal resources in the United States.

The DRB represents known coal resources that meet certain criteria of geologic reliability and economic minability. The criteria for geologic reliability are relatively uniform; they conform to standards defined and agreed upon by the Department of the Interior's U.S. Geological Survey (USGS) and U.S. Bureau of Mines. The geologic reliability criteria are based on the relative abundance of coal field data, including measurements of coalbed thickness and elevation. The criteria for economic minability are also relatively uniform. Because much of the DRB is based on resource studies that may encompass entire coalfields, typically aggregated at the county level, potential economic minability of the coal resources included in the DRB is generally based on standard ranges of coalbed thickness and estimated depths of resources beneath the surface. Actual access for mining and specific physical constraints, coal quality, and recoverability, however, will determine whether coal is profitable to mine.

As the only nationwide data file of the quantities of potentially minable coal available under a unified set of criteria, the DRB provides the basic input for numerous coal and energy analysis and forecasting models—both government and private. One of these models is the EIA's Resource Allocation and Mine Costing (RAMC) model, which provides input to other EIA models and to the National Energy Modeling System (NEMS), the EIA's new integrated energy forecasting system. The DRB is also used in commercial models, such as ICF, Incorporated's Coal and Electric Utility Model (CEUM).

The DRB fulfills the key requirement—to apply consistent resource criteria in a national data base—because it is the single most comprehensive source of information on potentially minable in-ground coal resources in the United States that is publicly available. The DRB, however, provides only estimates of the *quantity* of coal resources in the ground, one of two critical types of information usually needed to properly conduct analyses of coal. The other requisite piece of information, an accurate estimate of the *quality* of coal (such as heat or sulfur content, or other constituents or characteristics), is not inherent in the DRB.

The derived information on coal quality and a description of the methodology used to develop it were

published in 1989 in the EIA report, *Estimation of U.S. Coal Reserves by Coal Type: Heat and Sulfur Content*.[2]

[1]Based on British thermal units (Btu) of energy produced. Energy Information Administration, *Annual Energy Review 1991*, DOE/EIA-0384(91) (Washington, DC, June 1992).

[2]Energy Information Administration, *Estimation of U.S. Coal Reserves by Coal Type: Heat and Sulfur Content*, DOE/EIA-0529 (Washington, DC, October 1989).

The purpose of the present report, *U.S. Coal Reserves: An Update by Heat and Sulfur Content*, is to present and discuss the EIA's efforts to update the data and the methods developed since the previous publication was released.

History

To understand why the DRB exists as it does today, it is important to understand how and why it has changed over time. The DRB grew out of work performed by the Bureau of Mines, mostly in the 1960's, and was published in 1975 as Information Circulars 8680 and 8693. The purpose of that work, stated by the Bureau, was ". . . to identify the Nation's reserve base of coal . . . primarily because of concern over the inadequacy of reserves of low-sulfur coal in the eastern United States."[3] The Bureau sought to define the amount of coal that was known to exist with a relatively high degree of assurance, and that was assumed to be minable under then current or near-term future market conditions. The Bureau's intent was to provide data on the amount of coal contained in each area, for use in analyses of coal availability and costs and of the environmental consequences associated with coal production and use. The Bureau published estimates of the DRB tonnage remaining as of January 1, 1971, by county and coalbed, and by sulfur range. EIA assumed responsibility and authority for maintaining the DRB under the Department of Energy Organization Act of 1977 (P.L. 95-91).

The first EIA update of the DRB was an estimate as of January 1, 1979, which included detailed documentation of the coal resource data for each State and definitions and background information for the DRB.[4] All EIA updates and revisions of the DRB between 1977 and 1992 included results at the State level or coal-producing region level only; they did not include new assessments of sulfur or other coal quality factors.

The EIA has updated the DRB annually from 1979 to 1992, making one or more of the following adjustments (Table 1):

- Depletion updates (depletions of the DRB due to production and mining losses)
- Data revisions (revisions based on new data sources determined to be suitable under existing DRB criteria)
- Data adjustments (revisions based on existing data sources due to changes in DRB criteria or basic data analysis).

These updates are published as an appendix to EIA's annual publication, *Coal Production*.[5]

Recent Developments

In June 1987, acting in its advisory role to the Secretary of Energy, the National Coal Council (NCC) examined the DRB and identified numerous data needs for improving the Nation's coal reserve data base. In its report[6] the NCC emphasized the need for (1) better information on availability, accessibility, and recoverability of coal resources, (2) more reliable coal quality data, and (3) a better understanding of the impacts of competing land uses and regulations. The NCC stressed the need for improvement in coal reserve data. This need is especially important if these data are to be used to address critical national issues such as acid rain, the Clean Air Act Amendments of 1990, and global climate change. The NCC also pointed to a possible solution when it declared that the resolution of many of the problems with coal resource and reserve data lies "with the State agencies which make the initial and revised reserve estimates."[7]

Taking into account the NCC's recommendations and the status of new coal resource data programs, the EIA explored possible short-term actions to obtain improved coal resource and reserve data. The EIA's objective was to integrate coal quality information at levels of aggregation appropriate for national energy planning and policy analyses. EIA's actions included analyzing alternative sources of coal quality data and distribution methodologies, holding a conference on coal reserves assessment, and examining various alternative strategies to improve resource and reserves data. In 1989,

[3]U.S. Bureau of Mines, *The Reserve Base of U.S. Coals by Sulfur Content: Part 1, The Eastern States*, Information Circular 8680 (Washington, DC) and U.S. Bureau of Mines, *The Reserve Base of U.S. Coals by Sulfur Content: Part 2, The Western States*, Information Circular 8693 (Washington, D.C., 1975). The first DRB determined by the BOM was improperly labeled as the 1974 DRB; however, it was estimated for 1971, and subsequent DRB updates by the EIA reflect depletion adjustments from 1971.

[4]Energy Information Administration, *Demonstrated Reserve Base of Coal in the United States on January 1, 1979*, DOE/EIA-0280(74) (Washington, DC, May 1981).

[5]Energy Information Administration, *Coal Production*, DOE/EIA-0118 (Washington, DC, various years).

[6]National Coal Council, *Reserve Data Base: Report of the National Coal Council* (Arlington, VA, June 1987), p. 4.

[7]Ibid, p. 4.

Table 1. EIA Updates and Revisions, by Year, to the Demonstrated Reserve Base of Coal in the United States

State or Producing Area	Type of Update or Revision[a]						
	New Resource Data	Update of DRB Criteria	Reanalysis of Resource Data	New or Revised Depletion Data	Reanalysis of Depletion Data on File	Corrections to Resource Derivations	Corrections to Depletion Adjustments
Alabama	1979	1979, 1982	1979		1980		
Arizona	1979	1979	1979		1992	1992	
Arkansas		1982	1979, 1982		1992	1992	
Colorado	1980		1980				
E. Kentucky	1983		1983	1983		1985	
Georgia	1979		1979		1992		
Illinois	1982, 1983					1982, 1983	
Louisiana	1987				1987		
Maryland			1979		1979		
Michigan			1979		1979	1979	
Missouri	1979	1979					
New Mexico	1982		1982				
North Carolina			1979		1979		
Ohio	1980, 1992		1992		1980, 1992		
Oklahoma	1979	1979		1979			
Pennsylvania (Anth)	1992	1992	1992		1992	1985	1984, 1985
Pennsylvania (Bit)			1983				
South Dakota	1979		1979			1984	
Tennessee	1979	1979	1979	1979	1979		
Texas	1979, 1982, 1983	1979, 1982, 1983	1979	1979	1979, 1982 1983	1983	1983
Virginia	1979	1979					
Washington			1980			1980	1980
W. Kentucky	1979				1979		
West Virginia			1979				
Wyoming	1979, 1992		1979, 1992	1979, 1992	1979, 1992		

the EIA report, *Estimation of U.S. Coal Reserves by Coal Type*, provided a summary of the DRB and coal reserve estimates as of January 1, 1987, delineated by Btu and sulfur ranges.[8] By publishing and disseminating that report, the EIA sought to: (1) inform the coal community, exactly what coal resource and reserve information was driving many of the U.S. Government's analyses; (2) document the adjustments and analyses performed using the DRB and other data to derive Btu/sulfur range distributions and reserve allocations; and (3) obtain critiques and suggestions for improvements. That publication, in effect, served as a baseline to help assess the status of the current knowledge on coal resources and to establish priorities for improvements.

In 1990, the EIA held the Coal Reserves Assessment Conference, which led to a plan for improving coal reserves data. That plan was embodied in the Coal Reserves Data Base (CRDB) program, initiated later that year to help meet the growing need for updated data on U.S. coal reserves. The EIA's CRDB program has encouraged the strong participation of State agencies in revising resource and reserve estimates and allocations by coal quality. In particular, through CRDB funding by the EIA, Ohio and Wyoming have provided significantly revised estimates of coal reserves in those States. Kentucky is also currently in the process of revising its coal reserves data as part of the CRDB program.

The role of the DRB in coal supply analysis and in the estimation of coal reserves is described in Chapter 2 of this report. The CRDB projects in Ohio and Wyoming and their results are summarized in Chapter 3. Pennsylvania anthracite tonnages have also been revised and allocated by estimated sulfur and heat content, based on information from a 1984 resource study and coal quality data from the EIA Coal Analysis File and other sources. This revision includes the calculation of reserves by Btu/sulfur ranges for Pennsylvania anthra-cite resources, which had not been estimated previously by the EIA. New estimates of sulfur and heat content distributions and recoverable coal reserve allocations have also been developed by the EIA for existing DRB estimates in all or parts of 10 States. These results are also included in Chapter 3 of this report. Chapter 4 presents data summaries and a discussion of the updated DRB and estimates of coal reserves, which incorporate depletion adjustments for all States through January 1, 1992, including States not involved in specific coal resource or recoverable coal reserve data revisions.

Finally, this report includes three appendices: Appendix A describes the CRDB Program; Appendix B provides a synopsis of the methodology used to develop coal quality and reserve estimates prior to the CRDB, and still in effect for many States; and Appendix C presents detailed data tables for the DRB, the estimated accessible portions of the DRB, and the estimates of recoverable coal reserves by Btu/sulfur ranges.

2. The Demonstrated Reserve Base and Estimates of Coal Reserves

Defining the Demonstrated Reserve Base

A number of principal agencies are involved in resource and/or reserve estimation. These include the Energy Information Administration (EIA), the U.S. Geological Survey (USGS), the Bureau of Mines (BOM), the Bureau of Land Management (BLM), Office of Surface Mining Reclamation and Enforcement (OSMRE), and State geological surveys and mining research agencies.

The USGS, BOM, and EIA have agreed upon explicit standard definitions, which relate to the degree of geologic assurance and the disposition of quantified resources. These definitions are widely accepted or referenced by State, industry, and academic resource specialists.[9] Terms such as "resources" and "reserves" have precise meanings in the context of natural mineral endowments; but the terms have meanings in other contexts as well, and so are frequently misunderstood or used loosely.

"Resources" are defined as naturally occurring concentrations or deposits of coal in the Earth's crust, in such forms and amounts that economic extraction is potentially feasible. "Identified resources" consist of inferred, indicated, and measured resources (Figure 1 and Figure 2), which are differentiated on the basis of their distance from the nearest measurement or observation point (e.g., drillhole, mine exposure, or surface outcrop). "Undiscovered resources," the existence of which is only postulated, include "speculative" and "hypothetical" resources. Speculative resources com-prise virgin deposits that are *separate* from identified resources; hypothetical resources are virgin deposits that are *extensions* of identified resources. Undiscovered resources may be imputed in deposits of such quality, rank, quantity, and physical location as to be economic, marginally economic, or subeconomic. "Total resources" are the sum of "identified" resources and "undiscovered" resources. In the context of these basic definitions, the terms most important to the DRB are

defined in the following box, “Important Terminology: Resources, Reserves, and the DRB.”

The box on Important Terminology summarizes a much more detailed set of criteria that was published by the USGS after extensive consultation and coordination among coal assessment professionals in the United States. A simplified depiction (Figure 3) can indicate the quantitative relationships among coal resource data. It should be noted, however, that each category is composed of coal resources in a myriad of locations and of various depths and coalbed characteristics. Further, the coal resources and reserves depicted are drawn from an information base that is continuously evolving, with many Federal and State agencies contributing in various areas. Thus, the size and quantities represented by any of the areas depicted in Figure 3 are based on the best available qualified data and are certain to change (either higher or lower) from time to time, as the level of knowledge improves.

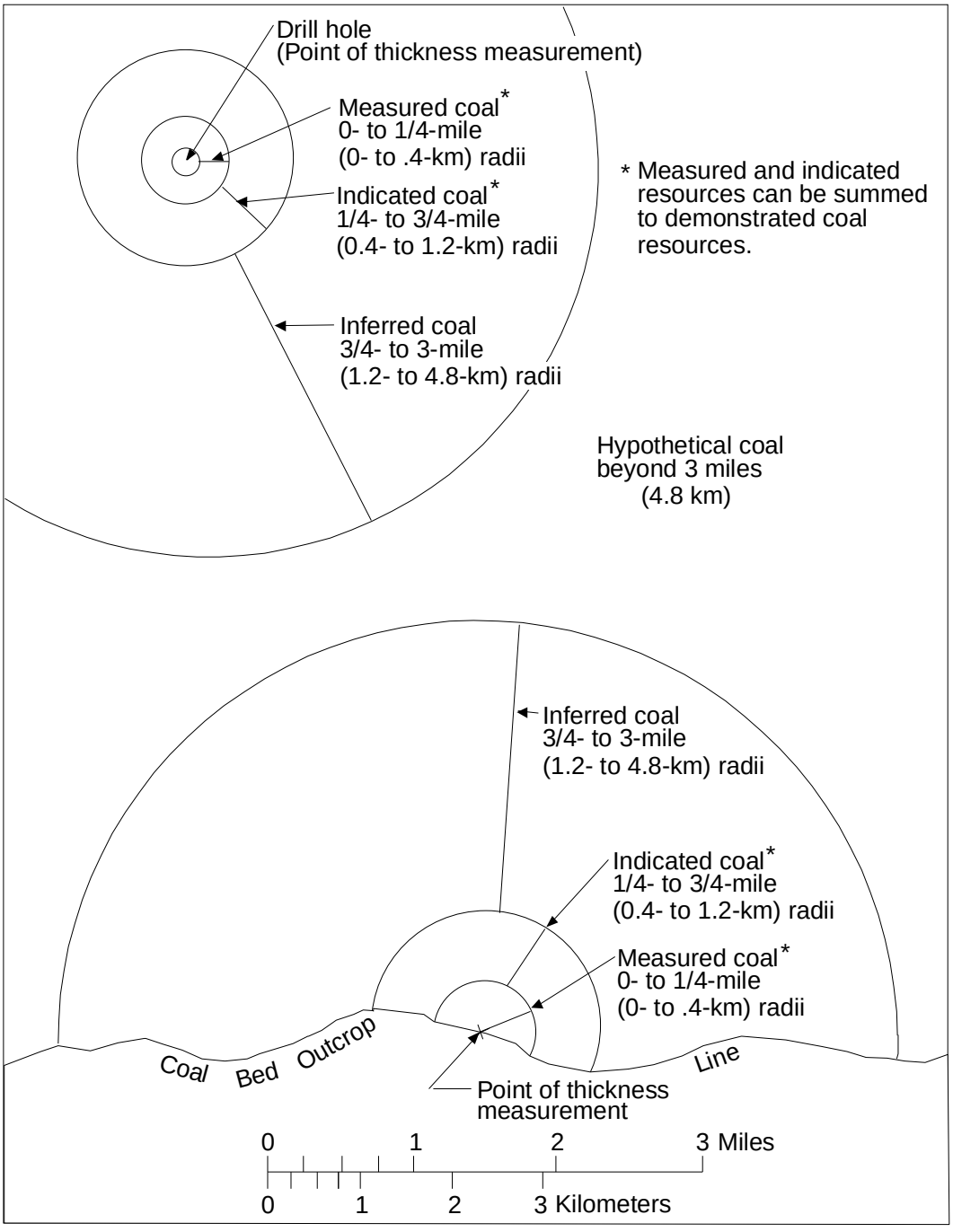
The DRB has, in general, been compiled conservatively from data on in-place coal resources in only the measured and indicated categories of reliability, which meet general minability criteria as of a specified date. The current DRB employs standard seam thickness and depth criteria to approximate economic criteria for minability, taking into account the limits of technological and economic minability at the time the estimate was made (Figure 4).

The DRB is not reestimated when economic conditions, such as coal prices, change. Changing economic conditions, as well as laws and regulations governing coal supply, are analytical variables to be evaluated for a particular issue, and are not directly related to the criteria for the DRB. The geologic reliability and economic minability criteria have, in general, been applied uniformly nationwide in order to maintain compatibility of data and objectivity.

The DRB criteria are intentionally flexible to allow for changes in mining practice, technology, and economics. The DRB also makes allowances to incorporate the best

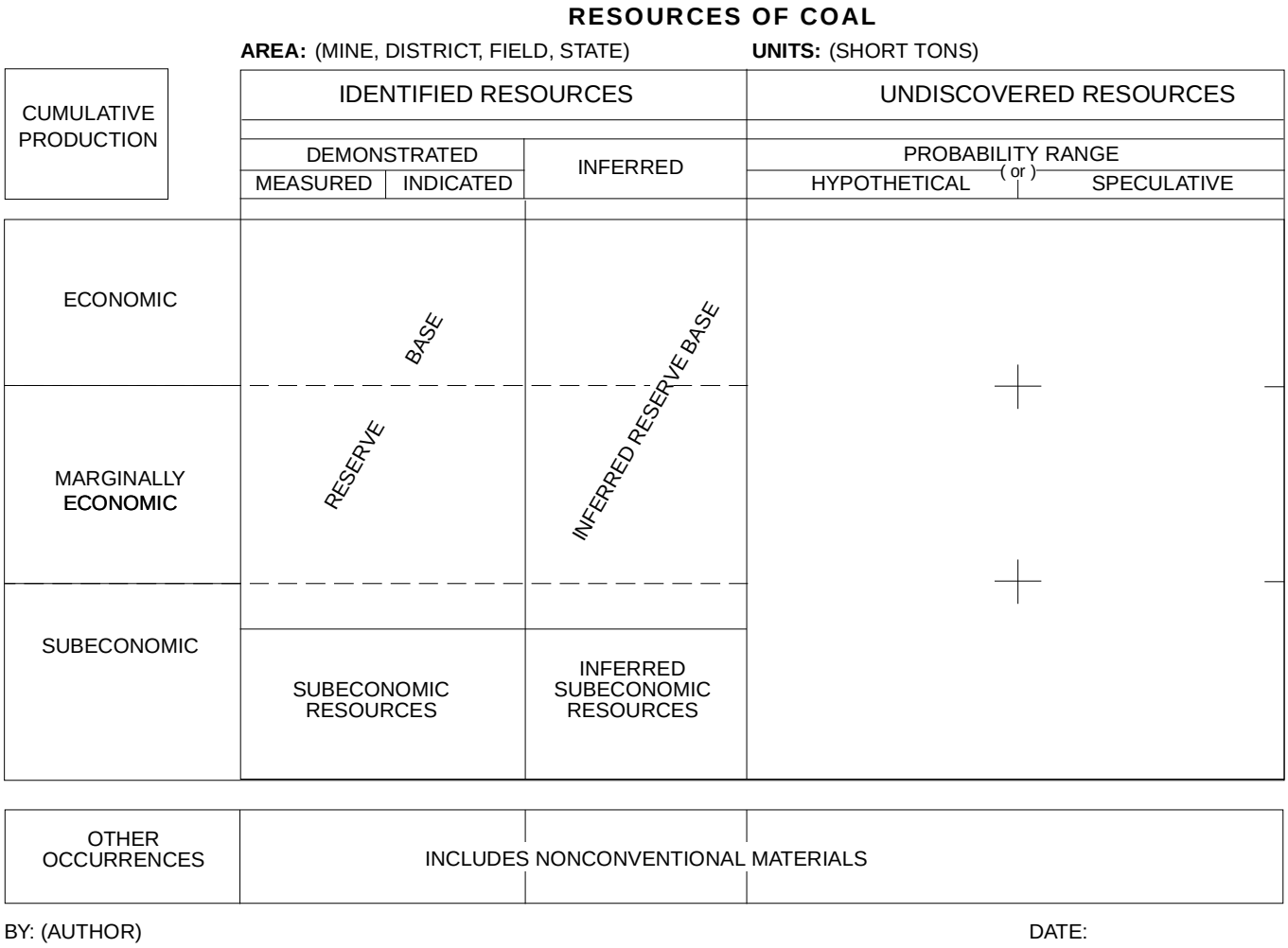
[9]A glossary of selected coal classification terms is included at the end of this report.

Figure 1. Diagram of Coal Resource Reliability Categories Based on Distances from Points of Measurement



Source: Adapted from U.S. Department of the Interior, *Coal Resource Classification System of the U.S. Geological Survey*, Geological Survey Circular 891 (1983).

Figure 2. USGS Format and Classification of Coal Resources by Reserve and Inferred Reserve Bases and Subeconomic and Inferred Subeconomic Resources Categories



Note: A portion of reserves of any category may be restricted by laws or regulations from extraction.
Source: U.S. Department of the Interior, *Coal Resource Classification System of the U.S. Geological Survey*, Geological Survey Circular 891 (1983).

available data, even where nonstandard methodologies were employed, as long as only highly reliable data are included.[10]

Neither the inclusion of measured and indicated resources nor the accommodation of regional mining

variations necessarily implies that those resources will be legally available, economically marketable, or technologically minable. Detailed local evaluations are normally required to determine ownership and regulatory limitations that may apply to the coal, to evaluate the quality of the coal and its value in current markets,

[10]For example, some important allowances are: for surface-minable DRB, the acceptance of bituminous coal of 14- to 28-inch thickness in the Appalachian and Interior regions and of less than 14-inch thickness in Alabama, Kansas, Missouri, and Oklahoma, and the acceptance of lignite resources of 30- to 60-inch thickness in Texas; the inclusion of certain thick-bedded coal seams lying at depths greater than 1,000 and 2,000 feet in Jefferson and Tuscaloosa counties in Alabama, and of the Pocahontas No. 3 seam at depths greater than 1,000 feet in Virginia; and the acceptance of non-standard geologic assurance categories for coal resources in Illinois, New Mexico, and Texas, where mapping criteria were judged to equal or exceed measured and indicated standard criteria.

Important Terminology: Resources, Reserves, and the DRB

"Measured resources" refers to coal for which estimates of the rank and quantity have been computed to a high degree of geologic assurance, from sample analyses and measurements from closely spaced and geologically well-known sample sites. Under the USGS criteria, the points of observation are no greater than 1/2 mile apart (Figure 1). Measured coal is projected to extend as a 1/4-mile-wide belt from the outcrop or points of observation or measurement.

"Indicated resources" refers to coal for which estimates of the rank, quality, and quantity have been computed to a moderate degree of geologic assurance, partly from sample analyses and measurements and partly from reasonable geologic projections. Under the USGS criteria, the points of observation are 1/2 to 1-1/2 miles apart (Figure 1). Indicated coal is projected to extend as a 1/2-mile-wide belt that lies more than 1/4 mile from the outcrop or points of observation or measurement.

"Demonstrated resources" are the sum of measured resources and indicated resources.

"Demonstrated reserve base," (or just "reserve base" according to USGS usage) refers, in its broadest sense, to those parts of the identified resources that meet specified minimum physical and chemical criteria related to current mining and production practices, including those for quality, depth, thickness, rank, and distance from points of measurement. The "reserve base" is the in-place demonstrated (measured plus indicated) resource from which reserves are estimated. The reserve base in the USGS classification may encompass those parts of a resource that have a reasonable potential for becoming economically available within planning horizons that extend beyond those which assume proven technology and current economics.

"Inferred resources" refers to coal of a low degree of geologic assurance in unexplored extensions of demonstrated resources for which estimates of the quality and size are based on geologic evidence and projection. Quantitative estimates are based on broad knowledge of the geologic character of the bed or region where few measurements or sampling points are available, and on assumed continuation from demonstrated coal for which there is geologic evidence. The points of measurement are 1-1/2 to 6 miles apart (Figure 1). Inferred coal is projected to extend as a 2-1/4-mile-wide belt that lies more than 3/4 mile from the outcrop or points of observation or measurement. Inferred resources are not part of the DRB.

"Reserves" relates to that portion of demonstrated resources that can be recovered economically with the application of extraction technology available currently or in the foreseeable future. Reserves include only recoverable coal; thus, terms such as "minable reserves," "recoverable reserves," or "economic reserves," are redundant. Although "recoverable reserves" is redundant and implies recoverability in both words, the EIA prefers to use the term selectively, in contexts where it is essential to distinguish recoverable coal from in-ground resources.

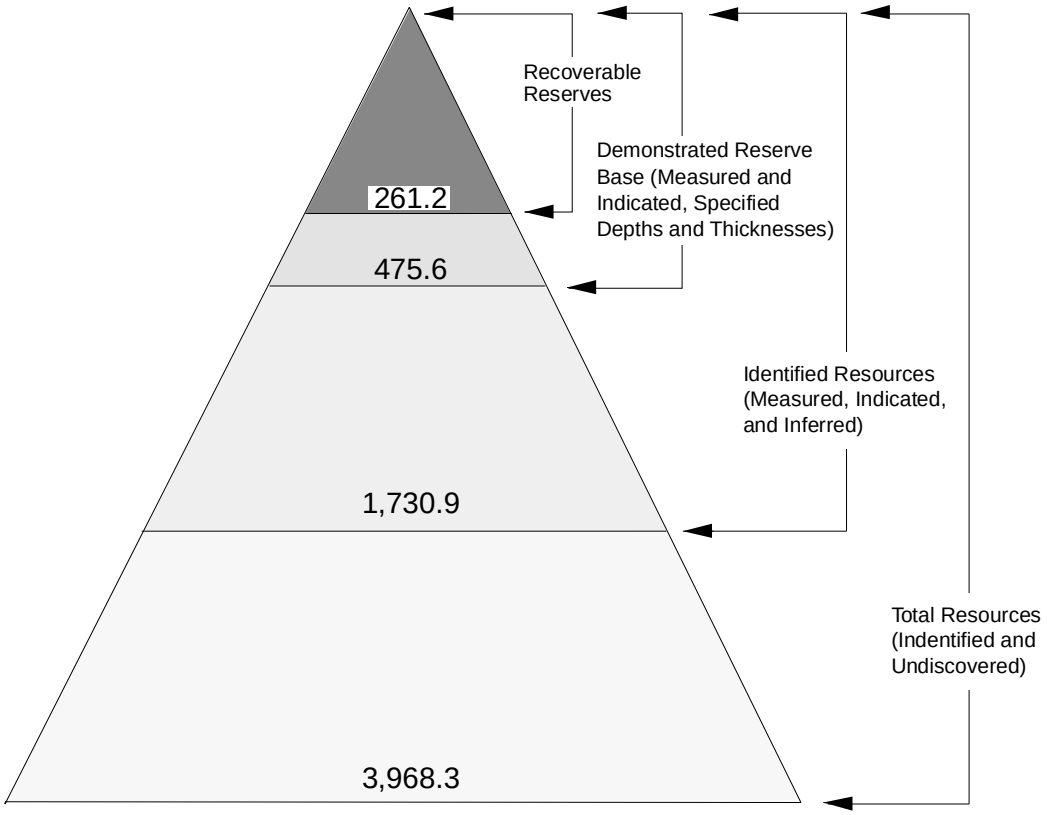
Sources: U.S. Department of the Interior, *Coal Resource Classification System of the U.S. Bureau of Mines and the U.S. Geological Survey*, Geological Survey Bulletin 1450-B (1976). U.S. Department of the Interior, *Coal Resource Classification Systems of the U.S. Geological Survey*, Geological Survey Circular 891 (1983).

and to detect impediments from natural geologic conditions (for example, proximity to alluvial valleys) or societal restrictions (for example, in national parks).

The actual amount of coal recoverable from the DRB is speculative. For many years, engineering judgment, based on the cumulative experience of mine operators and government geologists and mining engineers, sufficed (especially in the eastern half of the United States). Roughly 50 percent of the DRB was thought to be recoverable. In the late 1970's, separate evaluations were developed for the legal-to-mine fraction and the

recoverable fraction of the surface-minable and deep-minable DRB for the different coal supply regions (States or distinctive coalfield areas of States) for use in coal supply analyses. These evaluations were

Figure 3. Delineation of U.S. Coal Resources and Reserves
(Billion Short Tons)



Notes: Resources and reserves data are in million short tons. Darker shading in the diagram corresponds to greater relative data relability. The recoverable reserves depicted at the top of the diagram include 22 million short tons of recoverable coal reserves at mines producing 10,000 tons or more as reported by mine operators to the Energy Information Administration (EIA). This diagram portrays the theoretical relationships of data magnitude and reliability among coal resource data. All figures are subject to revison with changes in knowledge of coal resource data.

Sources: The DRB estimate was compiled by the Energy Information Administration as of January 1, 1992, and published in *Coal Production 1991*. Recoverable reserves were estimated by EIA's Resource Allocation and Mine Costing Model (RAMC), and Coal Reserves Data Base (CRDB) Program. Identified resources and total resources are estimates as of January 1, 1974, compiled and published by the U.S. Geological Survey in *Coal Resources of the United States, January 1, 1974.*

generalized and are still used largely unchanged. They resulted in about 57 percent of the DRB being designated as recoverable—with regional variations.

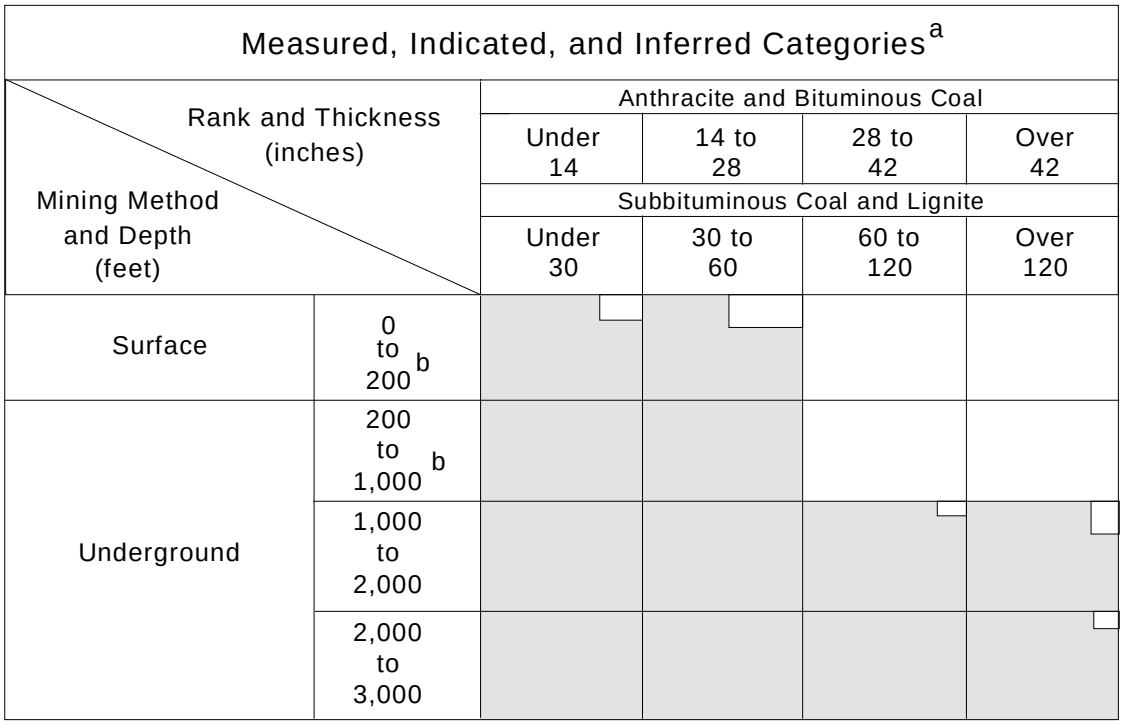
Coal Quality and Reserve Applications

The DRB has served a useful purpose, but the demands on it as a data base have grown. As the United States has found itself dealing with growing environmental concerns and in a more internationally competitive

position, the questions being asked have become complex. The issues for analysis require data on coal quality, characteristics, quantities, availability, and economic recoverability—data which the DRB alone was not designed to provide. The EIA has been challenged to address those issues at the same time that the adequacy of the knowledge base is being examined.

The criteria for the DRB were formulated two decades ago. Newer coal resource assessments often provide more detailed information on coalbed thickness and depth; some use criteria more directly related to economic recovery. In light of both new mining

Figure 4. Identified Coal Resources



[a]The three categories denote degrees of geologic assurance and collectively make up the identified resource category. Excludes less than 0.02 percent of identified coal resources not classifiable under current criteria.

[b]Current surface-minable coal is predominantly within the depth range of 0 to 200 feet. Some surface mines exceed this depth range; conversely, some coal resources less than 200 feet deep can be mined only by underground methods.

Notes: Blocks represent combinations of rank, thickness, and depth that define essential parameters for minability evaluations. Nonshaded blocks represent combinations for which measured and indicated resources are included in the DRB. Nonshaded partial blocks represent exceptions (combinations for which measured and indicated resources are included in the DRB in specified locations only). Fully shaded blocks and partially shaded areas represent coalbed rank, thickness, and depth combinations for which measured and indicated resources are too thin and/or too deep to be included currently in the DRB.

Source: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels.

technologies in use today and the proliferation of societal constraints on coal production, the DRB would benefit from these types of data. Better information is needed now, but such data are scattered and costly to develop. Although they contain recognized deficiencies, the data maintained by the EIA, including the DRB and associated information on coal quality, compose the most complete and comprehensive data base available on U.S. coal reserves.

In an effort to compensate for the recognized deficiencies in availability and quality of data in DRB, the EIA has initiated the Coal Reserves Data Base (CRDB) program. The CRDB program was designed to engage the expertise of State geological surveys and to coordi-

nate with other Federal agencies and the coal industry to revise the estimates of coal resources and reserves. The evolution of the CRDB program is described more fully in Appendix A.

Two pilot studies have been conducted under the CRDB program, one each in Ohio and Wyoming. These two studies, performed in Fiscal Year 1991, were executed as cooperative agreements between the EIA and the States involved. These studies and their results are explained in the next chapter. The CRDB program has continued to progress; a 15-month study of eastern Kentucky coal resources and reserves, which began in September 1992, is scheduled to be completed in December 1993.

3. New Coal Resource Data Derivations and National Data Base

Under the CRDB Program, revisions and/or new distributions and allocations of coal resource and reserve data have been performed in 13 coal resource areas,[11] which were grouped into 5 program categories:

- Ohio and Wyoming—for which revisions to their State DRB and recoverable coal reserves were completed in 1991 under the EIA-sponsored projects
- Pennsylvania (anthracite region)—for which revisions to the State DRB and recoverable coal reserves were made by the EIA in 1992 using data from published sources and file data
- Alaska (northern region)—for which allocations to Btu/sulfur ranges, accessible DRB, and recoverable coal reserves were made by the EIA in 1992 through the analysis of existing DRB data and coal quality data from EIA files and other sources
- Arkansas, Colorado, New Mexico, and Virginia (anthracite resources)—for which allocations to Btu/sulfur ranges, accessible DRB, and recover-able coal reserves were made by the EIA in 1992 through the analysis of existing DRB data and coal quality data from EIA files and other sources
- Georgia, Idaho, Michigan, North Carolina, and Oregon (all resources)—for which allocations to Btu/sulfur ranges, accessible DRB, and recover-able coal reserves were made by the EIA in 1992 through the analysis of existing DRB data and coal quality data from EIA files and other sources.

The analyses and methodologies used for these DRB updates are described in this chapter.

Coal Reserves Data Base Cooperative Agreements

The coal resources of Ohio and Wyoming were revised between September 1990 and September 1991, in pilot studies under the CRDB program. The selection of Ohio and Wyoming was based on: (1) their relative national importance as major coal-producing States, (2) the fact that important existing data (coal resource quantities and/or quality) in EIA files were out of date, (3) the availability of significant new data in State files with which to carry out the needed revisions, and (4) the capability and readiness of the geological surveys of these two States to perform the needed analytical tasks under the scheduling and funding terms of cooperative agreements with the EIA. Beyond these criteria, the selection of an Eastern high-sulfur coal State and a Western low-sulfur coal State for pilot studies afforded the opportunity to assess the CRDB guidelines in geographically and geologically different contexts. It also was used to evaluate the possible benefits of improved data bases in two areas expected to experience contrasting economic effects and adaptations to the requirements of the Clean Air Act Amendments of 1990.

Ohio Cooperative Agreement

The Ohio Geological Survey (OGS) cooperative agreement was designed to revise the DRB of coal in Ohio, to incorporate data and locations of coal quality analyses in OGS files, and to make adjustments for resource depletion, accessibility, and recoverability in order to calculate estimates of remaining recoverable coal reserves. The agreement required that State-level totals of DRB, accessible reserve base of coal, and recoverable reserves of coal be allocated to specific

[11]Three States contain distinct and significant coal-producing areas that are reported separately. They include the eastern and western Kentucky regions and the Pennsylvania bituminous and anthracite regions, which have traditionally been reported separately. Also, the southern, mostly sub-Arctic, coalfields of Alaska and the northern Arctic region of Alaska are considered separately by EIA because northern Alaska, which is remote from markets and has severe climatic, environmental, and recoverability restrictions, should be distinguishable for coal supply analysis.

Btu / sulfur content ranges. According to the agreement, resources and reserves were also to be reported by potential method of mining (surface or underground). Details of the OGS procedures are contained in the project's final report.[12]

Procedures

During the study, priority was assigned to the coal-bearing counties of Ohio, first on the basis of the amount of new resource data available and, secondly, on the basis of recent production levels. To a large degree the counties identified under the two criteria were the same. In the highest priority category, Group 1 counties, with abundant new resource data and relatively high production, the resources of all economically significant coalbeds were recalculated. In Group 2 counties, with new resource data for certain coalbeds and moderate production, coal resources were recalculated for selected coalbeds—usually those that are most important for future mining—while the remaining coalbeds were updated from the 1971 DRB using detailed coalbed depletion estimates. In Group 3 counties, with little or no new resource data and little or no recent production, the EIA 1971 DRB coalbed data were updated for coalbed depletion to January 1, 1991. The base year of 1991, therefore, represents the common date to which all the coal resource data were adjusted at specified levels of detail. Adjustments using the delineation of mined-out areas, and statistical depletions in Group 3 counties and Group 2 coalbeds that were not remapped, were carried out at the scale of Ohio civil townships and prorated for county data.

New DRB resources in Groups 1 and 2 were calculated on the basis of USGS 7.5-minute quadrangle maps, using new information on coal locations, thicknesses, and elevations. These data were merged with information on the areal extent of coalbeds at the surface and to specified subsurface limits (croplines and subcrops), average bed thicknesses (isopachs), and extent of mined-out areas. The limits of surface- and underground-minable DRB areas for this study were defined on the basis of the loci of 100-foot overburden measurements and on geologic structure and isopach contours. In these areas, the estimated remaining coal resources were calculated directly by deducting mined-out areas from coal resource areas. Similarly, areas inaccessible to mining because of land-use and environmental restrictions and regulations were delineated for surface and for underground coal mining, and the affected DRB tonnages were calculated. After delivery of the final report, the EIA, in consultation with the OGS and other branches of the Ohio Department of Natural Resources, performed additional map measurements and calculations. This work was undertaken to estimate the portions of the DRB that are inaccessible to mining due to land-use conflicts in national forests, in areas of oil-well development, and under Interstate and U.S. highway and major State and county road rights-of-way and buffer areas.

The distribution of the DRB by Btu and sulfur content was based on the evaluation of 1,700 coal sample analyses in OGS files. The coal resource quantities were distributed statistically for 7.5-minute quadrangle areas, using a methodology similar to the county / coalbed DRB distributions used by the EIA in the past (described in Appendix B). The OGS coal quality data include only carefully sampled coals of known locations, representing whole beds, production benches, or run of mine.[13]

Results

The Ohio pilot study produced a new DRB estimate of 23.9 billion short tons as of January 1, 1991. This is 28 percent higher than the published EIA estimate of 18.7 billion short tons for the 1987 DRB (Table 2). Almost all of this increase related to coal minable by underground mining methods. Many of the new coal measurement data points used in the revisions came from published and unpublished studies of deep coal resources not previously in the DRB.

Although the Ohio DRB increased by 28 percent, the estimated recoverable portion of the DRB's in-ground resources (Table 2) increased by only 11 percent. The difference is due to the fact that the OGS geologists used a 50-percent underground recovery factor, whereas the EIA had assumed 60-percent recovery for underground mining in its 1987 estimates. Further, although the surface-minable resource data changed measurably in several counties (due to new mapping data), there was little net change in the State-level data,

[12]Ohio Division of Geological Survey, *Modernization of Ohio's Coal Reserves, Phase I,* by Richard W. Carlton under Cooperative Agreement DE-FC01-90EI21951 between the Ohio Department of Natural Resources and the U.S. Department of Energy, Energy Information Administration (Columbus, OH, September 1991).

[13]A production bench is one of two or more divisions of a coal seam, separated by a layer of rock, or simply separated in the process of cutting the coal, one bench being cut before the adjacent one. Run of mine is the raw coal as it is delivered by the mine cars, conveyors, or trucks, prior to treatment of any sort; it may include coal from whole beds and/or benches from more than one active section of the mine.

Table 2. Comparison of 1987 and Revised 1991 Ohio Demonstrated Reserve Base of Coal and Recoverable Coal Reserve Data

(Million Short Tons)

Year	Demonstrated Reserve Base			Recoverable Reserves		
	Mining Method					
	Total	Underground	Surface	Total	Underground	Surface
1991	23,940	17,943	5,996	11,819	7,894	3,925
1987	18,670	12,889	5,781	10,614	6,960	3,654
Difference	5,269	5,054	215	1,205	934	271
Percentage Change	28	39	4	11	13	7
	Summary Sulfur Content Categories[a] (Pounds of Sulfur per Million Btu)					
	Low (≤ 0.60)	Medium (0.61–1.67)	High (≥ 1.68)	Low (≤ 0.60)	Medium (0.61–1.67)	High (≥ 1.68)
1991	482	2,764	20,693	253	1,398	10,168
1987	0	2,496	16,175	0	1,403	9,211
Difference	482	268	4,519	253	-5	957
Percentage Change	n.a.	11	28	n.a.	0	10

[a]For detailed analyses, the EIA uses six sulfur content ranges. For general discussion and summary data, however, those six ranges are combined into the three qualitative ratings of low-, medium-, and high-sulfur content coal presented here. See also Appendix B, Table B3.

Note: Totals may not equal sum of components due to independent rounding.

Sources: **1987**—Energy Information Administration, *Estimation of U.S. Coal Reserves by Coal Type: Heat and Sulfur Content*, DOE/EIA-0529 (1989). **1991**—Ohio Division of Geological Survey, *Modernization of Ohio's Coal Reserves, Phase I*, 1991 data (1991), with additional reserves analysis by Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels (1992).

because not much unmined near-surface coal resource remains to be assessed. In the long term, future mining in Ohio, if economically competitive, will be increasingly deep mined.

Compared with the 1987 reserve distributions, the OGS evaluations of coal quality data for 1991 reserves and the EIA supplemental adjustments resulted in an increase in the percentage of Ohio coal reserves in the highest EIA sulfur content category (≥ 2.50 pounds of sulfur per million Btu), from 57 percent to 64 percent of the State's recoverable coal reserves. Conversely, the OGS and the EIA allocated 253 million short tons to the two lowest EIA sulfur categories (≤ 0.40 and 0.41-0.60 pounds of sulfur per million Btu) compared with none before, but this amounts to only 2 percent of Ohio's recoverable coal reserves. Detailed distributions of the revised DRB, accessible reserve base of coal, and recoverable coal reserve estimates, which the EIA adjusted for depletion from the base year 1991 to

January 1, 1992, can be found in Appendix C, Tables C1, C2, and C3.

Wyoming Cooperative Agreement

The objective of the Wyoming study was to revise the distributions of coal resources and reserves by coal quality categories. Resource quantity revisions, not a goal of the study, were made with existing data on file at the Geological Survey of Wyoming (GSW), but only when incidental to the quality allocations. The revisions calculated in the Wyoming Cooperative Agreement were for potentially surface-minable resources because that is the area of immediate and foreseeable economic importance. There was a vast amount of new data to be analyzed, the preponderance of which, both for recent coal resource mapping data and for coal quality data, was associated with coal at surface-minable depths. Details of the GSW procedures, criteria, and results are documented in the project's final report.[14]

[14]The Geological Survey of Wyoming, *Coal Reserves Data Base Report: Final Report on the Demonstrated Reserve Base (DRB) of Coal in Wyoming*, prepared by Richard W. Jones and Gary B. Glass, for U.S. Department of Energy, Energy Information Administration, under Cooperative Agreement DE-FG01-90EI21952 (Laramie, WY, December 1991).

Although numerous sources of new coal resource data throughout the coalfields would reportedly result in still larger resource quantity assessments, these leads were not pursued in the Wyoming pilot study for several reasons. First, the data are in various formats and locations, and more time than was available would be necessary to analyze and compile these data in a unified DRB-grounded data base. Second, and just as importantly, the greatest needs for data improvement were for the Btu and sulfur characterizations of coal resources in the areas currently being mined—areas contributing to the largest tonnage of coal production of any U.S. State. Third, the addition of new quantities of coal to the already huge DRB of Wyoming would have little impact on coal supply analyses, because much of the coal would be located in areas (for example, those adjacent to or beneath 30- to 60-year reserve blocks currently being mined) where develop-ment should logically be postponed into the long-term future.

Procedures

With minor exceptions, existing GSW coal resource calculations of surface-minable coal were used to compile the new State DRB. Coal resource data were compiled by coalbed at the coalfield level, for areas delineated on previously completed coal resource maps. Because the EIA sources used for the 1990 estimate of the Wyoming DRB were largely the same as those used by the GSW, the size of the revised DRB would not be expected to differ significantly from the EIA's estimate. In some coalfields, however, the GSW included more recent coal resource data compilations. Using State mine-level reports of production since the base years of resource studies, the GSW also reevaluated depletion. All of the data used by the GSW in their State DRB compilations conform to the standard USGS criteria for measured and indicated degrees of reliability.

The GSW evaluated 15,000 coal-quality samples on file and incorporated several thousand analyses of coal samples delivered to electric power plants. Comparative analysis allowed questionable or unreliable data to be eliminated. In the end, the GSW selected more than 5,230 basic samples, including channel samples from mines or exposures, tipple samples from mines, and core samples. In addition, more than 1,500 delivered samples were selected to supplement the basic data.

Distribution of the coal quality data values was based on the selected analytical data, located on coal resource base maps, following one of two general methods. In some coal deposits, the variation in Btu and sulfur values was determined by constructing iso-Btu and iso-sulfur contour maps and calculating the total coal resources in each category. This method was best suited for deposits with large numbers of coal quality data points and a wide range of Btu and sulfur values. In areas with very little variation in coal quality data, the Btu and sulfur values were assigned on the basis of aggregated data from detailed industry development projects (based on hundreds or thousands of drillhole, production, and/or delivery data), analyses from regional coal exploration programs, and reconnaissance samples. The average or weighted average Btu and sul-fur values were determined for each coalbed (or coal zone), and the corresponding coal resources were assigned to Btu/sulfur ranges.

The GSW evaluated the accessible reserve base and recoverable reserves of surface-minable coal by using map measurements, field observations, and land use plans for individual coal deposits. From this information, the GSW developed percentages inaccessible for potentially surface-minable DRB and coal reserves by Btu/sulfur ranges. Similarly, recovery factors were first determined for individual coal deposits, using published and confidential, unpublished data. Weighted averages were then calculated to determine area-wide recovery factors. For underground-minable coal, the GSW did no independent analysis, but included the DRB, accessible reserve base of coal, and recoverable coal reserves data from EIA files to present a complete data base. The GSW applied minor depletion adjustments to the underground data and updated them to the 1991 base year.

Results

As of January 1, 1991, the revised DRB estimate of Wyoming surface-minable coal was 27.0 billion short tons. The new distributions to Btu/sulfur ranges place 5.2 billion short tons, or 19 percent, of the surface-minable DRB in Wyoming in the lowest EIA sulfur category of no more than 0.40 pounds of sulfur per million Btu; 2.6 billion short tons, or 10 percent, of the surface-minable DRB in the State were assigned to the highest EIA sulfur category of more than 2.50 pounds of sulfur per million Btu.

The 1991 estimate of Wyoming's surface-minable DRB increased by only 0.7 billion short tons compared with the latest published EIA data (1987) allocated to Btu / sulfur ranges. By contrast, the State's surface-minable recoverable coal reserves increased by 3.0 billion short tons (or 15 percent) due to the use of significantly less restrictive percentages inaccessible in the GSW derivation (Table 3). The GSW assumed that

Table 3. Comparison of 1987 and Revised 1991 Wyoming Demonstrated Reserve Base of Coal and Recoverable Coal Reserve Data

(Million Short Tons)

Year	Demonstrated Reserve Base			Recoverable Reserves		
	Mining Method					
	Total	Underground	Surface	Total	Underground	Surface
1991	69,542	42,545	26,998	46,288	22,974	23,314
1987	68,843	42,553	26,291	43,327	22,978	20,349
Difference	699	-9	707	2,961	-4	2,965
Percentage Change	1	0	3	7	0	15
	Summary Sulfur Content Categories[a] (Pounds of Sulfur per Million Btu)					
	Low (≤ 0.60)	Medium (0.61–1.67)	High (≥ 1.68)	Low (≤ 0.60)	Medium (0.61–1.67)	High (≥ 1.68)
1991	36,393	28,580	4,569	24,906	17,925	3,457
1987	30,646	34,751	3,446	18,900	22,052	2,375
Difference	5,746	-6,171	1,013	6,006	-4,127	1,082
Percentage Change	19	-18	29	32	-19	46

[a]For detailed analyses, the EIA uses six sulfur content ranges. For general discussion and summary data, however, those six ranges are combined into the three qualitative ratings of low-, medium-, and high-sulfur content coal presented here. See also Appendix B, Table B3.

Note: Totals may not equal sum of components due to independent rounding.

Sources: **1987**—Energy Information Administration, *Estimation of U.S. Coal Reserves by Coal Type: Heat and Sulfur Content*, DOE/EIA-0529 (1989). **1991**—The Geological Survey of Wyoming, *Coal Reserves Data Report: Final Report on the Demonstrated Reserve Base (DRB) of Coal in Wyoming*, 1991 data (1991).

only 2 percent of the surface-minable coal was inaccessible, while the EIA had assumed 14 percent previously. The GSW and EIA used similar surface mining recovery rates—a weighted average of 88 percent in the GSW project versus 90 percent previously used by the EIA.

Underground-minable coal data showed no significant changes, because the underground-minable DRB and the allocations used existing EIA data and, except for depletion updates, were not revised by the GSW. The increase of 6.0 billion short tons, or 32 percent, in the recoverable coal reserve data for 1991 low-sulfur ranges of coal quality (Table 3) was based primarily on the analysis of several thousand new coal quality data points in the Powder River Basin. The details of the revised data base are shown in Tables C1, C2, and C3.

Coal Reserves Data Base Revisions by EIA

The remaining 11 coal resource projects described in this chapter were completed by EIA for the primary purpose of bringing into the data base the areas and coal ranks in the DRB that had not previously been assessed for coal quality (including Btu / sulfur ranges).

These data were developed for Btu and sulfur levels based on data selected from the EIA's Coal Analysis File, using data from other sources as a supplement. Although the Coal Analysis File holds more than 60,000 samples, for most of the remaining States in this chapter that file includes few, if any, samples in the areas or ranks being studied, because the study areas have not recently been important coal-producing areas.

To bolster the data in these areas, the EIA added data—from published sources and State geological survey files—from nearly 500 coal samples in the general areas under consideration, along with more than 3,200 coal analyses throughout the United States from the computerized USGS USCHEM File.[15] The result is an inventory of nearly 64,000 coal analyses on file, including the EIA Coal Analysis File and other qualified sources (Table 4).

Pennsylvania Anthracite Project

The Pennsylvania anthracite project entailed both revising the basic resource data and analyzing the resulting DRB to make coal quality distributions and reserve allocations. The area of study consisted of the 10 counties of eastern and northeastern Pennsylvania that include the principal areas of the State's major anthracite coalfields, plus a minor area in Sullivan County. The new resource data for the 10-county area were based on a study sponsored by the BOM[16] and prepared by the Resources Technology Corporation (RTC). The Sullivan County area is based on data from the EIA files used to develop the 1979 DRB for Pennsylvania anthracite.

Using the RTC report, the EIA compiled, by individual coalfield and type of mining, demonstrated coal resources greater than 24 inches thick. The RTC methodology used a multi-parameter grid of 4-acre basic data units, or cells, to assess and characterize the remaining coal resources throughout the four major coalfields. One benefit of this detailed approach was that it permitted the RTC to evaluate both the coal resource potential and the accessibility of the coal-bearing areas on a cell-by-cell basis. Using this technique, the study included accessibility character-istics based on detailed evaluations of land-use conflicts equated with a population density threshold of 10 persons per 40 acres, and on the equilibrium water elevations, or pool levels, of subsurface flooding that is a long-term impediment to mining access. Much of the mine flooding is related to past surface water floods that broke into mines and is aggravated by multiple breaches among the abandoned underground mines. There is no likely prospect for these areas to be drained for coal mining.

The classification of type of mining in the RTC report combined conventional surface-minable DRB data with

Table 4. Total Inventory of Coal Sample Analyses Available for Coal Resource Distribution

Region/State	Number of Coal Analyses
East	**48,376**
Alabama	1,988
Georgia	134
Illinois	4,230
Indiana	1,680
Kentucky, Eastern	3,911
Kentucky, Western	2,528
Maryland	445
Michigan	114
Mississippi	11
North Carolina	44
Ohio	2,654
Pennsylvania, Anthracite	6,860
Pennsylvania, Bituminous	6,381
Tennessee	1,662
Virginia	2,573
West Virginia	13,161
West	**15,602**
North Alaska	13
South Alaska	261
Arizona	43
Arkansas	436
California	1
Colorado	3,795
Idaho	22
Iowa	434
Kansas	569
Missouri	791
Montana	613
Nebraska	7
Nevada	13
New Mexico	1,001
North Dakota	988
Oklahoma	1,173
Oregon	52
South Dakota	27
Texas	76
Utah	2,117
Washington	1,025
Wyoming	2,145
Total	**63,978**

Source: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels, 1992 data (1992).

[15]U.S. Department of the Interior, Geological Survey, USCHEM—Computer File of Chemical Analysis of Coals Sampled in the United States (Reston, Virginia, 1991).

[16]U.S. Department of the Interior, Bureau of Mines, *Defining the Anthracite Resources of Northeastern Pennsylvania,* by Ronald W. Stingelin and others, Resource Technologies Corporation, Final Report under Contract J033932 (Pittsburgh, PA, October 1984).

resources attainable by deep-pit mining, sometimes reaching depths of 1,000 feet. As no new open-pit mines have been started in the past 15 years and none are planned, EIA allocated these coal resources to the potentially underground-minable DRB. An allocation technique was devised by which the coal resources available for conventional surface mining could be reestimated on the basis of map information and depth and pool level data. The allocation factors developed for surface coal mining were applied at the coalfield level of aggregation.

The resulting DRB estimate was allocated to the accessible DRB on the basis of average accessibility factors for each Pennsylvania anthracite coalfield. The accessible DRB was further adjusted to estimate recoverable coal reserves, assuming recovery factors of 50 percent for underground mining and 90 percent for surface mining in the Pennsylvania anthracite region. The newly developed inaccessible factors and the recovery rates used are shown in Appendix B, Table B4.

As indicated earlier, data from the Coal Analysis File and the USCHEM File were used to develop estimates for the DRB by Btu and sulfur categories. For Pennsylvania anthracite, the Coal Analysis File contains 6,700 samples, which were supplemented with more than 100 additional USCHEM samples. All samples were evaluated for reliability. Only tipple, run of mine, and mine or core samples were judged to be valid to characterize the coal; delivered and refuse samples were not used. Both raw and prepared coal samples were considered, because mining in this region can easily pick up surrounding rock impurities, and both types of production are potentially representative of the coal in the ground. Whether raw and prepared mine samples are representative of the coal in the ground depends on the care used in mining and processing. On the other hand, because many of the breakers, or preparation plants, in this region have, over the years, processed and blended refuse pile material along with freshly mined coal, sample data with ash content of 20 percent or more were considered to contain excessive refuse and were not used.

The revised DRB estimate, representing a base year of 1981, was supplemented with data from the EIA 1971 DRB for Sullivan County (in the Western Middle Field of the Pennsylvania anthracite region), which was not covered in the RTC study. For the remaining coal resources as of 1981, the revised DRB totals 7.3 billion short tons, which is slightly higher than the 7.2 billion short tons of the previous (1991) published DRB estimate.[17] However, because of the high inaccessibility factors that were calculated—ranging from 11 percent to 57 percent—the accessible reserve base of coal was estimated to be only 1.2 billion short tons, and recoverable coal reserves were estimated to be 769 million short tons. Since correlations among EIA annual coal production data and the coalfield DRB estimates are not currently available, the 1981 data were adjusted proportionally to 1992 by applying production-related depletion to the Btu / sulfur range tonnages of all coalfields in the region. The detailed 1992 DRB, accessible reserve base of coal, and recoverable coal reserves data are presented in Appendix C.

Coal Quality Distributions to Existing Reserve Base

No new coal resource data were used for the remaining States. The objective of the analysis in these States was merely to allocate the DRB by Btu and sulfur categories. The enhanced coal sample analyses data on file (Table 4) were reviewed to identify samples that were applicable to the coal resource areas. Sample data were selected on the basis of coalbed / county matches, mapped locations of sample points relative to the coal resource areas, and use of uncorrelated samples, where necessary, that most closely matched the coal in the DRB area. The data were screened for improper coal rank or inordinately high levels of ash or other contaminants. The allocation of coal to the Btu and sulfur categories was based on the number of qualified samples representing each Btu and sulfur value. The data were converted to the as received basis[18] as the best available approximation of the values of coal resources in the ground.

Coal resource quantity revisions using new data for the 10 coal resource areas, by State, described below were beyond the scope of this work. Therefore, the brief discussions that follow are presented primarily to document the data sources used and to discuss any minor modifications or unusual circumstances that were encountered. The data for anthracite in Arkansas, Colorado, New Mexico, and Virginia represent relatively minor quantities and have been incorporated with existing distributions of bituminous coals in those States (Tables C1, C2, and C3).

Alaska

The analysis of data on Alaska's coal resources focused on the northern Alaska DRB. The known coal resources of this vast area lie north of the 68th parallel, well within the Arctic Circle. Only a few isolated and undeveloped locations where coal has been detected or sampled in "southern" Alaska lie just within the Arctic Circle. For purposes of identification, then, the area that was studied is referred to in this report as "northern Alaska," or "Arctic Alaska." It includes the oil-producing and pipeline area commonly known as the North Slope, which is located north of the Brooks Range. The major portion of the State, to the south, is referred to in this report as "southern" or "sub-Arctic" Alaska. No new analyses were done for southern Alaska except for reevaluating historic data on coal depletion.

The DRB of northern Alaska contains an estimated 1.4 billion short tons of coal resources. The estimate is based on data in the USGS Bulletin 1242-B,[19] with allocations for depth of mining by the BOM in the 1970's.[20] The very limited known coal production and test mining that has been done in the region occurred prior to the development of the 1979 DRB, and all depletion adjustments had been made previously. An estimate of the percentage inaccessible was made following a review of available information, including an engineering assessment by Kaiser Engineers.[21] In view of the numerous, but economically unquantified, climatic and environmental restrictions to commercial mining, the EIA assumed that 50 percent of both the surface and underground DRB were inaccessible. The EIA also considered the absence of commercial mining in the past, the remoteness of the region, the fact that formation of ice packs allows ocean shipping for only 2 or 3 months per year, and the extreme costs of carrying out activities in the region. In view of these economic deterrents, the EIA assumed that there would be no current or foreseeable economic recovery of the North Slope coal resources.

The coal quality sample data used to analyze northern Alaska coal came from the USCHEM file and from a series of coal washability projects sponsored by the U.S. Department of Energy (DOE),[22] with data from fewer than 10 additional samples in the area gleaned from various published sources. The EIA took care to ensure that the selected sample data were located in, and could be considered representative of, the DRB resource areas. In the process of delineating the DRB areas as defined in the USGS Bulletin 1242-B, the EIA determined that some of the coal resources of northern Alaska had been included previously in the southern Alaska DRB. This correction yielded a 5.8-million- short-ton shift, or reassignment, of the southern Alaska DRB to the northern Alaska DRB.

Arkansas

The DRB estimates for bituminous coal and anthracite in Arkansas are based on data developed in the USGS Bulletin 1072-P.[23] The 1992 DRB includes two minor depletion adjustments: the first, a reevaluation of thin-bedded, potentially surface-minable DRB, yielded an increase of 250,000 short tons in bituminous DRB, which was partially offset by the second, a reassign-ment of anthracite depletion in Johnson County that had previously been recorded as bituminous coal depletion. The reassigned Johnson County depletion was counterbalanced by restoring an equivalent amount of bituminous resources. The final result was an increase in the Arkansas DRB from 416.9 to 417.2 mil-lion short tons between 1991 and 1992, based on net increases in the States' anthracite and bituminous coal DRB.

Colorado

Colorado's DRB for anthracite is based on USGS data[24] in Gunnison County. The DRB files show slightly more than 1 million short tons of Gunnison County anthracite production through 1975. The coalbeds are not known. To allocate this total to appropriate beds, the EIA examined cumulative production data (1860

[19]U.S. Department of the Interior, Geological Survey, *Coal Resources of Alaska*, Bulletin 1242-B (Washington, DC, 1967).

[20]U.S. Department of Interior, Bureau of Mines, *Demonstrated Coal Reserve Base of the United States on January, 1, 1976*, Mineral Industry Surveys (Washington, DC, 1977).

[21]U.S. Department of the Interior, Bureau of Mines, *Surface Mining Coal Deposits, North Slope of Alaska: Phase I, Technical and Economic Feasibility*, Report No. 76-91-RE, prepared by Kaiser Engineers under USBM Contract No. JO265051 (Denver, CO, December 1976).

[22]U.S. Department of Energy, *Characterization and Evaluation of Washability of Alaskan Coals*, Final Technical Report for Phase II, by P. Dharma Rao and Ernest N. Wolff, Mineral Industry Research Laboratory, University of Alaska, under Contract No. ET-78-G-01-8969, (Pittsburgh, PA, October 1980).

[23]Haley, B.R., *Coal Resources of Arkansas*, U.S. Geological Survey Bulletin 1072-P (Washington, DC, 1954).

through 1977) compiled independently by the Colorado School of Mines (CSM).[25] Based on the CSM data, the EIA allocated the production among uncorrelated beds,[26] the Floresta bed, and the No. 3 bed and depleted each accordingly. No anthracite production was recorded from 1976 through 1991. The Colorado anthracite DRB was estimated to be 25.5 million short tons. The allocation of these data to Btu / sulfur ranges caused no changes in net DRB tonnages in Colorado.

Georgia

The 1992 DRB for Georgia incorporates changes in both surface and underground coal resources resulting from a detailed (county / coalbed) reallocation of depletion in the three most recent years of production—1979, 1983, and 1984. The reallocation indicated that more coal was mined from two coalbeds than was in the DRB, based on available resource mapping for those beds. To rectify this discrepancy in data currency, the EIA increased the Georgia DRB by 330,000 short tons by restoring the coalbed-level DRB tonnages depleted in past State-level adjustments. The resulting 1992 DRB estimate for Georgia totals 3.6 million short tons, compared with the 1991 estimate of 3.2 million short tons.

The DRB for the State is based on a USGS Coal Inven-tory Map[27] for Dade and Walker counties, and on adjustments to data in Georgia Geological Survey Bulletin 54[28] and information in a Georgia Department of Natural Resources report.[29] These sources were used to derive the 1979 DRB. No new resource data were included in the 1992 update.

Idaho

Commercial coal mining in Idaho was discontinued in 1950, shortly before the publication of the report by the Idaho Bureau of Mines and Geology that serves as the basis of the State's DRB.[30] Using information on historical mining activity appearing in that report, the EIA assigned depletion associated with 100,000 short tons of cumulative underground coal production to the three coalbeds in Idaho's DRB. The Brown Bear Bed was allotted slightly more than two-thirds of the total production. The Progressive bed accounted for the rest. Production figures for the Boise bed were deemed negligible. The reallocation of depletion data did not result in any change in the State DRB, which totals 4.4 million short tons.

Michigan

Except for one small mine that operated briefly in 1975, coal production in Michigan ceased in 1951, yielding to competition from nearby States. The State's DRB is based on the USGS Circular 77[31] and on modifications made by the EIA using the results of additional drilling data summarized in a 1976 BOM report.[32] All of the coal in the DRB is in uncorrelated beds underlying seven counties in eastern central Michigan. Of the 128 million short tons of bituminous coal resources in the DRB, less than 5 million short tons are accessible by surface mining. No new resource data were utilized, and no new depletion has occurred since 1975.

New Mexico

The DRB for New Mexico anthracite lies entirely within the Cerrillos coal field in the Madrid Gulch near Santa Fe. The New Mexico anthracite DRB is based on re-source data compiled by the USGS.[33] New Mexico's anthracite is attributed to various underground-minable beds of 28 inches or greater average thickness and totals 2.3 million short tons. The New Mexico Geological Society refers to the coal of the White Ash bed as being "by far the most valuable coal in the district,"

[25]Colorado School of Mines, *Colorado Coal Mine Information,* Open File Report, Depletion Study, by Coalfield, completed for U.S. Department of Energy (Golden, CO, 1977).

[26]Uncorrelated coalbeds are coalbeds for which the knowledge of regional geology is insufficient to determine either the physical or chronological congruity of nonadjacent beds, or for which the geologic environment is such that physical continuity of coalbeds is limited in area. In many cases, however (and Colorado is one of them), the geologic age or relative positions of the coalbeds in the surrounding rock strata can be used to identify within certain bounds the corresponding resource areas and production areas of uncorrelated coalbeds.

[27]Johnson, V.H., *Coal Deposits on Sand and Lookout Mountains Dade and Walker Counties, Georgia Preliminary Coal Inventory Map*, U.S. Geological Survey (Washington, DC, 1946).

[28]Butts, C., and Guildersleeve, B., Section on coal in *Geology and Mineral Resources of the Paleozoic Area in Northwest Georgia*, Georgia Geological Survey Bulletin 54 (Washington, DC, 1958).

[29]Coleman and others, *Analyses of Coal from Northwest Georgia*, Georgia Department of Natural Resources, U.S. Geological Survey Information Circular 76 (Washington, DC, 1977).

[30]Kiilsgaard, Thor H., *The Geology and Coal of the Horseshoe Creek District, Teton County, Idaho*, Idaho Bureau of Mines and Geology, Pamphlet (June 1951).

noting that the coal in various locations has been converted to anthracite by extreme heating caused by the proximity of molten rock in the geologic past, where the coalbed underlies an igneous intrusion along a distance of nearly 2 miles.[34]

North Carolina

North Carolina's coal resources are located in the Deep River Coal Field, an area of 26 square miles, overlapping the boundary of Chatham and Lee Counties. All of the State's demonstrated resources occur in two coalbeds—the Cumnock and the Gulf—and total 10.7 million short tons. The USGS data[35] provide the original source for the EIA's estimate of the DRB. Based on a study of maps, geologic factors, and mining history, the EIA concluded that no coal resources are surface-minable in the State's Deep River coalfield. The coal is bituminous in rank, but 17 percent of the State's bituminous DRB is estimated to occur in various locations along igneous dikes and sills where the coal has been metamorphosed to semianthracite, anthracite, and natural coke. The USGS resource data were allocated to the EIA categories for thickness (14 to 28 inches, 28 to 42 inches, and greater than 42 inches) and were adjusted for depletion on the basis of local production data compiled by the USGS for the period from 1852 through 1949. Between 1950 and 1952, North Carolina production was estimated from combined Georgia-North Carolina data from the BOM. Since 1952, there has been no recorded production (although a few test pits were initiated).

Oregon

The Oregon DRB consists of subbituminous coal that is located entirely in Coos County and estimated to total 17.5 million short tons. The underground DRB is based on resources remaining as of 1945, documented in the USGS Bulletin 982-B.[36] It includes depletion adjust-ments related to approximately 35,000 short tons of underground coal production from the Beaver Hill bed between 1945 and 1952. Approximately 20 percent of the State's DRB is known to be at depths expected to be minable through surface techniques. The surface-minable DRB is based on Beaver Hill coalbed resources in Bulletin 982-B, supplemented with data from another USGS report on Oregon coal resources published 2 years later.[37] Oregon coal deposits are typically scattered and are generally of poor quality.

Virginia

Data from a USGS report[38] provided the basis for calculating Virginia's DRB for anthracite, which is estimated to be 125.5 million short tons. The Valley Coal Fields in Montgomery, Pulaski, and Wythe counties were mined for anthracite during the Civil War and for nearly a century thereafter. Of the 12 million short tons of historical depletion estimated from EIA files, 9.6 million short tons were from Montgomery County. Anthracite production in Wythe County was deemed negligible. The remaining 2.4 million short tons were assigned to Pulaski County. Of the total, 9 million short tons were identified with the Brushy Mountain bed in Montgomery County, and the remaining 3 million short tons came from various (unidentified) beds.

[34]"Geology of the Cerrillos Coal Field, Santa Fe County, New Mexico," by Edward C. Beaumont, *New Mexico Geological Society Guidebook*, (Santa Fe County) (Sante Fe, NM, 1979).

[35]Reinemund, John A., *Geology of the Deep River Coal Field North Carolina*, U.S. Geological Survey Professional Paper 246 (Washington, DC, 1955).

4. Estimates of U.S. Coal Resources and Reserves by Heat and Sulfur Content

In addition to the specific revisions described in the preceding chapter, the EIA has developed detailed estimates of coal resources and reserves by Btu/sulfur range and mining method for each State included in the DRB. The detailed estimates were updated to January 1, 1992 (Appendix C). This chapter describes highlights of those estimates at the national level and for the three U.S. coal-producing regions—Appalachia, Interior, and West. In the discussion that follows, three qualitative ratings are used for sulfur content: low-, medium-, and high-sulfur coal. In this grouping, low-sulfur coal contains 0.6 pounds or less sulfur per million Btu. Low-sulfur coal nominally emits l.2 pounds of sulfur dioxide or less per million Btu of heat input, thus meeting the 1971 New Source Performance Standards (NSPS) for power plants without scrubbers.[39] In addition, some low-sulfur coal can be blended with medium-sulfur coal to meet the NSPS. Coal that contains between 0.61 and 1.67 pounds of sulfur per million Btu is classified as medium-sulfur coal, and coal containing 1.68 pounds of sulfur or more per million Btu is classified as high-sulfur coal.

The Demonstrated Reserve Base by Heat and Sulfur Content

The demonstrated reserve base (DRB) of coal as of January 1, 1992, totals 475.6 billion short tons. Almost one-third of the DRB is presently classified as surface minable (Table 5). About one-half of the DRB is bituminous coal, which is concentrated in Appalachia and the Interior Region. Another 38 percent of the DRB is subbituminous coal, which is located entirely in the West, and 9 percent is lignite, which is located predominantly in States west of the Mississippi, including Texas, North Dakota, South Dakota, Montana, Colorado, Louisiana, and Alaska.

Nationwide, low-sulfur coal is estimated to amount to 168.5 billion short tons, or 35 percent of all coal included in the DRB. Medium-sulfur coal totals 139.8 billion short tons, or 29 percent of the DRB. The quantities of low-, medium-, and high-sulfur coal in the DRB are relatively even, with each type accounting for about one-third of the total (Table 6).

tons, or 29 percent of the DRB, and high-sulfur coal amounts to 167.3 billion short tons, or 35 percent.

The regional distribution of each coal type is uneven. Most of the low-sulfur coal included in the DRB (83 percent) is in the West. Appalachia contains 16 percent of the low-sulfur DRB, and the Interior is estimated to have only about 1 billion short tons of low-sulfur resources (less than 1 percent of the total low-sulfur DRB coal), which are located entirely in Indiana and Oklahoma. Similarly, an estimated 81 billion short tons (58 percent) of the medium-sulfur DRB coal is in the West, about 27 percent of the total is estimated to be in Appalachia, and 15 percent is in the Interior Region. Conversely, most of the high-sulfur DRB coal is in the Interior Region. EIA estimates that the Interior contains 66 percent of the total high-sulfur DRB coal in the United States, Appalachia 26 percent, and the West just 8 percent.

Considering the coal profile of each region, Appalachia contains 108 billion short tons, or 23 percent, of the DRB coal in the United States. Coal resources in the region are almost entirely bituminous coal. Low-sulfur coal accounts for 25 percent of the region's DRB, medium-sulfur coal for nearly 35 percent, and high-sulfur coal for more than 40 percent. Low-sulfur coal in Appalachia is concentrated in eastern Kentucky, Virginia, and West Virginia, and in the Pennsylvania anthracite fields.

The Interior Region is estimated to contain 133.5 billion short tons, or 28 percent, of the DRB of U.S. coal. All of the DRB coal in the region is bituminous, except for 14 billion short tons of lignite deposits, primarily in Texas, and 0.1 billion short tons of anthracite in Arkansas. More than 83 percent of the region's DRB is high-sulfur coal and less than 1 percent is low-sulfur coal.

[39]That each unit of sulfur in the coal becomes one unit of sulfur dioxide assumes that 100 percent of the sulfur is converted to sulfur dioxide and none is retained in the ash.

Table 5. Demonstrated Reserve Base of Coal by Region, Coal Rank, and Potential Method of Mining
(Millions of Short Tons Remaining as of January 1, 1992)

Region[a] and Method of Mining	Coal Rank				
	Anthracite	Bituminous	Subbituminous	Lignite	Total
Appalachia					
Surface	3,380.8	16,790.1	-	1,083.0	21,253.9
Underground	3,977.8	82,354.9	-	-	86,332.7
Total	7,358.6	99,145.0	-	1,083.0	107,586.6
Interior					
Surface	15.6	26,800.4	-	13,775.0	40,590.9
Underground	88.6	92,870.4	-	-	92,959.0
Total	104.2	119,670.8	-	13,775.0	133,549.9
West					
Surface	-	2,273.5	61,812.4	29,929.6	94,015.5
Underground	27.8	21,605.4	118,812.5	-	140,445.7
Total	27.8	23,878.9	180,624.9	29,929.6	234,461.2
East of the Mississippi River	7,358.6	207,773.5	-	1,083.0	216,215.1
West of the Mississippi River	132.0	34,921.1	180,624.9	43,704.5	259,382.5
U.S. Total					
Surface	3,396.4	45,864.0	61,812.4	44,787.5	155,860.3
Undergound	4,094.2	196,830.6	118,812.5	-	319,737.3
Total	7,490.6	242,694.6	180,624.9	44,787.5	475,597.7

[a]States with qualified resource or reserve data in each region: **Appalachia**—Alabama, Georgia, eastern Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia. **Interior**—Arkansas, Illinois, Indiana, Iowa, Kansas, western Kentucky, Louisiana, Missouri, Oklahoma, Texas. **West**—Alaska, Arizona, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming.

Source: Energy Information Administration, *Coal Production 1991*, DOE/EIA-0118(91) (1992).

Table 6. Estimates of the Demonstrated Reserve Base of Coal in the United States by Btu/Sulfur Ranges and Regions

(Million Short Tons Remaining as of January 1, 1992)

Region[b]	Summary Sulfur Content Categories[a] (Pounds of Sulfur per Million Btu)						Total	
	≤ 0.60 (Low Sulfur)		0.61-1.67 (Medium Sulfur)		≥ 1.68 (High Sulfur)			
Appalachia	26,916.8	(16.0)	37,136.2	(26.6)	43,533.6	(26.0)	107,586.6	(22.6)
Interior	1,162.2	(0.7)	21,338.7	(15.3)	111,049.0	(66.4)	133,549.9	(28.1)
West	140,459.0	(83.3)	81,315.8	(59.2)	12,686.4	(7.6)	234,461.2	(49.3)
U.S. Total	168,538.0	(100.0)	139,790.6	(100.0)	167,269.1	(100.0)	475,597.7	(100.0)

[a]For detailed analyses, the EIA uses six sulfur content ranges. For general discussion and summary data, however, those six ranges are combined into the three qualitative ratings of low-, medium-, and high-sulfur content coal presented here. See also Appendix B, Table B3.

[b]States with qualified resource or reserve data in each region: **Appalachia**—Alabama, Georgia, eastern Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia. **Interior**—Arkansas, Illinois, Indiana, Iowa, Kansas, western Kentucky, Louisiana, Missouri, Oklahoma, Texas. **West**—Alaska, Arizona, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming.

Notes: Numbers in parentheses are percentages of the U.S. totals. Btu = British thermal units.

Source: Energy Information Administration estimates.

The DRB in the Western Region is estimated to total 234.5 billion short tons, or 49 percent of the total DRB in the United States. Seventy-seven percent of the region's DRB is subbituminous coal. About 13 percent is lignite, which is found mostly in Montana, North Dakota, and Colorado. The rest (about 10 percent) consists of bituminous coal (with small areas of anthracite), primarily in Colorado, Utah, and Wyoming. The EIA estimates that 60 percent of the DRB in the West is low-sulfur coal, 35 percent is medium-sulfur coal, and 5 percent is high-sulfur coal.

Accessible Reserve Base of Coal and Recoverable Coal Reserves by Heat and Sulfur Content

Nationwide, nearly 85 percent of the DRB is estimated to be accessible for mining (Table 7). A slightly higher percentage of underground than surface-minable resources is considered accessible. In general, accessibility is less contested for underground resources because deep mining causes impacts on smaller areas than does surface mining. If competing human values in those areas include economically significant surface developments, sensitive environments or aesthetic values, historically significant features, or natural resources of higher relative economic value than coal (e.g., oil and gas wells, prime farm lands, or important subsurface sources for groundwater wells in arid regions), then surface mining will usually be denied access. Underground mining, on the other hand, can be carried out safely and profitably under some of these surface-related features, and it involves less use of surface acreage.

Taking into account the fact that not all of the accessible reserve base of coal can be recovered, recoverable reserves of coal in the United States (that is, coal which can actually be extracted economically by mining) are estimated to total 265 billion short tons, representing 56 percent of the DRB (Table 8). Overall, 48 percent of underground DRB coal is estimated to be recoverable, and 71 percent of surface-minable DRB coal is estimated to be recoverable.

Reflecting the relatively low recovery rate for underground mining, recoverable coal reserves in Appalachia are estimated to be 55.1 billion short tons, or 21 percent of the total recoverable coal reserves in the United States. Recoverable coal reserves in the Interior Region are estimated to be 61.2 billion short tons, or about 23 percent of the total. Similarly, reflecting the relatively high recovery rate expected for surface mines in the West, recoverable coal reserves there are estimated to amount to 148.4 billion short tons, or 56 percent of the total recoverable coal reserves in the United States (a somewhat higher national share than the West holds for the total DRB).

Table 7. Estimates of the Accessible Reserve Base of Coal in the United States by Btu/Sulfur Ranges and Regions

(Million Short Tons Remaining as of January 1, 1992)

Region[b]	Summary Sulfur Content Categories[a] (Pounds of Sulfur per Million Btu) ≤ 0.60 (Low Sulfur)		0.61-1.67 (Medium Sulfur		≥ 1.68 (High Sulfur)		Total	
Appalachia	19,308.8	(13.1)	31,915.3	(26.1)	38,336.4	(28.6)	89,560.4	(22.2)
Interior	958.5	(0.7)	17,709.0	(14.5)	84,055.4	(62.8)	102,722.9	(25.5)
West	126,720.4	(86.2)	72,644.2	(59.4)	11,480.2	(8.6)	210,844.9	(52.3)
U.S. Total	146,987.7	(100.0)	122,268.5	(100.0)	133,872.0	(100.0)	403,128.2	(100.0)

[a]For detailed analyses, the EIA uses six sulfur content ranges. For general discussion and summary data, however, those six ranges are combined into the three qualitative ratings of low-, medium-, and high-sulfur content coal presented here. See also Appendix B, Table B3.

[b]States with qualified resource or reserve data in each region: **Appalachia**—Alabama, Georgia, eastern Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia. **Interior**—Arkansas, Illinois, Indiana, Iowa, Kansas, western Kentucky, Louisiana, Missouri, Oklahoma, Texas. **West**—Alaska, Arizona, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming.

Notes: Numbers in parentheses are percentages of the U.S. totals. Btu = British thermal unit.

Source: Energy Information Administration estimates.

Table 8. Estimates of Recoverable Coal Reserves in the United States by Btu/Sulfur Ranges and Regions
(Million Short Tons Remaining as of January 1, 1992)

Region[b]	Summary Sulfur Content Categories[a] (Pounds of Sulfur per Million Btu) ≤ 0.60 (Low Sulfur)		0.61-1.67 (Medium Sulfur		≥ 1.68 (High Sulfur)		Total	
Appalachia	12,291.2	(12.3)	20,237.4	(24.0)	22,557.5	(28.1)	55,086.2	(20.8)
Interior	547.5	(0.5)	11,969.9	(14.2)	48,692.7	(60.2)	61,210.1	(23.1)
West	87,331.8	(87.2)	52,097.7	(61.8)	8,956.2	(11.2)	148,385.7	(56.1)
U.S. Total	100,170.5	(100.0)	84,305.1	(100.0)	80,206.4	(100.0)	264,682.0	(100.0)

[a]For detailed analyses, the EIA uses six sulfur content ranges. For general discussion and summary data, however, those six ranges are combined into the three qualitative ratings of low-, medium-, and high-sulfur content coal presented here. See also Appendix B, Table B3.

[b]States with qualified resource or reserve data in each region: **Appalachia**—Alabama, Georgia, eastern Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia. **Interior**—Arkansas, Illinois, Indiana, Iowa, Kansas, western Kentucky, Louisiana, Missouri, Oklahoma, Texas. **West**—Alaska, Arizona, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming.

Notes: Numbers in parentheses are percentages of the U.S. totals. Btu = British thermal unit.

Source: Energy Information Administration estimates.

Low-sulfur recoverable coal reserves in the United States are estimated to total almost 100.2 billion short tons, 87 percent of which is concentrated in the West. Low-sulfur recoverable coal reserves in Appalachia are estimated to amount to 12.3 billion short tons, whereas those in the Interior Region are estimated at only 0.5 billion short tons, or less than 1 percent of the U.S. total.

Conclusion

The detailed estimates of the U.S. coal reserve base and recoverable coal reserves presented in this report (i.e., by State, method of mining, Btu content, and sulfur content) should be useful in analyzing the many issues related to the coal industry and coal consumers, especially in evaluating various scenarios evolving from the Clean Air Act Amendments of 1990. These estimates are the results of the EIA's best efforts, with available data, to compile information on U.S. coal resources on a uniform, nationwide basis. The data, methodologies, and assumptions used to develop such estimates should be updated continuously as new information becomes available. The emergence of the Coal Reserves Data Base program represents a renewed effort to effect revisions and updates as soon as feasible. The program will also involve the use of more complete data and work with State and regional experts through a targeted program of coordination and support.

Bibliography

Averitt, Paul, *Coal Resources of the United States, January 1, 1974*, U.S. Geological Survey Bulletin 1412 (Washington, DC, 1975).

Energy Information Administration, *Coal Production 1991*, DOE/EIA-0118(91), Appendix D, "Explanatory Notes" (Washington, DC, November 1992).

Energy Information Administration, *Coal Production 1990*, DOE/EIA-0118(90) (Washington, DC, September 1991).

Energy Information Administration, *Coal Production 1987*, DOE/EIA-0118(87), Appendix E, "Explanatory Notes" (Washington, DC, December 1988).

Energy Information Administration, *Coal Production 1986*, DOE/EIA-0118(86) (Washington, DC, January 1988).

Energy Information Administration, *Coal Production 1984*, DOE/EIA-0118(84), Appendix C (Washington, DC, November 1985).

Energy Information Administration, *Coal Production 1980*, DOE/EIA-0118(80) (Washington, DC, May 1982).

Energy Information Administration, *Coal Supply and Transportation Model (CSTM) Description*, DOE/EIA-M022 (Washington, DC, June 1987).

Energy Information Administration, *Demonstrated Reserve Base of Coal in the United States on January 1, 1979*, DOE/EIA-0280(79) (Washington, DC, May 1981).

Energy Information Administration, *Documentation of the Inputs to the Resource Allocation and Mine Costing (RAMC) Model*, DOE/EIA-M024 (Washington, DC, June 1987).

Energy Information Administration, *Documentation of the Reserve Related Data Inputs to the Resource Allocation and Mine Costing Model*, DOE/NBB-0026 (Washington, DC, September 1982).

Energy Information Administration, *Documentation of the Resource Allocation and Mine Costing (RAMC) Model*, DOE/EIA-M021 (Washington, DC, May 1987).

Energy Information Administration, *International Coal Trade Model: Executive Summary*, DOE/EIA-0444(EX) (Washington, DC, May 1984).

Energy Information Administration, *International Coal Trade Model, Version 2 (ICTM-2) Users Guide*, DOE/EIA-M026 (Washington, DC, March 1987).

Energy Information Administration, *National Coal Model, Model Description and Formulation*, DOE/EIA-0428 (Washington, DC, September 1983).

ICF, Inc., *Coal and Electric Utilities Model Documentation*, draft report (Washington, DC, May 1980).

ICF, Inc., *Coal and Electric Utilities Model Documentation* (Washington, DC, July 1977).

ICF, Inc., *Effects of Alternative New Source Performance Standards for Coal-Fired Electric Utility Boilers on the Coal Markets and on Utility Expansion Plans*, draft report submitted to the Environmental Protection Agency (Washington, DC, September 1978).

Science Applications International Corporation, *Development of Revised Reserve Inputs to the Resource Allocation and Mine Costing Model*, unpublished final report prepared for the Energy Information Administration, U.S. Department of Energy (Norristown, PA, May 1986).

Science Applications International Corporation, *Development of a Revised Methodology to Estimate the Distribution of the Demonstrated Reserve Base (DRB) by Quality*, prepared for the Energy Information Administration, U.S. Department of Energy (Norristown, PA, August 1988).

Science Applications International Corporation, *Selected Modifications to the Resource Allocation and Mine Costing*

(RAMC) Model, prepared for the Energy Information Administration, U.S. Department of Energy (Norristown, PA, April 1988).

Synergic Resources Corporation, *Documentation of the Demonstrated Reserve Base of Coal in the United States*, Vols. 1 and 2, SRC Report No. 7098-R1 (Bala-Cynwyd, PA, March 1982).

U.S. Bureau of Mines, *The Reserve Base of U.S. Coals by Sulfur Content*, Part 1, "The Eastern States," Information Circular 8680 (Washington, DC, 1975).

U.S. Bureau of Mines, *The Reserve Base of U.S. Coals by Sulfur Content*, Part 2, "The Western States," Information Circular 8693 (Washington, DC, 1975).

U.S. Department of the Interior, *Coal Resource Classification System of the U.S. Bureau of Mines and U.S. Geological Survey*, U.S. Geological Survey Bulletin 1450-B (Washington, DC, 1976).

Glossary of Selected Coal Classification Terms

demonstrated reserve base (DRB)—A collective term for the sum of coal in both Measured and Indicated Resource categories of reliability; and the DRB represents 100 percent of coal in place as of a certain date. Includes beds of bituminous coal and anthracite 28 inches or more thick and beds of subbituminous coal 60 inches or more thick that can be surface mined. Includes also thinner and/or deeper beds that presently are being mined or for which there is evidence that they could be mined commercially at this time. Represents that portion of the identified resources of coal from which reserves are calculated.

demonstrated resource—(see identified resources) Same qualifications as **identified resources**, but includes measured and indicated degrees of geologic assurance and excludes the inferred.

depletion[a]—The subtraction of both the tonnage produced and the tonnage lost to mining from the **demonstrated reserve base** and **identified resources** to determine the remaining tonnage as of a certain time.

depletion factor[a]—The multiplier of the tonnage produced that takes into account both the tonnage recovered and the tonnage lost due to mining. The Depletion Factor is the reciprocal of the **recovery factor** in relation to a given quantity of production.

hypothetical resource—**undiscovered coal resources** in beds that may reasonably be expected to exist in known mining districts under known geologic conditions. In general, **hypothetical resources** are in broad areas of coalfields where points of observation are absent and evidence is from distant outcrops, drill holes, or wells. Exploration that confirms their existence and better defines their quantity and quality would permit their reclassification as **identified resources**. Quantitative estimates are based on a broad knowledge of the geologic character of coalbed or region. Measurements of coal thickness are more than 6 miles apart. The assumption of continuity of coalbed is supported only by geologic evidence.

identified resources—Specific bodies of coal whose location, rank, quality, and quantity are known from geologic evidence supported by engineering measurements. Included are beds of bituminous coal and

anthracite 14 inches or more thick and beds of subbituminous coal and lignite 30 inches or more thick that occur at depths to 6,000 feet and whose existence and quantity have been delineated within specified degrees of geologic assurance as measured, indicated, or inferred.

indicated resources—Coal for which estimates of the rank, quality, and quantity have been computed partly from sample analyses and measurements and partly from reasonable geologic projections. **Indicated resources** are computed partly from specified measurements and partly from projection of visible data for a reasonable distance on the basis of geologic evidence. The points of observation are 0.5 to 1.5 miles apart. **Indicated** coal is projected to extend as a 0.5-mile wide belt that lies more than 0.25 miles from the outcrop or points of observation or measurement.

inferred resources—Coal in unexplored extensions of **demonstrated resources** for which estimates of the quality and size are based on geologic evidence and projection. Quantitative estimates are based largely on broad knowledge of the geologic character of the bed or region and where few measurements of bed thickness are available. The estimates are based primarily on an assumed continuation from demonstrated coal for which there is geologic evidence. The points of observation are 1.5 to 6 miles apart. Inferred coal is projected to extend as a 2.25-mile wide belt that lies more than 0.75 miles from the outcrop or points of observation or measurement.

measured resources—Coal for which estimates of the rank, quality, and quantity have been computed, within a high degree of geologic assurance, from sample analyses and measurements from closely spaced and geologically well-known sample sites. **Measured resources** are computed from dimensions revealed in outcrops, trenches, mine workings, and drill holes. The points of observation and measurement are so closely spaced and the thickness and extent of coals are so well defined that for older estimates the tonnage was judged to be accurate within 20 percent of true tonnage (statistical measures of error are currently not considered reliable). Although the spacing of the points of observation necessary to demonstrate continuity of the coal differs from region to region according to the character of the coalbeds, the points of observation are not greater than 0.5 mile apart. Measured coal is projected to extend as a 0.25-mile belt from the outcrop or points of observation or measurement.

quality or grade—Refers to individual measurements such as heat value, fixed carbon, moisture, ash, sulfur, phosphorus, major, minor, and trace elements, coking properties, petrologic properties, and particular organic constituents. The individual quality elements may be aggregated in various ways to classify coal for such special purposes as metallurgical, gas, petrochemical, and blending usages.

rank—The classification of coal relative to other coals, according to their degree of metamorphism, or progressive alteration, in the natural series from lignite to anthracite (Standard Classification of Coal by Rank, 1992 draft), American Society for Testing Materials, ASTM Designation D-388-91a.

recovery factor[a]—The percentage of total tons of coal estimated to be recoverable from a given area in relation to the total tonnage estimated to be in the **demonstrated reserve base**. For the purpose of calculating **depletion factors** only, the estimated **recovery factors** for the **demonstrated reserve base**, generally are 50 percent for underground mining methods and 80 percent for surface mining methods. More precise

recovery factors can be computed by determining the total coal in place and the total recoverable in any specific locale.

reserve[a]—That portion of the **demonstrated reserve base** that is estimated to be recoverable at the time of determination. The **reserve** is derived by applying a **recovery factor** to that component of the **identified resources of coal** designated as the **demonstrated reserve base**.

speculative resources—**undiscovered** coal in beds that may occur either in known types of deposits in a favorable geologic setting where no discoveries have been made, or in deposits that remain to be recognized. Exploration that confirms their existence and better defines their quantity and quality would permit their reclassification as **identified resources**.

undiscovered resources—Unspecified bodies of coal surmised to exist on the basis of broad geologic knowledge and theory. **Undiscovered resources** include beds of bituminous coal and anthracite 14 inches or more thick and beds of subbituminous coal and lignite 30 inches or more thick that are presumed to occur in unmapped and unexplored areas to depths of 6,000 feet. The **speculative** and **hypothetical resource** categories comprise **undiscovered resources**.

Appendix A

The Coal Reserves Data Base Program

Appendix A

The Coal Reserves Data Base Program

The Coal Reserves Assessment Conference was held in February 1990 to assemble State coal geologists, coal industry representatives, trade associations, private companies, and Federal Government officials. The objective of the conference was to identify the issues and review the guidelines for the emerging Coal Reserves Data Base (CRDB) program.[40] Other information on the status of State-specific data needs and funding requirements was also provided at the conference, and later refined. Based on recommendations from the attendees at the conference and from the conference Steering Committee,[41] the EIA defined the following major needs and issues:

- The basic resource needed for coal forecasting is a comprehensive data base that includes all coal resources and the associated reserves that could be exploited by current mining technologies and mining technologies foreseeable over a 30-year horizon. To meet this need, it may be necessary to allow variations to the USGS classification system for demonstrated resources where alternative methodologies are capable of producing resource estimates of reliability equivalent to or better than "demonstrated." Also, current mining practices may indicate that resources following either more or less restrictive inability criteria could be exploited over the technology horizon.

- In an ideal fiscal environment, to address all of the clean air, acid rain, and coal leasing issues, and to satisfy all known forecasting requirements, underlying bed-level resource estimates would need to be developed by coal quality characteristics (at least by sulfur, Btu, and ash content) and at three levels of confidence in the estimates (95 percent, 50 percent, and 5 percent). With access to

much more extensive data, the USGS has developed reserve estimates for petroleum and natural gas, expressed at those three levels of confidence, but the funding and time expenditures required to capture the same level of detail for coal would be prohibitive.

- Most of the pressing energy and environmental issues can be addressed with an integrated coal reserves and coal quality data base containing State-level data. An integrated quantity/quality coal reserves data base at the State level would: (1) be a significant improvement over the existing data; (2) be responsive to criticisms of the data; and (3) better satisfy known uses of the DRB.

- Statistical measures, such as those used in petroleum and natural gas reserves, are not currently feasible for the less studied U.S. coal reserves. However, they are less important than obtaining better resolution of other reserve-related factors, such as economic inability using known technology, accessibility adjustments, and mine recovery factors. Consequently, carefully derived and critiqued data representing the investigators' best estimate of reserves are acceptable in the CRDB program.

Taking account of these major needs and issues, the new EIA data base was defined to consist of estimates of State-level resources and economic reserves, categorized by quality type and representing the best estimates of the quantity of resources/reserves judged to be attainable. In other words, delineation of economically recoverable reserves was requested of the State geologists, who could draw on their knowledge of local conditions.

[40]Energy Information Administration, *Coal Reserves Assessment Conference: Background, Results and Future*, Open File Report, Analysis and Systems Division, Contract No. DE-AC01-87EI19801, Task 88 (Washington, DC, September 1990).

[41]The CRDB Steering Committee advises EIA on technical aspects of the program and reviews criteria and reports produced. It comprises eight coal specialists—five from geological surveys of coal States, one from USGS, one from a major coal company, and one from the National Coal Association.

The CRDB program was influenced by the experience of the EIA and the U.S. Bureau of Mines in attempting to incorporate new resource data into the DRB. State and industry experts would sometimes indicate that a current estimate of the resources of a State or coalfield was out of date. The problem with using this information was that the estimate either was based on proprietary company data that could not be released or on rough calculations using State file data that had not been fully processed and would need further review. In many cases involving State-held data, the data had been collected under a program that received some Federal, State, or industry support, but a source of funding to complete the data processing and publication could not be secured in tight State budgets. In cases of proprietary data in State files, aggregated or "sanitized" resource compilations might be releasable but, again, funding was not available for the task. Since these State problems were impinging on EIA's efforts to assemble a national data base, freeing these already-mapped data became a principal goal of the CRDB program.

The evaluation and acquisition of State data is sometimes complicated when investigators have used alternative methodologies involving geologic models to calculate coal resources. Also, geographic information systems (GIS) and computer software that have become available for mining applications facilitate volumetric calculations of resource deposits. Not always clear is how these applications, maintained in various agency computer systems, relate to the standard criteria on which the DRB is based. But since the criteria are well understood by State geological survey resource analysts and most industry geologists and engineers (the regional or State experts who participate in the CRDB program), they are permitted to submit coal resource estimates that they certify as equivalent to the standard USGS measured and indicated reliability categories.

Further, to obtain the best available estimates from existing data, the CRDB could accept documented estimates based on inferred data (less reliable than measured and indicated) if the investigator has other evidence to enhance data dependability (such as past, recent, or planned mining, geologic field observations in areas where mapping programs were not available, or confidential data that could not be released from its files).

A Steering Committee was established to provide peer review and to validate nonstandard procedures.[42] The EIA developed a complex set of procedural guidelines for CRDB participants and some new nomenclature so that data calculated by alternative methodologies could be distinguished from data compiled under the standard DRB and USGS criteria. As it has turned out, procedures followed in the two pilot studies and those being used in the eastern Kentucky cooperative agreement do not vary from standard criteria.

The Procedural Diagram (Figure A1) depicts the data flow and procedures developed for the CRDB. Since nonstandard procedures have not been used in the CRDB projects to date, Figure A1 includes only standard data nomenclature. Alternative data sources or procedures would be introduced primarily early in the "Augmentation Process" and would be unified in the "Integration Process." The alternative sources or procedures are retained in the diagram to maintain its integrity, but are not currently in use. The classification criteria for coal resource and reserve data in the CRDB Program are summarized in Table A1. The State or regional experts conducting a study determine the appropriate base level of aggregation (for example, property, quadrangle, or county level) needed to compile the new resource estimates with coal quality allocations.

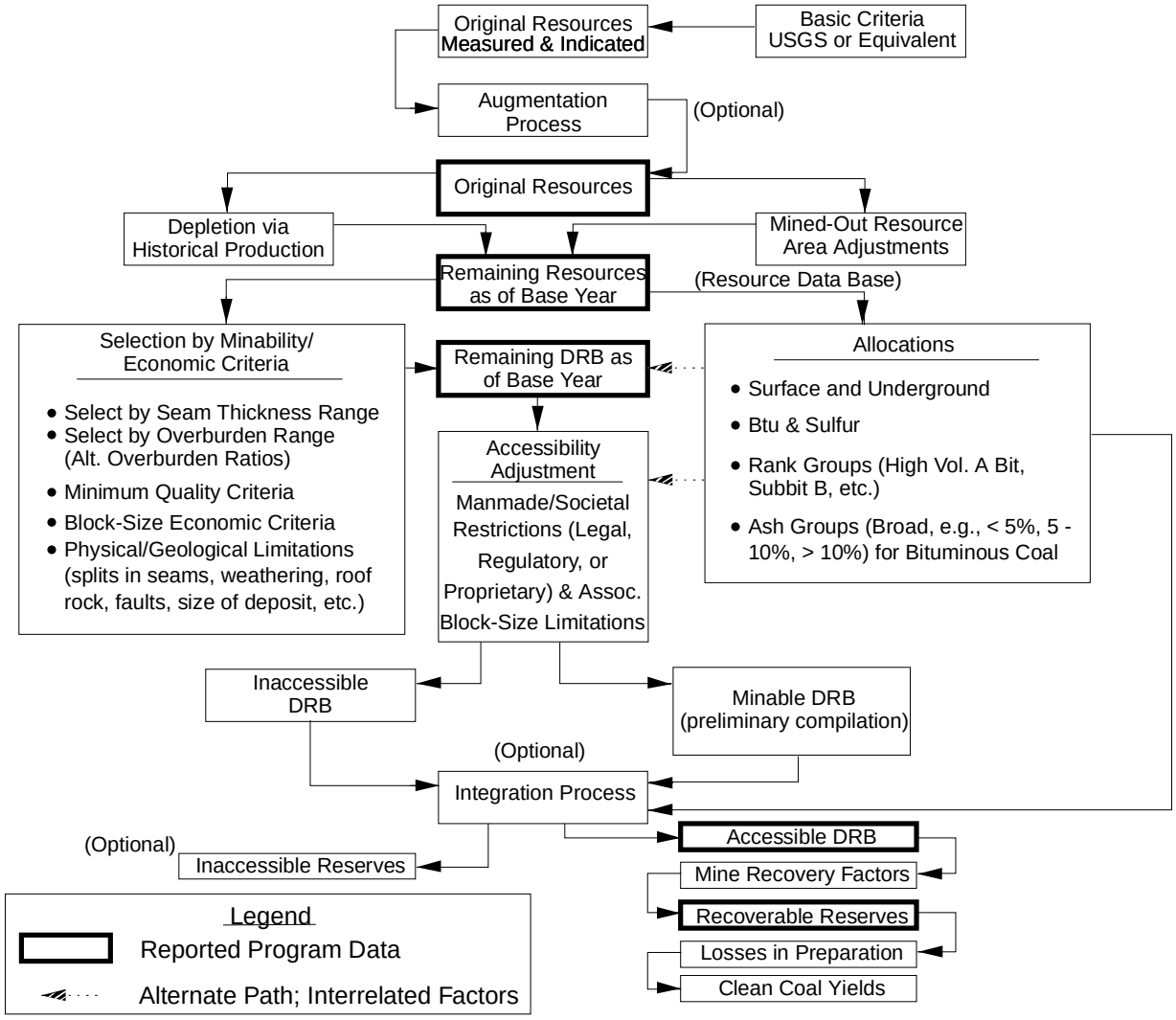
The procedural guidelines were developed in the context of the basic USGS criteria. As indicated at the top of Figure A1, the CRDB takes into account the USGS basic criteria. These criteria govern resource reliability, data reliability, inability, and coal rank, with minor variations, as follows:

- Resource reliability: the standard is measured and indicated or their equivalents for resource estimates (demonstrated resources).

- Data reliability for resource quality estimates: If available, areal resource estimates or bed maps with quality value distributions can be used as control areas. For point source data, proximate analyses on an as-received or inherent-moisture basis are preferred, from channel or core samples.[43] For raw run-of-mine samples, either whole seam or minable bench, can be used.

[42]The technical Steering Committee comprises eight members—representing five State geological surveys, USGS, one coal company, and the National Coal Association.

Figure A1. Coal Reserves Data Base (CRDB) Procedural Diagram for Coal Resources and Reserves



Note: "DRB" = demonstrated reserve base of coal.

- Minability/economic criteria: apply standard physical criteria for seam thickness and overburden thickness, as detailed in the USGS Circular 891 and summarized in Table A1.
- Coal rank: apply coal rank class and rank group criteria as described in Circular 891 and summarized in Table A1.

The CRDB procedures include an "augmentation process," which provides for variations in the basic criteria

when they would produce incomplete or outdated resource estimates or where mining is fully expected to exploit further categories of resources within the technology horizon. The augmentation process permits the use of additional resource data than would otherwise make up demonstrated resources under the standard criteria alone, such as the following:

- Data judged to be equal to or exceed the basic USGS coal resource estimation criteria

Table A1. Categories for Classifying Resource/Reserve Data

BASIC CRITERIA: RANK OF COAL

OUTPUT DATA CRITERIA: QUALITY CATEGORIES

Class	Rank Group	Abbrev.	Million Btu/ Short Ton [1]	Pounds Sulfur/ Million Btu
Ash (% by Weight)[1]				
Anthracite	Meta-anthracite	ma		
"	Anthracite	an		
"	Semianthracite	sa	26 or higher	0.40 or less
less than 5.00				
Bituminous Coal	Low-volatile bituminous	lvb	23-25.99	0.41-0.60
5.01-10.00				
"	Medium-volatile bituminous	lvb	20-22.99	0.61-0.83
higher than 10.00				
"	High-volatile A bituminous	hvAb	15-19.99	0.84-1.67
"	High-volatile B bituminous	hvBb	lower than 15	1.68-2.50
"	High-volatile C bituminous	hvCb		greater than 2.50
Subbituminous Coal	Subbituminous A coal	subA		
"	Subbituminous B coal	subB		
"	Subbituminous C coal	subC		
Lignite	Lignite A	ligA		
"	Lignite B	ligB		

BASIC CRITERIA: MINING CATEGORIES

Coal Seam Thickness (Underground or Surface Mining)[2]		Overburden Thickness (Depth from Surface)	
Anthracite and Bituminous Categories	Subbituminous and Lignite	Underground Mining Categories	Surface Mining
10-14 inches[3]	10-30 inches (2.5 feet)	0 to 500 feet	0 to 500 feet
14-28 inches	2.5-5 feet	500 to 1,000 feet	0 to 100 feet
28-42 inches	5-10 feet	1,000 to 2,000 feet	100 to 200 feet
> 42 inches, or...	> 10 feet, or...	2,000 to 3,000 feet	0 to 200 feet
42-84 inches [3]	10-20 feet [3]		200 to 500 feet [4]
84-168 inches[3]	20-40 feet [3]		
>168 inches[3]	>40 feet [3]		

- Data of the "inferred" reliability class, used selectively where supplementary information enhances reliability

- Proprietary data available in aggregated forms only

- Quality estimates available for a related group of seams, in whole basin, system-wide statistical analyses

- In the absence of other data, judicious use of reliable tipple or delivered sample data.

This augmentation process, if applicable, results in the CRDB original resource estimate. When an original resource estimate is available, adjustments for coal mined and lost in previous mining are made to obtain estimates of remaining resources as of a specified base year (Figure A1). If assessments can be made of coal resources rendered unminable by extraction of over-lying or underlying beds (sterilization), those adjustments would be made at this point.

The remaining coal resource data are then allocated by several inherent characteristics. These include allocations by mining type (surface and underground), rank class, Btu content, and sulfur content. In addition, optional allocations by coal rank groups and ash con-tent could be included in future analyses (Table A1). In situations where the basic criteria cannot properly define economic inability, more detailed or localized criteria, such as a deeper or more detailed set of overburden criteria or a thinner or more detailed set of seam thickness criteria, properly documented, may be used. Economic inability should be constrained by present and foreseeable technologic limits over a 30-year period.

The DRB has been calculated by this point in the derivation. Some of the DRB resources will not actually be developed due to societal restrictions, including legal and/or regulatory constraints or property ownership. The estimated DRB is divided into coal resources that are inaccessible and those that are truly minable when societal constraints are taken into account. This may require the use of extremely detailed data relating to land use, ownership, and regulatory constraints (pos-sibly in limited areas, extrapolated to analogous areas). Alternatively, these estimates might be based on field experience, regional planning information, mine operator experience, or some combination. This division of coal resources amounts to an impact analysis of societal constraints on the otherwise minable and economic coal resources in each State.

The investigators also assess coal quality distribution procedures to be employed. These procedures may include statistical probability distributions where sufficient data are available, and geostatistical distribution techniques. Expert judgment is the final arbiter of the best estimate and technique for each resource category. The objective of these analyses is to determine the modal or central tendency of each variable (quantity or quality resource estimate). At this stage in the reserve estimation, the Procedural Guidelines include an "inte-gration process." This integration process may not always be needed, but in most cases would be used to evaluate and resolve differences in disparate data sources in order to estimate a unified set judged to represent the best available State-wide adjusted data. The results are a division of the DRB into: (1) inaccessible resources and (2) the accessible DRB.

Finally, recoverable coal reserves are calculated using estimates of losses in the accessible DRB caused by the mining process—losses that vary depending on the mining methods and techniques anticipated. Given sufficient data and funding, the State investigators may infer expected mining methods and techniques on the basis of coalbed geology, recent mining activity, relative economic value of the coal, and knowledge of local adaptability toward regulations affecting changes in mining practices. Alternately, recoverable coal reserve estimates may be compiled using standard recovery factors when local analysis is not feasible.

Table A2 provides an example of the results of the CRDB resource/reserves estimation process. State-level data are captured for the remaining DRB, the accessible DRB (after non-accessible constraints are factored in), and recoverable coal reserves.

Table A2. EIA Coal Reserves Data Base — Data Matrix (Sample)

State: Carbonia **Region:** **Remaining as of: 1-1-91**

(if applicable)

Coal Rank: Bituminous

	Std. Btu Range	Std. Sulfur Range	Demonstrated Reserve Base	Accessible* Reserve Base	Recoverable Reserves
			(millions of short tons)		
(Remaining) Total	23 – 25.99	0.41 – 0.60	1,710.9	1,487.2	793.1
Underground			1,459.7	1,272.9	611.0
Surface			251.2	214.3	182.2
(Remaining) Total	23 – 25.99	0.61 – 0.83	5,685.2	4,936.5	2,877.1
Underground			4,583.4	3,996.7	2,078.3
Surface			1,101.8	939.8	798.8
(Remaining) Total	23 – 25.99	0.84 – 1.67	36,025.3	31,193.8	18,563.8
Underground			24,431.2	21,304.0	10,652.0
Surface			11,594.1	9,889.8	7,911.8
(Remaining) Total	20 – 22.99	0.40 or less	570.1	497.1	238.6
Underground			570.1	497.1	238.6
Surface			0	0	0
(Remaining) Total	20 – 22.99	0.41 – 0.60	2,287.6	1,990.9	1,047.2
Underground			2,085.0	1,818.1	909.0
Surface			202.6	172.8	138.2
(Remaining) Total	20 – 22.99	0.61 – 0.83	2,611.0	2,266.5	1,270.8
Underground			2,073.1	1,807.7	903.8
Surface			537.9	458.8	367.0
(Remaining) Total	20 – 22.99	0.84 – 1.67	4,180.7	3,623.6	2,107.8
Underground			3,024.2	2,637.1	1,318.6
Surface			1,156.5	986.5	789.2
(Remaining) Total					
Underground					
Surface					
(Remaining) Total	All Ranges	All Ranges	53,070.8	45,995.6	26,898.5
Underground			38,226.7	33,333.6	16,711.3
Surface			14,844.1	12,662.0	10,187.2

Inaccessible Percentage

	Land Use	Environmental*
Underground	9.7	3.1
Surface	10.5	4.2

Notes:

Appendix B

Prior Development of EIA Coal Reserves Data

Appendix B

Prior Development of EIA Coal Reserves Data

The CRDB program is intended to be the vehicle for future revisions of the DRB and recoverable coal reserves data with coal quality allocations. The CRDB data benefit from the use of coal quality analyses sampled in, and selected for their applicability to, the coal resource areas involved. On the other hand, for the many States and areas for which the CRDB projects still lie ahead, the EIA continues periodic updates to account for resource depletion. This is done to maintain a unified national data base of the remaining DRB and recoverable coal reserves adjusted to the latest common effective date. In this appendix, the procedures that were applied to derive the DRB and recoverable coal reserve allocations in the States and areas analyzed prior to the CRDB program are summarized.

A significant number of important coal-producing States are based on 1971 base year DRB data and on allocations performed for the EIA's Resource Allocation and Mine Costing (RAMC) model (Table B1). The DRB covers all States for which there are sufficient coal resource data to compute a reserve base. However, the RAMC model selects certain coal ranks and supply areas from the DRB, depending on the end-use sectors under consideration, for use in coal supply analyses. The RAMC model, in turn, provides input to the new National Energy Modeling System (NEMS), the EIA's integrated energy forecasting system.

A “base year” (Table B1) is the effective date of the detailed resource assessment for a DRB resource area, including adjustments for all known coal mined out and/or lost to mining (as of the base year). The latest common effective date is the date to which various base year data are adjusted to account for subsequent production and coal lost in mining and to maintain data base compatibility.

Table B1. Summary of 1992 Status of Data Base Updates for EIA Coal Resource and Reserve Data

Program	Lead Agency	State or Producing Area	Base Year
CRDB	Ohio Geological Survey	Ohio	1991
	Geological Survey of Wyoming	Wyoming	1991
	EIA	Pennsylvania (anthracite)	1981
	EIA	Arkansas, Colorado, New Mexico, and Virginia (anthracite fields); Alaska (northern); Georgia; Idaho; Michigan; North Carolina; Oregon	1992
RAMC	EIA (core RAMC file)	Alabama, Alaska (southern), Arizona, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky (eastern), Kentucky (western), Louisiana, Maryland, Missouri, Montana, New Mexico, North Dakota, Oklahoma, Pennsylvania (bituminous), South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia	1971

Data Inputs to the Resource Allocation and Mine Costing Model

Although the EIA coal resource and recoverable coal reserves data are publicly available, current criteria for distribution of the DRB data to Btu/sulfur ranges and allocation to estimated reserves support the RAMC and NEMS analysis requirements. The accuracy of information on recoverable coal reserves affects the accuracy both of EIA coal supply curves and of the equilibrium production and prices determined by coal supply and transportation models, such as EIA's Coal Supply and Transportation Model (CSTM) and the International Coal Trade Model (ICTM). These models are expected to be replaced in 1993 with modules of the NEMS, which will be used in future analyses for the EIA's *Annual Energy Outlook*.

Coal Quality

The EIA's CRDB and the earlier RAMC data files classify coal resources along two measures: heat content and sulfur content. Heat content is expressed on the as received basis[44] in millions of Btu per short ton of coal. The EIA's heat content ranges offer a rough approximation of the rank of bituminous, subbitumi-nous, and lignitic coals (Table B2). (Anthracite heat content ranges coincide with those of bituminous coals.) Because the Btu content of bituminous coal has a wide range, three of the five Btu categories relate to different subgroups of bituminous rank.

Table B2. EIA Coal Rank/Btu Categories

Rank of Coal	Million Btu per Short Ton[a]
Bituminous	> 26
Bituminous	> 23 but < 26
Bituminous	> 20 but < 23
Subbituminous	> 15 but < 20
Lignite	< 15

[a]As received basis.

Sulfur content is important in determining the usability and value of different coal types and in identifying clean-burning coal. The EIA classifies coal into three qualitative ratings, or six sulfur content categories, measured on the "as received" basis in pounds of sulfur per million Btu of heat content (Table B3). The six sulfur content categories are defined to offer approximate correlations with potential sulfur dioxide emissions regulated by the Clean Air Act and with sulfur content, expressed in percentages by weight of coal. Because sulfur dioxide emissions are expressed as a function of the heating potential of the coal, the exact emission values vary within the expected ranges of heat content of the coal, expressed in Btu. Consequently, the approximate correlations of coal sulfur content and emissions produced are based on the midpoint values of a range of Btu contents of U.S. coals (Table B3)

Table C1. EIA Sulfur Content Categories for Coal

Qualitative Rating	Pounds of Sulfur per Million Btu[a]	Approximate Correlation with Sulfur Criteria for Coal
Low Sulfur	≤ 0.40	Exceeds NSPS Requirements[b]
	0.41-0.60	Meets NSPS Requirements[b]
Medium Sulfur	0.61-0.83	Low-sulfur Coal; Fails NSPS Requirements[c]
	0.84-1.67	Sulfur Content Approximately 1-2 Percent
High Sulfur	1.68-2.50	Sulfur Content Approximately 2-3 Percent
	> 2.50	Sulfur Content Approximately > 3 Percent

[a]As received basis.
[b]NSPS = New Source Performance Standards of 1.2 pounds of emissions of sulfur dioxide per million Btu of coal burned.
[c]Coal in this category contains less than 1 percent sulfur by weight; although it does not meet emission requirements by itself, if blended with lower-sulfur coals, it may meet them.

[44]The "as received" basis applies to coal in the moisture condition as received at the laboratory, before any conditioning or preparation.

Mining Methods and Coal Supply Regions

Mining costs depend on many factors, including what mining method is used—surface or underground. Therefore, the EIA considers separately coal reserves that are amenable to each type of mining. The geographic distribution of coal in the EIA coal supply models is portrayed by 32 coal supply regions, most of which correspond to States. Five States—West Virginia, Kentucky, Wyoming, Montana, and Colorado—are split into two coal-producing regions each, to deal with significant differences in the type of coal produced or transportation distances to coal markets. The coal supply regions in Pennsylvania and Alaska had included only the western Pennsylvania bituminous region and the subarctic southern Alaska region; however, the new CRDB Program has developed DRB and reserve allocations by Btu/sulfur ranges for the Pennsylvania anthracite region, Arctic Alaska, and other areas previously not allocated.

Reliance on the Demonstrated Reserve Base of Coal

The basic data on coal resources that support the EIA recoverable coal reserve estimates are the DRB of coal in the United States. With the exception of new CRDB allocations, most recoverable coal reserve estimates used in EIA analyses are based on coal quality distributions compiled from the 1971 DRB, which provided data at the coalbed and county level, by mining method and coal rank, and included estimates of sulfur content. The following paragraphs summarize briefly the derivation of coal quality and recoverable coal reserve allocations under the earlier procedures.

Distribution of the Demonstrated Reserve Base by Btu and Sulfur Content

With the exception of some of the new data being developed under the CRDB program, the DRB source studies did not include integrated point source data on quality when they were performed. Furthermore, only once—at the time of the original 1971 DRB—were the staff mining specialists and field representatives, along with multi-year funding, available to develop resource estimates for each DRB State at the county and coalbed level. Since that time, the DRB depletion adjustments and data revisions have been incorporated at the State level only. For States not updated through the CRDB Program, the adjustments of the DRB data to the latest common effective date have followed the procedures described below.

Estimation Procedures

For non-CRDB data, the following estimation procedures were used for the latest update:

1. The 1992 State-level DRB by mining method were allocated into coalbed/county combinations on the basis of the bed/county distributions of the 1971 DRB.

2. The resulting 1992 bed/county-level DRB estimates were assigned to Btu/sulfur ranges. This procedure entailed the following steps:

   a. The beds and county locations of the coal quality analyses were matched with the DRB by bed/county combinations.

   b. The estimates of the 1992 DRB in each bed/county/mining method combination were divided into equal shares according to the number of analyses corresponding to the bed/county combination. For example, if there were 10 analyses, the recoverable coal reserves in that particular combination were divided into 10 equal shares.

   c. Each share of the DRB was assigned a Btu/sulfur range on the basis of the Btu and sulfur content of its corresponding quality analysis.

   The assembled coal quality analysis data did not cover all bed/county/mining method combinations that were contained in the 1971 DRB. Therefore, the DRB data that were not assigned Btu/sulfur ranges at the bed/county/mining-method level were summed at the county/min-ing method level and assigned on the basis of all quality analyses available for the county. The

procedure used for matching shares with Btu/sulfur ranges at this level was the same as that used at the bed/county/mining-method level. Even at the county level, coal quality data were not always available; in some cases matches were made at the bed/region/mining-method level or at the region/mining- method level.

3. The DRB estimates by coal type at the bed/county, county, and bed/region levels were summed to yield DRB by Btu/sulfur range, mining method, and coal supply region.

Coal Quality Data Sources

The coal quality information used in the non-CRDB distribution of DRB data by Btu and sulfur content was obtained primarily from the Coal Analysis File, which originated with the U.S. Bureau of Mines (BOM) and is currently maintained and updated by the EIA. The Coal Analysis File contains data from proximate and ultimate analyses of approximately 60,000 coal samples, collected from all coal-producing States. The file has been updated whenever qualified sample data have become available. Data from the Coal Analysis File do not cover all the bed/county combinations in the DRB, so supplementary sources of coal quality data have also been used. The supplementary sources include the BOM Information Circulars 8680[45] and 8693, and[46] Form EIA-7A, 1983 Supplement.[47]

Most of the samples in the Coal Analysis File were taken from coal purchases by U.S. Government facilities, sampled either at tipples (coal transfer structures) or at the place of delivery. The file also includes 1,500 analyses of mine samples, taken from channel cuts in the mine walls (or "face"), in seams exposed in underground workings, or in surface mine pits. A distinction is made between cleaned, partially cleaned, and raw (uncleaned) samples. Although the majority of the samples were taken during the 1940's and 1950's, the file includes samples from the first decade of the century up through the mid-1980's.

In 1988, a review of the results found that in some Eastern States the distribution of the DRB by Btu/sulfur ranges appeared to be biased toward low-sulfur coal. Additional information from the USGS and State geological surveys was reviewed and used as a basis for modifying the results for Illinois, Pennsylvania, and West Virginia.[48] The distribution of the 1992 DRB estimates by Btu/sulfur ranges, mining method, and State or region is presented in Appendix C, Table C1.

Estimation of Accessible Reserve Base of Coal and Recoverable Coal Reserves

Accessible Reserve Base of Coal

The DRB is determined under broad geologic reliability, economic and inability criteria, and some of the coal in the DRB may not be accessible for mining under currently foreseeable conditions. A part of the DRB is inaccessible for mining because of both known and indeterminable factors, such as natural and manmade obstructions and environmental and other legal restrictions. The illegal or inaccessible resources include, for example, those rendered not minable because they are near alluvial valleys, national parks, historic and archeological sites, or under towns or properties where subsidence (sinking and shifting of the ground surface) is a concern. Some resources are currently not minable due to geologic impediments such as faults, extreme dips, and other structural complications. Some potentially surface-minable resources are considered not exploitable because the mining areas cannot be properly reclaimed.

The factors affecting accessibility may be considered as part of the set of factors controlling recoverability of coal in mining. In the estimates provided here, however, accessibility is considered separately from recoverability, and inaccessible resources are factored out from the DRB before recoverable coal reserves are estimated. Inaccessible resource factors are used to estimate the accessible reserve base, or quantity of the DRB available for mining. The inaccessible factors were originally estimated in the late 1970's by ICF, Inc.[49] Both inaccessible resource factors and recovery factors were derived by mining method and coal supply region (Table B4). Table B4 includes new inaccessible factors that were estimated for some of the coal resources revised under the CRDB Program.

[45]U.S. Bureau of Mines, *The Reserve Base of U.S. Coals by Sulfur Content*, Part 1, "The Eastern States," Information Circular 8680 (Washington, DC, 1975).

[46]U.S. Bureau of Mines, *The Reserve Base of U.S. Coals by Sulfur Content*, Part 2, "The Western States," Information Circular 8693 (Washington, DC, 1975).

[47]Energy Information Administration, *Coal Production 1984*, DOE/EIA-0118(84), Appendix C (Washington, DC, November 1985).

[48]For details see Science Applications International Corporation, *Selected Modifications to the Resource Allocation and Mine Costing (RAMC) Model*, prepared for the Energy Information Administration, U.S. Department of Energy (Norristown, PA, April 1988).

Table D1. Inaccessible and Recoverable Coal Resource Factors By Supply Region

Region/State	Inaccessible Percentage		Recoverable Percentage	
	Surface	Underground	Surface	Underground
Appalachia				
Alabama	17	10	86	56
Georgia	15	10	80	50
Kentucky, Eastern	23	10	79	62
Maryland	15	10	80	61
North Carolina	15	10	80	50
Ohio	18	12	80	50
Pennsylvania, Anth	86	82	90	50
Pennsylvania, Bit	15	10	82	59
Tennessee	15	10	80	61
Virginia	20	10	80	62
West Virginia, Northern	25	10	79	59
West Virginia, Southern	18	10	79	59
Interior				
Arkansas	15	10	82	51
Illinois	59	20	74	51
Indiana	29	20	82	52
Iowa	15	10	82	52
Kansas	15	10	82	60
Kentucky, Western	25	20	83	53
Louisiana	10	10	82	60
Michigan	15	10	80	50
Missouri	15	10	82	52
Oklahoma	15	10	82	52
Texas	10	10	86	60
Western				
Alaska, Northern	50	50	00	00
Alaska, Southern	10	10	88	56
Arizona	10	10	88	56
Colorado	11	10	88	58
Idaho	14	10	80	50
Montana, Eastern	14	10	91	56
Montana, Western	30	10	91	56
New Mexico	10	10	88	56
North Dakota	15	10	90	50
Oregon	10	10	80	50
South Dakota	16	10	90	60
Utah	10	10	88	54
Washington	10	10	88	56
Wyoming	02	10	88	60

Recoverable Coal Reserves

In coal mining, it is never possible to extract and recover all of the coal from accessible resources. For example, in most underground mining, some coal is left in place as roof coal, pillars, or barrier pillars to support the strata lying above the coal seam; in some mines, coal from the bottom of the seam is left to create a competent workbase. In surface mining, mining of thicker or better-quality upper seams often results in serious impediments to future mining of lower seams. Recoverability of coal resources also varies depending on the characteristics of the coalbed and the mining method used. In general, recoverability is higher for surface-minable resources than for underground resources.

The tonnage of coal recoverable from accessible resources constitutes the reserves. For the estimates of recoverable coal reserves used in the EIA models, a specific recovery factor is used to represent the percentage of the accessible reserve base that might be extracted from a given type of mine. The recovery factors used in the 1992 estimates are based on recovery rates submitted by mine operators on Form EIA-7A for 1991.[50] In some areas, recovery factors from the EIA-7A survey cannot be made public, to protect the confidentiality of individual mine operators. In those cases, average recovery factors for the geographic region (i.e., Appalachia, Interior, or West) are used. In areas revised under the CRDB Program, recovery rates may have been estimated or assumed in the context of the study, and are not based on the EIA-7A survey. Many of the recovery factors shown in Table B4 are higher than those used for annual depletion adjustments of DRB resources. However, the recovery factors in Table B4 are applied to the accessible DRB, whereas the recovery factors used in the DRB depletion adjustments are applied directly to the DRB itself.

The estimates of the accessible reserve base of coal (Appendix C, Table C2) portray the 1992 DRB by Btu/sulfur range, allocated using percentages inaccessible for each coal supply region and type of mining. The estimates of recoverable coal reserves (Appendix C, Table C3) use the 1992 accessible reserve base by Btu/sulfur range and allocate the data using the recovery factors for each coal supply region and type of mining.

Appendix C

Detailed Estimates of Demonstrated Reserve Base, Accessible Reserve Base, and Recoverable Reserves of U.S. Coal

Appendix C

Detailed Estimates of Demonstrated Reserve Base, Accessible Reserve Base, and Recoverable Reserves of U.S. Coal

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Alabama - Surface							
<15	0	0	0	1,083.0	0	0	1,083.0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	165.5	243.7	616.8	195.2	0	1,221.2
26+	0	198.2	140.2	665.4	0	0	1,003.7
Total	0	363.7	383.9	2,365.1	195.2	0	3,307.9
Alabama - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	156.0	222.8	307.4	121.4	0	807.7
26+	0	178.5	0	467.6	0	0	646.1
Total	0	334.5	222.8	775	121.4	0	1,453.8
Alabama - Total							
<15	0	0	0	1,083.0	0	0	1,083.0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	321.5	466.6	924.2	316.6	0	2,028.9
26+	0	376.6	140.2	1,133.0	0	0	1,649.8
Total	0	698.2	606.7	3,140.2	316.6	0	4,761.7
Alaska, Southern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	493.1	52.6	0	0	0	0	545.7
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	493.1	52.6	0	0	0	0	545.7
Alaska, Southern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	4,083.2	87.2	0	0	0	0	4,170.4
20-22.99	0	17.6	0	0	0	0	17.6
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	4,083.2	104.7	0	0	0	0	4,188.0
Alaska, Southern - Total							
<15	0	0	0	0	0	0	0
15-19.99	4,576.3	139.7	0	0	0	0	4,716.1
20-22.99	0	17.6	0	0	0	0	17.6
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	4,576.3	157.3	0	0	0	0	4,733.6
Alaska, Northern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	17.4	4.9	3.9	2.4	0	0	28.5
20-22.99	77.2	39.1	0	0	0	0	116.3
23-25.99	16.7	5.7	0	0	0	0	22.4
26+	0	0	0	0	0	0	0
Total	111.3	49.6	3.9	2.4	0	0	167.2
Alaska, Northern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	129.4	36.1	28.3	17.9	0	0	211.7
20-22.99	569.4	286.5	0	0	0	0	855.9
23-25.99	125.6	41.9	0	0	0	0	167.5
26+	0	0	0	0	0	0	0
Total	824.3	364.4	28.3	17.9	0	0	1,235.0
Alaska, Northern - Total							
<15	0	0	0	0	0	0	0
15-19.99	146.7	40.9	32.2	20.3	0	0	240.1
20-22.99	646.6	325.5	0	0	0	0	972.2

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
23-25.99	142.2	47.6	0	0	0	0	189.8
26+	0	0	0	0	0	0	0
Total	935.6	414.0	32.2	20.3	0	0	1,402.2

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total	
Arizona - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	134.5	0	0	0	0	134.5	
23-25.99	0	0	0	0	0	0	0	
26+	0	0	0	0	0	0	0	
Total	0	134.5	0	0	0	0	134.5	
Arizona - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	101.6	0	0	0	0	101.6	
23-25.99	0	0	0	0	0	0	0	
26+	0	0	0	0	0	0	0	
Total	0	101.6	0	0	0	0	101.6	
Arizona - Total								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	236.0	0	0	0	0	236.0	
23-25.99	0	0	0	0	0	0	0	
26+	0	0	0	0	0	0	0	
Total	0	236.0	0	0	0	0	236.0	
Arkansas - Surface								
<15	0	0	0	25.4	0	0	25.4	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	0	0	0	0	0.5		0.5
23-25.99	0	0	0	0	0	0	0	
26+	0	2.2		104.3	9.2	1.5	1.5	118.8
Total	0	2.2		104.3	34.6	1.5	2.0	144.6
Arkansas - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	0	0	0	0	1.9		1.9
23-25.99	0	0	0	0	0	0	0	
26+	0	14.2	192.7	43.5	10.1	10.1	270.6	
Total	0	14.2	192.7	43.5	10.1	12.0	272.5	
Arkansas - Total[a]								
<15	0	0	0	25.4	0	0	25.4	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	0	0	0	0	2.4		2.4
23-25.99	0	0	0	0	0	0	0	
26+	0	16.3	297.0	52.8	11.7	11.7	389.4	
Total	0	16.3	297.0	78.1	11.7	14.1	417.2	
Colorado - Surface								
<15	0	0	4,189.9	0	0	0	4,189.9	
15-19.99	30.1	12.0	1.0	0	0	0	43.1	
20-22.99	146.0	0	10.6	12.6	0	0	169.2	
23-25.99	194.1	145.4	25.5	39.7	17.8	0	422.6	
26+	0	3.7		0	0	0	0	3.7
Total	370.2	161.1	4,227.0	52.3	17.8	0	4,828.4	
Colorado - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	2,671.3	1,101.1	64.5	0	0	0	3,837.0	
20-22.99	1,443.5	1,591.7	243.4	154.4	0	0	3,432.9	
23-25.99	2,196.7	1,235.2	316.5	311.6	157.8	0	4,217.8	
26+	204.5	286.4	66.3	83.0	0	0	640.2	
Total	6,516	4,214.4	690.8	549.0	157.8	0	12,127.9	
Colorado - Total[a]								
<15	0	0	4,189.9	0	0	0	4,189.9	

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	2,701.4	1,113.2	65.5	0	0	0	3,880.1
20-22.99	1,589.5	1,591.7	254.0	166.9	0	0	3,602.1
23-25.99	2,390.8	1,380.7	342.0	351.3	175.6	0	4,640.4
26+	204.5	290.0	66.3	83.0	0	0	643.8
Total	6,886.2	4,375.5	4,917.7	601.3	175.6	0	16,956.3

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Georgia - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0.1	0	0.2	0	0	0.2
26+	0.3	0.5	0.5	*	0.1	0.1	1.5
Total	0.3	0.6	0.5	0.2	0.1	0.1	1.7
Georgia - Underground[b]							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0.1	0	0.1	0	0	0.2
26+	0.8	0.3	0.2	0.1	0.2	0.2	1.7
Total	0.8	0.4	0.2	0.2	0.2	0.2	1.9
Georgia - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0.1	0	0.3	0	0	0.4
26+	1.1	0.8	0.6	0.1	0.3	0.3	3.2
Total	1.1	1.0	0.6	0.4	0.3	0.3	3.6
Idaho - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Idaho - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0.5	2.0	1.0	1.0	0	0	4.4
26+	0	0	0	0	0	0	0
Total	0.5	2.0	1.0	1.0	0	0	4.4
Idaho - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0.5	2.0	1.0	1.0	0	0	4.4
26+	0	0	0	0	0	0	0
Total	0.5	2.0	1.0	1.0	0	0	4.4
Illinois - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	7.9	212.0	3,346.0	7,844.6	11,410.5
23-25.99	0	0	113.5	431.5	2,215.7	1,199.5	3,960.3
26+	0	0	0	0	14.7	0	14.7
Total	0	0	121.4	643.5	5,576.4	9,044.1	15,385.4
Illinois - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	130.8	1,542.6	2,359.0	39,565.3	43,597.6
23-25.99	0	0	1,968.8	4,846.2	6,876.8	5,326.1	19,017.9
26+	0	0	0	0	115.9	0	115.9
Total	0	0	2,099.6	6,388.8	9,351.7	44,891.4	62,731.5
Illinois - Total							
<15	0	0	0	0	0	0	0

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	138.7	1,754.6	5,705.0	47,409.8	55,008.1
23-25.99	0	0	2,082.3	5,277.7	9,092.5	6,525.6	22,978.2
26+	0	0	0	0	130.6	0	130.6
Total	0	0	2,221.0	7,032.3	14,928.1	53,935.4	78,116.9

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Indiana - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	78.0	40.1	166.9	0	303.3	588.3
23-25.99	0	40.4	10.7	33.4	278.6	269.3	632.5
26+	0	0	0	0	0	0	0
Total	0	118.4	50.8	200.4	278.6	572.6	1,220.8
Indiana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	336.7	264.1	747.1	1,277.0	2,361.2	4,986.1
23-25.99	0	263.5	116.9	623.7	1,083.9	1,815.7	3,903.8
26+	0	0	0	0	0	0	0
Total	0	600.2	381.1	1,370.8	2,360.9	4,176.9	8,889.9
Indiana - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	414.7	304.3	914.1	1,277.0	2,664.4	5,574.5
23-25.99	0	304.0	127.6	657.1	1,362.5	2,085.1	4,536.3
26+	0	0	0	0	0	0	0
Total	0	718.7	431.9	1,571.2	2,639.5	4,749.5	10,110.7
Iowa - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	457.6	0	457.6
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	457.6	0	457.6
Iowa - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	187.3	1,545.2	1,732.5
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	187.3	1,545.2	1,732.5
Iowa - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	644.9	1,545.2	2,190.1
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	644.9	1,545.2	2,190.1
Kansas - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	76.1	433.6	509.6
23-25.99	0	0	0	0	246.7	152.0	398.7
26+	0	0	0	0	0	68.6	68.6
Total	0	0	0	0	322.7	654.1	976.8
Kansas - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Kansas - Total							
<15	0	0	0	0	0	0	0

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	76.1	433.6	509.6
23-25.99	0	0	0	0	246.7	152.0	398.7
26+	0	0	0	0	0	68.6	68.6
Total	0	0	0	0	322.7	654.1	976.8

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Kentucky, Eastern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	38.3	80.9	0	0	119.2
23-25.99	12.8	131.7	295.3	178.7	28.2	29.4	676.0
26+	47.8	413.5	160.5	115.4	46.2	8.8	792.2
Total	60.5	545.2	494.0	375.0	74.4	38.2	1,587.4
Kentucky, Eastern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	63.8	171.9	0	0	235.7
23-25.99	67.8	547.3	938.0	483.1	65.4	94.4	2,196.0
26+	264.2	2,536.8	1,165.0	508.3	244.3	65.8	4,784.4
Total	332.1	3,084.1	2,166.8	1,163.3	309.7	160.2	7,216.0
Kentucky, Eastern - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	102.1	252.8	0	0	354.9
23-25.99	80.6	679.0	1,233.2	661.8	93.6	123.8	2,872.0
26+	312.0	2950.3	1,325.5	623.7	290.6	74.6	5,576.6
Total	392.6	3629.2	2,660.8	1,538.3	384.2	198.3	8,803.4
Kentucky, Western - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	60.3	712.5	682.3	1,455.2
23-25.99	0	0	0	142.4	761.8	1,386.2	2,290.4
26+	0	0	0	0	30.1	5.2	35.3
Total	0	0	0	202.7	1,504.5	2,073.6	3,780.8
Kentucky, Western - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	14.0	1,907.1	2,693.6	4,614.6
23-25.99	0	0	0	60.7	1,874.4	9,250.4	11,185.5
26+	0	0	0	0	478.7	213.6	692.3
Total	0	0	0	74.7	4,260.1	12,157.6	16,492.4
Kentucky, Western - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	74.3	2,619.6	3,375.9	6,069.8
23-25.99	0	0	0	203.1	2,636.2	10,636.6	13,475.9
26+	0	0	0	0	508.8	218.7	727.6
Total	0	0	0	277.4	5,764.6	14,231.2	20,273.2
Louisiana - Surface							
<15	0	0	0	483.6	0	0	483.6
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	483.6	0	0	483.6
Louisiana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Louisiana - Total							
<15	0	0	0	483.6	0	0	483.6

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	483.6	0	0	483.6

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Maryland - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	25.0	0	25.0
26+	0	4.1		12.3	19.7	24.4	0 60.5
Total	0	4.1		12.3	19.7	49.4	0 85.5
Maryland - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	202.4	0	202.4
26+	0	53.1	92.5	196.3	120.1	0	462.0
Total	0	53.1	92.5	196.3	322.5	0	664.4
Maryland - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	227.4	0	227.4
26+	0	57.2	104.8	216.0	144.5	0	522.5
Total	0	57.2	104.8	216.0	371.9	0	749.9
Michigan - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.1		0 0.1
20-22.99	0	0	0.2		0.6	0.1	0.1 0.9
23-25.99	0	0	0.5		1.9	0.5	0.3 3.2
26+	0	0	0	0.2		0.1	0 0.3
Total	0	0	0.7		2.7	0.8	0.4 4.6
Michigan - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.8		0 0.8
20-22.99	0	0	6.6		10.3	6.8	6.5 30.2
23-25.99	0	0	10.6	32.1	21.7	17.3	81.8
26+	0	0	0	4.8		5.6	0 10.4
Total	0	0	17.2	47.2	34.8	23.9	123.1
Michigan - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.8		0 0.8
20-22.99	0	0	6.8		10.8	6.8	6.6 31.1
23-25.99	0	0	11.1	34.1	22.2	17.6	8.05
26+	0	0	0	5.0		5.7	0 10.7
Total	0	0	17.9	49.9	35.6	24.2	127.7
Missouri - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	77.9	2,827.1	2,905.0
23-25.99	0	0	0	0	136.9	1,440.0	1,576.9
26+	0	0	0	0	0	40.1	40.1
Total	0	0	0	0	214.9	4,307.1	4,522.0
Missouri - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	6.2		1,181.9 1,188.1
23-25.99	0	0	0	0	35.8	239.7	275.5
26+	0	0	0	0	0	15.5	15.5
Total	0	0	0	0	42.0	1,437.1	1,479.1
Missouri - Total							
<15	0	0	0	0	0	0	0

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	84.1	4,009.0	4,093.2
23-25.99	0	0	0	0	172.7	1,679.7	1,852.4
26+	0	0	0	0	0	55.6	55.6
Total	0	0	0	0	256.9	5,744.3	6,001.1

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Montana - Surface							
<15	1,860.5	3,721.0	5,842.9	1,546.3	1,860.5	930.3	15,761.6
15-19.99	20,271.8	4,993.6	6,023.5	1,508.3	185.4	216.0	33,198.6
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	22,132.3	8,714.6	11,866.4	3,054.7	2,045.9	1,146.3	48,960.1
Montana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	30,392.4	19,001.0	14,304.0	4,472.8	676.9	726.3	69,573.3
20-22.99	349.6	422.9	70.5	211.0	137.8	193.5	1,385.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	30,742.0	19,423.9	14,374.5	4,683.8	814.7	919.8	70,958.7
Montana - Total							
<15	1,860.5	3,721.0	5,842.9	1,546.3	1,860.5	930.3	15,761.6
15-19.99	50,664.1	23,994.6	20,327.4	5,981.1	862.3	942.3	102,771.9
20-22.99	349.6	422.9	70.5	211.0	137.8	193.5	1,385.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	52,874.2	28,138.5	26,240.9	7,738.5	2,860.6	2,066.1	119,918.9
New Mexico - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	890.7	714.8	0	0	1,605.5
20-22.99	0	154.8	101.6	48.0	0	0	304.5
23-25.99	0	228.8	169.5	0	0	0	398.3
26+	0	0	0	0	0	0	0
Total	0	383.6	1,161.9	762.9	0	0	2,308.3
New Mexico - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	165.7	177.7	419.1	126.5	0	889.0
20-22.99	0	121.8	88.2	26.7	0	0	236.7
23-25.99	0	690.4	165.6	0.3	0	0	856.3
26+	0	138.7	0.9	0	0	0	139.6
Total	0	1,116.6	432.3	446.1	126.5	0	2,121.6
New Mexico - Total[a]							
<15	0	0	0	0	0	0	0
15-19.99	0	165.7	1,068.4	1,134.0	126.5	0	2,494.5
20-22.99	0	276.6	189.9	74.7	0	0	541.2
23-25.99	0	919.2	335.1	0.3	0	0	1,254.6
26+	0	138.7	0.9	0	0	0	139.6
Total	0	1,500.2	1,594.2	1,209.0	126.5	0	4,429.9
North Carolina - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
North Carolina - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0.7		2.9	3.6
26+	0	0	0.7		3.6	2.9	0	7.1
Total	0	0	0.7		3.6	3.6	2.9	10.7
North Carolina - Total							
<15	0	0	0	0	0	0	0

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0.7	2.9	3.6
26+	0	0	0.7	3.6	2.9	0	7.1
Total	0	0	0.7	3.6	3.6	2.9	10.7

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
North Dakota - Surface							
<15	578.4	995.8	1,825.3	4,563.2	1,137.5	489.8	9,590.0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	578.4	995.8	1,825.3	4,563.2	1,137.5	489.8	9,590.0
North Dakota - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
North Dakota - Total							
<15	578.4	995.8	1,825.3	4,563.2	1,137.5	489.8	9,590.0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	578.4	995.8	1,825.3	4,563.2	1,137.5	489.8	9,590.0
Ohio - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	18.4	34.3	94.1	285.2	643.6	1,075.7
23-25.99	31.0	86.0	136.6	446.3	958.8	2,626.9	4,285.6
26+	0	41.4	83.7	107.7	108.1	271.2	612.1
Total	31.0	145.8	254.7	648.1	1,352.1	3,541.7	5,973.4
Ohio - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	9.2		10.6	157.1	644.1	1,488.4	2,309.4
23-25.99	140.5	112.5	290.9	1,029.4	2,575.6	8,281.8	12,430.7
26+	0	42.3	79.1	288.0	815.1	1,954.2	3,178.7
Total	140.5	164.0	380.6	1,474.5	4,034.8	11,724.4	17,918.8
Ohio - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	27.6	44.9	251.2	929.3	2,132.1	3,385.1
23-25.99	171.5	198.5	427.5	1,475.7	3,534.4	10,908.6	16,716.3
26+	0	83.6	162.9	395.7	923.2	2,225.5	3,790.8
Total	171.5	309.7	635.2	2,122.6	5,387.0	15,266.2	23,892.2
Oklahoma - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	27.2	27.2
23-25.99	0	29.5	5.1	9.1	14.6	91.3	149.6
26+	0	66.7	31.1	40.0	34.0	0	171.8
Total	0	96.2	36.2	49.2	48.6	118.5	348.6
Oklahoma - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	64.9	64.9
23-25.99	0	61.2	83.5	75.4	55.7	149.0	424.7
26+	0	269.8	127.0	234.9	116.7	0	748.3
Total	0	331.0	210.5	310.2	172.4	213.9	1,237.9
Oklahoma - Total							
<15	0	0	0	0	0	0	0

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	92.1	92.1
23-25.99	0	90.7	88.5	84.5	70.3	240.3	574.3
26+	0	336.5	158.1	274.9	150.7	0	920.1
Total	0	427.2	246.6	359.4	220.9	332.4	1,586.6

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Oregon - Surface[c]							
<15	0	0	0	0	0	0	0
15-19.99	0.8	0.4	0.6	0	0.2	0.2	2.3
20-22.99	0.4	0	0.2	0	0	0	0.6
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	1.3	0.4	0.8	0	0.2	0.2	2.9
Oregon - Underground							
<15	0	0	0	0	0	0	0
15-19.99	4.1	2.1	3.1	0	1.0	1.0	11.4
20-22.99	2.1	0	1.0	0	0	0	3.1
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	6.2	2.1	4.1	0	1.0	1.0	14.5
Oregon - Total							
<15	0	0	0	0	0	0	0
15-19.99	5.0	2.5	3.7	0	1.2	1.2	13.7
20-22.99	2.5	0	1.2	0	0	0	3.7
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	7.5	2.5	5	0	1.2	1.2	17.4
Pennsylvania, Anthracite - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	10.9	2.0	3.9	0	0	16.8
23-25.99	427.9	1,692.5	432.1	75.3	11.1	4.1	2,643.1
26+	97.8	495.4	108.5	19.0	0.2	0	720.9
Total	525.8	2,198.9	542.6	98.2	11.3	4.1	3,380.8
Pennsylvania, Anthracite - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	13.3	0	3.9	0	0	17.2
23-25.99	864.7	1,907.0	251.9	30.5	4.3	0	3,058.3
26+	197.1	415.5	135.2	26.6	2.5	0	776.9
Total	1,061.7	2,335.7	387.1	61.0	6.8	0	3,852.3
Pennsylvania, Anthracite - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	24.2	2.0	7.8	0	0	34.0
23-25.99	1,292.6	3,599.5	684.0	105.8	15.4	4.1	5,701.4
26+	294.9	910.9	243.7	45.6	2.7	0	1,497.8
Total	1,587.5	4,534.6	929.7	159.2	18.1	4.1	7,233.1
Pennsylvania, Bituminous - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	42.8	19.9	62.7
23-25.99	0	7.2	30.5	163.2	158.7	138.4	498.1
26+	0	27.0	67.8	305.9	146.2	48.7	595.6
Total	0	34.2	98.3	469.1	347.8	206.9	1,156.3
Pennsylvania, Bituminous - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	97.0	249.4	229.6	576.1
23-25.99	0	96.8	244.0	2,172.8	2,894.7	1,691.9	7,100.3
26+	0	395.1	1,159.6	6,605.3	4,273.2	690.0	13,123.2
Total	0	491.9	1,403.5	8,875.2	7,417.3	2,611.5	20,799.5
Pennsylvania, Bituminous - Total							
<15	0	0	0	0	0	0	0

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	97.0	292.3	249.5	638.7
23-25.99	0	104.1	274.5	2,336.1	3,053.5	1,830.3	7,598.3
26+	0	422.1	1,227.4	6,911.2	4,419.4	738.7	13,718.7
Total	0	526.1	1,501.8	9,344.3	7,765.1	2,818.5	21,955.8

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
South Dakota - Surface							
<15	0	0	137.0	1.0	228.1	0	366.1
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	137.0	1.0	228.1	0	366.1
South Dakota - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
South Dakota - Total							
<15	0	0	137.0	1.0	228.1	0	366.1
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	137.0	1.0	228.1	0	366.1
Tennessee - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	110.3	0	0	110.3
26+	0	58.1	35.1	29.1	60.1	0	182.4
Total	0	58.1	35.1	139.5	60.1	0	292.8
Tennessee - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	183.5	0	0	183.5
26+	0	125.6	71.1	60.8	109.4	0	367.0
Total	0	125.6	71.1	244.3	109.4	0	550.5
Tennessee - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	293.8	0	0	293.8
26+	0	183.7	106.2	90.0	169.5	0	549.4
Total	0	183.7	106.2	383.8	169.5	0	843.2
Texas - Surface							
<15	0	0	778.8	7,493.4	4,497.3	496.4	13,265.9
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	778.8	7,493.4	4,497.3	496.4	13,265.9
Texas - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Texas - Total							
<15	0	0	778.8	7,493.4	4,497.3	496.4	13,265.9

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	778.8	7,493.4	4,497.3	496.4	13,265.9

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)							
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**	
Utah - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	34.7	21.9	106.8	44.0	42.6	250.0	
23-25.99	9.0		4.9	1.8	0	0	0	15.7
26+	1.3		0.9	0	0	0	0	2.2
Total	10.3	40.5	23.7	106.8	44.0	42.6	267.9	
Utah - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	803.7	961.7	1,628.3	396.0	558.1	4,347.9	
23-25.99	632.5	357.3	155.3	0	0	0	1,145.2	
26+	140.6	188.2	0	0	0	0	328.8	
Total	773.2	1,349.2	1,117.1	1,628.3	396.0	558.1	5,821.9	
Utah - Total								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	838.4	983.6	1,735.1	440.0	600.7	4,597.9	
23-25.99	641.5	362.2	157.1	0	0	0	1,160.9	
26+	141.9	189.1	0	0	0	0	331.0	
Total	783.5	1,389.7	1,140.8	1,735.1	440.0	600.7	6,089.8	
Virginia - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	0	0	0	0	0	0	
23-25.99	3.6		13.8	115.3	0	0	0	132.6
26+	67.0	308.2	148.1	74.4	0	0	597.7	
Total	70.6	322	263.4	74.4	0	0	730.4	
Virginia - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	13.4	9.1	13.3	0	0	0	35.7	
23-25.99	77.7	161.2	145.1	9.1	0	0	393.1	
26+	209.0	693.6	320.1	164.2	0	0	1,386.8	
Total	300.0	863.9	478.5	173.3	0	0	1,815.7	
Virginia - Total[a]								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	13.4	9.1	13.3	0	0	0	35.7	
23-25.99	81.2	175.1	260.4	9.1	0	0	525.8	
26+	276.0	1,001.7	468.2	238.6	0	0	1,984.6	
Total	370.6	1,185.9	741.9	247.7	0	0	2,546.0	
Washington - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	86.3	0	0	86.3	
20-22.99	0	0	0	0	0	0	0	
23-25.99	0	0	0	0	0	0	0	
26+	0	0	0	0	0	0	0	
Total	0	0	0	86.3	0	0	86.3	
Washington - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	83.4	169.0	776.1	0	0	1,028.5	
20-22.99	124.8	0	0	81.4	0	0	206.2	
23-25.99	0	97.6	0	0	0	0	97.6	
26+	0	0	0	0	0	0	0	
Total	124.8	181.0	169.0	857.5	0	0	1,332.3	
Washington - Total								
<15	0	0	0	0	0	0	0	

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	83.4	169.0	862.4	0	0	1,114.8
20-22.99	124.8	0	0	81.4	0	0	206.2
23-25.99	0	97.6	0	0	0	0	97.6
26+	0	0	0	0	0	0	0
Total	124.8	181.0	169.0	943.8	0	0	1,418.6

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
West Virginia, - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	24.1	24.1
23-25.99	0	458.6	405.2	275.2	10.4	73.4	1,222.7
26+	188.2	1,926.4	527.0	467.7	296.4	85.2	3,491.0
Total	188.2	2,385.0	932.2	742.9	306.8	182.7	4,737.8
West Virginia - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	190.5	214.2	73.7	478.3
23-25.99	0	804.2	833.0	2,100.6	988.5	3,566.0	8,292.3
26+	1,031.5	8,859.0	3,326.6	4,566.0	3,239.3	2,256.0	23,278.4
Total	1,031.5	9,663.2	4,159.6	6,857.1	4,442.1	5,895.6	32,049.1
West Virginia - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	190.5	214.2	97.8	502.4
23-25.99	0	1,262.8	1,238.1	2,375.8	998.9	3,639.4	9,515.0
26+	1,219.7	10,785.4	3,853.6	5,033.7	3,535.7	2,341.2	26,769.4
Total	1,219.7	12,048.2	5,091.8	7,600.0	4,748.8	6,078.3	36,786.8
Wyoming - Surface							
<15	0	0	0	1,127.4	210.0	1,646.3	2,983.7
15-19.99	5,196.0	10,314.3	4,684.0	1,653.8	444.0	989.8	23,282.0
20-22.99	36.1	162.7	216.9	55.1	21.7	0	492.5
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	5,232.1	10,477	4,900.9	2,836.3	675.8	2,636.1	26,758.2
Wyoming - Underground							
<15	0	0	0	0	0	0	0
15-19.99	3,781.4	15,223	9,691.9	8,780.7	1,186.1	0	38,663.1
20-22.99	493.1	504.1	686.5	366.6	0	61.0	2,111.4
23-25.99	82.6	506.2	834.0	342.7	0	0	1,765.4
26+	0	0	0	0	0	0	0
Total	4,357.1	16,233.2	11,212.4	9,490.0	1,186.1	61.0	42,539.9
Wyoming - Total							
<15	0	0	0	1,127.4	210.0	1,646.3	2,983.7
15-19.99	8,977.4	25,537.3	14,375.9	10,434.5	1,630.1	989.8	61,945.1
20-22.99	529.1	666.8	903.4	421.8	21.7	61.0	2,603.9
23-25.99	82.6	506.2	834.0	342.7	0	0	1,765.4
26+	0	0	0	0	0	0	0
Total	9,589.1	26,710.3	16,113.3	12,326.3	1,861.9	2,697.1	69,298.1

See footnotes at end of table.

Table C1. Estimates of the Demonstrated Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
United States - Surface							
<15	2,438.9	4,716.8	12,773.9	16,323.4	7,933.5	3,562.8	47,749.1
15-19.99	26,009.2	15,377.8	11,603.6	3,965.6	629.7	1,206.0	58,792
20-22.99	259.7	633.0	474.1	841.3	5,064.0	12,848.7	20,120.9
23-25.99	695.0	3,010.2	1,985.3	2,524.0	5,060.0	7,410.7	20,685.2
26+	402.4	3,546.2	1,419.1	1,853.8	762.2	529.4	8,513
Total	29,805.2	27,284.0	28,255.9	25,508.1	19,449.4	25,557.7	155,860.3
United States - Underground[d]							
<15	0	0	0	0	0	0	0
15-19.99	41,061.8	35,699.5	24,438.5	14,466.6	1,991.3	727.3	118,385.1
20-22.99	2,995.8	4,218.0	2,540.7	5,402.8	7,384.8	50,024.8	72,566.9
23-25.99	4,188.6	7,040.5	6,577.8	12,610.4	16,959.0	30,435.2	77,811.5
26+	2,047.7	14,196.9	6,736.8	13,253.0	9,534.1	5,205.4	50,973.9
Total	50,293.9	61,154.9	40,293.8	45,732.8	35,869.3	86,392.7	319,737.4
United States - Total							
<15	2,438.9	4,716.8	12,773.9	16,323.4	7,933.5	3,562.8	47,749.1
15-19.99	67,071.0	51,077.3	36,042.1	18,432.2	2,621.1	1,933.4	177,177.1
20-22.99	3,255.5	4,851.0	3,014.8	6,244.1	12,448.9	62,873.5	92,687.8
23-25.99	4,883.6	10,050.7	8,563.1	15,134.4	22,019.1	37,845.9	98,496.7
26+	2,450.1	17,743.1	8,155.9	15,106.8	10,296.2	5,734.8	59,486.9
Total	80,099.1	88,438.9	68,549.7	71,240.9	55,318.7	111,950.4	475,597.7

[a]Data include minor amounts of anthracite (all occurring in heat content categories greater than 23.00 million short tons) as follows: Arkansas 104.2, Colorado 25.5, New Mexico 2.3, and Virginia 125.5, expressed in million short tons.

[b]Georgia: The surface-minable DRB includes a correction of 0.03 million short tons; compared with the data published in *Coal Production 1991,* this results in a 0.1 million short ton increase in the rounded data published herein.

[c]Oregon: The surface-minable DRB includes a correction of (-)0.01 million short tons; compared with the data published in *Coal Production 1991,* this results in a 0.1 million short ton decrease in the rounded data published herein, apparent only in the State total.

[d]United States: The underground-minable DRB includes a correction of 0.03 million short tons, based on the Georgia DRB; compared with the data published in *Coal Production 1991,* this results in a 0.1 million short ton increase in the rounded data published herein.

* Quantity less than 0.05 million short tons.

Note: Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration estimates.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Alabama - Surface							
<15	0	0	0	898.9	0	0	898.9
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	137.4	202.3	511.9	162.0	0	1,013.6
26+	0	164.5	116.3	552.3	0	0	833.1
Total	0	301.8	318.6	1,963.1	162.0	0	2,745.5
Alabama - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	140.4	200.6	276.7	109.3	0	727.0
26+	0	160.6	0	420.8	0	0	581.5
Total	0	301.1	200.6	697.5	109.3	0	1,308.4
Alabama - Total							
<15	0	0	0	898.9	0	0	898.9
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	277.8	402.8	788.6	271.3	0	1,740.6
26+	0	325.1	116.3	973.1	0	0	1,414.5
Total	0	602.9	519.2	2,660.6	271.3	0	4,054
Alaska, Southern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	443.8	47.3	0	0	0	0	491.1
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	443.8	47.3	0	0	0	0	491.1
Alaska, Southern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	3,674.9	78.5	0	0	0	0	3,753.4
20-22.99	0	15.8	0	0	0	0	15.8
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	3,674.9	94.3	0	0	0	0	3,769.2
Alaska, Southern - Total							
<15	0	0	0	0	0	0	0
15-19.99	4,118.7	125.8	0	0	0	0	4,244.5
20-22.99	0	15.8	0	0	0	0	15.8
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	4,118.7	141.6	0	0	0	0	4,260.3
Alaska, Northern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	8.7		2.4	1.9	1.2	0	0	14.2
20-22.99	38.6	19.5	0	0	0	0	58.2	
23-25.99	8.3		2.9	0	0	0	0	11.2
26+	0	0	0	0	0	0	0	
Total	55.6	24.8	1.9	1.2	0	0	83.6	
Alaska, Northern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	64.7	18.0	14.2	9	0	0	105.8
20-22.99	284.7	143.2	0	0	0	0	427.9
23-25.99	62.8	21.0	0	0	0	0	83.7
26+	0	0	0	0	0	0	0
Total	412.2	182.2	14.2	9	0	0	617.5
Alaska, Northern - Total							
<15	0	0	0	0	0	0	0
15-19.99	73.4	20.5	16.1	10.2	0	0	120.1

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
20-22.99	323.3	162.8	0	0	0	0	486.1
23-25.99	71.1	23.8	0	0	0	0	94.9
26+	0	0	0	0	0	0	0
Total	467.8	207.0	16.1	10.2	0	0	701.1

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Arizona - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	121.0	0	0	0	0	121.0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	121.0	0	0	0	0	121.0
Arizona - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	91.4	0	0	0	0	91.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	91.4	0	0	0	0	91.4
Arizona - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	212.4	0	0	0	0	212.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	212.4	0	0	0	0	212.4
Arkansas - Surface							
<15	0	0	0	21.6	0	0	21.6
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0.4	0.4
23-25.99	0	0	0	0	0	0	0
26+	0	1.8		88.6	7.9	1.3	1.3 101.0
Total	0	1.8		88.6	29.4	1.3	1.7 122.9
Arkansas - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	1.7	1.7
23-25.99	0	0	0	0	0	0	0
26+	0	12.7	173.4	39.2	9.1	9.1	243.5
Total	0	12.7	173.4	39.2	9.1	10.8	245.3
Arkansas - Total[a]							
<15	0	0	0	21.6	0	0	21.6
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	2.1	2.1
23-25.99	0	0	0	0	0	0	0
26+	0	14.6	262.0	47.0	10.4	10.4	344.5
Total	0	14.6	262.0	68.6	10.4	12.6	368.2
Colorado - Surface							
<15	0	0	3,729.0	0	0	0	3,729.0
15-19.99	26.8	10.7	0.9	0	0	0	38.4
20-22.99	129.9	0	9.4	11.2	0	0	150.6
23-25.99	172.8	129.4	22.7	35.3	15.9	0	376.1
26+	0	3.3		0	0	0	0 3.3
Total	329.5	143.4	3762	46.5	15.9	0	4,297.3
Colorado - Underground							
<15	0	0	0	0	0	0	0
15-19.99	2,404.2	991.0	58.1	0	0	0	3,453.3
20-22.99	1,299.1	1,432.5	219.1	138.9	0	0	3,089.6
23-25.99	1,977.0	1,111.7	284.8	280.5	142.0	0	3796.0
26+	184.1	257.7	59.7	74.7	0	0	576.2
Total	5,864.4	3,793.0	621.7	494.1	142.0	0	10,915.1
Colorado - Total[a]							
<15	0	0	3,729.0	0	0	0	3,729.0

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	2,431.0	1,001.7	58.9	0	0	0	3,491.7
20-22.99	1,429.1	1,432.5	228.5	150.1	0	0	3,240.2
23-25.99	2,149.8	1,241.1	307.6	315.8	157.8	0	4,172.1
26+	184.1	261.0	59.7	74.7	0	0	579.4
Total	6,193.9	3,936.4	4,383.7	540.6	157.8	0	15,212.4

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Georgia - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	*	0	0.2	0	0	0.2
26+	0.3		0.4	0.4 *	0.1	0.1	1.3
Total	0.3		0.5	0.4	0.2	0.1	0.1 1.5
Georgia - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0.1		0	0.1	0	0 0.2
26+	0.7		0.3	0.1	0.1	0.2	0.2 1.5
Total	0.7		0.4	0.1	0.1	0.2	0.2 1.7
Georgia - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0.1		0	0.2	0	0 0.4
26+	0.9		0.7	0.5	0.1	0.3	0.3 2.8
Total	0.9		0.9	0.5	0.3	0.3	0.3 3.2
Idaho - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Idaho - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0.4		1.8	0.9	0.9	0	0 4
26+	0	0	0	0	0	0	0
Total	0.4		1.8	0.9	0.9	0	0 4
Idaho - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0.4		1.8	0.9	0.9	0	0 4
26+	0	0	0	0	0	0	0
Total	0.4		1.8	0.9	0.9	0	0 4
Illinois - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	3.2		86.9	1,371.9	3,216.3 4,678.3
23-25.99	0	0	46.6	176.9	908.4	491.8	1,623.7
26+	0	0	0	0	6.0		0 6.0
Total	0	0	49.8	263.8	2,286.3	3,708.1	6,308.0
Illinois - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	104.7	1,234.1	1,887.2	31,652.2	34,878.1
23-25.99	0	0	1,575.0	3,877.0	5,501.4	4,260.9	15,214.3
26+	0	0	0	0	92.8	0	92.8
Total	0	0	1,679.7	5,111.1	7,481.3	35,913.1	50,185.2
Illinois - Total							
<15	0	0	0	0	0	0	0

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	107.9	1,321.0	3,259.0	34,868.5	39,556.4
23-25.99	0	0	1,621.6	4,053.9	6,409.8	4,752.7	16,838.0
26+	0	0	0	0	98.8	0	98.8
Total	0	0	1,729.5	5,374.9	9,767.7	39,621.2	56,493.2

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Indiana - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	55.4	28.5	118.5	0	215.3	417.7
23-25.99	0	28.7	7.6	23.7	197.8	191.2	449.0
26+	0	0	0	0	0	0	0
Total	0	84.1	36.1	142.3	197.8	406.5	866.8
Indiana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	269.3	211.3	597.7	1,021.6	1,889.0	3,988.9
23-25.99	0	210.8	93.5	499.0	867.1	1,452.6	3,123.0
26+	0	0	0	0	0	0	0
Total	0	480.2	304.8	1,096.7	1,888.7	3,341.5	7,111.9
Indiana - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	324.7	239.8	716.2	1,021.6	2,104.3	4,406.6
23-25.99	0	239.5	101.1	522.7	1,064.9	1,643.8	3,572.1
26+	0	0	0	0	0	0	0
Total	0	564.3	340.9	1,238.9	2,086.5	3,748.1	7,978.7
Iowa - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	389.0	0	389.0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	389.0	0	389.0
Iowa - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	168.6	1,390.7	1,559.2
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	168.6	1,390.7	1,559.2
Iowa - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	557.5	1,390.7	1,948.2
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	557.5	1,390.7	1,948.2
Kansas - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	64.6	368.5	433.2
23-25.99	0	0	0	0	209.7	129.2	338.9
26+	0	0	0	0	0	58.3	58.3
Total	0	0	0	0	274.3	556.0	830.3
Kansas - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Kansas - Total							
<15	0	0	0	0	0	0	0

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	64.6	368.5	433.2
23-25.99	0	0	0	0	209.7	129.2	338.9
26+	0	0	0	0	0	58.3	58.3
Total	0	0	0	0	274.3	556.0	830.3

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Kentucky, Eastern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	29.5	62.3	0	0	91.8
23-25.99	9.8		101.4	227.4	137.6	21.7	22.6 520.5
26+	36.8	318.4	123.6	88.9	35.6	6.8	610.0
Total	46.6	419.8	380.4	288.8	57.3	29.4	1,222.3
Kentucky, Eastern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	57.4	154.7	0	0	212.1
23-25.99	61.0	492.6	844.2	434.8	58.8	84.9	1,976.4
26+	237.8	2283.1	1,048.5	457.5	219.9	59.2	4,305.9
Total	298.9	2775.6	1,950.1	1,047	278.7	144.1	6,494.4
Kentucky, Eastern - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	86.9	217.0	0	0	303.9
23-25.99	70.9	594.0	1,071.5	572.4	80.6	107.6	2,496.9
26+	274.6	2601.5	1,172.1	546.3	255.5	66.0	4,915.9
Total	345.5	3195.4	2,330.5	1,335.7	336.1	173.5	7,716.7
Kentucky, Western - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	45.3	534.4	511.7	1,091.4
23-25.99	0	0	0	106.8	571.4	1,039.6	1,717.8
26+	0	0	0	0	22.6	3.9	26.5
Total	0	0	0	152.0	1,128.4	1,555.2	2,835.6
Kentucky, Western - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	11.2	1,525.6	2,154.9	3,691.7
23-25.99	0	0	0	48.6	1,499.5	7,400.4	8,948.4
26+	0	0	0	0	383.0	170.9	553.8
Total	0	0	0	59.7	3,408.1	9,726.1	13,193.9
Kentucky, Western - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	56.4	2,060.0	2,666.6	4,783.0
23-25.99	0	0	0	155.4	2,070.9	8,440.0	10,666.2
26+	0	0	0	0	405.6	174.7	580.3
Total	0	0	0	211.8	4,536.5	11,281.3	16,029.5
Louisiana - Surface							
<15	0	0	0	435.3	0	0	435.3
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	435.3	0	0	435.3
Louisiana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Louisiana - Total							
<15	0	0	0	435.3	0	0	435.3

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	435.3	0	0	435.3

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Maryland - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	21.2	0	21.2
26+	0	3.5	10.5	16.7	20.7	0	51.4
Total	0	3.5	10.5	16.7	42.0	0	72.7
Maryland - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	182.2	0	182.2
26+	0	47.8	83.2	176.7	108.1	0	415.8
Total	0	47.8	83.2	176.7	290.3	0	598.0
Maryland - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	203.4	0	203.4
26+	0	51.3	93.7	193.4	128.9	0	467.3
Total	0	51.3	93.7	193.4	332.3	0	670.7
Michigan - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.1	0	0.1
20-22.99	0	0	0.2	0.5	0.1	0.1	0.8
23-25.99	0	0	0.4	1.6	0.4	0.2	2.7
26+	0	0	0	0.2	0.1	0	0.3
Total	0	0	0.6	2.3	0.7	0.3	3.9
Michigan - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.7	0	0.7
20-22.99	0	0	5.9	9.2	6.1	5.9	27.1
23-25.99	0	0	9.6	28.9	19.5	15.6	73.6
26+	0	0	0	4.3	5.0	0	9.4
Total	0	0	15.5	42.5	31.3	21.5	110.8
Michigan - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.8	0	0.8
20-22.99	0	0	6.1	9.7	6.2	5.9	27.9
23-25.99	0	0	10.0	30.6	19.9	15.9	76.4
26+	0	0	0	4.5	5.1	0	9.7
Total	0	0	16.1	44.8	32.0	21.8	114.7
Missouri - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	66.3	2,403.0	2,469.3
23-25.99	0	0	0	0	116.4	1,224.0	1,340.3
26+	0	0	0	0	0	34.1	34.1
Total	0	0	0	0	182.6	3,661.1	3,843.7
Missouri - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	5.6	1,063.7	1,069.3
23-25.99	0	0	0	0	32.2	215.7	248.0
26+	0	0	0	0	0	14.0	14.0
Total	0	0	0	0	37.8	1,293.4	1,331.2
Missouri - Total							
<15	0	0	0	0	0	0	0

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	71.8	3,466.8	3,538.6
23-25.99	0	0	0	0	148.6	1,439.7	1,588.3
26+	0	0	0	0	0	48.0	48.0
Total	0	0	0	0	220.4	4,954.5	5,174.9

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Montana - Surface							
<15	1,600.0	3,200.1	5,024.9	1,329.9	1,600.0	800.1	13,555.0
15-19.99	18,244.6	4,494.3	5,421.1	1,357.5	166.9	194.4	29,878.7
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	19,844.6	7,694.3	10,446	2,687.3	1,766.9	994.5	43,433.7
Montana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	27,353.1	17,100.9	12,873.6	4,025.5	609.2	653.7	62,616.0
20-22.99	314.7	380.6	63.5	189.9	124.0	174.2	1,246.9
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	27,667.8	17,481.5	12,937.0	4,215.4	733.2	827.8	63,862.8
Montana - Total							
<15	1,600.0	3,200.1	5,024.9	1,329.9	1,600.0	800.1	13,555.0
15-19.99	45,597.7	21,595.1	18,294.7	5,383.0	776.1	848.1	92,494.7
20-22.99	314.7	380.6	63.5	189.9	124.0	174.2	1,246.9
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	47,512.4	25,175.8	23,383.1	6,902.8	2,500.1	1,822.3	107,296.5
New Mexico - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	623.5	500.4	0	0	1,123.9
20-22.99	0	108.3	71.2	33.6	0	0	213.1
23-25.99	0	160.2	118.7	0	0	0	278.8
26+	0	0	0	0	0	0	0
Total	0	268.5	813.3	534.0	0	0	1,615.8
New Mexico - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	149.1	159.9	377.2	113.9	0	800.1
20-22.99	0	109.6	79.4	24.0	0	0	213.0
23-25.99	0	621.4	149.0	0.3	0	0	770.6
26+	0	124.9	0.8	0	0	0	125.6
Total	0	1,005.0	389.1	401.5	113.9	0	1,909.4
New Mexico - Total[a]							
<15	0	0	0	0	0	0	0
15-19.99	0	149.1	783.4	877.6	113.9	0	1,924.0
20-22.99	0	218.0	150.6	57.6	0	0	426.2
23-25.99	0	781.5	267.7	0.3	0	0	1,049.5
26+	0	124.9	0.8	0	0	0	125.6
Total	0	1,273.4	1,202.4	935.5	113.9	0	3,525.2
North Carolina - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
North Carolina - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0.6	2.6	3.2
26+	0	0	0.6		3.2	0	6.4
Total	0	0	0.6		3.2	3.2	2.6 9.6
North Carolina - Total							
<15	0	0	0	0	0	0	0

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0.6	2.6	3.2
26+	0	0	0.6	3.2	2.6	0	6.4
Total	0	0	0.6	3.2	3.2	2.6	9.6

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
North Dakota - Surface							
<15	491.6	846.4	1,551.5	3,878.7	966.9	416.3	8,151.5
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	491.6	846.4	1,551.5	3,878.7	966.9	416.3	8,151.5
North Dakota - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
North Dakota - Total							
<15	491.6	846.4	1,551.5	3,878.7	966.9	416.3	8,151.5
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	491.6	846.4	1,551.5	3,878.7	966.9	416.3	8,151.5
Ohio - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	16.1	28.8	77.6	227.6	531.3	881.5
23-25.99	25.4	71.2	112.2	358.7	774.6	2,161.1	3,503.1
26+	0	34.5	71.1	89.0	88.7	219.7	503.0
Total	25.4	121.8	212.0	525.3	1,090.9	2,912.1	4,887.5
Ohio - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	8.1		9.6	137.4	566.7	1,309.4	2,031.3
23-25.99	123.6	100.5	256.6	880.9	2,271.2	7,309.5	10,942.4
26+	0	37.3	70.3	253.9	722.3	1,709.5	2,793.2
Total	123.6	146.0	336.5	1,272.2	3,560.2	10,328.3	15,766.8
Ohio - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	24.2	38.4	215.1	794.4	1,840.7	2,912.7
23-25.99	149.0	171.7	368.7	1,239.6	3,045.8	9,470.6	14,445.4
26+	0	71.8	141.3	342.9	811.0	1,929.1	3,296.2
Total	149.0	267.7	548.4	1,797.6	4,651.1	13,240.5	20,654.4
Oklahoma - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	23.1	23.1
23-25.99	0	25.1	4.3	7.8	12.4	77.6	127.2
26+	0	56.7	26.4	34.0	28.9	0	146.0
Total	0	81.7	30.7	41.8	41.3	100.7	296.3
Oklahoma - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	58.4	58.4
23-25.99	0	55.1	75.1	67.8	50.1	134.1	382.2
26+	0	242.9	114.3	211.4	105.0	0	673.5
Total	0	297.9	189.4	279.2	155.1	192.5	1,114.1
Oklahoma - Total							
<15	0	0	0	0	0	0	0

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	81.5	81.5
23-25.99	0	80.2	79.4	75.6	62.5	211.7	509.4
26+	0	299.5	140.7	245.4	133.9	0	819.5
Total	0	379.7	220.2	321.0	196.4	293.2	1,410.5

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Oregon - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0.8	0.4	0.6	0	0.2	0.2	2.1
20-22.99	0.4	0	0.2	0	0	0	0.6
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	1.1	0.4	0.8	0	0.2	0.2	2.6
Oregon - Underground							
<15	0	0	0	0	0	0	0
15-19.99	3.7	1.9	2.8	0	0.9	0.9	10.3
20-22.99	1.9	0	0.9	0	0	0	2.8
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	5.6	1.9	3.7	0	0.9	0.9	13.1
Oregon - Total							
<15	0	0	0	0	0	0	0
15-19.99	4.5	2.2	3.4	0	1.1	1.1	12.3
20-22.99	2.2	0	1.1	0	0	0	3.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	6.7	2.2	4.5	0	1.1	1.1	15.7
Pennsylvania, Anthracite - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	2.0	0.2	0.7	0	0	2.9
23-25.99	78.1	227.3	54.4	9.8	1.3	0.4	371.3
26+	17.0	62.8	13.7	2.2	*	0	95.8
Total	95.1	292.1	68.4	12.7	1.3	0.4	470.1
Pennsylvania, Anthracite - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	2.6	0	0.7	0	0	3.4
23-25.99	156.0	331.1	45.3	6.1	0.7	0	539.2
26+	33.9	76.5	23.8	4.6	0.4	0	139.2
Total	189.8	410.3	69.1	11.4	1.2	0	681.8
Pennsylvania, Anthracite - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	4.7	0.2	1.4	0	0	6.3
23-25.99	234.0	558.5	99.7	15.9	2.0	0.4	910.5
26+	50.9	139.3	37.5	6.8	0.5	0	235.0
Total	284.9	702.4	137.5	24.1	2.5	0.4	1,151.9
Pennsylvania, Bituminous - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	36.4	16.9	53.3
23-25.99	0	6.2	25.9	138.7	134.9	117.6	423.4
26+	0	22.9	57.6	260.0	124.3	41.4	506.2
Total	0	29.1	83.5	398.7	295.6	175.9	982.9
Pennsylvania, Bituminous - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	87.3	224.5	206.6	518.5
23-25.99	0	87.1	219.6	1,955.6	2,605.3	1,522.7	6,390.3
26+	0	355.6	1,043.6	5,944.8	3,845.9	621.0	11,810.8
Total	0	442.7	1,263.2	7,987.7	6,675.6	2,350.4	18,719.5
Pennsylvania, Bituminous - Total							
<15	0	0	0	0	0	0	0

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	87.3	260.9	223.5	571.7
23-25.99	0	93.3	245.5	2,094.3	2,740.2	1,640.3	6,813.6
26+	0	378.5	1,101.2	6,204.8	3,970.1	662.4	12,317.1
Total	0	471.8	1,346.7	8,386.4	6,971.2	2,526.3	19,702.4

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
South Dakota - Surface							
<15	0	0	115.1	0.8	191.6	0	307.5
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	115.1	0.8	191.6	0	307.5
South Dakota - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
South Dakota - Total							
<15	0	0	115.1	0.8	191.6	0	307.5
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	115.1	0.8	191.6	0	307.5
Tennessee - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	93.8	0	0	93.8
26+	0	49.4	29.8	24.8	51.1	0	155.1
Total	0	49.4	29.8	118.5	51.1	0	248.8
Tennessee - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	165.2	0	0	165.2
26+	0	113.1	64.0	54.7	98.5	0	330.3
Total	0	113.1	64.0	219.9	98.5	0	495.4
Tennessee - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	258.9	0	0	258.9
26+	0	162.4	93.8	79.5	149.5	0	485.3
Total	0	162.4	93.8	338.4	149.5	0	744.3
Texas - Surface							
<15	0	0	700.9	6,744.1	4,047.6	446.8	11,939.4
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	700.9	6,744.1	4,047.6	446.8	11,939.4
Texas - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Texas - Total							
<15	0	0	700.9	6,744.1	4,047.6	446.8	11,939.4

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	700.9	6,744.1	4,047.6	446.8	11,939.4

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total	
Utah - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	31.2	19.7	96.1	39.6	38.3	225.0	
23-25.99	8.1		4.4	1.6	0	0	0	14.1
26+	1.2		0.8	0	0	0	0	2.0
Total	9.3		36.4	21.3	96.1	39.6	38.3	241.1
Utah - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	723.4	865.6	1,465.5	356.4	502.3	3,913.1	
23-25.99	569.3	321.6	139.8	0	0	0	1,030.7	
26+	126.6	169.4	0	0	0	0	295.9	
Total	695.9	1,214.3	1,005.4	1,465.5	356.4	502.3	5,239.7	
Utah - Total								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	754.6	885.3	1,561.6	396.0	540.6	4,138.1	
23-25.99	577.4	326.0	141.4	0	0	0	1,044.8	
26+	127.7	170.2	0	0	0	0	297.9	
Total	705.1	1250.8	1,026.7	1,561.6	396.0	540.6	5,480.8	
Virginia - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	0	0	0	0	0	0	
23-25.99	2.8		11.1	92.2	0	0	0	106.1
26+	53.6	246.6	118.5	59.5	0	0	478.2	
Total	56.4	257.6	210.7	59.5	0	0	584.3	
Virginia - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	12.0	8.2	11.9	0	0	0	32.1	
23-25.99	69.9	145.1	130.6	8.2	0	0	353.8	
26+	188.1	624.2	288.1	147.8	0	0	1,248.1	
Total	270.0	777.5	430.6	156.0	0	0	1,634.1	
Virginia - Total[a]								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	12.0	8.2	11.9	0	0	0	32.1	
23-25.99	72.8	156.2	222.8	8.2	0	0	459.9	
26+	241.7	870.8	406.6	207.3	0	0	1,726.3	
Total	326.5	1,035.1	641.3	215.5	0	0	2,218.4	
Washington - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	77.7	0	0	77.7	
20-22.99	0	0	0	0	0	0	0	
23-25.99	0	0	0	0	0	0	0	
26+	0	0	0	0	0	0	0	
Total	0	0	0	77.7	0	0	77.7	
Washington - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	75.1	152.1	698.5	0	0	925.6	
20-22.99	112.3	0	0	73.3	0	0	185.6	
23-25.99	0	87.8	0	0	0	0	87.8	
26+	0	0	0	0	0	0	0	
Total	112.3	162.9	152.1	771.7	0	0	1,199.0	
Washington - Total								
<15	0	0	0	0	0	0	0	

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	75.1	152.1	776.1	0	0	1,003.3
20-22.99	112.3	0	0	73.3	0	0	185.6
23-25.99	0	87.8	0	0	0	0	87.8
26+	0	0	0	0	0	0	0
Total	112.3	162.9	152.1	849.4	0	0	1,276.7

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
West Virginia - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	19.8	19.8
23-25.99	0	371.8	322.3	214.8	8.5	55.5	973.0
26+	153.0	1,561.9	425.0	370.5	223.8	63.9	2,798.0
Total	153.0	1,933.8	747.3	585.3	232.3	139.2	3,790.8
West Virginia - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	171.4	192.8	66.3	430.5
23-25.99	0	723.8	749.7	1,890.6	889.7	3,209.4	7,463.1
26+	928.4	7,973.1	2,993.9	4,109.4	2,915.4	2,030.4	20,950.6
Total	928.4	8,696.9	3743.6	6,171.4	3,997.8	5,306.0	28,844.1
West Virginia - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	171.4	192.8	86.0	450.3
23-25.99	0	1,095.6	1,072.0	2,105.4	898.2	3,264.9	8,436.1
26+	1,081.3	9,535.0	3,418.9	4,479.9	3,139.2	2,094.3	23,748.6
Total	1,081.3	10,630.6	4,490.9	6,756.7	4,230.1	5,445.3	32,634.9
Wyoming - Surface							
<15	0	0	0	1,018.4	189.0	1,639.0	2,846.4
15-19.99	5,086.1	10,088.1	4,596.4	1,611.7	414.7	985.7	22,782.7
20-22.99	35.7	159.5	214.5	54.6	21.5	0	485.8
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	5,121.8	10,247.6	4,810.9	2,684.7	625.2	2,624.7	26,114.9
Wyoming - Underground							
<15	0	0	0	0	0	0	0
15-19.99	3,403.3	13,700.7	8,722.7	7,902.6	1,067.5	0	34,796.8
20-22.99	443.8	453.7	617.9	330.0	0	54.9	1,900.2
23-25.99	74.3	455.6	750.6	308.4	0	0	1,588.9
26+	0	0	0	0	0	0	0
Total	3,921.4	14,609.9	10,091.2	8,541.0	1,067.5	54.9	38,285.9
Wyoming - Total							
<15	0	0	0	1,018.4	189.0	1,639.0	2,846.4
15-19.99	8,489.4	23,788.8	13,319.1	9,514.3	1,482.2	985.7	57,579.5
20-22.99	479.5	613.2	832.4	384.6	21.5	54.9	2,386.0
23-25.99	74.3	455.6	750.6	308.4	0	0	1,588.9
26+	0	0	0	0	0	0	0
Total	9,043.2	24,857.5	14,902.1	11,225.7	1,692.7	2,679.6	64,400.8

See footnotes at end of table.

Table C2. Estimates of the Accessible Reserve Base of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
United States - Surface							
<15	2,091.6	4,046.5	11,121.4	14,327.7	6,995.1	3,302.2	41,884.4
15-19.99	23,810.7	14,643.2	10,644.3	3,548.4	581.9	1,180.3	54,408.8
20-22.99	204.6	513.1	405.4	587.3	2,751.4	7,344.8	11,806.6
23-25.99	305.3	1,277.0	1,238.6	1,817.5	3,156.6	5,511.0	13,306.0
26+	261.8	2,527.5	1,081.6	1,506.0	603.2	429.4	6,409.5
Total	26,674.1	23,007.3	24,491.2	21,786.9	14,088.1	17,767.7	127,815.3
United States - Underground							
<15	0	0	0	0	0	0	0
15-19.99	36,903.9	32,115.1	21,983.3	13,012.8	1,792.2	654.6	106,461.9
20-22.99	2,468.5	3,638.6	2,247.2	4,625.4	6,079.1	40,530.1	59,588.8
23-25.99	3,094.4	4,907.5	5,524.8	10,729.4	14,229.6	25,608.4	64,094.1
26+	1,699.5	12,479.0	5,964.3	11,903.0	8,508.1	4,614.1	45,168.0
Total	44,166.2	53,140.1	35,719.7	40,270.6	30,609.0	71,407.2	275,312.9
United States - Total							
<15	2,091.6	4,046.5	11,121.4	14,327.7	6,995.1	3,302.2	41,884.4
15-19.99	60,714.6	46,758.3	32,627.7	16,561.2	2,374.0	1,834.9	160,870.7
20-22.99	2,673.1	4,151.7	2,652.6	5,212.7	8,830.4	47,874.9	71,395.4
23-25.99	3,399.7	6,184.4	6,763.4	12,546.9	17,386.2	31,119.4	77,400.2
26+	1,961.3	15,006.5	7,045.9	13,409.0	9,111.3	5,043.5	51,577.4
Total	70,840.4	76,147.4	60,210.9	62,057.5	44,697.1	89,174.9	403,128.2

[a]Data include minor amounts of anthracite (all occurring in heat content categories greater than 23.00 million short tons) as follows: Arkansas 93.0, Colorado 23.0, New Mexico 2.1, and Virginia 112.9, expressed in million short tons.

* Quantity less than 0.05 million short tons.

Note: Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration estimates.

Table C3. Estimate of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Alabama - Surface							
<15	0	0	0	771.4	0	0	771.4
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	117.9	173.6	439.3	139.0	0	869.9
26+	0	141.1	99.8	474.0	0	0	714.9
Total	0	259.0	273.4	1,684.7	139.0	0	2,356.2
Alabama - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	78.6	112.3	155.0	61.2	0	407.1
26+	0	90.0	0	235.7	0	0	325.6
Total	0	168.6	112.3	390.6	61.2	0	732.7
Alabama - Total							
<15	0	0	0	771.4	0	0	771.4
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	196.5	285.9	594.3	200.2	0	1,277.0
26+	0	231.1	99.8	709.6	0	0	1,040.6
Total	0	427.6	385.8	2,075.3	200.2	0	3,088.9
Alaska, Southern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	390.4	41.6	0	0	0	0	432.0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	390.4	41.6	0	0	0	0	432.0
Alaska, Southern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	2,067.1	44.1	0	0	0	0	2,111.3
20-22.99	0	8.9		0	0	0	0 8.9
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	2,067.1	53.0	0	0	0	0	2,120.1
Alaska, Southern - Total							
<15	0	0	0	0	0	0	0
15-19.99	2,457.5	85.7	0	0	0	0	2,543.3
20-22.99	0	8.9		0	0	0	0 8.9
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	2,457.5	94.6	0	0	0	0	2,552.2
Alaska, Northern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Alaska, Northern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Alaska, Northern - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Arizona - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	106.4	0	0	0	0	106.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	106.4	0	0	0	0	106.4
Arizona - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	51.4	0	0	0	0	51.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	51.4	0	0	0	0	51.4
Arizona - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	157.9	0	0	0	0	157.9
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	157.9	0	0	0	0	157.9
Arkansas - Surface							
<15	0	0	0	17.8	0	0	17.8
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0.4	0.4
23-25.99	0	0	0	0	0	0	0
26+	0	1.5		73.0	6.5	1.1	1.1 83.1
Total	0	1.5		73.0	24.2	1.1	1.4 101.3
Arkansas - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0.9	0.9
23-25.99	0	0	0	0	0	0	0
26+	0	6.6		89.8	20.3	4.7	4.7 126.1
Total	0	6.6		89.8	20.3	4.7	5.6 127.0
Arkansas - Total[a]							
<15	0	0	0	17.8	0	0	17.8
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	1.2	1.2
23-25.99	0	0	0	0	0	0	0
26+	0	8.1		162.8	26.8	5.8	5.8 209.2
Total	0	8.1		162.8	44.5	5.8	7.0 228.2
Colorado - Surface							
<15	0	0	3,296.4	0	0	0	3,296.4
15-19.99	23.7	9.5	0.8	0	0	0	33.9
20-22.99	114.9	0	8.3	9.9	0	0	133.1
23-25.99	152.7	114.4	20.1	31.2	14.0	0	332.5
26+	0	2.9		0	0	0	0 2.9
Total	291.3	126.8	3,325.6	41.1	14.0	0	3,798.8
Colorado - Underground							
<15	0	0	0	0	0	0	0
15-19.99	1,401.9	577.9	33.9	0	0	0	2,013.6
20-22.99	757.5	835.3	127.8	81.0	0	0	1,801.6
23-25.99	1,152.8	648.2	166.1	163.5	82.8	0	2,213.5
26+	107.3	150.3	34.8	43.6	0	0	336.0
Total	3,419.5	2,211.7	362.5	288.1	82.8	0	6,364.6
Colorado - Total[a]							
<15	0	0	3296.4	0	0	0	3,296.4

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	1,425.6	587.3	34.6	0	0	0	2,047.6
20-22.99	872.4	835.3	136.1	90.9	0	0	1,934.7
23-25.99	1,305.5	762.6	186.2	194.8	96.8	0	2,545.9
26+	107.3	153.2	34.8	43.6	0	0	338.8
Total	3,710.8	2,338.4	3,688.1	329.2	96.8	0	10,163.4

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Georgia - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	*	0	0.1	0	0	0.2
26+	0.2		0.4	0.3 *	0.1	0.1	1.0
Total	0.2		0.4	0.3	0.1	0.1	0.1 1.2
Georgia - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	*	0	*	0	0	0.1
26+	0.3		0.1	0.1 *	0.1	0.1	0.7
Total	0.3		0.2	0.1	0.1	0.1	0.1 0.8
Georgia - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0.1		0	0.2	0	0 0.2
26+	0.6		0.5	0.4 *	0.2	0.2	1.8
Total	0.6		0.6	0.4	0.2	0.2	0.2 2.0
Idaho - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Idaho - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0.2		0.9	0.4	0.4	0	0 2.0
26+	0	0	0	0	0	0	0
Total	0.2		0.9	0.4	0.4	0	0 2.0
Idaho - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0.2		0.9	0.4	0.4	0	0 2.0
26+	0	0	0	0	0	0	0
Total	0.2		0.9	0.4	0.4	0	0 2.0
Illinois - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	2.4		64.4	1,016.0	2,382.0 3,464.7
23-25.99	0	0	34.5	131.0	672.8	364.2	1,202.5
26+	0	0	0	0	4.5		0 4.5
Total	0	0	36.9	195.4	1,693.3	2,746.2	4,671.7
Illinois - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	53.0	625.1	955.9	16,031.8	17,665.8
23-25.99	0	0	797.8	1,963.7	2,786.5	2,158.1	7,706.0
26+	0	0	0	0	47.0	0	47.0
Total	0	0	850.8	2,588.8	3,789.3	18,190.0	25,418.8
Illinois - Total							
<15	0	0	0	0	0	0	0

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	55.4	689.4	1,971.9	18,413.8	21,130.5
23-25.99	0	0	832.2	2,094.7	3,459.3	2,522.4	8,908.6
26+	0	0	0	0	51.4	0	51.4
Total	0	0	887.6	2,784.1	5,482.5	20,936.2	30,090.5

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Indiana - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	45.6	23.5	97.6	0	177.3	344.0
23-25.99	0	23.6	6.2	19.5	162.9	157.5	369.8
26+	0	0	0	0	0	0	0
Total	0	69.3	29.7	117.2	162.9	334.8	713.9
Indiana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	139.4	109.4	309.4	528.9	977.9	2,065.1
23-25.99	0	109.1	48.4	258.3	448.9	752.0	1,616.8
26+	0	0	0	0	0	0	0
Total	0	248.6	157.8	567.7	977.8	1,729.9	3,681.9
Indiana - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	185.1	132.9	407.0	528.9	1,155.2	2,409.1
23-25.99	0	132.8	54.7	277.9	611.8	909.5	1,986.6
26+	0	0	0	0	0	0	0
Total	0	317.8	187.5	684.9	1,140.7	2,064.7	4,395.7
Iowa - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	320.4	0	320.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	320.4	0	320.4
Iowa - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	87.3	719.9	807.2
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	87.3	719.9	807.2
Iowa - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	407.6	719.9	1,127.6
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	407.6	719.9	1,127.6
Kansas - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	53.2	303.5	356.8
23-25.99	0	0	0	0	172.7	106.4	279.1
26+	0	0	0	0	0	48.0	48.0
Total	0	0	0	0	225.9	457.9	683.8
Kansas - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Kansas - Total							
<15	0	0	0	0	0	0	0

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	53.2	303.5	356.8
23-25.99	0	0	0	0	172.7	106.4	279.1
26+	0	0	0	0	0	48.0	48.0
Total	0	0	0	0	225.9	457.9	683.8

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Kentucky, Eastern - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	23.2	49.0	0	0	72.1
23-25.99	7.7		79.7	178.7	108.1	17.1	17.8 409.1
26+	28.9	250.3	97.1	69.9	28.0	5.3	479.5
Total	36.6	330.0	299.0	227.0	45.1	23.1	960.7
Kentucky, Eastern - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	35.6	96.0	0	0	131.6
23-25.99	37.9	305.6	523.8	269.8	36.5	52.7	1,226.3
26+	147.6	1,416.6	650.6	283.9	136.5	36.7	2,671.8
Total	185.4	1,722.3	1,210.0	649.6	173.0	89.4	4,029.8
Kentucky, Eastern - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	58.8	145.0	0	0	203.8
23-25.99	45.6	385.3	702.5	377.9	53.6	70.5	1,635.5
26+	176.5	1,666.9	747.7	353.7	164.4	42.1	3,151.3
Total	222.1	2,052.2	1,509.0	876.6	218.0	112.5	4,990.5
Kentucky, Western - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	37.7	445.6	426.7	910.1
23-25.99	0	0	0	89.0	476.5	866.9	1,432.4
26+	0	0	0	0	18.8	3.2	22.1
Total	0	0	0	126.8	940.9	1,296.9	2,364.6
Kentucky, Western - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	5.9		811.2	1,145.7 1,962.9
23-25.99	0	0	0	25.8	797.3	3,934.8	4,757.9
26+	0	0	0	0	203.6	90.8	294.5
Total	0	0	0	31.8	1,812.1	5,171.4	7,015.2
Kentucky, Western - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	43.7	1,256.8	1,572.5	2,873.0
23-25.99	0	0	0	114.9	1,273.7	4,801.7	6,190.3
26+	0	0	0	0	222.5	94.1	316.5
Total	0	0	0	158.5	2,753.0	6,468.3	9,379.8
Louisiana - Surface							
<15	0	0	0	358.5	0	0	358.5
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	358.5	0	0	358.5
Louisiana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Louisiana - Total							
<15	0	0	0	358.5	0	0	358.5

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	358.5	0	0	358.5

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Maryland - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	16.9	0	16.9
26+	0	2.8	8.3	13.3	16.5	0	41.0
Total	0	2.8	8.3	13.3	33.5	0	58.0
Maryland - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	110.9	0	110.9
26+	0	29.1	50.7	107.6	65.9	0	253.2
Total	0	29.1	50.7	107.6	176.8	0	364.2
Maryland - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	127.9	0	127.9
26+	0	31.9	59.0	121.0	82.4	0	294.2
Total	0	31.9	59.0	121.0	210.3	0	422.1
Michigan - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.1	0	0.1
20-22.99	0	0	0.1	0.4 *	0.1	0.6	
23-25.99	0	0	0.3	1.3	0.3	0.2	2.2
26+	0	0	0	0.1	0.1	0	0.2
Total	0	0	0.5	1.8	0.5	0.3	3.1
Michigan - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.3	0	0.3
20-22.99	0	0	3.0	4.6	3.0	2.9	13.6
23-25.99	0	0	4.8	14.5	9.8	7.8	36.8
26+	0	0	0	2.2	2.5	0	4.7
Total	0	0	7.8	21.3	15.7	10.7	55.4
Michigan - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0.4	0	0.4
20-22.99	0	0	3.1	5.0	3.1	3.0	14.2
23-25.99	0	0	5.1	15.8	10.1	8.0	39.0
26+	0	0	0	2.3	2.6	0	4.9
Total	0	0	8.2	23.1	16.2	11.0	58.5
Missouri - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	54.6	1,979.1	2,033.7
23-25.99	0	0	0	0	95.8	1,008.1	1,103.9
26+	0	0	0	0	0	28.1	28.1
Total	0	0	0	0	150.4	3,015.2	3,165.7
Missouri - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	2.9	550.7	553.6
23-25.99	0	0	0	0	16.7	111.7	128.4
26+	0	0	0	0	0	7.2	7.2
Total	0	0	0	0	19.6	669.6	689.2
Missouri - Total							
<15	0	0	0	0	0	0	0

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	57.5	2,529.8	2,587.3
23-25.99	0	0	0	0	112.5	1,119.8	1,232.3
26+	0	0	0	0	0	35.3	35.3
Total	0	0	0	0	170.0	3,684.8	3,854.8

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
Montana - Surface							
<15	1,458.3	2,916.5	4,579.7	1,212.0	1,458.3	729.2	12,354.0
15-19.99	16,628.1	4,096.1	4,940.8	1,237.2	152.1	177.2	27,231.5
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	18,086.4	7,012.6	9,520.5	2,449.2	1,610.3	906.4	39,585.4
Montana - Underground							
<15	0	0	0	0	0	0	0
15-19.99	15,386.1	9,619.2	7,241.4	2,264.4	342.7	367.7	35,221.5
20-22.99	177.0	214.1	35.7	106.8	69.8	98.0	701.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	15,563.1	9,833.4	7,277.1	2,371.2	412.4	465.7	35,922.8
Montana - Total							
<15	1,458.3	2,916.5	4,579.7	1,212.0	1,458.3	729.2	12,354.0
15-19.99	32,014.2	13,715.3	12,182.2	3,501.6	494.8	544.9	62,453.0
20-22.99	177.0	214.1	35.7	106.8	69.8	98.0	701.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	33,649.5	16,846.0	16,797.6	4,820.4	2,022.8	1,372.0	75,508.3
New Mexico - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	548.5	440.2	0	0	988.7
20-22.99	0	95.3	62.6	29.6	0	0	187.5
23-25.99	0	140.9	104.4	0	0	0	245.3
26+	0	0	0	0	0	0	0
Total	0	236.2	715.5	469.8	0	0	1,421.4.0
New Mexico - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	83.9	90.0	212.2	64.1	0	450.1
20-22.99	0	61.7	44.7	13.5	0	0	119.8
23-25.99	0	349.5	83.8	0.1	0	0	433.5
26+	0	70.2	0.4	0	0	0	70.7
Total	0	565.3	218.9	225.8	64.1	0	1,074
New Mexico - Total[a]							
<15	0	0	0	0	0	0	0
15-19.99	0	83.9	638.4	652.4	64.1	0	1,438.7
20-22.99	0	157.0	107.3	43.1	0	0	307.3
23-25.99	0	490.4	188.2	0.1	0	0	678.8
26+	0	70.2	0.4	0	0	0	70.7
Total	0	801.5	934.3	695.6	64.1	0	2,495.5
North Carolina - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
North Carolina - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0.3		1.3 1.6
26+	0	0	0.3		1.6	1.3	0 3.2
Total	0	0	0.3		1.6	1.6	1.3 4.8
North Carolina - Total							
<15	0	0	0	0	0	0	0

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0.3	1.3	1.6
26+	0	0	0.3	1.6	1.3	0	3.2
Total	0	0	0.3	1.6	1.6	1.3	4.8

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
North Dakota - Surface							
<15	441.2	759.6	1,392.5	3,481.2	867.8	373.7	7,315.9
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	441.2	759.6	1,392.5	3,481.2	867.8	373.7	7,315.9
North Dakota - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
North Dakota - Total							
<15	441.2	759.6	1,392.5	3,481.2	867.8	373.7	7,315.9
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	441.2	759.6	1,392.5	3,481.2	867.8	373.7	7,315.9
Ohio - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	12.9	23.0	62.1	182.1	425.1	705.2
23-25.99	20.3	56.9	89.7	287.0	619.7	1,728.9	2,802.5
26+	0	27.6	56.8	71.2	71.0	175.7	402.4
Total	20.3	97.4	169.6	420.3	872.8	2,329.7	3,910.0
Ohio - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	4.1		4.8	68.7	283.4	654.7	1,015.6
23-25.99	61.8	50.3	128.3	440.5	1,135.6	3,654.8	5,471.2
26+	0	18.6	35.1	126.9	361.1	854.7	1,396.6
Total	61.8	73.0	168.2	636.1	1,780.1	5,164.2	7,883.4
Ohio - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	16.9	27.8	130.8	465.5	1,079.8	1,720.8
23-25.99	82.1	107.2	218	727.4	1,755.3	5,383.6	8,273.7
26+	0	46.3	92.0	198.2	432.1	1,030.5	1,799.0
Total	82.1	170.4	337.8	1,056.4	2,652.8	7,493.9	11,793.5
Oklahoma - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	19.1	19.1
23-25.99	0	20.7	3.5	6.4	10.2	63.9	104.7
26+	0	46.7	21.8	28.0	23.8	0	120.3
Total	0	67.3	25.3	34.4	34.0	83.0	244.1
Oklahoma - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	30.2	30.2
23-25.99	0	28.5	38.9	35.1	25.9	69.4	197.9
26+	0	125.7	59.2	109.4	54.4	0	348.7
Total	0	154.2	98.1	144.5	80.3	99.6	576.8
Oklahoma - Total							
<15	0	0	0	0	0	0	0

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	49.3	49.3
23-25.99	0	49.2	42.4	41.5	36.2	133.3	302.6
26+	0	172.4	80.9	137.5	78.1	0	468.9
Total	0	221.6	123.4	179.0	114.3	182.6	820.9

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
Oregon - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0.6	0.3	0.5	0	0.2	0.2	1.7
20-22.99	0.3	0	0.2	0	0	0	0.5
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0.9	0.3	0.6	0	0.2	0.2	2.1
Oregon - Underground							
<15	0	0	0	0	0	0	0
15-19.99	1.9	0.9	1.4	0	0.5	0.5	5.1
20-22.99	0.9	0	0.5	0	0	0	1.4
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	2.8	0.9	1.9	0	0.5	0.5	6.5
Oregon - Total							
<15	0	0	0	0	0	0	0
15-19.99	2.5	1.2	1.9	0	0.6	0.6	6.8
20-22.99	1.2	0	0.6	0	0	0	1.9
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	3.7	1.2	2.5	0	0.6	0.6	8.6
Pennsylvania, Anthracite - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	1.8	0.2	0.6	0	0	2.6
23-25.99	70.3	204.6	49.0	8.8	1.1	0.4	334.2
26+	15.3	56.5	12.4	2.0	*	0	86.2
Total	85.6	262.9	61.5	11.4	1.2	0.4	423.1
Pennsylvania, Anthracite - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	1.3	0	0.4	0	0	1.7
23-25.99	78.0	165.6	22.7	3.0	0.4	0	269.6
26+	16.9	38.2	11.9	2.3	0.2	0	69.6
Total	94.9	205.1	34.6	5.7	0.6	0	340.9
Pennsylvania, Anthracite - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	3.2	0.2	1.0	0	0	4.3
23-25.99	148.2	370.2	71.6	11.8	1.5	0.4	603.8
26+	32.3	94.7	24.3	4.3	0.2	0	155.8
Total	180.5	468.1	96.1	17.1	1.8	0.4	764.0
Pennsylvania, Bituminous - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	29.8	13.8	43.7
23-25.99	0	5.0	21.3	113.7	110.6	96.4	347.0
26+	0	18.8	47.2	213.1	101.9	33.9	414.9
Total	0	23.8	68.5	326.8	242.3	144.2	805.6
Pennsylvania, Bituminous - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	51.9	133.5	122.9	308.3
23-25.99	0	51.8	130.5	1,162.8	1,549.1	905.4	3,799.6
26+	0	211.4	620.5	3,534.8	2,286.7	369.3	7,022.7
Total	0	263.2	751.1	4,749.5	3,969.3	1,397.5	11,130.6
Pennsylvania, Bituminous - Total							
<15	0	0	0	0	0	0	0

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	51.9	163.3	136.7	351.9
23-25.99	0	56.9	151.8	1,276.5	1,659.7	1,001.8	4,146.6
26+	0	230.2	667.8	3,747.9	2,388.6	403.2	7,437.6
Total	0	287.1	819.6	5,076.3	4,211.6	1,541.7	11,936.2

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining / Heat Content (Million Btu per Short Ton)	Sulfur Content (Pounds of Sulfur per Million Btu) ≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	Total
South Dakota - Surface							
<15	0	0	103.6	0.8	172.4	0	276.8
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	103.6	0.8	172.4	0	276.8
South Dakota - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
South Dakota - Total							
<15	0	0	103.6	0.8	172.4	0	276.8
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	103.6	0.8	172.4	0	276.8
Tennessee - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	74.8	0	0	74.8
26+	0	39.4	23.8	19.8	40.7	0	123.6
Total	0	39.4	23.8	94.5	40.7	0	198.4
Tennessee - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	100.6	0	0	100.6
26+	0	68.9	39.0	33.3	60.0	0	201.1
Total	0	68.9	39.0	133.9	60.0	0	301.7
Tennessee - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	175.4	0	0	175.4
26+	0	108.2	62.8	53.1	100.7	0	324.8
Total	0	108.2	62.8	228.4	100.7	0	500.1
Texas - Surface							
<15	0	0	599.5	5,768.2	3,461.9	382.1	10,211.7
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	599.5	5,768.2	3,461.9	382.1	10,211.7
Texas - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Texas - Total							
<15	0	0	599.5	5,768.2	3,461.9	382.1	10,211.7

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	0	0
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	0	0	599.5	5,768.2	3,461.9	382.1	10,211.7

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)							
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**	
Utah - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	27.5	17.3	84.6	34.8	33.7	197.9	
23-25.99	7.1		3.9	1.4	0	0	0	12.4
26+	1.0		0.7	0	0	0	0	1.7
Total	8.2		32.1	18.8	84.6	34.8	33.7	212.1
Utah - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	394.0	471.5	798.3	194.1	273.6	2,131.5	
23-25.99	310.1	175.2	76.1	0	0	0	561.4	
26+	68.9	92.3	0	0	0	0	161.2	
Total	379.0	661.4	547.6	798.3	194.1	273.6	2,854.1	
Utah - Total								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	421.5	488.8	882.8	229.0	307.3	2,329.4	
23-25.99	317.2	179.0	77.6	0	0	0	573.8	
26+	70.0	93.0	0	0	0	0	162.9	
Total	387.2	693.5	566.4	882.8	229.0	307.3	3,066.2	
Virginia - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	0	0	0	0	0	0	0	
23-25.99	2.3		8.8	73.8	0	0	0	85.0
26+	42.9	197.4	94.9	47.7	0	0	382.9	
Total	45.2	206.3	168.7	47.7	0	0	467.8	
Virginia - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	7.5		5.1	7.4	0	0	0	20.1
23-25.99	43.6	90.5	81.5	5.1	0	0	220.8	
26+	117.3	389.4	179.7	92.2	0	0	778.7	
Total	168.5	485.1	268.7	97.3	0	0	1,019.5	
Virginia - Total[a]								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	0	0	0	0	
20-22.99	7.5		5.1	7.4	0	0	0	20.1
23-25.99	45.9	99.4	155.3	5.1	0	0	305.7	
26+	160.3	586.9	274.6	139.9	0	0	1,161.6	
Total	213.7	691.4	437.4	145.0	0	0	1,487.4	
Washington - Surface								
<15	0	0	0	0	0	0	0	
15-19.99	0	0	0	68.3	0	0	68.3	
20-22.99	0	0	0	0	0	0	0	
23-25.99	0	0	0	0	0	0	0	
26+	0	0	0	0	0	0	0	
Total	0	0	0	68.3	0	0	68.3	
Washington - Underground								
<15	0	0	0	0	0	0	0	
15-19.99	0	42.2	85.6	392.9	0	0	520.7	
20-22.99	63.2	0	0	41.2	0	0	104.4	
23-25.99	0	49.4	0	0	0	0	49.4	
26+	0	0	0	0	0	0	0	
Total	63.2	91.6	85.6	434.1	0	0	674.5	
Washington - Total								
<15	0	0	0	0	0	0	0	

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
15-19.99	0	42.2	85.6	461.2	0	0	589.0
20-22.99	63.2	0	0	41.2	0	0	104.4
23-25.99	0	49.4	0	0	0	0	49.4
26+	0	0	0	0	0	0	0
Total	63.2	91.6	85.6	502.4	0	0	742.8

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
West Virginia - Surface							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	0	0	15.6	15.6
23-25.99	0	293.5	254.4	169.5	6.7	43.8	768.0
26+	120.7	1,232.8	335.5	292.4	176.6	50.5	2,208.5
Total	120.7	1,526.3	589.9	461.9	183.3	109.9	2,992.1
West Virginia - Underground							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	101.7	114.3	39.3	255.3
23-25.99	0	429.2	444.6	1,121.1	527.6	1,903.2	4,425.6
26+	550.5	4,728.0	1,775.4	2,436.9	1,728.8	1,204.0	12,423.7
Total	550.5	5,157.2	2,220.0	3,659.7	2,370.7	3,146.5	17,104.6
West Virginia - Total							
<15	0	0	0	0	0	0	0
15-19.99	0	0	0	0	0	0	0
20-22.99	0	0	0	101.7	114.3	54.9	270.9
23-25.99	0	722.7	699.0	1,290.6	534.3	1,947.0	5,193.6
26+	671.2	5,960.9	2,110.9	2,729.3	1,905.4	1,254.5	14,632.2
Total	671.2	6,683.6	2,809.8	4,121.6	2,554.0	3,256.4	20,096.7
Wyoming - Surface							
<15	0	0	0	909.8	170.1	1,393.4	2,473.3
15-19.99	4,559.6	8,995.9	4,099.6	1,408.6	351.9	843.0	20,258.6
20-22.99	28.6	130.3	173.0	43.7	17.2	0	392.8
23-25.99	0	0	0	0	0	0	0
26+	0	0	0	0	0	0	0
Total	4,588.2	9,126.2	4,272.6	2,362.0	539.3	2,236.4	23,124.7
Wyoming - Underground							
<15	0	0	0	0	0	0	0
15-19.99	2,042.0	8,220.4	5,233.6	4,741.6	640.5	0	20,878.1
20-22.99	266.3	272.2	370.7	198.0	0	33.0	1,140.1
23-25.99	44.6	273.3	450.3	185.0	0	0	953.3
26+	0	0	0	0	0	0	0
Total	2,352.8	8,765.9	6,054.7	5,124.6	640.5	33.0	22,971.5
Wyoming - Total							
<15	0	0	0	909.8	170.1	1,393.4	2,473.3
15-19.99	6,601.6	17,216.3	9,333.2	6,150.2	992.4	843.0	41,136.6
20-22.99	294.8	402.5	543.7	241.7	17.2	33.0	1,532.9
23-25.99	44.6	273.3	450.3	185.0	0	0	953.3
26+	0	0	0	0	0	0	0
Total	6,941.0	17,892.2	10,327.3	7,486.7	1,179.7	2,269.3	46,096.2

See footnotes at end of table.

Table C3. Estimates of the Recoverable Reserves of Coal by Btu/Sulfur Range, State, and Type of Mining (Continued)

(Million Short Tons Remaining as of January 1, 1992)

State and Type of Mining	Sulfur Content (Pounds of Sulfur per Million Btu)						
Heat Content (Million Btu per Short Ton)	≤ 0.40	0.41 - 0.60	0.61 - 0.83	0.84 - 1.67	1.68 - 2.50	> 2.50	**Total**
United States - Surface							
<15	1,899.5	3,676.2	9,971.6	12,519.7	6,130.5	2,878.4	37,075.8
15-19.99	21,602.5	13,143.3	9,590.1	3,154.3	504.2	1,020.3	49,014.7
20-22.99	143.7	419.9	333.8	479.5	2,153.9	5,776.4	9,307.1
23-25.99	260.4	1,070.0	1,011.0	1,479.9	2,516.4	4,454.6	10,792.3
26+	209.1	2,018.9	870.9	1,238.0	483.0	345.9	5,165.8
Total	24,115.2	20,328.3	21,777.5	18,871.3	11,788.0	14,475.5	111,355.8
United States - Underground							
<15	0	0	0	0	0	0	0
15-19.99	20,899.0	18,588.7	12,685.8	7,611.0	1,048.0	368.2	61,200.6
20-22.99	1,272.4	1,987.5	1,264.0	2,502.5	3,184.2	20,681.6	30,892.2
23-25.99	1,729.0	2,805.9	3,110.4	5,904.5	7,589.4	13,551.1	34,690.3
26+	1,009.0	7,435.5	3,547.5	7,030.6	4,952.8	2,567.6	26,543.0
Total	24,909.3	30,817.7	20,607.7	23,048.6	16,774.4	37,168.5	153,326.2
United States - Total							
<15	1,899.5	3,676.2	9,971.6	12,519.7	6,130.5	2,878.4	37,075.8
15-19.99	42,501.4	31,732.0	22,275.9	10,765.3	1,552.3	1,388.5	110,215.3
20-22.99	1,416.1	2,407.4	1,597.9	2,982.0	5,338.0	26,457.9	40,199.3
23-25.99	1,989.4	3,875.9	4,121.4	7,384.3	10,105.8	18,005.7	45,482.6
26+	1,218.1	9,454.4	4,418.4	8,268.6	5,435.8	2,913.5	31,708.9
Total	49,024.6	51,146.0	42,385.2	41,919.9	28,562.4	51,644.0	264,682.0

[a]Data include minor amounts of anthracite (all occurring in heat content categories greater than 23.00 million short tons) as follows: Arkansas 52.2, Colorado 13.4, New Mexico 1.2, and Virginia 70.5, expressed in million short tons.

* Quantity less than 0.05 million short tons.

Note: Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration estimates.