Energy
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Administration

An Assessment of the Quality of Selected EIA Data Series

Coal Data: 1983 Through 1988

November 1991

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A western coal-loading facility. Photo courtesy of the Association of American Railroads.

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Energy Information Administration
Office of Statistical Standards
U.S. Department of Energy
Washington, DC 20585

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1. Introduction

The purpose of this report is to present information on the quality of some of the Energy Information Administration's (EIA) coal data. The report contains discussions of data on production, direct labor hours, recoverable reserves, and prices from 1983 through 1988. These data are collected on Form EIA-7A, "The Coal Production Report," an annual survey of mining operations. An earlier report discusses coal production data for the period 1978 through 1982.¹

Data quality cannot be measured directly. The approach adapted here is to evaluate the consistency of the data by comparing them with other similar series and by examining reporting practices and unexpected variation. When anomalies are found, they are further studied by:

- Telephone contacts with EIA-7A respondents
- Examination of completed forms and survey editor comments
- Consultation with coal industry experts
- Discussion with EIA data analysts responsible for surveys in the coal data collection.

It is not, of course, possible to pinpoint the cause of the discrepancy in every situation. Furthermore, the reader should note that the discrepancies unaccounted for are not necessarily errors and, conversely, that the absence of apparent inconsistencies does not necessarily imply quality. Nevertheless, analyses of this type have proven useful in evaluating the data.

Chapter 2 of this report presents a summary of the EIA coal data collection and identifies other sources providing similar data. Chapters 3 and 4 focus on data on coal production and direct labor hours, respectively. Detailed comparisons with data from the Mine Safety and Health Administration (MSHA) and State mining agencies are presented. Chapter 5 examines recoverable reserves. Included are internal comparisons as well as comparisons with other published reserve-related data, namely those of BXC, Inc. Chapter 6 describes how EIA obtains estimates of coal prices and discusses the variability in the prices caused by factors such as mine type, coal rank, and region.

¹Energy Information Administration, *An Assessment of the Quality of EIA Data Series: Coal and Electric Power Data from 1977 to 1982*, DOE/EIA-0292(83) (Washington, DC, April 1984).

2. Highlights

The Energy Information Administration (EIA) collects data on various aspects of the coal industry: production, distribution, consumption, labor hours, value, reserves, and stocks. This chapter describes the coal data that EIA collects and presents a summary of findings in question-and-answer format. The report focuses on data collected on the annual Form EIA-7A, "Coal Production Report." Other EIA forms used to collect coal data include:

- EIA-6, "Coal Distribution Report"
- EIA-3, "Quarterly Coal Consumption Report--Manufacturing Plants"
- EIA-5, "Coke Plant Report--Quarterly"
- EIA-28, "Financial Reporting System"
- EIA-759, "Monthly Power Plant Report"
- EIA-846A/D, "Manufacturing Energy Consumption Survey."

In addition, there are three standby forms:²

- EIA-1, "Weekly Coal Monitoring Report--General Industries and Blast Furnaces"
- EIA-4, "Weekly Coal Monitoring Report--Coke Plants"
- EIA-20, "Weekly Telephone Survey of Coal Burning Utilities."

Some questions can be answered in a few words and are addressed fully in this chapter. Others require more detailed explanations and refer the reader to later chapters.

In this report, data quality is evaluated primarily in terms of consistency with other series and internal variation. Based on these criteria, the EIA coal quantity data (production, reserves, and direct labor hours) are of good quality. Overall, the data are consistent with other collections, and the anomalies in the series reflect real, though unusual, situations. The price data are highly variable, and the causes of this variability could be explained only partially.

A. Sources of Coal Data

1. Where are coal data published?

As shown in Table 1, coal data are published in a number of EIA reports including *Coal Production*, *Coal Distribution*, the *Quarterly Coal Report*, and the *Monthly Energy Review*.

2. What are other sources of coal data?

Other agencies and organizations gather and/or publish information on coal. These include:

- The Mine Safety and Health Administration (MSHA)

MSHA generates a profile of injury and accident statistics. Data used in these profiles are obtained quarterly on Form 7000-2, "Quarterly Mine Employment and Coal Production Report," and are published annually in *Injury Experience in Coal Mining*.

- State mining/licensing agencies
- The Federal Energy Regulatory Commission (FERC)

FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants," provides data for use by various agencies in economic studies to determine the justification for increasing electric rates, environmental studies, fuel emergencies, and policy decisions.

FERC Form 580, "Interrogatory on Fuel and Energy Purchase Practices Act," requests specified information from electric utilities on fuel purchasing practices and policies.

- BXG, Inc.

BXG, Inc., a private organization, publishes annual reports on coal supply and demand that include data on mine location (State and county), production, capacity, coal quality, total reserves,

²Standby forms are used only during coal supply disruptions, as needed.

Table 1. EIA Forms, Publications, and Alternative Sources of Selected Coal Data Items

Data Item	EIA Form	EIA Publication	Alternative Sources
Direct Labor Hours	EIA-7A	AOC, CP	MSHA, State Mining Agencies
Distribution (short tons)	EIA-6	All Publications	
Production (short tons)	EIA-5 ^a	AER, QCR	MSHA, State Mining Agencies, BXG, Inc.
	EIA-6 EIA-7A	AOC, CD, QCR, STEO, WCP AEO, AOC, CDREF, CP, WCP	
Recovery Percentage	EIA-7A	CP	BXG, Inc.
Recoverable Reserves (short tons)	EIA-7A	AEO, CDREF, CP	BXG, Inc.
Stocks (short tons)	EIA-3 EIA-5 EIA-6 EIA-7A	QCR, WCP AER, QCR, WCP AER, CD, MER, QCR, WCP CP	
Value (dollars)	EIA-3 EIA-5 EIA-7A	AEO, QCR AEO, AOC, QCR AEO, CP	BXG, Inc., FERC Form 423, FERC Form 580

^a Used to collect coke production data only.

MSHA= Mine Safety and Health Administration.

Note: Energy Information Administration publications: AEO=Annual Energy Outlook; AER=Annual Energy Review; AOC=Annual Outlook for U.S. Coal; CD=Coal Distribution; CP=Coal Production; CDREF=Coal Data: A Reference; MER=Monthly Energy Review; QCR=Quarterly Coal Report; SEDR=State Energy Data Report; STEO=Short-Term Energy Outlook; WCP=Weekly Coal Production.

Source: Energy Information Administration, Office of Statistical Standards.

and recoverable reserves obtained from mine permit applications.

- The U.S. Department of Commerce, Bureau of the Census
- MacLean Hunter's *Coal* magazine
- MacLean Hunter's *Keystone Coal Industry Manual*, based on a voluntary mail survey.

The first four sources are also shown in Table 1. Copies of Forms EIA-7A, EIA-6, FERC Form 423, and MSHA Form 7000-2 appear in Appendix C.

B. Data Reporting

1. What are the response rates³ for coal production, direct labor hours, and value data on Form EIA-7A?

The response rate for data on production quantity from Form EIA-7A in 1988 (for mines producing at least 10,000 short tons of coal) was 75 percent in terms of number of mines and 95 percent in terms of production. Although one-fourth of the eligible mines did not respond, their production was estimated to account for

only 5 percent of total coal production. In other words, the nonresponse rate was higher for the small mines than for the large ones.

For direct labor hours and value of coal produced, the response rate was 73 percent in 1988. Again, the nonresponse rate was higher for the small mines; the mines that responded accounted for about 94 percent of total production. Nonresponse rates by State are provided in Appendix Tables A1, A2, and A3 for production, direct labor hours, and value, respectively.

2. How does EIA account for nonrespondent data?

For quantity of coal produced, missing data are obtained from other sources. The primary additional source is the State mining agency. If it cannot provide data, then data from MSHA are used. For example, in 1988, tonnage obtained from MSHA accounted for less than 1 percent of total production, and tonnage from the State mining agencies accounted for approximately 5 percent.

Missing data on labor hours are also obtained from secondary sources. However, if State agency and MSHA data are unavailable, direct labor hours are imputed from county- or State-level productivity averages, depending on the number and size of mines within

³EIA records do not provide a means of distinguishing imputed from reported reserves data. Therefore, the response rate for reserves is not discussed here.

Figure 1. Nonresponse to Form EIA-7A Coal Production Data Element as a Percentage of U.S. Coal Production, 1983-1988

Sources: Energy Information Administration, Form EIA-7A, "Coal Production Report"; State Mining Agency coal production reports; Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report."

the county. For value of coal produced, missing data are imputed by multiplying the quantity of production by the county average for price.

3. How do the response rates for production volumes compare over the years?

The response rate for production volumes has fluctuated between 93 and 97 percent from 1983 through 1988 (Figure 1).

C. Production and Labor Hours

1. How do EIA-7A production estimates as published in Coal Production compare with EIA-6 estimates as published in Coal Distribution?

At the national level and for the three broad regions (Appalachian, Interior, and Western) the figures were close--within 1 percent for 1988. At the District level, a few considerably larger differences occurred. These differences are discussed in Chapter 3. Beginning in 1989, EIA began collecting and publishing data at the State level from Form EIA-6. When the detailed comparisons for this report were performed, these data were unavailable; therefore, Chapter 3 focuses on district-level data for Form EIA-6.

2. Since the reporting threshold is 50,000 short tons for Form EIA-6 and 10,000 short tons for Form EIA-7A, it appears that EIA-6 figures should be consistently lower than EIA-7A figures. Why are they slightly higher for 1988?

The reporting threshold for Form EIA-6 refers to companies that produce or distribute coal. Small coal producers often sell their coal to distributors who are above the EIA-6 reporting threshold. In addition to

company production, each distributor reports purchases from these small producers on Form EIA-7A. Thus, Forms EIA-6 and EIA-7A represent approximately the same universe. Differences in the published figures are more likely the result of differences in reporting than in the target populations.

3. How do EIA-7A production estimates compare with those of MSHA and the State mining agencies?

At the national level a two-way comparison was performed using MSHA and EIA-7A data. A national total could not be computed from State agency data because there is no central source for these data (for this study, data were obtained from the State mining agencies for the eight largest coal-producing States and Colorado). At the national level, data from MSHA were within 3 percent of EIA-7A data from 1983 through 1988. MSHA figures were lower, most likely reflecting the fact that MSHA does not adjust for nonresponse (production is not the primary focus of its data collection).

At the State level, a three-way comparison was performed, using data from MSHA, Form EIA-7A, and State mining agencies for the eight largest coal-producing States and Colorado. The correspondence was still good but not quite as close as at the national level. For example, data from the State agency and MSHA were generally within 5 percent of the EIA-7A figures for the following States from 1983 through 1988: Colorado, Illinois, Pennsylvania (bituminous), Texas, Virginia, West Virginia, and Wyoming. Data from the State agencies for Ohio, Kentucky, and Pennsylvania anthracite showed larger discrepancies. At the county and mine levels, the correspondence is more problematic. Chapter 3 and Appendix Table A4 provide the details.

There are several explanations for the differences. Among them are (1) somewhat different data requirements; for example, Form EIA-7A requires production as sold (that is, clean or as shipped), while MSHA requests clean coal; (2) no explicit instructions on how to report production remaining in stocks on the MSHA form; (3) reporting or processing errors in any of the data collections; and (4) different classifications of mines by county.

4. How do EIA-7A, MSHA, and EIA-6 estimates of coal production compare over time at the national level?

As shown in Figure 2, they show the same trend over time.

5. How do EIA-7A estimates of direct labor hours compare with MSHA estimates?

At the national level there is very close correspondence; differences in reported labor hours were within 1 percent from 1983 through 1988. Larger differences were observed when data were disaggregated by State,

method of mining (surface and underground), and mining operation (mines versus preparation plants). Particularly large differences were observed for mines in Colorado. See Chapter 4 for details and explanation.

D. Reserves

1. How are recoverable reserves and recovery percentages for operating coal mines estimated?

Recoverable reserves represent that portion of the mine's minable resources that is expected to be extracted or recovered through mining over the life of the mine. Mine operators generally estimate minable resources and apply a recovery percentage to obtain recoverable reserves.

Mine operators estimate minable resources from a limited number of measurements taken at points where a coal seam is exposed and in drill holes. Next, a map may be made of expected conditions in unmeasured areas. The total volume of coal to be mined within the tract is estimated based on this map.

The recovery percentage is based on what the mine operator thinks can be extracted over the life of the mine. Factors that can result in changes in recovery percentages are changes in mining conditions, market conditions, technology, and regulations.

2. How do recoverable reserves differ from the Demonstrated Reserve Base (DRB)?

The DRB is a compilation, using available data, of the reliably estimated coal which is potentially minable in an area regardless of the legal, technical, or economic restrictions. Recoverable reserves represent the amount of coal that can be extracted at an active site.

3. It appears that production and the reduction in recoverable reserves should be equal. Why are large discrepancies sometimes observed?

There are several possible explanations:

- Re-estimation of reserves (beyond a simple correction to account for depletion) based on new data, assumptions, and/or procedures
- Actual changes in reserves caused by the acquisition of new coal properties or the sale of existing properties
- Reporting errors in the data.

For this study, specific explanations were obtained through telephone calls to a sample of the respondents

Figure 2. EIA-6, EIA-7A, and MSHA Coal Production, 1983-1988

Sources: Energy Information Administration, *Coal Production, 1983-1988*; *Coal Distribution, January-December 1983-1988*; Mine Safety and Health Administration, MSHA: *Injury Experience in Coal Mining, 1983-1986*, Table 6. MSHA data exclude bituminous coal refuse and culm bank production.

with differences. The results are included in Chapter 5.

4. How do EIA-7A reserves data compare with data from other sources?

The only other source available was the BXG report, *Powder River Basin Coal Supply and Demand 1988 Update*. For the Powder River Basin, which includes mines in northern Wyoming and southeastern Montana, the 1986 BXG figure was about 2 percent lower than the EIA-7A total. As discussed in Chapter 5, much larger differences were found when data were disaggregated by State and mine, primarily because BXG data are not obtained from mine operators annually. Instead BXG obtains estimates based on data from earlier years.

E. Prices

1. How does EIA obtain estimates of the price of coal?

EIA collects data on the value of coal produced (revenue) and on the quantity of coal produced at the mine level on Form EIA-7A. For each data category published in *Coal Production*, the data on value are summed and are divided by the sum of the data on quantity to obtain a weighted-average price. These data do not include transportation costs.

2. What accounts for the large variability in the distribution of the coal price data? Does EIA collect any data that explain this variation?

Rank and quality of coal, method of mining, market category (open versus captive), type of contract, and geographic location are all possible factors accounting for the wide distribution of coal prices. Of these items,

EIA collects data on rank, method of mining, market category, and geography. EIA is planning to collect data on quality of coal produced for report year 1991. EIA does not collect data on type of contract on Form EIA-7A. Some contract data are available on FERC Form 580, but only for electric utilities. These various factors are discussed in Chapter 6 as they relate to coal price variability.

3. Are there extreme data values (outliers) in EIA-7A price data? If so, can they be explained?

Yes, in 1988 coal prices varied from \$3 to \$90 per short ton at the mine level. Outliers were examined during this study and in all cases it was found that the data in question had been verified with the respondents. The

respondents also provided possible reasons for why their prices appeared extreme.

4. How do EIA-7A price data compare with other coal price series?

There are no directly comparable sources. The comparability of EIA-7A and FERC Form 423 data is discussed in Chapter 6. The comparison was not straightforward but did show that at the State level, most of the differences between Form EIA-7A prices, which exclude transportation costs, and FERC Form 423 costs, which include transportation costs, were in the expected direction. That is, EIA-7A prices were generally lower.

3. Production

Production, as collected on Form EIA-7A, is the quantity of coal--whether raw, crushed, screened, or mechanically cleaned--that is either disposed from a mining operation on a first-sale basis, consumed at the mining operation, transferred to a parent or subsidiary company, or stockpiled.

This chapter addresses the questions posed in Chapter 2 on how EIA-7A production data compare with those of the Mine Safety and Health Administration (MSHA), State mining agencies, and Form EIA-6, "Coal Distribution Report," at the national, district, State, county, and mine levels.

Discrepancies among estimates were investigated by:

- Matching individual respondent records from the data series
- Reviewing individual EIA-7A forms and respondent contact records⁴
- Contacting data analysts responsible for the surveys.

Data from 1983 through 1988 were used in the analyses with a special focus on 1988 data for detailed comparisons. Production data reported to EIA (on Form EIA-7A) and to MSHA were compared at the national, State, county, and mine levels. Similar comparisons were made between EIA-7A and State mining agency estimates, but not at the national level.⁵ In the State-level comparisons particular attention was given to nine States, eight of which--Kentucky, Illinois, Ohio, Pennsylvania, Texas, Virginia, West Virginia, and Wyoming--were the largest coal producers from 1983 through 1988. The ninth State, Colorado, which is a relatively large coal producer, was chosen as an additional representative of western States. Production data collected on Form EIA-6 were compared with those on Form EIA-7A at the national, regional, and district levels.

EIA-7A and EIA-6 Comparisons

Form EIA-6 and Form EIA-7A have different reporting thresholds and respondent targets but represent approximately the same population. Companies that owned or purchased and distributed more than 50,000 short tons of coal during the year are required to submit Form EIA-6. Some companies above the threshold own and/or purchase coal from small mines. Subsequently, production from these mines is included in EIA-6 production totals. All mining companies that processed or prepared coal during the year should report production data on Form EIA-7A.⁶

At both the national and regional levels, EIA-6 and EIA-7A coal production estimates differed by less than 1 percent in 1988. However, differences among district-level estimates were larger (Table 2).

For over half of the coal-producing districts, EIA-6 and EIA-7A estimates were relatively close. But for District 16 and District 7, differences greater than 20 percent were observed. Although the discrepancy for District 16 appears to be large (a 25.4-percent difference), in terms of short tons, this difference is small (21,000 short tons). For District 7, the EIA-6 estimate exceeded the EIA-7A estimate by 21.4 percent, or by more than 3 million short tons.

EIA-6 respondents may misreport their appropriate coal-producing district since some are unfamiliar with the system of dividing the United States into geographical districts.⁷ (A State may have counties within two different districts.) Differences between estimates for Districts 7 and 8, which both include counties from Virginia and West Virginia, may be attributable to such misreporting of districts. EIA-6 and EIA-7A estimates of production from the two districts combined

⁴Respondent contact records are annotated documents containing information provided by mine operators in response to EIA editors' telephone requests for data or explanations of questionable data.

⁵Copies of State mining agency reports were not available for most years from 1983 through 1988. Therefore, contact persons at the agencies, whose names and addresses appear in Appendix B, provided the necessary production data over the telephone.

⁶Data on direct labor hours and coal value are collected from mines producing more than 10,000 short tons. Therefore, for consistency, the production of mines producing less than 10,000 short tons was not included in EIA-7A totals in this analysis. The excluded amount was approximately 0.3 percent of the total in 1988.

⁷Richard L. Gordon, "The Coal Data System: An Appraisal," unpublished report prepared from an independent expert review conducted by EIA's Office of Statistical Standards in 1990.

Table 2. EIA-6 and EIA-7A Coal Production by Region and District, 1988
(Thousand Short Tons)

Region and District	EIA-6 (1)	EIA-7A ^a (2)	(1) as a Percent of (2)
Appalachian	448,716	445,793	100.7
District 01	47,922	44,333	108.1
District 02	28,710	29,864	96.1
District 03	43,803	41,891	104.6
District 04	32,320	33,842	95.5
District 06	7,120	7,129	99.9
District 07	19,065	15,710	121.4
District 08	236,532	241,899	97.8
District 13	29,786	28,020	106.3
District 24	3,458	3,105	111.4
Interior	194,089	192,909	100.6
District 09	40,692	40,295	101.0
District 10	59,081	58,590	100.8
District 11	31,563	31,231	101.1
District 12	338	333	101.5
District 14	694	727	95.5
District 15	61,722	61,733	100.0
Western	306,874	307,843	99.7
District 16	103	82	125.6
District 17	16,568	16,660	99.4
District 18	33,291	33,408	99.6
District 19	163,497	164,014	99.7
District 20	18,064	18,163	99.5
District 21	29,783	29,721	100.2
District 22	38,873	38,881	100.0
District 23	6,695	6,915	96.8
U.S. Total	949,680	946,545	100.3

^a Excludes mines producing less than 10,000 short tons of coal during the year.

Sources: Energy Information Administration, *Coal Distribution*, January-December 1988, Table 1 and *Coal Production 1988*, Tables 2 and 3.

were within 1 percent of each other. Because Form EIA-6 collected production data only by district prior to 1989, State-level comparisons could not be made to explain differences between EIA-6 and EIA-7A estimates. EIA-6 data are now collected at the State level.

EIA-7A, MSHA, and State Mining Agency Comparisons

In comparing EIA-7A estimates with data from MSHA and the State mining agencies, it is important to keep in mind that the EIA-7A estimates contain tonnage for nonrespondents from both of these sources. At the national level, production from these sources (particu-

larly MSHA) account for very small proportions of total production. At the State level, the contribution of the State mining agency data is larger. For example, in Virginia tonnage obtained from the State mining agency accounted for approximately 9 percent of the total EIA-7A estimate in 1988. However, the inclusion of tonnage obtained from other sources in the EIA-7A estimates had little effect on comparisons.⁸

National Level

In 1988, MSHA estimates of annual U.S. production were 1 percent lower than EIA-7A estimates (Table 3). Furthermore, from 1983 through 1988, MSHA estimates were closer to EIA-7A estimates than in

⁸In *An Assessment of the Quality of EIA Data Series: Coal and Electric Power Data from 1977 to 1982* (Appendix B, Table B4), percentage differences between EIA-7A estimates and those from the State mining agencies were computed, eliminating tonnage for EIA-7A nonrespondents from both sets of estimates. These percentages did not indicate additional discrepancies; that is, other than those identified by comparing State mining agency and EIA-7A estimates including data for nonrespondents. Also, because there were fewer nonrespondents in 1988 than in the period from 1978 through 1982 (the period covered by the previous assessment), inclusion of tonnage from other sources should have affected the comparisons less than in the earlier report.

Table 3. EIA-7A and MSHA Annual Coal Production by Method of Mining, 1983-1988
(Thousand Short Tons)

Year	EIA-7A ^a (1)	MSHA (2)	Difference (2)-(1)	(2) as a Percent of (1)
Surface				
1983	478,315	466,479	-11,836	97.5
1984	540,490	535,376	-5,114	99.1
1985	529,746	514,175	-15,571	97.1
1986	526,932	517,941	-8,991	98.3
1987	543,396	532,604	-10,792	98.0
1988	565,961	561,023	-4,938	99.1
Underground				
1983	298,320	292,142	-6,178	97.9
1984	350,154	342,682	-7,472	97.9
1985	348,795	342,591	-6,204	98.2
1986	358,949	352,834	-6,115	98.3
1987	371,263	364,595	-6,668	98.2
1988	380,584	377,119	-3,465	99.1
Total				
1983	776,635	758,621	-18,014	97.7
1984	890,644	878,058	-12,586	98.6
1985	878,540	856,766	-21,774	97.5
1986	885,880	870,775	-15,105	98.3
1987	914,659	897,198	-17,461	98.1
1988	946,545	938,142	-8,403	99.1

^a Excludes mines producing less than 10,000 short tons of coal during the year.

Sources: Energy Information Administration, *Coal Production* 1983-1988 and Mine Safety and Health Administration, *Injury Experience in Coal Mining* 1933-1988, Table 6. MSHA production excludes bituminous coal refuse and culm bank production.

previous years (1978 through 1982).⁹ From 1978 through 1982, the differences between MSHA and EIA-7A U.S. production totals ranged from a high of 4.7 percent in 1978 to a low of 2.6 percent in 1982; from 1983 through 1988, the differences were no greater than 2.5 percent.

Similar observations were made when EIA-7A and MSHA data disaggregated by method of mining were compared.¹⁰

State Level

State-level comparisons analogous to those at the national level were made for the eight largest coal-producing States and Colorado for 1983 through 1988. (Colorado was included as an additional representative of western State production.)

Generally, there was close agreement between MSHA and EIA-7A estimates for each of the nine States.¹¹ However, for a few years a great disparity existed between MSHA and EIA-7A estimates of production for eastern Kentucky (1984, 1985, and 1987) and Pennsylvania anthracite (1985) (Appendix A, Table A4). EIA estimates exceeded those of MSHA, possibly because MSHA did not follow up on small-mine nonresponse.

There was also close agreement between State mining agency and EIA-7A estimates for each State except for Ohio, Pennsylvania, and Kentucky (Appendix A, Table A4). According to an official reached at the Ohio mining agency (Appendix B), the State agency's figures may be missing as much as 1 million short tons since there is no penalty for not reporting. The State mining agency estimates of production for Pennsylvania (1985) and Kentucky (1984 through 1987) were much higher than those of the EIA-7A. Based on respondent contacts, the Pennsylvania and Kentucky agency estimates include raw tonnage whereas only clean tonnage, which was shipped or sold, is included in the EIA-7A estimates.

⁹Results from analyses performed on data from 1978 through 1982 that are referenced throughout this section can be found in the EIA report cited in the previous footnote.

¹⁰Because national data aggregated from State mining agency reports were not available at the time this report was being prepared, comparisons involving them do not appear.

¹¹Estimates were considered close if percent differences were less than 7 percent.

Table 4. EIA-7A Small Mine Production, 1988
(Thousand Short Tons)

State	Production		(2) as a Percent of (1)
	EIA-7A All Mines (1)	EIA-7A Small Mines (2)	
Colorado	15,912	16	0.1
Illinois	58,594	4	*
Kentucky			
Eastern	117,524	1,170	1.0
Western	40,328	33	0.1
Ohio	34,043	201	0.6
Pennsylvania			
Anthracite	3,555	450	12.7
Bituminous	67,091	595	0.9
Texas	52,281	0	0
Virginia	45,886	343	0.7
West Virginia	145,005	622	0.4
Wyoming	164,014	0	0

* Rounds to zero.

Note: A small mine is defined as a mine producing less than 10,000 short tons.

Source: Energy Information Administration, *Coal Production 1988*, Tables 1 and 2.

County Level

EIA-7A and MSHA

EIA-7A and MSHA 1988 production data were compared at the county level for the nine States of interest. Since most of those States include numerous counties, a few counties were selected. Those considered were counties where MSHA county-level estimates exceeded those of the EIA-7A by an amount equal to the State-level production tonnage of mines producing less than 10,000 short tons (Table 4, Column 2). If for any given State, the difference between MSHA and EIA-7A county-level estimates was greater than the State-level production figure in Table 4, Column 2, this difference was not attributable solely to the exclusion of "small" mine production from the EIA-7A estimates (Table 5).¹²

In an attempt to explain the county-level differences in Table 5, mine-level production data were compared by matching mines within these counties that filed Form EIA-7A with those that reported to MSHA. These mines could be matched because each EIA-7A respondent is required to report its MSHA-assigned identification number.

Differences between EIA-7A and MSHA estimates at the county level were as high as 552.0 percent and as large as 4 million short tons. The primary reason for the discrepancies was the difference between the EIA and MSHA definitions of a mine. An operation may be considered as one mine for MSHA's purposes, but as two or possibly more mines for the EIA-7A data collection or vice versa. The following are examples:

- One mine in Texas, for example, seemingly reported production estimates to MSHA and EIA (via Form EIA-7A) that differed by almost 4 million short tons. Its production (17.2 percent of the State's production) was divided between two adjacent counties (Panola and Rusk) in the EIA-7A data base, but was found in only one county (Panola) in the MSHA data base.
- One underground mine was located in a single county (Wabash) in Illinois in the MSHA data base, while it was located in adjoining counties (Wabash County, Illinois and Gibson County, Indiana) in the EIA-7A data base. The Wabash County-level difference resulting from this discrepancy was 1.3 million short tons.

The actual physical locations of these operations were not investigated.

¹²There were no anthracite-producing counties in Pennsylvania or counties in Virginia for which the difference in EIA-7A and MSHA estimated production exceeded 10,000 short tons as described in the beginning of this section.

Table 5. EIA-7A and MSHA Coal Production for Selected Counties in Selected States, 1988
(Thousand Short Tons)

County	EIA-7A ^a (1)	MSHA ^b (2)	Difference (1)-(2)	(2) as a Percent of (1)	(1) as a Percent of EIA-7A State Total	(2) as a Percent of MSHA State Total
Colorado						
Weld	40	75	-36	189.9	0.3	0.5
Delta	421	441	-19	104.6	2.6	2.8
Illinois						
Wabash	1,595	2,910	-1,315	182.5	2.7	5.0
Randolph	5,793	8,796	-3,003	151.8	9.9	15.0
Williamson	1,040	1,385	-344	133.1	1.8	2.4
Christian	1,702	1,889	-187	111.0	2.9	3.2
Jefferson	3,983	4,023	-40	101.0	6.8	6.9
Ohio						
Guernsey	188	958	-770	509.7	0.6	2.8
Muskingum	552	806	-254	146.0	1.6	2.3
Harrison	2,562	2,820	-258	110.1	7.8	8.2
Texas						
Panola	8,968	12,574	-3,606	140.2	17.2	24.5
Hopkins	2,022	2,025	-3	100.1	3.9	3.9
Titus	8,739	8,747	-8	100.1	16.7	17.0
Kentucky						
Eastern						
Perry	9,450	10,941	-1,491	115.8	8.1	9.9
Western						
Union	6,595	9,053	-2,458	137.3	16.4	22.6
Hopkins	10,096	10,468	-372	103.7	25.1	26.1
Ohio	1,993	2,026	-33	101.7	4.9	5.1
Pennsylvania (bituminous)						
Mercer	180	1,172	-992	652.0	.3	1.8
Cambria	4,288	6,247	-1,959	145.7	6.4	9.5
Armstrong	4,796	5,553	-757	115.8	7.2	8.4
West Virginia						
Logan	14,210	15,279	-1,070	107.5	9.8	10.6
Wyoming						
Lincoln	4,896	5,004	-108	102.2	3.0	3.1
Campbell	135,975	136,054	-79	100.1	82.9	83.1

^a Excludes silt, culm, refuse bank, slurry dam, and dredge production except for Pennsylvania anthracite. Excludes mines producing less than 10,000 short tons of coal during the year.

^b Excludes bituminous coal refuse and culm bank production.

Sources: Energy Information Administration, Form EIA-7A, "Coal Production Report," and Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report," using a Statistical Analysis System (SAS) program.

EIA-7A and State Mining Agency

County-level differences between EIA-7A and State mining agency estimates were investigated for selected counties in Colorado and Illinois. These States had fewer than 50 mines each in 1988, and their agency data were conveniently accessible.¹³ As in the EIA-7A/MSHA comparison, the county-level differences were due mainly to the differing mine location definitions between the data collections.

The counties in Illinois and Colorado with State mining agency estimates exceeding those of the EIA-7A by an amount equal to the EIA-7A State-level production tonnage of small mines (14,000 and 16,000 short tons, respectively) were selected for analysis. The exclusion of small mines from EIA-7A tonnage did not account for county-level differences between EIA-7A and State mining agency estimates of 1988 production, which were as large as 36,000 and 1,315,000 short tons, respectively, in Colorado and Illinois (Table 6).

¹³State mining agency data on 1988 coal production for most of the nine States covered were not suitable for county-level and mine-level comparisons. Most of these data are sent to EIA in hardcopy form. A few State mining agencies, such as those in West Virginia, Virginia, Pennsylvania, and Kentucky, submit computer tapes containing respondent data.

Table 6. EIA-7A and State Mining Agency Coal Production for Selected Counties in Colorado and Illinois, 1988
(Thousand Short Tons)

State/ County	EIA-7A ^a (1)	Agency (2)	Difference (1)-(2)	(1) as a Percent of EIA-7A State Total	(2) as a Percent of Agency State Total
Colorado					
Gunnison	798	804	-6	5.0	4.8
Weld	40	75	-36	0.3	0.5
Illinois					
Christian	1,702	1,889	-187	2.9	3.2
Jefferson	3,983	4,033	-50	6.8	6.8
Wabash	1,595	2,910	-1,315	2.7	4.9
Williamson	1,040	1,460	-420	1.8	2.4

^a Excludes silt, culm, refuse bank, slurry dam, and dredge production except for Pennsylvania anthracite. Excludes mines producing less than 10,000 short tons of coal during the year.

Note: Differences and percents were computed using unrounded numbers.

Sources: Energy Information Administration, Form EIA-7A, "Coal Production Report," tonnage aggregated from individual responses using a Statistical Analysis System (SAS) program, and Colorado and Illinois State Mining Agency Reports.

Further Comparisons

To ascertain additional explanations for differences among the three data collections, EIA-7A forms and respondent contact records for 1988 in Ohio and parts of eastern Kentucky were reviewed.¹⁴ The results for a sample of the mines are as follows (Table 7):¹⁵

- Mine A. The definition of production on Form EIA-7A was misconstrued by the respondent.
- Mines B, C, D. Production from more than one operator was filed under one MSHA identification number. For the production of Mine C, the company reported its entire tonnage to MSHA rather than just tonnage for the one mine.

- Mine E. The company reported to EIA an incorrect production figure that was not proportionally large at the State level, but accounted for approximately 4 percent of the county production.
- Mine F. Tonnage was incorrectly reported to MSHA for a portion of the year.

Other reasons for differences for mines other than those in Table 7 were:

- Different tonnage was reported to the various data collectors.

The mining operator, its parent company, and/or contractors complete data collection forms. Therefore, it is possible for each of the three data collections to have different production totals.

Table 7. Sample of Differences in Reported Production Among Data Collections, 1988

Mine	State	County	Production (short tons)		
			EIA-7A	MSHA	State Agency
Mine A	Ohio	Harrison	67,254	68,918	68,918
Mine B	Ohio	Hocking	7,567	44,800	7,567
Mine C	Ohio	Holmes	6,900	599,751	348,982
Mine D	Ohio	Jackson	381,140	431,737	178,987
Mine E	Eastern Kentucky	Breathitt	200,000	741,893	741,001
Mine F	Eastern Kentucky	Floyd	228,485	62,360	NA

NA = Not available.

Sources: EIA: Energy Information Administration, Form EIA-7A, "Coal Production Report"; MSHA: Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report"; and State Agency: "1988 Ohio Alphabetical Directory of Reporting Producing Coal-Mine Operators."

¹⁴Selection of these two areas was based on large percent differences between MSHA and EIA-7A State-level totals from 1983 through 1988.

¹⁵Although some differences were small, they were investigated further to gain insight on respondent reporting errors.

- MSHA and the State mining agency were given the tonnage of coal shipments, but the amount of coal produced (including amounts that remained as stocks) is collected on Form EIA-7A.
- EIA tonnage included coal produced in 1987 but shipped in 1988.
- Stocks and tonnage produced under contract were not reported to MSHA.
- Tonnage was not reported to MSHA for one quarter.

Summary

The State- and national-level production estimates from Form EIA-7A corresponded closely to estimates from the other two data collections. At the county and mine levels, the reader should be aware that some discrepancies exist and are mainly the results of:

- Dissimilarities in mine definitions
- A wide variety of interpretations of the requests for production data.

4. Direct Labor Hours

In addition to data on the quantity of coal produced, Form EIA-7A is used to collect data on the total direct labor hours worked at the mining operation during the year. These data are used to obtain the "productivity" data published in *Coal Production*. Productivity is calculated by dividing total coal production by the total direct labor hours worked.

The Mine Safety and Health Administration (MSHA) also collects data on direct labor hours. This chapter addresses the question posed in Chapter 2 on how labor-hour data from MSHA and EIA compare. First a description of how the two agencies collect labor-hour data appears and then a comparison of these data at the national and State levels.

Differences Between EIA and MSHA Data Collections

Direct labor hours are collected by EIA on Form EIA-7A and by MSHA on the "Quarterly Mine Employment and Coal Production Report." The forms differ in the following ways:

- Reporting threshold

Form EIA-7A requests labor-hour data from mining operations that produced, processed, or prepared 10,000 or more short tons of coal, while the MSHA form asks all mining operations, regardless of size, to report labor hours.

- Handling of nonresponse

EIA mails letters to nonrespondents if EIA-7A forms are not submitted by the due date. Attempts are then made to telephone those nonrespondents who were large producers of coal during the previous year. Labor hours are estimated from secondary sources if the mining operation fails to provide labor-hour data.¹⁶

MSHA cites mining operations not responding to repeated requests for data. Although the citation generally is sufficient to induce a response, it is estimated that 1 to 2 percent of the data remain unreported.¹⁷

- Overtime hours

Form EIA-7A does not indicate explicitly how the respondent should report overtime hours, although the instructional phrase "report hours actually worked" suggests that each overtime hour is to be reported as 1 hour, rather than as the overtime equivalent. The MSHA form clearly states that each overtime hour worked is equivalent to 1 hour.

- Treatment of professional workers

Form EIA-7A requires respondents to include labor hours for onsite mining operations management and technical/engineering (professional) personnel but to exclude labor hours for office workers. MSHA combines professional and clerical personnel labor hours in a single category "Office."

- Allocation of labor hours for preparation plants located at a mine site

The labor hours associated with a preparation plant co-located at a mine that prepares coal originating from either a surface mine or an underground mine (but not both) are reported as part of the neighboring mine's labor hours on Form EIA-7A. In contrast, the MSHA form asks the respondent to make a distinction between mine and preparation plant labor hours.

Data Comparisons

Labor hours, as reported to EIA and MSHA, were compared at the national and State levels. Since MSHA labor hours for professional personnel cannot be sep-

¹⁶Secondary sources are State mining agencies and MSHA. If data from those sources are unavailable, direct labor hours are imputed from county- or State-level productivity averages, depending on the number and size of the mines within the county.

¹⁷Personal communication, Richard Smith, Mine Safety and Health Administration, Denver, Colorado, October 31, 1990.

arated from those for clerical personnel (as discussed earlier), labor hours falling in the category "Office" were excluded from the MSHA estimates in the comparisons. Consequently, EIA-7A labor hours should be slightly larger than those of MSHA since the EIA-7A estimates include hours worked by professional personnel (that is, technical/engineering staff).¹⁸

Also, to be consistent with the data published in the annual *Coal Production* reports, data for culm banks, refuse piles, and dredge operations were excluded from the analysis except for Pennsylvania anthracite.

National Level

At the national level, the MSHA labor-hour estimate was slightly higher (0.2 percent) than that of EIA in 1988. However, since the two data collections do not cover the same universe, differences in estimates were examined separately for mining operations present in both the EIA-7A and MSHA reporting systems (matched operations) and mining operations that were present in one reporting system only (unmatched operations).

Matched mining operations accounted for the bulk of labor hours reported to EIA and MSHA. From 1983 through 1988, differences between EIA-7A and MSHA labor-hour estimates for all matched mining operations did not exceed 1.0 percent (Table 8). Higher differences of 5.8 percent, 2.4 percent, and 4.3 percent (in 1988) were observed for matched surface mines, underground mines, and preparation plants, respectively.

On average, unmatched mining operations accounted for approximately 3 percent of total reported EIA-7A and MSHA labor hours from 1983 through 1988 (Table 8). Of the differences noted between EIA-7A and MSHA labor hours for all preparation plants (matched and unmatched), 65 percent were attributable to unmatched mining operations during this same period. However, differences in labor hours for surface and underground mining operations were due predominantly to differences among matched operations.

Some differences between reported labor hours are explained by the difficulty in commonly allocating labor hours for professional and preparation plant personnel for MSHA and EIA-7A estimates. Other explanations include processing errors and differences in the handling of nonresponses.

State Level

For nearly half of the coal-producing States, differences between EIA and MSHA reported labor hours exceeded 5 percent in 1988. Also, differences between total labor hours for matched mines were much greater than comparable national-level differences. Percent differences in 1988 were as high as 23.0 percent (Louisiana), 12.8 percent (Illinois), and 48.3 percent (New Mexico), respectively, for surface, underground, and preparation plant operations (Table 9).

The number of labor hours worked at surface mining operations in Colorado and underground mining operations in Wyoming were examined for 1988 to evaluate the consistency between EIA and MSHA reported labor hours for operations within a State (Table 10).¹⁹ The range of percent differences was zero to 8.1 percent for Wyoming and -0.2 to 32.3 percent for Colorado. Inconsistencies appear to be caused by the reporting of different labor hours to EIA and MSHA or the inclusion of preparation plant and professional personnel labor hours in EIA reported values that were not included in those of MSHA.

Summary

The analysis of differences in EIA-7A reported labor hours and MSHA reported labor hours suggests that both data collections are capturing essentially the same data. At the national level, minute differences among the data make the two sets highly comparable. However, the reader should be aware that as the data are disaggregated, differences increase.

¹⁸The impact of excluding "Office" labor hours from the MSHA data may be more evident for surface mining operations than for underground mining operations because the ratio of professional employees to total mining-related employees is generally larger at surface mines.

¹⁹Colorado and Wyoming were selected since the small number of surface and underground operations in each of these States simplified the investigation.

Table 8. EIA-7A and MSHA Annual Labor Hours for Matched and Unmatched Mining Operations, 1983-1988
(Million Hours)

Mining Operation/Year	Matched Mining Operations			Unmatched Mining Operations	
	EIA-7A (1)	MSHA (2)	(2) as a Percent of (1)	EIA-7A (3)	MSHA (4)
Surface					
1983	109.8	106.3	96.8	9.0	6.2
1984	120.2	116.8	97.2	6.6	5.3
1985	114.3	109.3	95.6	5.2	3.3
1986	105.8	101.8	96.2	3.5	2.8
1987	100.3	97.3	97.0	3.6	2.6
1988	98.2	92.5	94.2	2.8	2.1
Underground					
1983	164.5	166.8	101.4	7.6	6.5
1984	183.8	184.2	100.2	4.6	4.0
1985	175.4	178.7	102.0	3.9	3.0
1986	165.0	168.3	101.9	2.4	2.1
1987	153.4	154.1	100.5	2.5	2.6
1988	145.3	148.7	102.4	2.5	1.8
Preparation Plant					
1983	17.9	18.0	100.6	1.6	3.4
1984	20.9	21.2	101.4	1.5	2.7
1985	20.5	21.0	102.4	1.7	1.7
1986	16.3	18.7	110.7	1.2	3.4
1987	17.3	18.3	105.8	1.0	3.0
1988	17.4	18.4	105.7	1.0	2.6
All Mining Operations					
1983	292.2	291.1	99.6	18.2	16.1
1984	324.9	322.2	99.2	12.6	12.0
1985	310.2	309.0	99.6	10.8	8.0
1986	287.7	288.8	100.4	7.1	8.3
1987	271.0	269.7	99.5	7.1	8.2
1988	260.9	259.6	99.5	6.3	6.5

Sources: Energy Information Administration, Form EIA-7A, "Coal Production Report," and Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report," using a Statistical Analysis System (SAS) program.

Table 9. EIA-7A and MSHA Annual Labor Hours for Matched and Unmatched Mining Operations by State, 1988
(Thousand Hours)

Mining Operation/State	Matched Mining Operations			Unmatched Mining Operations	
	EIA-7A (1)	MSHA (2)	(2) as a Percent of (1)	EIA-7A (3)	MSHA (4)
Surface					
Alabama	4,168.6	3,644.3	87.4	43.3	47.1
Alaska	215.1	215.1	100.0	0	0
Arkansas	17.6	20.9	118.8	15.6	20.2
Arizona	1,922.3	1,961.7	102.0	0	0
Colorado	1,389.7	1,212.3	87.2	0	0
Illinois	5,817.3	5,610.3	96.4	69.1	9.0
Indiana	7,752.8	7,415.1	95.6	14.2	34.2
Iowa	214.2	222.1	103.7	0	0
Kansas	194.3	194.5	100.1	307.9	0
Kentucky	17,945.0	17,045.9	95.0	668.0	478.4
Louisiana	180.5	138.9	77.0	0	0
Maryland	431.9	447.0	103.5	39.4	0
Missouri	1,553.2	1,611.9	103.8	2.5	0
Montana	1,744.2	1,936.4	111.0	243.5	0
New Mexico	3,263.3	2,625.7	80.5	0	0
North Dakota	1,899.9	1,878.5	98.9	1.6	0
Ohio	7,593.5	7,305.5	96.2	178.9	19.9
Oklahoma	943.9	937.6	99.3	72.0	0
Pennsylvania	11,640.3	10,608.8	91.1	624.1	538.0
Tennessee	784.3	743.5	94.8	0	0
Texas	8,024.6	7,404.1	92.3	0	0
Virginia	2,438.5	2,525.5	103.6	158.3	170.8
Washington	1,446.3	1,465.7	101.3	0	0
West Virginia	8,212.1	7,748.5	94.4	317.1	764.3
Wyoming	8,375.2	7,582.4	90.5	44.4	43.3
Underground					
Alabama	8,411.7	8,387.5	99.7	0	0
Colorado	2,551.1	2,441.2	95.7	0	10.1
Illinois	15,388.9	17,352.3	112.8	0	0
Indiana	220.0	192.6	87.5	837.9	112.0
Kentucky	33,005.4	33,338.1	101.0	800.0	478.8
Maryland	500.0	495.6	99.1	0	0
New Mexico	74.3	69.0	92.9	0	0
Ohio	5,577.4	5,559.3	99.7	0	0
Pennsylvania	18,975.3	18,277.2	96.3	89.0	60.1
Tennessee	2,890.6	2,697.9	93.3	0	39.8
Utah	3,797.3	3,767.3	99.2	556.0	655.5
Virginia	14,206.6	16,009.5	112.7	25.4	118.1
West Virginia	39,412.0	39,816.4	101.0	205.0	330.9
Wyoming	305.9	285.7	93.4	0	0
Preparation Plant					
Alabama	235.6	215.2	91.3	170.4	135.6
Arizona	0	0	--	0	61.5
Colorado	95.1	101.9	107.2	0	23.0
Illinois	638.5	631.0	98.8	0	50.0
Indiana	64.7	77.8	120.2	132.3	55.5
Kentucky	4,793.7	5,464.6	114.0	73.2	593.0
Maryland	99.1	98.5	99.4	0	0.8
New Mexico	30.2	15.6	51.7	30.2	10.5
Ohio	581.9	513.7	88.3	220.9	8.7
Oklahoma	0	0	--	0	12.9
Pennsylvania	1,951.6	1,903.1	97.5	69.4	1,086.6
Tennessee	414.4	405.1	97.8	0	11.0
Utah	13.5	13.5	100.0	0	51.5
Virginia	2,869.5	3,091.4	107.7	39.6	14.9
West Virginia	5,605.9	5,865.6	104.6	247.2	469.9
Wyoming	0	0	--	0	7.6

Sources: Energy Information Administration, Form EIA-7A, "Coal Production Report," and Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report," using a Statistical Analysis System (SAS) program.

Table 10. EIA-7A and MSHA Annual Labor Hours and Production in Colorado and Wyoming, 1988

Mining Operations	Annual Labor Hours (thousand hours)			Coal Production (thousand tons)		
	EIA-7A (1)	MSHA (2)	Percent Differences ((1)-(2))/(1)	EIA-7A (3)	MSHA (4)	Percent Differences ((3)-(4))/(3)
Colorado Surface Mines						
Mine 1	33.32	32.46	2.6	178.70	176.90	1.0
Mine 2	115.00	77.89	32.3	760.91	759.90	0.1
Mine 3	55.61	40.49	27.2	220.81	208.76	5.5
Mine 4	201.95	202.30	-0.2	1,583.52	1,584.66	-0.1
Mine 5	13.71	11.63	15.2	42.43	27.94	34.2
Mine 6	355.02	284.34	19.9	2261.84	2235.96	1.1
Mine 7	585.40	537.05	8.3	3954.71	3954.71	0
Mine 8	29.64	26.11	11.9	39.53	75.05	-89.9
Wyoming Underground Mines						
Mine 1	42.52	41.23	3.0	30.84	27.26	11.6
Mine 2	■ 29.40	29.40	0	17.48	17.32	0.9
Mine 3	233.96	215.11	8.1	1089.69	1067.30	2.1

■ Imputed from MSHA data.

Sources: Energy Information Administration, Form EIA-7A, "Coal Production Report," and Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report," using a Statistical Analysis System (SAS) program.

5. Recoverable Reserves

This chapter presents information on the quality of the data on recoverable reserves obtained from Form EIA-7A. It answers the following questions posed in Chapter 2:

- How are recoverable reserves and recovery percentages estimated?
- Why do estimates of production differ from estimates of the reduction in recoverable reserves?
- How do data on reserves from Form EIA-7A compare with other sources?

Estimation of Recoverable Reserves and Recovery Percentages

While it is possible to obtain measurements of production and direct labor hours (discussed in Chapters 3 and 4), it is not possible to measure directly the quantity of reserves in the ground or the percentage of minable resources that will be recovered or mined in the future.

Mine operators estimate these resources from a limited number of measurements of thickness and elevation of potentially minable coal seams. These measurements are made in drill holes and at exposed portions of the seams. Next, with adequate data, a map may be made of expected conditions in unmeasured areas of the coal seam, showing isolines²⁰ of thickness within the minable depth range of the seam(s) and delineating the tract to be mined. Based on this map, the total volume of coal to be mined within the tract is estimated. Minalable resource tonnages are calculated using density factors for the coal in the mining area.

What EIA Collects

EIA collects annual data on recoverable reserves and recovery percentages for operating mines. Volumes of recoverable reserves are less than those of minable re-

sources (described above) because all of the coal within the mine cannot be extracted.

- In underground mining, some coal must be left in place (*in situ*) to support the strata lying above the mine openings and to provide safety-required or legally mandated barriers to water, fire, or air movements. In surface mining, some coal must be left along the pit walls, and additional coal may have to be left under mine roads, property boundaries, and other surface facilities.
- Federal, State, and local regulations may further limit the amount of coal that can be recovered.
- Coal may be left in place for economic as well as technological and regulatory reasons.

To estimate recoverable reserves on Form EIA-7A, mine operators are asked to multiply the estimated minable resources by the projected recovery percentage. Recoverable reserves, therefore, represent the portion of the minable resources that is expected to be extracted or recovered through mining. A recovery percentage represents what the mine operator thinks can be extracted over the life of the mine. Generally, mine operators do not revise recovery percentages even after coal is extracted. However, the factors that can result in changes in recovery percentages are changes in mining conditions, market conditions, technology, and regulations.

Complicating Factors

Several factors complicate the estimation of reserves:

- Seam thickness. Even over short distances, seam thickness is highly variable. Exploration drilling can improve estimates, but it is expensive; even extensive drilling programs may leave large areas unmeasured.
- Unexposed seams. Seams that have not been exposed by past mining activity have relatively few measurement points.
- The size of the mine. Larger operators can afford more extensive drilling programs.

²⁰An isoline is a line on a map along which there is a constant value, such as temperature or pressure.

Table 11. Classification of Mines Based on Changes in Reserves Versus Production, 1987 and 1988

Classification	Number of Mines ^a	Percentage of Total
1. Production, but No Changes in Recoverable Reserves	88	7.6
2. Production Greater than 110 Percent of Reduction in Recoverable Reserves	151	13.0
3. Recoverable Reserves Increase Despite Production	168	14.5
4. Production Less than 30 Percent of Reduction in Recoverable Reserves	80	6.9
5. Production Compares Closely with Change in Recoverable Reserves	672	58.0
Total	1,159	100.0

^a Excludes silt, culm, refuse bank, slurry dam, and dredge operations except for Pennsylvania anthracite counties. Excludes mines producing less than 10,000 short tons of coal during the year.

Note: For mines with equal recovery percentages only.

Source: Energy Information Administration, Form EIA-7A, "Coal Production Report," using a Statistical Analysis System (SAS) program.

- The location of the mine. Mines in regions such as the midwestern region of Illinois, Indiana, and western Kentucky are characterized by relatively consistent seams that permit more accurate estimates of reserves.
- The use of the estimates. Since reserve estimates are used by mine operators in their economic feasibility analyses, prudence would warrant conservative assumptions in the development of these estimates. On the other hand, an individual or company seeking to demonstrate a mine's economic viability might be inclined to overestimate the mine's reserves.

Production Versus Change in Recoverable Reserves

Assuming that the mining plan has not changed, and that the reserves have not been re-estimated using new data, procedures, or assumptions, the only change in the mine's recoverable reserves from one year to the next should be caused by production. The EIA-7A definition of recoverable reserves equates essentially to the coal in the ground that can be produced. Therefore, any difference between actual production for a year and the recoverable reserves mined within that same year should indicate a refinement of the recovery factor or a reporting error.²¹

The difference between (1) production and (2) the change in recoverable reserves was examined for the 1,159 mines that had recoverable reserves in both 1987 and 1988 and reported unchanged recovery percent-

ages in both years. The recoverable reserves for these mines accounted for 76.9 percent of the total recoverable reserves in 1988. Asymmetric bounds (less than 30 percent, greater than 110 percent of reduction in recoverable reserves) were used to detect anomalies. Of the mines of interest, 487 mines were anomalies, accounting for 18.8 percent of the total recoverable reserves for 1988 (Table 11).

As a part of this study, telephone calls were made to a sample of 32 respondents with discrepancies to obtain explanations for the anomalies. This sample represented the major mining regions of the Nation and covered mines in Pennsylvania, Kentucky, Wyoming, Montana, and Illinois.

A random sample of approximately 160 mines with discrepancies was initially selected from the 487 mines with anomalous values. These mines had:

- Production that was less than 30 or greater than 110 percent of the reduction in recoverable reserves
- Production but no changes in recoverable reserves
- Recoverable reserves that increased despite production.

EIA-7A forms submitted by these mines were reviewed to eliminate those with imputed or adjusted values, resulting in a list of 47 mines eligible for followup calls. Of the 47 mines called, responses were obtained for 32, which accounted for 2.5 percent of total recoverable reserves in 1988.

For over 80 percent of the 32 respondents, the most common explanations for the discrepancies were:

²¹A mine's production may be measured either before or after coal is prepared. When measured prior to preparation, the coal will contain unavoidable impurities (for example, shale, limestone, and pyrite). When production is measured following preparation, it will generally exclude some material (both coal and impurities) originally contained within the coal seam. Thus, another possible reason for the difference between the reduction in a mine's reserves and production is the time of measurement of production relative to coal preparation.

- Re-estimations of reserves (11 respondents)
- Actual changes in reserves caused by the acquisition of new coal properties or the sale of existing properties (11 respondents)
- Reporting error (4 respondents).

In addition:

- Two respondents did not know the cause of the discrepancy.
- One respondent indicated that the observed discrepancy was due in part to the reporting, for 1988, of a preliminary estimate that was subsequently revised, and in part to the acquisition of additional reserves.
- Another respondent stated that the 1988 reported reserves included coal held in stocks as well as *in situ* coal. Since the 1988 production was still held in stocks as of the end of the year, there was no change in the reported recoverable reserves.
- One respondent subtracted the portion of reserves expected to be lost during the cleaning process in 1987, but in 1988 the mine stopped cleaning its coal and hence did not subtract any amount.
- One respondent's mine is small and has no drilling program. The reported recoverable reserves are nothing more than crude "guesstimates"; they are not re-estimated each year.

Comparison with Other Sources

Two potential sources of data for reserve-related comparisons were found:

- BXG, Inc.'s annual reports on coal supply and demand
- MacLean Hunter's *Keystone Coal Industry Manual*.

Only the first source is viable; the second does not provide comparable data because:

- It is a voluntary mail survey with few respondents actually providing estimates of their reserves.
- The limited available data on reserves are published at the company (as opposed to the mine) level.
- The company-level estimates include not only reserves that have already been committed to existing mines, but also reserves that will be developed by new mines to be opened in the future.

The BXG data are published in a series of coal supply and demand reports covering the U.S. coal mining regions, and are updated annually. In addition to data on mine location (State and county), production, capacity, and coal quality, the BXG reports include estimates of total and recoverable reserves.²² For the western mine regions, these reserve-related data are provided for most (if not all) mines. In the East, reserve estimates are provided only for the larger mines (defined roughly as those producing over 100,000 short tons per year).

Recoverable reserve estimates for 1986 presented in the BXG report, *Powder River Basin Coal Supply and Demand 1988 Update*, were compared with the EIA-7A data. The Powder River Basin, located in northern Wyoming and southeastern Montana, includes most of the mines currently operating in these two States. It has few mines, easy minability, and well-drilled reserve areas.

First, the mines in the 1986 EIA-7A data base were compared with the mines in the Powder River Basin report. From the mines located in the EIA-7A data base, 6 of the 8 mines located in Montana and 18 of the 27 mines located in Wyoming were identified and matched with mines included in the BXG reports. The recoverable reserves data for those 24 mines from the EIA-7A data base and the BXG report were summed at the State level and compared.

For the two States combined, the BXG total was 1.9 percent lower than the EIA-7A total. A considerably larger difference was observed for Montana where the BXG total was 24.3 percent (414 million tons) lower than the EIA-7A total. In Wyoming, there was better correspondence. The BXG State total was 4.4 percent larger than the EIA-7A total.

Furthermore, differences between the two sets of data were typically large at the mine level (Figure 3). The BXG estimate was smaller than the EIA-7A estimate for 13 mines; for the remaining 11 mines, it exceeded the EIA-7A estimate. The BXG estimate fell within plus or minus 10 percent of the EIA-7A estimate for only 7 of the 24 Powder River mines. It differed from the EIA-7A estimate by plus or minus 20 percent or more for 12 mines (50 percent of the total). At four mines, the BXG estimate was less than 50 percent of the EIA-7A estimate, and at two mines it was at least 9 times larger.

The large differences between the BXG and EIA-7A estimates appear to be caused largely by BXG procedures. To obtain its estimates, BXG uses recoverable reserve data contained in the permit applications filed by mine operators with State and/or Federal regulatory agencies. The recoverable reserve estimate provided in each mine's permit application represents original reserves. Each year, BXG updates this estimate to

²²The BXG definition of reserves is similar to that of EIA.

reflect depletion estimated from MSHA production data. In short, the reserve data published by BXG are not obtained annually from mine operators; rather BXG estimates them using data from earlier years.

Unlike the EIA-7A data, BXG estimates do not capture some of the changes unrelated to depletion (for example, re-estimation based on new data or procedures). These factors tend to slow the expected rate of change in reserves. As a result, estimates of reserves based on current data would tend to be larger than those based on data for earlier years adjusted for depletion. Although the EIA-7A total recoverable reserves are slightly less than the BXG total for Wyoming, in general, the EIA-7A reserve estimates exceed the BXG estimates. These results support the hypothesis that the observed differences reflect the BXG estimation procedures.

Summary

Data on recoverable reserves were evaluated by comparing them with production data collected on Form EIA-7A and with data on reserves obtained by another organization (BXG, Inc.). While the internal comparison (which included followup telephone calls to a sample of 32 respondents with anomalous values) identified some reporting errors, most of the discrepancies were due either (1) to re-estimation of reserves based on new data or procedures or (2) to acquisition of new properties. The comparison with BXG data, on the other hand, did not reveal any reporting errors in the EIA-7A data. In this situation, discrepancies appear to be mainly caused by the BXG estimation procedures.

Figure 3. EIA-7A and BXG, Inc. Recoverable Reserves for Mines in the Powder River Basin, 1986

Sources: Energy Information Administration, Form EIA-7A, "Coal Production Report," and BXG, Inc., *Powder River Basin Coal Supply and Demand 1988 Update*.

Note: Each point on the graph represents the EIA and BXG estimates of recoverable reserves for a given mine in the Powder River Basin. A point on the solid line represents a BXG estimate that is equal to the corresponding estimate reported to EIA. A point on the dotted line below (above) the solid line represents a BXG estimate that is 90 percent (110 percent) of the corresponding estimate reported to EIA.

6. Prices

Unlike the data on production, direct labor hours and recoverable reserves discussed in Chapters 3, 4 and 5, respectively, mine-level data that are directly comparable with Form EIA-7A coal price data are not available. In this chapter, EIA coal price data are examined by looking at variability and anomalous values within the data series. Anomalous values are not necessarily the result of errors in the data but could be due to factors intrinsic to the coal industry such as type of coal, location of the mine, or type of contract. EIA collects data on some, but not all, of these factors.

This chapter begins by discussing how EIA obtains data on mine price and the variability in the mine price data. It then discusses the factors that could account for variability in the price data, presents results for those for which EIA collects data, and discusses extreme coal price values.

EIA-7A price data are further examined through comparisons with data from FERC Form 423 and with data from FERC Form 580, which contains information on items not included on Form EIA-7A that could affect price.

How EIA Obtains Data on Mine Price

Form EIA-7A does not collect mine price data directly. Instead, mining companies are required to report the quantity of coal produced during the year and its free on board (f.o.b.) value. The f.o.b. value is the value of coal at the coal mine or of coke and breeze at the coke plant, without any insurance, freight transportation charges, or taxes added. EIA defines mine price as the coal f.o.b. value divided by the total quantity of coal produced, and thus the price is a production-weighted average price.²³

The Concept of Price

The EIA definition of price differs from other concepts of price. For example, coal mine operators typically think in terms of contract prices for both long- and short-term delivery. Inventory managers, brokers, and buyers pay close attention to spot prices: the amounts for which coal can be bought or sold on a desired day of purchase in an open market. Economists, however, usually conceive of price as market price. Market price differs from both contract and spot prices in that it refers to the price at which coal of a specific quality, in a particular location, and available at specified times can be freely bought or sold. Unlike contract prices, market price is a reflection of current supply and demand conditions.

EIA publishes aggregated coal price data. They are not disaggregated by coal quality, delivery date, and contract type. This should be taken into consideration when using these data.

Variability of Mine Price Data

In 1988, mine prices for the 2,915 mines in the United States that produced more than 10,000 short tons of coal during the year ranged from \$2.67 to \$90.80 per short ton, with a median price of \$25.00. The largest differences between minimum and maximum mine prices at the State level were for eastern Kentucky (\$12.21 to \$90.80 per short ton) and Pennsylvania anthracite (\$2.67 to \$73.00 per short ton).

At the State level, average mine prices ranged from \$7.38 (North Dakota lignite), to \$44.16 per short ton (Pennsylvania anthracite), while the average mine price for the United States was \$22.07.²⁴

²³Obtaining mine prices in this manner reduces the respondent's burden. Rather than reporting price data for each transaction, the respondent reports only total value and volume.

²⁴Average mine price, as defined in *Coal Production 1988*, is the total f.o.b. value of coal divided by the total amount of coal produced. This definition holds at the county, State, and national levels.

Table 12. Distribution of Coal Price Data by Selected Classifications, 1988
(Dollars per Short Ton)

Classification	Number of Mines ^a	Price Percentiles		
		25	50	75
Coal Rank				
Anthracite	64	21.38	39.57	54.18
Bituminous	2,781	20.25	25.00	29.07
Subbituminous	44	6.90	11.96	20.66
Lignite	26	7.79	11.00	12.62
Mine Type				
Surface	1,452	19.54	23.03	27.59
Underground	1,463	22.00	26.53	30.00
Market Category^b				
Open	2,862	20.00	25.00	29.09
Captive	145	19.37	27.64	34.02
Region^c				
Appalachian	2,563	20.50	25.64	29.54
Interior	248	18.97	23.00	27.43
Western	104	9.80	17.30	24.23

^a Excludes silt, culm, refuse bank, slurry dam, and dredge operations except for Pennsylvania anthracite counties. Excludes mines producing less than 10,000 short tons of coal during the year.

^b Both captive and open market coal was sold by 32 mines.

^c See the glossary for the coal-producing States in each region.

Source: Energy Information Administration, Form EIA-7A, "Coal Production Report," using a Statistical Analysis System (SAS) program.

Factors Contributing to the Variability

EIA collects data on several factors that could account for some of the variability in the price data. In this section, descriptive statistics (the median, first quartile, and third quartile)²⁵ are examined in order to identify and quantify variability by coal rank, mine type, market category, and geographic region (Table 12).

The data suggest that coal prices increase with coal rank. For example, the median price is the lowest for the lowest rank coal (lignite), and the highest for the highest rank coal (anthracite).

Prices also vary by mining type. Quartile prices for underground mines are higher than for surface mines.

The median and third quartile prices for captive market coal are higher than for open market coal, whereas the first quartile price is higher for open market coal. Captive mine prices sometimes reflect internal accounting adjustments. The price may include costs not normally included in the minemouth price, such as the cost of

transporting the coal to the power plant or coke plant. Alternatively, a "price" calculated for internal accounting purposes might include only the costs of production, exclusive of return on investment. Hence, prices used for internal accounting purposes may not be directly comparable to open market prices. At times, electric utilities and steel companies acquire captive operations in order to assure a stable and uniform supply of high quality coal, and thus may be willing to pay a high price.

The coal prices also vary by geographic region. Quartile prices are highest in the Appalachian region and lowest in the Western region.²⁶

Although the four factors just discussed contribute to variation in mine prices, there are large variations in the data even when the prices are crossclassified by these factors. Median mine prices varied among States in the same region for both surface and underground bituminous mining operations, as shown by comparing open market bituminous coal prices for States with more than 10 mines (Table 13). For example, the median prices for bituminous, open market surface mines in Alabama and Ohio are \$33.88 and \$21.68 per short ton, respectively.

²⁵The first quartile is the 25th percentile, the median the 50th percentile (or second quartile), and the third quartile the 75th percentile. The median represents the middle point of the data.

²⁶This is partly due to the fact that anthracite is only produced in the Appalachian region, and relative to other regions, a higher percentage of the mines in the Western region produces subbituminous and lignite coal.

Table 13. Open Market Prices for Bituminous Coal in Selected States by Mine Type and Region, 1988
(Dollars per Short Ton)

Region/Mine Type	Number of Mines ^a	Maximum Price	Minimum Price	Price Percentile			Interquartile Range of Price
				25	50	75	
Appalachian							
Surface							
Alabama	65	81.06	13.04	27.75	33.88	40.40	12.65
Eastern Kentucky	305	43.56	14.29	19.96	22.70	28.28	8.32
Maryland	21	29.28	11.45	17.94	19.42	22.16	4.22
Ohio	146	37.98	7.50	17.50	21.68	26.28	8.78
Pennsylvania Bituminous	296	36.00	10.50	20.00	23.33	26.55	6.55
Tennessee	22	29.43	16.00	20.75	24.82	25.96	5.21
Virginia	76	35.72	8.50	21.86	24.37	26.66	4.79
West Virginia	196	37.24	14.00	19.29	23.00	25.89	6.60
Underground							
Alabama	12	54.52	34.20	36.48	39.97	43.09	6.61
Eastern Kentucky	553	44.55	12.22	22.43	26.53	29.32	6.89
Ohio	10	37.50	14.06	14.44	30.98	35.85	21.41
Pennsylvania Bituminous	67	50.23	14.73	27.15	30.73	33.68	6.53
Tennessee	54	39.76	17.00	20.98	22.10	25.25	4.27
Virginia	251	38.03	12.00	18.90	26.61	29.45	10.55
West Virginia	392	43.38	10.90	23.50	27.43	30.00	6.50
Interior							
Surface							
Illinois	18	32.98	21.49	23.69	26.28	30.10	6.41
Indiana	60	30.75	13.00	18.00	20.56	23.72	5.72
Oklahoma	21	41.18	21.63	27.15	31.01	35.57	8.42
Western Kentucky	57	32.13	14.03	18.00	20.00	22.82	4.82
Underground							
Illinois	28	46.04	20.81	25.24	28.33	31.05	5.81
Western Kentucky	24	32.38	16.16	21.58	24.84	26.04	4.46
Western^b							
Underground							
Colorado	12	46.51	17.10	18.88	23.68	30.87	11.99
Utah	18	37.83	14.21	19.54	25.00	30.86	11.32

^a Excludes silt, culm, refuse bank, slurry dam, and dredge operations except for Pennsylvania anthracite counties.

^b There were no western States with 10 or more surface mines.

Note: Data are provided for States with 10 or more surface or underground mines producing 10,000 or more short tons during the year.

Source: Energy Information Administration, Form EIA-7A, "Coal Production Report," using a Statistical Analysis System (SAS) program.

There were also considerable differences in interquartile range.²⁷ Thus, not only were median prices different, but also the distributions about the respective medians varied for both surface and underground mines. For example, in Figures 4 and 5, where the distribution of both surface and underground mine prices in Virginia and Alabama are shown, respectively, the distribution for surface mines in Virginia is more concentrated about its median than that of Alabama.

Therefore, there are additional factors affecting coal prices that are not captured by EIA data collections. One factor may be type of coal produced (for example, metallurgical versus steam). Another factor may be

the type of contract. There are four basic types of contracts: long-term, captive, short-term, and spot market.

Under long-term coal contracts, a producer agrees to provide coal of a certain quality and quantity over a specified period of time to a buyer at a mutually acceptable price. Most long-term contracts represent the future delivery of coal from a dedicated quantity of reserves. As a result, contract prices are usually negotiated to cover the full cost (including capital costs) of mining a specific reserve block. Mutually agreed-upon mechanisms for price escalations are provided so that the operator can recover the increases in operating costs over time. Similarly, in captive coal operations, the objective of the buyer is to obtain a secure and

²⁷The interquartile range is the difference between the third and first quartiles. For a fixed median value, a larger interquartile range suggests a broader distribution of coal prices than a smaller interquartile range.

Figure 4. Open Market Mine Prices for Bituminous Coal in Virginia, 1988

Source: Energy Information Administration, Form EIA-7A, "Coal Production Report," using a Statistical Analysis System (SAS) program.

Figure 5. Open Market Mine Prices for Bituminous Coal in Alabama, 1988

Source: Energy Information Administration, Form EIA-7A, "Coal Production Report," using a Statistical Analysis System (SAS) program.

Table 14. Price Outliers for Bituminous Coal, 1988

Mine Type/Mine ID	Open Market Price (dollars per short ton)	Open Market Production (thousand short tons)	Captive Price (dollars per short ton)	Captive Production (thousand short tons)
Surface Mines				
Mine A	58.49	834,761	--	0
Mine B	61.50	46,000	--	0
Mine C	81.06	571,107	--	0
Mine D	20.02	79,470	6.00	351
Mine E	8.00	25,761	--	0
Mine F	7.50	11,441	--	0
Mine G	7.93	93,658	--	0
Mine H	8.50	30,027	--	0
Underground Mines				
Mine I	50.23	43,882	--	0
Mine J	20.93	14	90.81	168,904
Mine K	10.90	183,827	--	0

Source: Energy Information Administration, Form EIA-7A, "Coal Production Report," using a Statistical Analysis System (SAS) program.

reliable source of supply over an extended period of time.

Prices in the short-term and spot markets reflect prevailing market conditions. As a result, they tend to be volatile, rising rapidly during periods of excess demand and dropping quickly during periods of low demand and excess supply. Like long-term contracts, short-term purchases allow for price adjustment to account for variability in the quality of coal.²⁸

Analysis of Outlying Coal Values

Outlying bituminous coal prices were selected for analysis. The criteria used to select outliers were as follows:

- For bituminous surface mines, open and/or captive prices less than \$10 and greater than \$40 per short ton
- For bituminous underground mines, open and/or captive prices less than \$12 and greater than \$40 per short ton.

Of the bituminous surface and underground mine prices, 2 percent were outside of the chosen bounds.

The respondent contact records for 11 of the mines with extreme prices were examined to determine possible reasons for the prices (Table 14). These prices were verified with the respondents as being correctly reported to EIA.

For surface mines, respondent contact records indicated that high open market prices for three mines (mines A, B, and C) resulted from the sale of high quality coal; low captive prices for one mine (mine D) resulted from the use of captive production at the mine for auxiliary purposes (for example, heating offices); and low open market prices for four mines (mines E, F, G, H) resulted from auger mining. For underground mines, respondent contact records indicated that one mine (mine I) was temporarily abandoned and new owners were able to sell coal at a higher price; one mine consumed the coal at the mine (mine J) and the high price reflected internal accounting procedures; and the quality of the coal at one mine was poor (mine K).

Extreme prices are not always attributable to a single factor. For example, a representative contacted at mine C stated that prices are negotiated on contracts allowing for price escalation. The prior price history for mine C indicated that the price in 1986 was \$74 per short ton and the price in 1988 was \$81. The representative also stated that the mine's coal price is relatively high in order to guarantee a supply of coal to a buyer.

²⁸The description of contract types was initially part of the unpublished report "Economic Evaluation of the Western Coal Mining Industry" by Al Herhal and Scott Britton, prepared for the Department of the Interior, Office of Policy and Evaluation (May 1981).

Comparisons with Other Surveys

FERC Form 423

Price data from 1986 collected on Form EIA-7A were compared with 1986 cost data from FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants."²⁹ The relevant data items on Form EIA-7A are total coal production, total f.o.b. value, mine type, and mine location; respondents need not report sales by end use (steam, metallurgical) or economic sector (industrial, commercial, electric utility).

FERC Form 423 collects information on monthly fuel purchases by electric utilities. This form is completed by electric utilities for each of their fossil-fuel plants operating in the United States with a combined steam installed nameplate capacity of 50 megawatts or larger. The relevant data reported on this form are quantity of coal delivered to the power plant, receipts/costs of each delivery reported in cents per million Btu, coal quality characteristics measured by heat content, mine type, and originating source of the coal.

The two data sets are not directly comparable. Form EIA-7A requires the reporting of total production and f.o.b. mine value (excluding transportation, handling, and insurance costs and taxes) for all mines producing more than 10,000 short tons per year. FERC Form 423 requires the total quantity of coal received, by supplier, and the total delivered cost of the coal received from each supplier. Since the EIA-7A frame includes those mines selling their products exclusively to nonutility markets, its quantities of coal production should be greater than the quantities of coal receipts reported on FERC Form 423. Also, since values are supposed to be f.o.b., EIA-7A prices should be less than estimates of costs reported on FERC Form 423.

EIA-7A and FERC Form 423 data were compared at the State level, by mine type (Table 15). For the most part, EIA-7A production quantities were greater than FERC Form 423 deliveries, as expected.

However, although delivered costs on FERC Form 423 were higher than prices on Form EIA-7A, there were large differences between the estimates. A detailed review of these differences provided little insight as to their cause. A direct matching of mines reporting

on both forms was not feasible because of the following problems:

- Numerous mines known to be selling coal to electric utilities could not be found on FERC Form 423.
- The same mine is listed under different names on Form EIA-7A and FERC Form 423.
- Some mines are listed several times on FERC Form 423.
- Company names are sometimes reported as mine names on FERC Form 423.
- The same mine is listed in multiple counties on FERC Form 423.
- Multiple mines on Form EIA-7A are sometimes listed as a single mine on FERC Form 423.

FERC Form 580

FERC Form 580 data were used to gain additional insight on f.o.b. mine price data reported on Form EIA-7A and identified as outliers by mining method and geographical region.³⁰

FERC Form 580, "Interrogatory on Fuel and Energy Purchase Practices," is a biannual survey of electric utilities that is used by FERC to conduct reviews of utility fuel and energy purchasing practices. All public utilities with steam-electric generating capacity of 50 megawatts, or greater, are required to respond to this survey. Among the information collected on this survey are the location of all coal supplies, actual delivered tonnage, contract and actual coal quality specifications, f.o.b. mine price, delivered price, and transportation mode and costs. Also required is the identification of captive operations and all financial associations with fuel suppliers, fuel brokers, and/or fuel transportation systems.

Only 20 outliers, accounting for 22 million short tons of production, could be successfully linked with FERC Form 580 data. For the 14 eastern mines that had high prices, 9 represent long-term contracts with price escalation provisions. Two of the mines produce high quality bituminous coal and the remaining three are captive operations. Of the six western mines, the five that had high prices were large operations selling their product under long-term contracts. It is not clear why the sixth price was low.

²⁹The analysis in this section was initially part of the unpublished study "Comparison of Coal Prices by State of Origin from Form EIA-7A and FERC Form 423," prepared for the Energy Information Administration, by Al Herhal (1988).

³⁰Prices for eastern underground mines were defined as outliers if the reported f.o.b. mine price per short ton was less than \$12 or greater than \$40; for eastern surface mines, less than \$10 or greater than \$40; and for western surface mines, less than \$4 or greater than \$15. The definition for western underground mines was similar to the definition for eastern underground mines; however, none were found that could be matched with FERC Form 423 and FERC Form 580 data.

Table 15. Summary of Coal Production and Purchases by Mining Method and State, 1986

Mining Method/State	EIA-7A		FERC Form 423		
	Dollars per Short Ton	Production (thousand short tons)	Dollars per Short Ton	Purchases (thousand short tons)	Difference (3)-(1) (dollars per short ton)
	(1)	(2)	(3)	(4)	(5)
Surface Mining Method					
Alabama	41.17	12,419	49.79	10,001	8.62
Colorado	21.49	9,760	28.02	8,454	6.53
Illinois	28.79	22,147	34.17	21,455	5.38
Indiana	25.09	30,950	30.91	24,882	5.82
Iowa	W	352	29.89	146	W
Kansas	25.65	1,479	24.78	1,253	-0.87
Kentucky	25.93	65,089	39.40	66,152	13.47
Maryland	W	1,418	36.04	1,171	W
Missouri	29.67	4,682	30.35	4,423	0.68
Montana	12.93	33,978	29.05	30,490	16.12
New Mexico	W	20,743	26.21	20,143	W
North Dakota	8.49	25,640	11.37	19,662	2.88
Ohio	28.61	21,858	36.34	19,263	7.75
Oklahoma	28.23	3,036	35.38	1,480	7.15
Pennsylvania	27.22	33,398	37.38	24,595	10.16
Tennessee	26.45	1,516	38.87	1,069	12.42
Texas	11.60	48,590	14.09	42,283	2.49
Virginia	27.27	6,966	44.67	6,339	17.40
West Virginia	28.70	26,136	38.44	20,703	9.74
Wyoming	W	136,656	28.05	134,368	W
Underground Mining Method					
Alabama	41.36	13,273	51.63	6,385	10.27
Colorado	26.92	5,456	49.67	3,827	22.75
Illinois	30.66	39,716	37.40	35,542	6.74
Indiana	29.94	1,860	32.95	446	3.01
Kentucky	26.22	87,201	40.93	48,713	14.71
Ohio	39.17	14,352	43.49	14,713	4.32
Pennsylvania	33.07	37,167	37.96	21,667	4.89
Tennessee	28.45	5,232	38.65	3,454	10.20
Utah	27.64	14,269	36.75	9,705	9.11
Virginia	28.31	33,803	47.82	11,436	19.51
West Virginia	31.46	103,128	41.59	51,842	10.13

W = Withheld to avoid disclosure of individual company data.

Sources: Energy Information Administration, *Coal Production 1986*, Table 24 and Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants."

Summary

There is substantial variation in the EIA-7A price data. Some price variability is explained by differences in region, coal rank, mine type, and market category, and other unmeasured factors, perhaps contract type and coal quality, as suggested by data from FERC Form 580, may be behind the price variation. However, it is

difficult to determine how much of the remaining variability is due to factors for which EIA does not collect data.

In most cases, Form EIA-7A prices were lower than FERC Form 423 estimates of cost at the State level. This was expected, as mine values reported on Form EIA-7A exclude transportation, handling, and insurance costs and taxes, which are included in FERC Form 423 values.

Appendix A

Detailed Tables

Appendix A

Detailed Tables

Table A1. Nonresponse to Form EIA-7A Coal Production Data Element by State, 1983-1988

State/Year	Production (thousand short tons)			Number of Mines		
	All Mines ^a (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Alabama						
1983	23,625	422	1.8	98	11	11.2
1984	27,019	521	1.9	106	14	13.2
1985	27,685	822	3.0	96	23	24.0
1986	25,692	1,123	4.4	84	22	26.2
1987	25,461	240	0.9	77	11	14.3
1988	26,434	399	1.5	77	10	13.0
Alaska						
1983	786	0	0	1	0	0
1984	859	0	0	1	0	0
1985	1,433	0	0	1	0	0
1986	1,570	0	0	1	0	0
1987	1,492	0	0	1	0	0
1988	1,745	0	0	1	0	0
Arizona						
1983	11,404	0	0	2	0	0
1984	11,522	0	0	2	0	0
1985	9,625	0	0	2	0	0
1986	11,556	0	0	2	0	0
1987	11,379	0	0	2	0	0
1988	12,398	0	0	2	0	0
Arkansas						
1983	62	31	50.4	3	1	33.3
1984	60	15	25.9	3	1	33.3
1985	68	43	63.3	3	2	66.7
1986	148	0	0	4	0	0
1987	67	0	0	4	0	0
1988	255	0	0	3	0	0
California						
1983	0	0	--	0	0	--
1984	0	0	--	0	0	--
1985	71	0	0	1	0	0
1986	0	0	--	0	0	--
1987	46	0	0	1	0	0
1988	54	0	0	1	0	0
Colorado						
1983	16,713	47	0.3	35	2	5.7
1984	17,946	14	0.1	34	1	2.9
1985	17,202	77	0.4	27	2	7.4
1986	15,216	0	0	22	0	0
1987	14,411	0	0	19	0	0
1988	15,896	0	0	20	0	0

See footnotes at end of table.

Table A1. Nonresponse to Form EIA-7A Coal Production Data Element by State, 1983-1988
(Continued)

State/Year	Production (thousand short tons)			Number of Mines		
	All Mines ^a (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Georgia						
1983	185	0	0	1	0	0
1984	125	125	100.0	1	1	100.0
1985	0	0	--	0	0	--
1986	0	0	--	0	0	--
1987	0	0	--	0	0	--
1988	0	0	--	0	0	--
Illinois						
1983	56,845	0	0	55	0	0
1984	63,756	0	0	53	0	0
1985	59,201	79	0.1	54	2	3.7
1986	61,862	55	0.1	52	1	1.9
1987	59,151	44	0.1	50	2	4.0
1988	58,590	0	0	46	0	0
Indiana						
1983	31,788	231	0.7	80	4	5.0
1984	37,540	720	1.9	80	12	15.0
1985	33,294	326	1.0	66	4	6.1
1986	32,811	217	0.7	59	3	5.1
1987	34,172	51	0.1	60	1	1.7
1988	31,231	362	1.2	65	3	4.6
Iowa						
1983	368	0	0	4	0	0
1984	526	0	0	5	0	0
1985	591	0	0	5	0	0
1986	477	93	19.6	5	2	40.0
1987	468	0	0	4	0	0
1988	333	0	0	3	0	0
Kansas						
1983	1,263	0	0	7	0	0
1984	1,328	0	0	6	0	0
1985	994	0	0	4	0	0
1986	1,479	0	0	4	0	0
1987	2,016	0	0	4	0	0
1988	735	0	0	4	0	0
Kentucky						
Eastern						
1983	93,199	20,386	21.9	999	426	42.6
1984	114,645	23,591	20.6	116	461	41.3
1985	111,010	21,626	19.5	60	434	40.9
1986	111,196	20,069	18.0	970	389	40.1
1987	118,486	12,507	10.6	944	304	32.2
1988	116,354	21,933	18.9	860	340	39.5
Western						
1983	35,494	1,502	4.2	105	23	21.9
1984	42,130	1,581	3.8	99	14	14.1
1985	38,920	485	1.2	95	15	15.8
1986	41,094	1,574	3.8	87	15	17.2
1987	45,232	248	0.5	90	7	7.8
1988	40,295	1,758	4.4	81	12	14.8

See footnotes at end of table.

Table A1. Nonresponse to Form EIA-7A Coal Production Data Element by State, 1983-1988
(Continued)

State/Year	Production (thousand short tons)			Number of Mines		
	All Mines* (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Louisiana						
1983	0	0	--	0	0	--
1984	0	0	--	0	0	--
1985	207	0	0	1	0	0
1986	2,254	0	0	1	0	0
1987	2,751	0	0	1	0	0
1988	2,889	0	0	1	0	0
Maryland						
1983	3,130	0	0	29	0	0
1984	4,056	38	0.9	34	1	2.9
1985	2,903	155	5.3	27	4	14.8
1986	3,869	149	3.8	27	5	18.5
1987	3,926	0	0	25	0	0
1988	3,229	0	0	24	0	0
Missouri						
1983	4,976	0	0	15	0	0
1984	6,724	558	8.3	14	3	21.4
1985	5,561	18	0.3	13	1	7.7
1986	4,682	162	3.5	11	2	18.2
1987	4,282	55	1.3	11	2	18.2
1988	4,169	47	1.1	10	1	10.0
Montana						
1983	28,924	0	0	8	0	0
1984	33,000	0	0	9	0	0
1985	33,286	0	0	8	0	0
1986	33,978	0	0	8	0	0
1987	34,399	0	0	8	0	0
1988	38,881	16	0	8	1	12.5
New Mexico						
1983	20,415	0	0	10	0	0
1984	21,269	0	0	10	0	0
1985	22,202	0	0	11	0	0
1986	21,496	0	0	11	0	0
1987	19,131	0	0	10	0	0
1988	21,802	0	0	9	0	0
North Dakota						
1983	19,181	0	0	12	0	0
1984	22,108	0	0	14	0	0
1985	26,871	0	0	13	0	0
1986	25,640	0	0	13	0	0
1987	25,140	0	0	10	0	0
1988	29,721	0	0	10	0	0
Ohio						
1983	33,582	379	1.1	185	15	8.1
1984	39,115	591	1.5	182	18	9.9
1985	35,411	753	2.1	165	15	9.1
1986	36,209	1,453	4.0	173	35	20.2
1987	35,551	594	1.7	158	21	13.3
1988	33,842	1,346	4.0	164	31	18.9

See footnotes at end of table.

Table A.1. Nonresponse to Form EIA-7A Coal Production Data Element by State, 1983-1988
(Continued)

State/Year	Production (thousand short tons)			Number of Mines		
	All Mines* (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Oklahoma						
1983	3,664	64	1.7	30	2	6.7
1984	4,598	45	1.0	30	2	6.7
1985	3,316	98	3.0	23	2	8.7
1986	3,036	60	2.0	18	1	5.6
1987	2,855	36	1.3	16	1	6.3
1988	2,131	213	10.0	21	3	14.3
Pennsylvania						
Anthracite						
1983	3,750	541	14.4	68	18	26.5
1984	3,869	705	18.2	70	23	32.9
1985	4,281	939	21.9	79	19	24.1
1986	3,828	565	14.8	77	19	24.7
1987	3,090	346	11.2	58	10	17.2
1988	3,105	310	10.0	64	15	23.4
Bituminous						
1983	65,109	5,723	8.8	416	87	20.9
1984	72,795	4,075	5.6	434	64	14.7
1985	66,030	4,779	7.2	399	79	19.8
1986	66,736	5,278	7.9	386	73	18.9
1987	66,355	4,798	7.2	350	57	16.3
1988	66,496	7,177	10.8	368	87	23.6
Tennessee						
1983	6,565	388	5.9	95	11	11.6
1984	7,211	731	10.1	90	21	23.3
1985	7,339	1,297	17.7	90	28	31.1
1986	6,749	1,045	15.5	75	19	25.3
1987	6,351	470	7.4	72	16	22.2
1988	6,409	695	10.8	77	18	23.4
Texas						
1983	38,947	0	0	12	0	0
1984	41,145	0	0	13	0	0
1985	45,459	0	0	14	0	0
1986	48,590	0	0	15	0	0
1987	50,529	0	0	15	0	0
1988	52,281	0	0	14	0	0
Utah						
1983	11,756	0	0	25	0	0
1984	12,323	0	0	23	0	0
1985	12,776	0	0	21	0	0
1986	14,269	0	0	23	0	0
1987	16,508	0	0	21	0	0
1988	18,163	0	0	20	0	0
Virginia						
1983	34,517	6,110	17.7	438	127	29.0
1984	39,906	10,013	25.1	444	181	40.8
1985	40,531	5,453	13.5	412	123	29.9
1986	40,769	3,755	9.2	392	97	24.7
1987	44,179	3,931	8.9	374	95	25.4
1988	45,543	3,979	8.7	327	74	22.6

See footnotes at end of table.

Table A1. Nonresponse to Form EIA-7A Coal Production Data Element by State, 1983-1988
(Continued)

State/Year	Production (thousand short tons)			Number of Mines		
	All Mines* (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Washington						
1983	3,884	0	0	2	0	0
1984	3,863	0	0	2	0	0
1985	4,438	0	0	3	0	0
1986	4,593	0	0	3	0	0
1987	4,449	0	0	3	0	0
1988	5,170	0	0	3	0	0
West Virginia						
1983	114,290	10,051	8.8	642	194	30.2
1984	130,295	13,616	10.4	664	201	30.3
1985	127,125	8,796	6.9	634	169	26.7
1986	129,264	9,497	7.3	625	176	28.2
1987	135,933	5,457	4.0	614	129	21.0
1988	144,383	10,700	7.4	602	140	23.3
Wyoming						
1983	112,213	0	0	28	0	0
1984	130,914	0	0	27	0	0
1985	140,711	0	0	28	0	0
1986	136,820	0	0	27	0	0
1987	146,849	0	0	28	0	0
1988	164,014	17	0	30	1	3.3

* Includes production from State Mining Agency coal production reports and Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report."

* Rounds to zero.

Note: Excludes silt, culm, refuse bank, slurry dam, and dredge production except for Pennsylvania anthracite. Excludes mines producing less than 10,000 short tons of coal during the year.

Source: Energy Information Administration, Form EIA-7A, "Coal Production Report," using a Statistical Analysis System (SAS) program.

Table A2. Nonresponse to Form EIA-7A Labor-Hour Data Element by State, 1983-1988

State/Year	Labor Hours (thousands)			Number of Mines		
	All Mines ^a (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Alabama						
1983	14,289	349	2.4	98	16	16.3
1984	16,339	284	1.7	106	18	17.0
1985	16,034	339	2.1	96	23	24.0
1986	13,223	480	3.6	84	25	29.8
1987	12,475	177	1.4	77	13	16.9
1988	12,559	175	1.4	77	10	13.0
Alaska						
1983	143	0	0	1	0	0
1984	193	0	0	1	0	0
1985	231	0	0	1	0	0
1986	232	0	0	1	0	0
1987	218	0	0	1	0	0
1988	215	0	0	1	0	0
Arizona						
1983	1,767	0	0	2	0	0
1984	1,807	0	0	2	0	0
1985	1,475	0	0	2	0	0
1986	1,669	0	0	2	0	0
1987	1,684	0	0	2	0	0
1988	1,922	0	0	2	0	0
Arkansas						
1983	30	10	34.4	3	1	33.3
1984	29	6	20.5	3	1	33.3
1985	38	22	57.1	3	1	33.3
1986	85	54	64.0	4	1	25.0
1987	37	0	0	4	0	0
1988	33	0	0	3	0	0
California						
1983	0	0	--	0	0	0
1984	0	0	--	0	0	0
1985	17	17	100.0	1	1	100.0
1986	0	0	--	0	0	0
1987	9	9	100.0	1	1	100.0
1988	4	0	0	1	0	0
Colorado						
1983	5,303	10	0.2	35	2	5.7
1984	5,425	20	0.4	34	1	2.9
1985	5,123	54	1.1	27	2	7.4
1986	3,889	0	0	22	0	0
1987	3,339	0	0	19	0	0
1988	3,941	0	0	20	0	0

See footnotes at end of table.

Table A2. Nonresponse to Form EIA-7A Labor-Hour Data Element by State, 1983-1988 (Continued)

State/Year	Labor Hours (thousands)			Number of Mines		
	All Mines* (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Georgia						
1983	88	0	0	1	0	0
1984	67	67	100.0	1	1	100.0
1985	0	0	--	0	0	0
1986	0	0	--	0	0	0
1987	0	0	--	0	0	0
1988	0	0	--	0	0	0
Illinois						
1983	25,544	0	0	55	0	0
1984	27,975	0	0	53	0	0
1985	26,899	32	0.1	54	2	3.7
1986	25,489	4	*	52	1	1.9
1987	22,840	34	0.1	50	2	4.0
1988	21,275	36	0.2	46	1	2.2
Indiana						
1983	11,586	168	1.4	80	8	10.0
1984	12,559	496	4.0	80	17	21.3
1985	11,329	298	2.6	66	7	10.6
1986	9,483	245	2.6	59	6	10.2
1987	9,367	204	2.2	60	4	6.7
1988	8,686	481	5.5	65	12	18.5
Iowa						
1983	208	0	0	4	0	0
1984	312	0	0	5	0	0
1985	333	53	16.0	5	1	20.0
1986	270	50	18.5	5	2	40.0
1987	310	132	42.6	4	1	25.0
1988	205	0	0	3	0	0
Kansas						
1983	545	0	0	7	0	0
1984	503	0	0	6	0	0
1985	407	0	0	4	0	0
1986	522	0	0	4	0	0
1987	538	0	0	4	0	0
1988	502	0	0	4	0	0
Kentucky						
Eastern						
1983	42,191	10,026	23.8	999	444	44.4
1984	48,188	10,293	21.4	1,116	465	41.7
1985	46,767	9,742	20.8	1,060	445	42.0
1986	43,568	8,811	20.2	970	395	40.7
1987	41,035	4,719	11.5	944	307	32.5
1988	38,996	7,482	19.2	860	344	40.0
Western						
1983	13,998	520	3.7	105	24	22.9
1984	15,405	476	3.1	99	14	14.1
1985	13,233	169	1.3	95	15	15.8
1986	13,265	595	4.5	87	18	20.7
1987	14,481	73	0.5	90	7	7.8
1988	13,012	608	4.7	81	12	14.8

See footnotes at end of table.

Table A2. Nonresponse to Form EIA-7A Labor-Hour Data Element by State, 1983-1988 (Continued)

State/Year	Labor Hours (thousands)			Number of Mines		
	All Mines ^a (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Louisiana						
1983	0	0	--	0	0	0
1984	0	0	--	0	0	0
1985	89	0	0	1	0	0
1986	181	0	0	1	0	0
1987	180	0	0	1	0	0
1988	181	0	0	1	0	0
Maryland						
1983	1,341	0	0	29	0	0
1984	1,553	14	0.9	34	1	2.9
1985	1,090	60	5.5	27	4	14.8
1986	1,010	66	6.6	27	5	18.5
1987	1,062	51	4.8	25	3	12.0
1988	971	0	0	24	0	0
Missouri						
1983	2,302	13	0.6	15	1	6.7
1984	2,615	253	9.7	14	3	21.4
1985	2,435	101	4.1	13	2	15.4
1986	2,127	29	1.3	11	2	18.2
1987	1,879	34	1.8	11	2	18.2
1988	1,556	25	1.6	10	1	10.0
Montana						
1983	2,077	0	0	8	0	0
1984	2,313	0	0	9	0	0
1985	2,260	0	0	8	0	0
1986	1,927	0	0	8	0	0
1987	1,840	0	0	8	0	0
1988	1,988	5	0.3	8	1	12.5
New Mexico						
1983	2,892	0	0	10	0	0
1984	3,595	0	0	10	0	0
1985	4,037	0	0	11	0	0
1986	3,650	0	0	11	0	0
1987	3,222	0	0	10	0	0
1988	3,338	0	0	9	0	0
North Dakota						
1983	2,101	0	0	12	0	0
1984	2,189	0	0	14	0	0
1985	2,357	0	0	13	0	0
1986	2,089	0	0	13	0	0
1987	1,867	0	0	10	0	0
1988	1,901	0	0	10	0	0
Ohio						
1983	17,314	760	4.4	185	29	15.7
1984	18,559	562	3.0	182	27	14.8
1985	16,585	499	3.0	165	22	13.3
1986	16,238	619	3.8	173	39	22.5
1987	14,821	204	1.4	158	21	13.3
1988	13,350	819	6.1	164	39	23.8

See footnotes at end of table.

Table A2. Nonresponse to Form EIA-7A Labor-Hour Data Element by State, 1983-1988 (Continued)

State/Year	Labor Hours (thousands)			Number of Mines		
	All Mines ^a (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Oklahoma						
1983	2,071	58	2.8	30	4	13.3
1984	2,545	758	29.8	30	8	26.7
1985	1,902	43	2.2	23	2	8.7
1986	1,748	22	1.2	18	1	5.6
1987	1,505	117	7.8	16	3	18.8
1988	1,016	158	15.6	21	3	14.3
Pennsylvania						
Anthracite						
1983	2,766	501	18.1	68	24	35.3
1984	2,608	400	15.3	70	24	34.3
1985	2,817	698	24.8	79	23	29.1
1986	2,864	589	20.6	77	23	29.9
1987	1,942	177	9.1	58	10	17.2
1988	1,772	210	11.8	64	16	25.0
Bituminous						
1983	38,788	3,295	8.5	416	94	22.6
1984	40,087	1,637	4.1	434	69	15.9
1985	36,074	2,071	5.7	399	81	20.3
1986	33,541	2,244	6.7	386	80	20.7
1987	31,302	2,206	7.0	350	63	18.0
1988	29,211	2,841	9.7	368	91	24.7
Tennessee						
1983	3,879	527	13.6	95	21	22.1
1984	4,277	456	10.7	90	23	25.6
1985	4,414	695	15.7	90	27	30.0
1986	3,892	565	14.5	75	19	25.3
1987	3,450	517	15.0	72	17	23.6
1988	3,674	384	10.5	77	18	23.4
Texas						
1983	6,715	0	0	12	0	0
1984	7,026	0	0	13	0	0
1985	7,266	0	0	14	0	0
1986	7,659	0	0	15	0	0
1987	7,813	0	0	15	0	0
1988	8,025	0	0	14	0	0
Utah						
1983	4,376	0	0	25	0	0
1984	4,026	85	2.1	23	3	13.0
1985	4,476	0	0	21	0	0
1986	4,560	0	0	23	0	0
1987	4,265	0	0	21	0	0
1988	4,353	0	0	20	0	0
Virginia						
1983	17,605	2,686	15.3	438	131	29.9
1984	21,621	5,495	25.4	444	184	41.4
1985	19,456	2,691	13.8	412	134	32.5
1986	19,012	2,142	11.3	392	106	27.0
1987	18,533	1,741	9.4	374	98	26.2
1988	16,813	1,513	9.0	327	75	22.9

See footnotes at end of table.

Table A2. Nonresponse to Form EIA-7A Labor-Hour Data Element by State, 1983-1988 (Continued)

State/Year	Labor Hours (thousands)			Number of Mines		
	All Mines ^a (1)	Nonrespondents (2)	(2) as a Percent of (1)	All Mines (4)	Nonrespondents (5)	(5) as a Percent of (4)
Washington						
1983	1,162	0	0	2	0	0
1984	1,236	0	0	2	0	0
1985	1,407	0	0	3	0	0
1986	1,623	17	1.1	3	1	33.3
1987	1,452	0	0	3	0	0
1988	1,446	0	0	3	0	0
West Virginia						
1983	59,862	5,520	9.2	642	209	32.6
1984	62,226	6,213	10.0	664	208	31.3
1985	57,979	3,692	6.4	634	173	27.3
1986	53,276	4,408	8.3	625	189	30.2
1987	49,442	2,124	4.3	614	131	21.3
1988	48,136	3,764	7.8	602	155	25.7
Wyoming						
1983	9,593	0	0	28	0	0
1984	9,500	0	0	27	0	0
1985	9,808	0	0	28	0	0
1986	8,693	180	2.1	27	1	3.7
1987	8,200	0	0	28	0	0
1988	8,725	29	0.3	30	1	3.3

^a Includes production from State Mining Agency coal production reports and Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report."

* Rounds to zero.

Note: Excludes silt, culm, refuse bank, slurry dam, and dredge production except for Pennsylvania anthracite. Excludes mines producing less than 10,000 short tons of coal during the year.

Source: Energy Information Administration, Form EIA-7A, "Coal Productions Report," using a Statistical Analysis System (SAS) program.

Table A3. Nonresponse to Form EIA-7A Coal Value Data Element by State, 1988

State	Number of Mines			Production (thousand short tons)		
	Total ^a (1)	Nonrespondents (2)	(2) as a Percent of (1)	Total ^a (4)	Nonrespondents (5)	(5) as a Percent of (4)
Alabama	77	12	15.6	26,434	2,061	7.8
Alaska	1	0	0	1,745	0	0
Arizona	2	0	0	12,398	0	0
Arkansas	3	0	0	255	0	0
California	1	0	0	54	0	0
Colorado	20	0	0	15,896	0	0
Illinois	46	1	2.2	58,590	99	0.2
Indiana	65	6	9.2	31,231	1,226	3.9
Iowa	3	0	0	333	0	0
Kansas	4	0	0	735	0	0
Kentucky						
Eastern	860	353	41.0	116,354	22,753	19.6
Western	81	12	14.8	40,295	1,758	4.4
Louisiana	1	0	0	2,889	0	0
Maryland	24	0	0	3,229	0	0
Missouri	10	1	10.0	4,169	47	1.1
Montana	8	1	12.5	38,881	16	*
New Mexico	9	0	0	21,802	0	0
North Dakota	10	0	0	29,721	0	0
Ohio	164	33	20.1	33,842	1,521	4.5
Oklahoma	21	3	14.3	2,131	213	10.0
Pennsylvania						
Anthracite	64	17	26.6	3,105	389	12.5
Bituminous	368	104	28.3	66,496	11,973	18.0
Tennessee	77	18	23.4	6,409	695	10.8
Texas	14	0	0	52,281	0	0
Utah	20	0	0	18,163	0	0
Virginia	327	77	23.5	45,543	4,079	9.0
Washington	3	0	0	5,170	0	0
West Virginia	602	142	23.6	144,383	10,913	7.6
Wyoming	30	2	6.7	164,014	48	*
Total	2,915	782	26.8	946,545	57,791	6.1

^a Excludes silt, culm, refuse bank, slurry dam, and dredge operations except for those in Pennsylvania anthracite counties. Excludes mines producing less than 10,000 short tons of coal during the year.

* Rounds to zero.

Source: Energy Information Administration, Form EIA-7A, "Coal Production Report," using a Statistical Analysis System (SAS) program.

**Table A4. Coal Production from Form EIA-7A, State Mining Agency Reports, and MSHA
by Method of Mining, 1983-1988**
(Thousand Short Tons)

State/Year	EIA-7A ^a (1)	MSHA ^b (2)	State (3)	(2) as a Percent of (1)	(3) as a Percent of (1)
Surface Production					
Colorado					
1983	11,131	10,918	11,220	98.1	100.8
1984	11,547	11,274	10,874	97.6	94.2
1985	10,856	10,613	10,041	97.8	92.5
1986	9,760	9,797	8,782	100.4	90.0
1987	8,773	8,691	8,711	99.1	99.3
1988	9,042	9,024	8,241	99.8	91.1
Illinois					
1983	25,007	25,022	25,003	100.1	100.0
1984	25,259	25,111	25,344	99.4	100.3
1985	21,858	21,333	21,829	97.6	99.9
1986	22,147	22,223	22,302	100.3	100.7
1987	21,630	21,452	21,573	99.2	99.7
1988	20,068	18,939	20,585	94.4	102.6
Kentucky					
Eastern					
1983	44,190	40,514	NA	91.7	--
1984	53,720	48,634	NA	90.5	--
1985	48,651	43,311	52,335	89.0	107.6
1986	46,190	42,790	47,851	92.6	103.6
1987	52,228	46,821	53,547	89.6	102.5
1988	48,066	44,897	47,121	95.3	98.0
Western					
1983	19,678	19,791	NA	100.6	--
1984	24,815	24,309	NA	98.0	--
1985	21,013	21,067	22,562	100.3	107.4
1986	18,898	18,131	19,915	95.9	105.4
1987	19,347	17,883	20,632	92.4	106.6
1988	14,505	14,279	14,984	95.3	103.3
Total					
1983	63,868	60,305	64,883	94.4	101.6
1984	78,535	72,943	81,221	92.9	103.4
1985	69,664	64,378	74,897	92.4	107.5
1986	65,089	60,921	67,765	93.6	104.1
1987	71,575	64,704	74,179	90.4	103.6
1988	62,571	59,176	62,105	95.3	99.3
Ohio					
1983	22,760	23,221	23,581	102.0	103.6
1984	25,013	27,296	24,656	109.1	98.6
1985	21,781	23,410	21,814	107.5	100.2
1986	21,858	22,900	20,956	104.8	95.9
1987	22,941	24,400	21,729	106.4	94.7
1988	22,581	23,243	19,995	102.9	88.5
Pennsylvania					
Anthracite					
1983	3,449	3,414	2,485	99.0	72.0
1984	3,470	3,387	3,252	97.6	93.7
1985	3,841	3,139	4,475	81.7	116.5
1986	3,417	3,265	3,119	95.6	91.3
1987	2,703	2,715	4,611	100.4	170.5
1988	2,759	2,569	3,627	93.1	131.5

See footnotes at end of table.

**Table A4. Coal Production from Form EIA-7A, State Mining Agency Reports, and MSHA
by Method of Mining, 1983-1988 (Continued)**
(Thousand Short Tons)

State/Year	EIA-7A ^a (1)	MSHA ^b (2)	State (3)	(2) as a Percent of (1)	(3) as a Percent of (1)
Surface Production					
Pennsylvania					
Bituminous					
1983	30,612	31,075	31,425	101.5	102.7
1984	35,941	35,934	36,278	100.0	100.9
1985	30,204	30,129	39,458	99.8	130.6
1986	29,981	28,604	31,290	95.4	104.4
1987	28,576	29,178	28,524	102.1	99.8
1988	27,728	27,586	27,311	99.5	98.5
Total					
1983	34,061	34,488	33,910	101.3	99.6
1984	39,411	39,319	39,531	99.8	100.3
1985	34,045	33,266	43,933	97.7	129.0
1986	33,398	31,866	34,409	95.4	103.0
1987	31,279	31,893	33,135	102.0	105.9
1988	30,487	30,155	30,938	98.9	101.5
Texas					
1983	38,947	38,701	38,925	99.4	99.9
1984	41,145	41,387	41,284	100.6	100.3
1985	45,459	44,940	45,387	98.9	99.8
1986	48,590	48,734	48,492	100.3	99.8
1987	50,529	50,321	50,617	99.6	100.2
1988	52,281	51,323	52,322	98.2	100.1
Virginia					
1983	7,738	7,093	7,577	91.7	97.9
1984	7,279	7,570	7,309	104.0	100.4
1985	7,260	6,967	7,108	96.0	97.9
1986	6,966	7,147	7,102	102.6	101.9
1987	7,448	7,429	7,414	99.8	99.6
1988	7,966	7,847	7,943	98.5	99.7
West Virginia					
1983	22,371	21,871	22,834	97.8	102.1
1984	24,456	24,843	24,640	101.6	100.8
1985	23,650	23,255	23,326	98.3	98.6
1986	26,136	26,208	26,681	100.3	102.1
1987	28,764	29,472	29,716	102.5	103.3
1988	34,605	35,663	35,377	103.1	102.2
Wyoming					
1983	110,963	107,744	NA	97.1	--
1984	129,569	129,233	NA	99.7	--
1985	139,653	133,396	NA	95.5	--
1986	136,656	134,300	NA	98.3	--
1987	146,743	143,013	146,382	97.5	99.8
1988	162,876	162,548	162,473	99.8	99.8

See footnotes at end of table.

**Table A4. Coal Production from Form EIA-7A, State Mining Agency Reports, and MSHA
by Method of Mining, 1983-1988 (Continued)
(Thousand Short Tons)**

State/Year	EIA-7A ^a (1)	MSHA ^b (2)	State (3)	(2) as a Percent of (1)	(3) as a Percent of (1)
Underground Production					
Colorado					
1983	5,582	5,424	6,470	97.2	115.9
1984	6,399	6,294	5,907	98.4	92.3
1985	6,346	6,476	6,781	102.0	106.8
1986	5,456	5,363	6,357	98.3	116.5
1987	5,638	5,675	6,100	100.7	108.2
1988	6,854	6,898	8,338	100.7	121.7
Illinois					
1983	31,838	32,498	33,370	102.1	104.8
1984	38,498	40,073	39,945	104.1	103.8
1985	37,343	38,574	38,649	103.3	103.5
1986	39,716	40,604	40,932	102.2	103.1
1987	37,521	39,257	39,188	104.6	104.4
1988	38,522	39,726	39,011	103.1	101.3
Kentucky					
Eastern					
1983	49,009	46,577	NA	95.0	--
1984	60,925	56,656	NA	93.0	--
1985	62,359	57,848	73,465	92.8	117.8
1986	65,005	61,610	72,051	94.8	110.8
1987	66,258	61,739	72,835	93.2	109.9
1988	68,288	65,886	71,559	96.5	104.8
Western					
1983	15,817	15,872	NA	100.4	--
1984	17,315	16,834	NA	97.2	--
1985	17,907	18,690	21,189	104.4	118.3
1986	22,196	22,589	25,787	101.8	116.2
1987	25,885	26,445	30,245	102.2	116.8
1988	25,791	25,831	27,546	100.2	106.8
Total					
1983	64,826	62,449	66,712	96.3	102.9
1984	78,240	73,489	89,547	93.9	114.5
1985	80,266	76,538	94,653	95.4	117.9
1986	87,201	84,199	97,838	96.6	112.2
1987	92,143	88,185	103,080	95.7	111.9
1988	94,079	91,718	99,104	97.5	105.3
Ohio					
1983	10,822	10,857	10,822	100.3	100.0
1984	14,102	14,160	14,172	100.4	100.5
1985	13,630	13,610	13,660	99.9	100.2
1986	14,352	14,181	14,256	98.8	99.3
1987	12,610	12,567	11,432	99.7	90.7
1988	11,260	11,259	11,169	100.0	99.2
Pennsylvania					
Anthracite					
1983	301	422	438	140.0	145.6
1984	399	529	642	132.7	160.9
1985	440	626	754	142.4	171.3
1986	411	569	629	138.3	153.0
1987	386	568	615	147.0	159.2
1988	345	503	554	145.8	160.4

See footnotes at end of table.

**Table A4. Coal Production from Form EIA-7A, State Mining Agency Reports, and MSHA
by Method of Mining, 1983-1988 (Continued)
(Thousand Short Tons)**

State/Year	EIA-7A ^a (1)	MSHA ^b (2)	State (3)	(2) as a Percent of (1)	(3) as a Percent of (1)
Underground Production					
Pennsylvania					
Bituminous					
1983	34,498	34,208	37,308	99.2	108.1
1984	36,854	36,923	37,528	100.2	101.8
1985	35,826	35,501	36,077	99.1	100.7
1986	36,755	36,655	38,163	99.7	103.8
1987	37,779	37,835	38,340	100.1	101.5
1988	38,768	38,505	40,242	99.3	103.8
Total					
1983	34,799	34,630	37,746	99.5	108.5
1984	37,253	37,452	38,169	100.5	102.5
1985	36,266	36,128	36,831	99.6	101.6
1986	37,167	37,224	38,792	100.2	104.4
1987	38,165	38,402	38,955	100.6	102.1
1988	39,114	39,008	40,796	99.7	104.3
Texas					
1983	0	0	0	--	--
1984	0	0	0	--	--
1985	0	0	0	--	--
1986	0	0	0	--	--
1987	0	0	0	--	--
1988	0	0	0	--	--
Virginia					
1983	26,779	26,739	27,929	99.9	104.3
1984	32,627	31,973	34,115	98.0	104.6
1985	33,271	32,891	35,268	98.9	106.0
1986	33,803	33,797	34,666	100.0	102.6
1987	36,731	36,414	38,123	99.1	103.8
1988	37,577	37,996	38,422	101.1	102.2
West Virginia					
1983	91,918	90,317	92,291	98.3	100.4
1984	105,839	103,906	106,400	98.2	100.5
1985	103,475	101,553	104,541	98.1	101.0
1986	103,128	100,974	104,107	97.9	100.9
1987	107,169	105,036	107,956	98.0	100.7
1988	109,777	108,561	109,541	98.9	99.8
Wyoming					
1983	1,250	818	NA	65.4	--
1984	1,345	1,345	NA	100.0	--
1985	1,058	1,059	NA	100.1	--
1986	164	164	NA	100.5	--
1987	106	107	107	101.0	101.0
1988	1,138	1,112	1,116	97.7	98.0

See footnotes at end of table

**Table A4. Coal Production from Form EIA-7A, State Mining Agency Reports, and MSHA
by Method of Mining, 1983-1988 (Continued)**
(Thousand Short Tons)

State/Year	EIA-7A ^a (1)	MSHA ^b (2)	State (3)	(2) as a Percent of (1)	(3) as a Percent of (1)
Total Production					
Colorado					
1983	16,713	16,343	17,690	97.8	105.8
1984	17,946	17,568	16,781	97.9	93.5
1985	17,202	17,089	16,822	99.3	97.8
1986	15,216	15,160	15,140	99.6	99.5
1987	14,411	14,366	14,811	99.7	102.8
1988	15,896	15,922	16,579	100.2	104.3
Illinois					
1983	56,845	57,520	58,374	101.2	102.7
1984	63,756	65,184	65,289	102.2	102.4
1985	59,201	59,907	60,477	101.2	102.2
1986	61,862	62,827	63,233	101.6	102.2
1987	59,151	60,708	60,761	102.6	102.7
1988	58,590	58,665	59,596	100.1	101.7
Kentucky					
Eastern					
1983	93,199	87,091	NA	93.4	--
1984	114,645	105,290	NA	91.8	--
1985	111,010	101,159	125,800	91.1	113.3
1986	111,196	104,400	119,902	93.9	107.8
1987	118,486	108,561	126,382	91.6	106.7
1988	116,354	110,783	118,680	95.2	102.0
Western					
1983	35,494	35,663	NA	100.5	--
1984	42,130	41,142	NA	97.7	--
1985	38,920	39,757	43,750	102.2	112.4
1986	41,094	40,720	45,702	99.1	111.2
1987	45,232	44,328	50,877	98.0	112.5
1988	40,295	40,111	42,529	99.5	105.5
Total					
1983	128,694	122,755	131,596	95.4	102.3
1984	156,774	146,432	170,768	93.4	108.9
1985	149,929	140,916	169,550	94.0	113.1
1986	152,290	145,120	165,603	95.3	108.7
1987	163,718	152,889	177,259	93.4	108.3
1988	156,650	150,894	161,209	96.3	102.9
Ohio					
1983	33,582	34,078	34,403	101.5	102.4
1984	39,115	41,456	38,827	106.0	99.3
1985	35,411	37,021	35,474	104.5	100.2
1986	36,209	37,081	35,212	102.4	97.2
1987	35,551	36,967	33,161	104.0	93.3
1988	33,842	34,503	31,164	102.0	92.1
Pennsylvania					
Anthracite					
1983	3,750	3,835	2,923	102.3	77.9
1984	3,869	3,916	3,894	101.2	100.6
1985	4,281	3,765	5,229	87.9	122.1
1986	3,828	3,834	3,748	100.1	97.9
1987	3,090	3,283	5,226	106.3	169.1
1988	3,105	3,072	4,181	99.0	134.7

See footnotes at end of table.

**Table A4. Coal Production from Form EIA-7A, State Mining Agency Reports, and MSHA
by Method of Mining, 1983-1988 (Continued)**
(Thousand Short Tons)

State/Year	EIA-7A ^a (1)	MSHA ^b (2)	State (3)	(2) as a Percent of (1)	(3) as a Percent of (1)
Total Production					
Pennsylvania					
Bituminous					
1983	65,109	65,283	68,733	100.3	105.6
1984	72,795	72,857	73,806	100.1	101.4
1985	66,030	65,630	75,535	99.4	114.4
1986	66,736	65,259	69,453	97.8	104.1
1987	66,355	67,013	66,864	101.0	100.8
1988	66,496	66,091	67,553	99.4	101.6
Total					
1983	68,860	69,118	71,656	100.4	104.1
1984	76,664	76,771	77,700	100.1	101.4
1985	70,311	69,394	80,764	98.7	114.9
1986	70,564	69,090	73,201	97.9	103.7
1987	69,444	70,295	72,090	101.2	103.8
1988	69,601	69,164	71,734	99.4	103.1
Texas					
1983	38,947	38,701	38,925	99.4	99.9
1984	41,145	41,387	41,284	100.6	100.3
1985	45,459	44,940	45,387	98.9	99.8
1986	48,590	48,734	48,492	100.3	99.8
1987	50,529	50,321	50,617	99.6	100.2
1988	52,281	51,323	52,322	98.2	100.1
Virginia					
1983	34,517	33,832	35,506	98.0	102.9
1984	39,906	39,543	41,425	99.1	103.8
1985	40,531	39,858	42,376	98.3	104.6
1986	40,769	40,943	41,768	100.4	102.5
1987	44,179	43,844	45,538	99.2	103.1
1988	45,543	45,843	46,365	100.7	101.8
West Virginia					
1983	114,290	112,188	115,125	98.2	100.7
1984	130,295	128,749	131,041	98.8	100.6
1985	127,125	124,808	127,867	98.2	100.6
1986	129,264	127,182	130,787	98.4	101.2
1987	135,933	134,507	137,672	99.0	101.3
1988	144,383	144,224	144,918	99.9	100.4
Wyoming					
1983	112,213	108,562	112,188	96.7	100.0
1984	130,914	130,578	130,746	99.7	99.9
1985	140,711	134,455	140,424	95.6	99.8
1986	136,820	134,464	135,403	98.3	99.0
1987	146,849	143,120	146,489	97.5	99.8
1988	164,014	163,660	163,588	99.8	99.7

^a Excludes silt, culm, refuse bank, slurry dam, and dredge production except for Pennsylvania anthracite. Excludes mines producing less than 10,000 short tons of coal during the year.

^b Excludes bituminous coal refuse and culm bank production.

NA=Not Available.

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

Sources: EIA: Energy Information Administration, *Coal Production*, 1983-1988; MSHA: Mine Safety and Health Administration, *Injury Experience in Coal Mining*, 1983-1988, Table 6; State: State Mining Agencies (see Appendix B for contacts).

Appendix B

Contacts for Information on State Mining Agency Data Collections

Appendix B

Contacts for Information on State Mining Agency Data Collections

Table B1. Contacts for Information on State Mining Agency Data Collections

Agency	Contact
Colorado Division of Mines 1313 Sherman Street, Room 215 Denver, Colorado 80203	J. Arthur Haske, (303) 866-3401 (hardcopies available)
Illinois Department of Mines and Minerals 704 Stratton Office Building Springfield, Illinois 62706	Arthur Rice, Chief Clerk (217) 782-6791
Kentucky Department of Mines and Minerals P.O. Box 680 Lexington, Kentucky 40586	Eula Witt (606) 254-0367
Ohio Geology and Mineral Statistics Building B, Fountain Square Columbus, Ohio 43224	Sherry Lopez (614) 265-6588
Pennsylvania Bureau of Mining and Reclamation Department of Environmental Resources, Statistical Section P.O. Box 2063 Harrisburg, Pennsylvania 17120	Pat Nickols (717) 783-7515
Railroad Commission of Texas Coal Production Division Austin, Texas 78711	Bobby Harrod (512) 464-6731
Virginia Department of Labor and Industry Division on Mines and Quarries 219 Wood Avenue Big Stone Gap, Virginia 24219	Mike Abbott, Public Affairs Officer (703) 523-8100
West Virginia Department of Energy State Capitol Charleston, West Virginia 25305	Heanna Estap (304) 348-3500
Wyoming Department of Mines Department of Revenue and Taxation Cheyenne, Wyoming, 82002	Brian Folks (307) 777-5310
Wyoming State Inspector of Mines P.O. Box 1094 Rock Springs, Wyoming 82901	Patsy Lowseth (307) 362-5222

Appendix C

Data Collection Forms

Appendix C

Data Collection Forms

U.S. Department of Energy Energy Information Administration Form EIA-7A (October 1988)	Coal Production Report	<small>Form Approved OMB No. 1805-0167 Expires: 03/31/82 Burden: 1.21 hours</small>
<small>This report is mandatory under Public Law 93-275. Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. For the provisions concerning the confidentiality of information submitted on this form, see Part H of the instructions. Public reporting burden for this collection of information is estimated to average 1.21 hours per response, including the time of reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Office of Statistical Standards, EI-73, Mail Station 1H-023 Forrestal, 1000 Independence Ave. SW, Washington, DC 20585, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.</small>		
Please read the instructions provided before completing this form.		
<div style="border: 1px solid black; width: 100%; height: 100%;"></div>		<div style="border: 1px solid black; padding: 2px; width: 40px; float: right;">100</div>
<small>(Please make any corrections to the mailing label in the area provided at the right and return the completed form in the business reply envelope provided)</small>		
GENERAL REPORTING INSTRUCTIONS: Form EIA-7A must be submitted by all coal mining companies that owned a mining operation that produced, processed, or prepared coal during the reporting year. A separate Form EIA-7A must be submitted for each mining operation, i.e., mine and/or preparation plant, and/or tipple.		
Mining operations that produced, processed, or prepared 10,000 or more short tons of coal should report as follows: (i) For mines only or mines with preparation plants or tipples, complete all parts of the form, (ii) For preparation plants and tipples only, complete Parts I, II.C.3 and III through V of the form.		
If this mining operation produced, processed, or prepared under 10,000 short tons during the year, check this box, complete Sections I (Identification), II.C.6 column (1) (Total Production Quantity), and V (Certification) and return this form in the enclosed envelope.		☐ <div style="border: 1px solid black; padding: 2px; width: 40px; float: right;">110</div>
Operating subsidiaries and contractors who are unable to provide the data requested should forward Form EIA-7A to the parent company or contractee for completion prior to submission to the Energy Information Administration.		
I. Identification The shaded areas in this section are reserved for preprinted information. Please make any corrections to the information in these areas by drawing a line through the incorrect information and entering the changes in the space provided at the right.		
A. Name and Location of Mining Operation		Mining Operation Name: Location(County): Location(State):
		<div style="border: 1px solid black; padding: 2px; width: 40px; float: right;">111</div>
B. Name and Address of Operating Company		Company Name: Address: City, State, Zip:
		<div style="border: 1px solid black; padding: 2px; width: 40px; float: right;">112</div>
C. Operating Company Point of Contact The operating company representative who can answer questions regarding the information provided on this form.		Name, Title: Address: City, State, Zip: Phone No.(Area code):
		<div style="border: 1px solid black; padding: 2px; width: 40px; float: right;">113</div>
D. Type of Company Operating this Mining Operation Check one. (See instructions for definitions of company types.)		☐ 1. Independent Producer Operator ☐ 2. Operating Subsidiary ☐ 3. Contractor
		<div style="border: 1px solid black; padding: 2px; width: 40px; float: right;">115</div>
If you checked box 2 or 3 in section I.D above, fill in Sections I.E and I.F below. If there is more than one Parent Company or Contractee, provide the additional information for these sections on a separate sheet of paper.		
E. Parent Company or Contractee Provide the following information about your Parent Company or Contractee.		Name of Parent/Contractee: Address: City, State, Zip:
		<div style="border: 1px solid black; padding: 2px; width: 40px; float: right;">117</div>
F. Parent Company/Contractee Point of Contact Provide the following information about your Parent Company or Contractee contact person.		Name, Title: Address: City, State, Zip: Phone No.(Area Code)
		<div style="border: 1px solid black; padding: 2px; width: 40px; float: right;">118</div>

Id Number

[illegible]

(3) Preparation Plant or Tipple ☐

☐ (d) Silt, Culm, Refuse Bank or Slurry Dam

For EIA Use Only

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120

Enter the Id numbers associated with the mining operation reported on this form. Use the Remarks section or a separate sheet of paper to list any additional numbers.

122

1.							
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2.							
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123

☐ (1) Yes ☐ (2) No IF "yes", give date of change and, as applicable, new name of mine and/or name and address of new owner/operator.

Month	Day	Year

125

New Name of Mining Operation		Name of New Owner/Operator		
Address of New Owner/Operator (Street)		(City)	(County)	(State) (Zip Code)

☐ (1) Active, Producing ☐ (2) Active, Not Producing ☐ (3) Temporarily Abandoned ☐ (4) Permanently Abandoned

129

Is this mining operation unionized? ☐ Yes ☐ No
If "yes", enter union name:

130

Latitude:

--	--

--	--

--	--

Degrees Minutes Seconds

Longitude:

--	--	--

--	--

--	--

Degrees Minutes Seconds

If not known, check this box ☐

135

A. Coal Bed(s) Mined Report the name, average thickness, percentage of production and coal classification for each coal bed mined during the reporting year at this mine. Exclude partings one inch or more thick. For reporting of coal classification, refer to Table 1, Classification of Coals by Rank, which is included with your form and instructions. For each coal bed, see Table 1 to determine the correct coal group for the coal produced from that bed and enter the code number (2 digits) for that coal group from Table 1, in column 4 below. If the specific coal group is unknown, enter the coal Rank Code for that coal bed using the code number from Table 1.

Note: Coal production percentage by coal bed (Column 3) should add up to 100.

For EIA Use Only	(1) Name of Coal Bed	(2) Average Thickness (inches)	(3) Percentage of Production(percent)	(4) Coal Classification Code

211

212

213

214

215

1. Enter the coal tonnage representing that portion of the coal reserves remaining at this mine at the end of the reporting year that you estimate can be recovered (mined) in the future. Report to the level of accuracy known. Exclude coal left in situ after mining.

Recoverable Reserves (short tons)

221

2. Enter the recovery percentage used in estimating recoverable coal reserves in this mine. Report recovery percentage to the nearest whole percent. Note: Total coal reserves times recovery percentage should equal recoverable coal reserves (item II.B.1 above).

Recovery Percentag	

222

Coal Production Report
PAGE 3

Form Approved
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Burden 1 21 hours

II. Production (continued)

Id Number

-

C. Production Quantity and Value by Disposition (Exclude coal produced in prior years but shipped this year.)

The company owning the coal produced at this mining operation should report, by disposition (as of the end of the reporting year), the quantity and f.o.b. value of all coal produced at this mining operation during the reporting year. The quantity and value figures reported here must reflect the condition of the coal as of its disposition. Report open market disposition on a first sale basis, (i.e. as of its first sale or first change of ownership). Report captive market disposition based on use, (i.e. as consumed at this mining operation, sold or transferred to and for use by the parent company or any subsidiaries of the parent company, or stockpiled.) Calculate open market values using actual sales prices. Calculate captive market values and stock values using the actual accounting values recorded by your company for this coal. Exclude purchased coal.

Disposition of Coal Produced During the Year	(1) Quantity (short tons)	(2) Value (dollars) (f.o.b. Mining Operation)	
Open Market Sales			
1. Total coal produced at this mining operation during the year which was sold to other mining companies and coal dealers/ brokers (wholesale and retail).			231
2. Total coal produced at this mining operation during the year which was sold to all consumers other than coal mining companies and coal dealers. Include sales to employees.			232
Captive Market Uses/Sales			
3. Total coal produced during the year which was used / consumed in this mining operation.			233
4. Total coal produced at this mining operation during the year which was sold to or transferred for use by the parent company or any other subsidiaries of the parent company.			234
Stocks			
5. Total coal produced at this mining operation during the year which was remaining in stocks at the end of the year.			235
Total Production			
6. Total production at this mining operation during the year. (Sum of 1-5)			236
FOR EIA USE ONLY			240

III. Productivity

A. Employment

For EIA Use Only

410 420 430 450 400

- Total Direct Labor Hours Worked at this Mining Operation During the Year (hours).** Report direct labor hours for all employees at this mining operation who were engaged in production, preparation, processing, development, maintenance, repair, shop or yard work at the mining operation including on site mining operations management and technical/engineering personnel. Exclude office workers. For hourly employees, report hours actually worked and do not report vacation or leave hours. For salaried employees, report actual or best estimate of hours worked. Exclude reclamation hours. 410
 - Total Number of Production Days Worked at this Mining Operation During the Year (days).** A production day is any day in which coal was mined, and/or loaded for shipment, and/or stockpiled. 420
 - Average Number of Employees per Shift.** Compute by adding the total number of employees working each shift, whether it is a production or a maintenance shift, and dividing this total by the total number of shifts worked per day. Average over the total number of days worked. Round to the nearest whole number. 430
 - Average Number of Shifts per Day.** Average over the total number of days worked. Include maintenance as well as production shifts. Report to the nearest tenth of a shift (i.e. 1.0, 2.2, 3.5). . 440
 - Average Length of Production Shift. (hours)** Report to the nearest hundredth of an hour. (For example, 7 1/4 = 07.25, 8 1/2 = 08.50). Include overtime if usually worked during the year. . 450
- Employment data check:** If the data entered for lines 420, 430, 440, and 450 are multiplied together, the result should be approximately equal to line 410. If this answer is not within 15 percent of the data on line 410, please explain in the remarks.

B. Daily Productive Capacity and Projected Production

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460 470

- Daily productive capacity of this mining operation (short tons/day).** Report the maximum amount of coal that realistically could be/was produced (or prepared if this mining operation is a preparation plant/tipple only) on any day during the year. 460
- Projected Production for this Mining Operation During Next Year (short tons).** 470

Id Number[illegible]

490

Title 18 U.S.C. §1001 makes it a crime for any person knowingly and willingly to make to any Agency or Department of the United States any false, fictitious or fraudulent statement or misrepresentation as to any matter within its jurisdiction.

Instructions for completing Form EIA-7A, "Coal Production Report"

- A. PURPOSE** This survey collects coal production data from U.S. coal mining companies. Information on coal production and value of production, coal beds mined, employment, recoverable reserves, productive capacity, and stocks is collected to provide Congress with basic statistics concerning coal supply, as required by the Federal Energy Administration Act of 1974 (P.L. 93-275) as amended.

These data appear in the annual report *Coal Production*, the *Quarterly Coal Report*, the *Monthly Energy Review*, the *Annual Energy Review*, and the *Weekly Coal Production* report. In addition, the Energy Information Administration uses the data for coal production related analysis and in short-term and mid-term models (i.e., the Short-Term Coal Analysis System (SCOAL), the Short-Term Integrated Forecasting System (STIFS), the Resource Allocation and Mine Costing Model (RAMC), and the Coal Supply and Transportation Model (CSTM)). The forecast data appear quarterly in the *Short-Term Energy Outlook* and the *Annual Energy Outlook* publications.

- B. WHO MUST SUBMIT** Form EIA-7A must be submitted by all coal mining companies that owned a mining operation that produced, processed or prepared coal in the U.S. during the reporting year. A separate Form EIA-7A must be submitted for each mining operation, i.e., mine and/or preparation plant and/or tipple.

- C. WHERE TO SUBMIT** Form EIA-7A should be returned in the business reply envelope provided to:

Energy Information Administration, EI-521
Mail Station: BG-094, FORSTL
U.S. Department of Energy
Washington, D.C. 20585
Attn: EIA-7A

Requests for further information, additional forms, or business reply envelopes should be directed to the address above or by telephone on (202) 254-5400.

- D. WHEN TO SUBMIT** Form EIA-7A must be submitted by March 1 to report data for the previous year.

- E. SANCTIONS** The timely submission of Form EIA-7A by a company required to report is a mandatory requirement. Late filing, failure to file, or failure otherwise to make information available to EIA in accordance with these instructions may result in criminal fines, civil penalties and other sanctions as provided by Section 13(i) of the FEA Act (P.L. 93-275).

F. DEFINITIONS

Auger Mine: A surface mine in which the coal bed is removed by means of a large diameter drill. Usually operated only when the overburden becomes too thick for economical strip mining.

Captive Coal: All coal produced and consumed by the independent producer/operator or operating subsidiary or produced for consumption by a parent company.

Coal Bed: A bed or stratum of coal. Also called a coal seam.

Drift Mine: A mine that opens horizontally into the coal bed or coal outcrop.

f.o.b. (Free on Board) Mining Operation Value: The price of coal at the mining operation. Does not include insurance and freight or shipping costs.

Independent Producer/Operator: A company which operates a coal mining operation and has no subsidiaries or parent companies and is not a contractor.

Latitude and Longitude: The distance on the earth's surface measured, respectively, north or south of the equator and east or west of the standard meridian, expressed in angular degrees, minutes, and seconds.

Mining Operation: One mine and/or tipple at a single physical location.

MSHA ID Number: Seven (7) digit code assigned to a mining operation by the Mine Safety and Health Administration.

Open Market Coal: Coal sold in the open market (i.e., coal sold to companies other than the reporting company's parent company or an operating subsidiary of the parent company).

Operating Subsidiary: Company which operates a coal mining operation and is owned by another company (i.e., the parent company).

Parent Company: A company which solely or jointly owns a subsidiary which operates a coal mining operation and is not owned itself by another company.

Report Year: The calendar year beginning at 12:00 a.m. January 1 and ending at 11:59 p.m. December 31.

Shaft Mine: A mine that reaches the coal bed by means of a vertical shaft.

Slope Mine: A mine that reaches the coal bed by means of an inclined opening.

State Permit/License/Mine Number: Code assigned to a mining operation by the state in which the operation is located.

Strip Mine: An open cut in which the overburden is removed from a coal bed prior to the removal of coal.

- G. GENERAL INSTRUCTIONS** Mining operations that produced, processed or prepared less than 10,000 short tons of coal during the year should check the first box (Line Code 110) on the form and complete Sections I (Identification), II.C.6 column (1) (Total Production Quantity), and V (Certification). Mines only or mines with preparation plants or tipples that produced 10,000 or more short tons during the year should complete all parts of the form. Preparation plants or tipples only that prepared or processed 10,000 or more short tons of coal during the year should complete Parts I, II.C.3 and III through V of the form. Report coal quantities in short tons (2,000 pounds) to the nearest whole ton. Report value in dollars to the nearest dollar. Report coal bed thickness in inches, to the nearest whole inch. Report percentages to the nearest whole percent. Operating subsidiaries and contractors who are unable to provide the data requested should forward Form EIA-7A immediately to the parent company or contractee for completion prior to submission to the Energy Information Administration.

- H. DISCLOSURE OF INFORMATION** The following data elements will not be treated as confidential by EIA:

- a. Total production quantity.
- b. Coal beds mined.

The name and address of the responding company, the mine or plant type (i.e., underground, surface, preparation plant) and location (state, county, and/or coal-producing district) will be released upon request in the form of a full or partial list of respondents for this for this coal data collection survey. All other information, other than that described above, will be kept confidential to the extent that it satisfies the criteria for exemption in the Freedom of Information Act (FOIA), the DOE regulations implementing the FOIA, and the Trade Secrets Act, 18 U.S.C. §1905.

Upon receipt of a request for this information under the FOIA, the DOE shall, in accordance with the procedures and criteria provided in 10 C.F.R. §1004.11, make a final determination whether the information is exempt from disclosure. To assist in this determination, respondents should demonstrate to the DOE that, for example, their information contains trade secrets or commercial or financial information whose release would be likely to cause substantial harm to their company's competitive position. A letter accompanying the submission that explains (on an element-by-element basis) the reasons why the information would be likely to cause the respondent substantial competitive harm if released to the public would aid in this determination. A new justification does not need to be provided each time information is submitted on the form if the company has previously submitted a justification for that information and the justification has not been changed.

Except as otherwise provided by law, the information may be made available in response to an order of a Court of competent jurisdiction, or, upon request, to other components of the Department of Energy, to any Committee of Congress, the General Accounting Office, or other congressional agencies authorized by law to receive such information. Detailed provisions of the restrictions on the disclosure of the information can be found in the Policy on the Disclosure of Individually Identifiable Energy Information in the Possession of the Energy Information Administration (45 Federal Register §59812 (1980)).

**Energy Information Administration
Coal Distribution Report**

U.S. Department of Energy

This report is mandatory under Public Law 93-275. Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. For the provisions concerning the confidentiality of information submitted on this form, see Section VI of the instructions. Public reporting burden for this collection of information is estimated to average 2.5 hour per response, including the time of reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Office of Statistical Standards, EI-73, Mail Station 1H-023 Forrestal, 1000 Independence Ave. SW, Washington, DC 20585, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Form Approved
OMB # 1905-0167
Expires 03/31/89

I. RESPONDENT IDENTIFICATION

If the above name and address label is incorrect, please make changes in the space provided at the right

If you have nothing to report, please indicate this in the Remarks (Part VII), sign the Certification (Part X) and return the form.
Please read the instructions before completing this form.

Report all coal quantities in short tons (2,000 lbs.) to the nearest whole ton. If exact figures are not available, estimate the quantities and indicate the estimated data by placing (est) in front of the reported data item.

Blanks will be interpreted as zeros, therefore it is not necessary to enter "not applicable (NA)" or dashes or zeros where you have no data to report.

If a data item reported herein includes a revision to the same data item as previously reported which results in a net minus quantity, indicate this by enclosing the reported quantity in parentheses ().

After entering your data, please check its consistency using the equations given in Part VI to ensure that your data submission can be processed.

If you desire a free subscription to the publication, "Coal Distribution", Quarterly, please check here. ☐

A. Coal Producing District

Enter the number for the coal producing district covered in this report as described in table 1 of the instructions. ☐

A SEPARATE FORM EIA-6 MUST BE SUBMITTED FOR EACH COAL PRODUCING DISTRICT IN WHICH COAL WAS MINED.

B. Name(s) and Address(es) of Parent Company(ies) See VI D2 of the instructions for the definition of Parent Company before completing this section. (If additional space is needed, use a separate sheet of paper.)

Name of Parent Company (if different than responding company) Address (Street, City, State, Zip)

II. MINE ORIGIN OF COAL

A. Coal Produced at Your Company's Mines during the Quarter

The quantity of coal reported here must reflect the condition of the coal (i.e., raw, crushed, screened or mechanically cleaned) as of its sale, distribution or placement into stocks. Exclude refuse. For each of your company's mines located in this coal producing district, enter the name of the producing company (if different than responding company), the name and location of the mine and the quantity of coal produced during the reporting quarter. (If additional space is needed, use a separate sheet of paper.)

Name of Mine	Name of Producing Company (if different than responding company)	Mine Location (County) (State)	Quantity Produced (short tons)

Total coal produced in this District at your company's mines during the quarter excluding refuse.

B. Coal Purchased from Other Companies during the quarter which was produced in this District

The quantity of coal reported here must reflect the condition of the coal (i.e., raw, crushed, screened or mechanically cleaned) as of its purchase. Report here the quantity of coal purchased from other companies during the reporting quarter which was produced in this coal producing district. Enter for each company, the company name and address, the name(s) of the mining operations from which the coal originated and the quantity of coal purchased. (If additional space is needed, use a separate sheet of paper.)

Name of Company	Address (Street, City, State, Zip)	Name of Producing Mine(s)	Quantity Purchased (short tons)

Total coal purchased from other companies during the quarter which was produced in this District excluding refuse.

C. Total Coal Produced or Purchased during the quarter which was mined in this district.

(Sum of totals in Sections A and B)

EIA-6 (Nov 1986)

10010

11010

21999

22999

23999

III. DISTRIBUTION WHERE THE CONSUMER IS KNOWN

Report here the distribution during the reporting quarter of that portion of the coal reported in Part II C plus any coal distributed from stocks located in this coal producing district for which you know the consumer. **Please read parts VI, A, B, and C of the instructions before completing Part III** so that the consumer categories, methods of transportation and other uses will be correctly identified. Please note that mining (column 4 of the consumer categories) does not include coal mining. Coal used at your company's mining operations must be reported in Part III G Line 37499. Report Shipments of Coal to Tidewater Piers or Coastal Ports for Overseas Exports (except Canada and Mexico) on Line 34802 of Part III D

A. Shipments by Rail

Destination	Quantity Distributed by Consumer Categories (Short Tons)					
	Electric Utilities (1)	Coke Plants (2)	Manufacturing (except Coke Plants) (3)	Agriculture, Mining, and Construction (4)	Residential/ Commercial (5)	Total (6)
U. S.						
Alabama						
Alaska						
Arizona						
Arkansas						
California						
Colorado						
Connecticut						
Delaware						
District of Columbia						
Florida						
Georgia						
Idaho						
Illinois						
Indiana						
Iowa						
Kansas						
Kentucky						
Louisiana						
Maine						
Maryland						
Massachusetts						
Michigan						
Minnesota						
Mississippi						
Missouri						
Montana						
Nebraska						
Nevada						
New Hampshire						
New Jersey						
New Mexico						
New York						
North Carolina						
North Dakota						
Ohio						
Oklahoma						
Oregon						
Pennsylvania						
Rhode Island						
South Carolina						
South Dakota						
Tennessee						
Texas						
Utah						
Vermont						
Virginia						
Washington						
West Virginia						
Wisconsin						
Wyoming						
Canada						
Mexico						
Total rail shipments						

31001
31002
31004
31005
31006
31008
31008
31009
31010
31011
31012
31013
31016
31017
31018
31019
31020
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31056
31122
31201
31199

Destination	Quantity Distributed by Consumer Categories (Short Tons)					
	Electric Utilities	Coke Plants	Manufacturing (except Coke Plants)	Agriculture, Mining, and Construction	Residential/Commercial	Total
U.S. (list by state)	(1)	(2)	(3)	(4)	(5)	(6)
Total shipments via river						

Quantity in short tons delivered by—	Rail	
	Truck	
	Tramway/conveyor	

Destination						
U S						
Illinois						
Indiana						
Michigan						
Minnesota						
New York						
North Dakota						
Ohio						
Pennsylvania						
South Dakota						
Wisconsin						
Canada						
Total shipments via Great Lakes						

Quantity in short tons delivered by--	Rail	
	Truck	
	River	

Destination U S (list by state of destination)	Do not list the State location of an export pier or port. List all shipments for overseas exports on line 34802 "Overseas exports (except Canada and Mexico)"					
Canada						
Mexico						
Overseas exports (except Canada and Mexico)						
Total shipments via tidewater piers and coastal ports						

Quantity in short tons delivered by—	Rail	
	Truck	
	River	

34122
34201
34802
34499
34401
34402
34403

37598

Enter below the name(s) and address(es) of coal distribution companies where you know and reported the coal sales. For each company, identify the quantity of coal purchased from you during the reporting quarter and indicate where this coal was reported in Part III of the form. (If additional space is needed, use a separate sheet of paper.)

38999

Quantity Purchased
(Short Tons)[illegible]

Total quantity of your coal purchased by other coal distribution companies where the consumer is unknown.		40999
V. STOCKS	Quantity (Short Tons)	
A Coal produced in this district which was held in stocks by your company at the start of the reporting quarter <i>(exclude refuse)</i>		51999
B Coal produced in this district which was held in stocks by your company at the end of the reporting quarter <i>(exclude refuse)</i>		52999

VII. REMARKS

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80030

90010

Energy Information Administration/An Assessment of the Quality of Selected EIA Data Series

Energy Information Administration
Instructions for Form EIA-6 -
Coal Distribution Report

U.S. Department of Energy

I. Purpose

This survey collects coal distribution data from U.S. coal mining companies, and wholesale and retail coal dealers including brokers. Information on coal production and purchases, distribution and stocks are collected to provide Congress with basic statistics concerning the origin, method of transportation, consumer use, and destination of U.S. coal, as required by the Federal Energy Administration Act of 1974 (P.L. 93-275) as amended.

These data appear in the *Coal Distribution Report*, the *Quarterly Coal Report*, the *Monthly Energy Review*, and the *State Energy Data Report*. In addition, the Energy Information Administration uses the data for coal transportation related analyses and in short and mid-term models (i.e. the Short-Term Coal Analysis System (SCOAL), the Short-Term Integrated Forecasting System (STIFS), the Intermediate Future Forecasting System (IFFS), and the Coal Supply and Transportation Model (CSTM). The forecast data appear in the *Short-Term Energy Outlook* and the *Annual Energy Outlook*.

II. Who Shall Submit

All companies in the 50 United States and the District of Columbia that owned or purchased and distributed in excess of 50,000 tons of coal during the year defined by the current reporting quarter and the previous three reporting quarters. These companies include coal mining companies, wholesale coal dealers (including brokers) and retail coal dealers. Companies that take custody (physical possession) of the coal and transport but never own or purchase the coal or companies that only negotiate the sale of coal but never own or purchase the coal need not report. Retain the copy marked "File Copy" for your records.

III. Where to Submit

Companies shall return completed EIA-6 forms to

Energy Information Administration, EI-521
Mail Station: BG-094 FORSTL
U.S. Department of Energy
Washington, D.C. 20585

Requests for further information, additional forms and instructions, or an extension of the reporting deadline may be directed to the address above or by telephone to (202) 586-6868.

IV. When to Submit

Form EIA-6 shall be submitted no later than thirty (30) working days after the close of each report quarter. The reporting quarters are: January 1 - March 31, April 1 - June 30, July 1 - September 30, and October 1 - December 31.

V. Sanctions

The timely submission of Form EIA-6 by a company required to report is a mandatory requirement. Late filing, failure to file, or failure otherwise to comply with these instructions may result in criminal fines, civil penalties and other sanctions as provided by Section 13 (i) of the FEA Act of 1974 (P.L. 93-275).

VI. Definitions

A. Consumer Categories

1. Electric Utilities - All privately owned companies and all publicly owned agencies engaged in the production of electric power for public use. Publicly owned agencies include the following: Municipal electric utilities, Federal power projects, such as the Tennessee Valley Authority (TVA), and rural electrification cooperatives, power districts, and State power projects.
2. Coke Plants - All plants where coal is carbonized for the manufacture of coke in slot or beehive ovens. Report only coal that is carbonized to produce coke. Shipments of coal to coke plants for use in space heating or electric power generation should be included with "Manufacturing (except Coke Plants)". Do not report coal used to produce form coke. Include coal used for form coke with "Manufacturing (except Coke Plants)".
3. Manufacturing (except Coke Plants) - Those industrial users/plants, not including coke plants, that are engaged in the mechanical or chemical transformation of materials or substances into new (i.e. finished or seminished) products.
4. Agriculture, Mining, and Construction - Companies engaged in agriculture, mining (other than coal mining), or construction industries.
5. Residential/Commercial - Housing units, wholesale and retail businesses (except coal wholesale dealers), health institutions (hospitals), social and educational institutions (schools and universities), and Federal, State, and local governments (military installations, prisons, office buildings, etc.). Exclude shipments to Federal power projects such as TVA, rural electrification cooperatives, power districts, and State power projects. These are to be included in consumer category 1 (Electric Utilities).

B. Methods of Transportation to Consumers

1. Rail - Shipments of coal moved to consumers by rail (private or public/commercial). Included is coal hauled to or away from a railroad siding by truck.
2. River - Shipments of coal moved to consumers via river by barge. Not included are shipments to Great Lakes Coal Loading Docks or Tidewater Piers or Coastal Ports.
3. Great Lakes - Shipments of coal moved to consumers via the Great Lakes. These shipments are moved via the Great Lakes Coal Loading Docks which are identified by name and location as follows:
 - Superior Midwest Energy Terminal, Superior, Wisconsin
 - Bessemer & Lake Erie Coal Storage & Transfer Facility, Conneaut, Ohio
 - B&O Railroad Coal Loading Dock, Lorain, Ohio
 - C&O Railroad Presque Isle Docks, Toledo, Ohio
 - Lakelront Dock and Railroad Terminal Company Coal Loading Dock, Toledo, Ohio
 - N&W Sandusky Coal Pier No. 3, Sandusky, Ohio
 - ConRail Coal Transfer Facilities, Ashtabula, Ohio
 - Rail to Water Transfer Corp. Dock, Chicago, Illinois
4. Tidewater Piers and Coastal Ports - Shipments of coal moved to Tidewater Piers and Coastal Ports for further shipments to consumers via coastal water or ocean. The Tidewater Piers are identified by name and location as follows:
 - B&O Curtis Bay Coal Piers, Baltimore, Maryland
 - C&O Coal Piers Nos. 14 & 15, Newport News, Virginia
 - N&W Lamberts Point Coal Piers Nos. 5 & 6, Norfolk, Virginia
 - Alabama State Docks Bulk Handling Plant, Mobile, Alabama
 - Alabama State Docks/McDuffie Terminals, Mobile, Alabama
 - Canton Coal Pier, Baltimore Harbor on Chesapeake Bay
 - Greenwich Coal Pier, Greenwich Point, Philadelphia, Pa. on Delaware River
 - Port Richmond Pier, Pier 18 - Port Richmond, Philadelphia, Pa. on Delaware River
 - Galveston Regional Coal Distribution Center, Pelican Island, Galveston, Texas
 - International Marine Terminals/Paquemines Parish Terminal, Mile 57 AHP - Mississippi River, Approx. 30 miles South of New Orleans
 - Energy Terminals of Houston, Inc., a Subsidiary of Soros Associates, Houston, TexasThe Coastal Ports include those located at Charleston, S.C., New York, N.Y., San Diego, Ca., Los Angeles, Ca., Seattle, Wa.

Instructions for Form EIA-6 - Coal Distribution Report - Continued

5. Truck - Shipments of coal moved to consumers by truck. Not included is coal hauled to or away from a railroad siding by truck.

6. Tramway, Conveyor, or Slurry Pipeline - Shipments moved to consumers by tramway, conveyor, or slurry pipeline.

C. Other Uses

1. Railroad fuel - Shipments of coal to railroad companies to be used as fuel (engine, powerhouse, etc.).

2. Vessel/Ship fuel - Shipments of coal to be used as vessel/ship fuel.

3. Coal gasification/liquefaction - Conversion of coal to gaseous (low to medium BTU gas) or liquid (such as synthetic crude oil and methanol) hydrocarbons.

4. Coal used at your company's mines - Coal consumed at your company's mines in this district during the reporting quarter.

5. Coal sold to employees - Coal sold to employees during the reporting quarter.

D. Miscellaneous

1. Coal-Producing Districts - See Table 1: Coal-Producing Districts.

2. Parent Company - A company which solely or jointly owns the reporting company and which is not itself a subsidiary of or owned by another company.

VII. General Instructions

A separate report shall be submitted for each coal producing district in which the coal was mined. Complete all data items on the form applicable to your operation. All figures should be rounded to the nearest whole number. Report all tonnage in short tons (2,000 pounds). Blanks will be interpreted as zeroes, therefore it is not necessary to enter "not applicable (NA)" or dashes or zeroes where you have no data to report.

VIII. Specific Instructions

How to report the methods of transporting coal to a consumer:

A. If the shipment involved only one method of transportation from the point of origin to the consumer, report the shipment in the section for that method of transportation.

B. If the shipment involved more than one method of transportation from the point of origin to the consumer, use the following guidelines in reporting the method of transportation:

1. If water transportation was involved, regardless of other methods of transportation also involved, report the method of transportation as one of the three types of water shipments, i.e., river, Great Lakes, or Tidewater Piers or Coastal Ports. In addition, specify how the shipment(s) was (were) delivered to the river (rail, truck, or tramway/conveyor), Great Lakes (rail, truck, or river), or Tidewater Piers or Coastal Ports (i.e., by rail, truck, or river).

2. If rail and truck are involved and no water transportation was involved, then report the method of transportation as rail.

3. Truck is to be reported as the method of transportation to the consumer only if the coal was shipped directly to the consumer by truck.

IX. Disclosure Information

The name and address of the responding company, and location (State, county, and/or coal-producing district) will be released upon request in the form of a full or partial list of respondents for this coal data collection survey.

The information contained on Form EIA-6, other than that described above, will be kept confidential to the extent that it satisfies the criteria set forth in the Freedom of Information Act (FOIA) exemption for trade secrets and confidential commercial information and DOE regulations implementing the FOIA, and is prohibited from public release by the Trade Secrets Act, 18 U.S.C. 1905.

Upon receipt of a request for disclosure of this information under the FOIA, the DOE shall, in accordance with procedures and criteria provided in 10 C.F.R. 1004.11, make a final determination whether the information is exempt from disclosure. To assist us in this determination, respondents should demonstrate to the DOE that their information constitutes trade secrets or commercial or financial information whose release would be likely to cause substantial harm to the competitive position of their company. A letter accompanying the submission that explains (on an element-by-element basis, if possible) the reasons why the information would be likely to cause the respondent substantial competitive harm if released to the public would aid in this determination.

Requests from other Federal agencies for information from these forms shall be evaluated in accordance with the DOE Policy on the Disclosure of Individually Identifiable Energy Information in the Possession of the EIA [45 Fed. Reg. 59812 (1980)]. Information concerning coal supplies (stocks) is subject to disclosure to State agencies under certain limited conditions and provided that the State agrees to maintain the confidential nature of the data.

Except as otherwise provided by law, the information will also be made available in response to an order of a Court of competent jurisdiction, or upon written request, to the Congress, any Committee of the Congress, the General Accounting Office, or other Congressional agencies authorized by law to receive such information.

•U.S. GOVERNMENT PRINTING OFFICE:

•U.S. G.P.O. 1987- 181-180:40300

MONTHLY REPORT OF COST AND QUALITY OF FUELS FOR ELECTRIC PLANTS

Form Approved
OMB No. 1902-0024
Expires 9/30/93

This report is mandatory under the Federal Power Act. Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. The Federal Energy Regulatory Commission does not consider this report to be of a confidential nature.

1. Company-Plant Code		2. Month and Year of Report		3. Name of Reporting Company		4. Page Number OF							
5. Plant Name				6. Plant Location (nearest village, town, city, etc.)									
7. Name, Title and Address of person to be contacted concerning data entered on this form				8. Telephone No. Area Code ()		Extension:							
9. Signature of Official submitting this report				10. Title		11. Date Report Completed							
Line No.	PURCHASES		Fuel Type (Use code)	COAL MINES ONLY			SOURCE DATA			QUALITY (AS RECEIVED)			Purchase Price in \$ per million BTU to nearest 0.1 cent (m)
	Type (Use code)	Contract Expires Within 24 Mos., Expiral Date		Type (Use code)	LOCATION	Quantity Received (Units) coal: 1,000 tons oil: 1,000 barrels gas: 1,000 Mcf	BTU Content (Average of coal, per lb; oil, per gal; gas, per cu. ft)	Sulfur Content (To nearest 0.01%)	Ash Content (To nearest 0.1%)				
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
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(Use Continuation Sheet if Necessary)

FERC Form No. 423 (1/91)

Form Approved
OMB No. 1902-0024
Expires 9/30/93

FERC FORM NO. 423

MONTHLY REPORT OF COST AND QUALITY OF FUELS FOR ELECTRIC PLANTS

INSTRUCTIONS FOR COMPLETING FERC FORM NO. 423

This report is mandatory under the Federal Power Act. Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. The Federal Energy Regulatory Commission does not consider this report to be of a confidential nature.

GENERAL INFORMATION

I. PURPOSE

This form collects data on the cost and quality of fossil fuels delivered to electric generating plants. These data enable the Federal Energy Regulatory Commission to perform its regulatory functions in accordance with the Federal Power Act and to perform analyses relating to the cost and quality of fossil fuels delivered to electric generating plants.

II. WHO MUST SUBMIT

A separate form must be completed by each electric power producer for each of its electric generating plants whose total steam turbine electric generating capacity and/or combined-cycle (steam and associated gas turbine) generating capacity is 50 or more megawatts. Report only fuel delivered for use in steam turbine and combined-cycle units. Fuel received for use in gas turbine or internal combustion units that are not associated with a combined-cycle operation should not be reported.

III. WHAT AND WHERE TO SUBMIT

Mail an original and 3 copies of this report to:

U. S. Department of Energy
Energy Information Administration, EI-541
Mail Stop: BG-094 (FERC Form 423)
Washington, D.C. 20585

IV. WHEN TO SUBMIT

Submit this form monthly no later than forty-five (45) days after the end of the report month. For example, the June report is due on August 15.

V. WHERE TO SEND COMMENTS ON PUBLIC REPORTING BURDEN

The public reporting burden for this collection of information is estimated to average 2 hours per response (i.e., per plant), including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Office of Statistical Standards, EI-73, Mail Station 2F-081 Forrestal, 1000 Independence Avenue S.W., Washington, D.C. 20585; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.

SPECIFIC INSTRUCTIONS

(Unless otherwise stated, all items are self explanatory.)

Item	Instruction	Item	Instruction
Column (a)	Use separate lines for coal, oil, and gas purchases. For coal and oil purchases, use only the following codes: (S) for "spot" purchase shipments under purchase orders or contracts of less than one year duration; (NC) for new or newly renegotiated contract purchases under which deliveries were first made during the reporting month; or (C) for all other contract purchases. For gas purchases, use only the codes (I) for "interruptible," (F) for "firm," and (OP) for "off peak."	Column (g)	Enter the three digit FIPS County Code from the list provided to show the county in which the coal was mined. Do not report locations of transfer facilities, shipping facilities, preparation plants, or mining company headquarters. Use the mine location only for county of origin. If the coal from a supplier originates in more than one county, use separate lines to show county of origin and appropriate quantity, quality, and cost data.
Column (b)	If the contract for contract purchases expires within 24 months following the report month, enter the expiration date (month and year). For example, "1188" = November, 1988. For spot purchases, leave this column blank.	Column (i)	Enter quantities in units of a thousand; use thousands of tons for coal, thousands of barrels for oil and other liquid fuels, and thousands of Mcf for gas. For example, if 213,000 tons of coal are delivered during the reporting month, report 213. Enter separate quantities for each type of fuel. To derive the quantity, group all fuels received within the month from the supplier for which the price was based upon a given or related set of laboratory analyses. Note: For quantities of fuel received from a given supplier during the month for which no laboratory analysis is made, report on the basis of the last previous laboratory analysis upon which price paid was determined for that supplier or on the basis of contract specifications or estimates, and specify in a footnote the basis used.
Column (c)	Identify purchased fuels (including start-up and flame stabilization fuel) using the following abbreviations: For Coal - ANT = anthracite, BIT = bituminous coal, SUB = subbituminous coal, LIG = lignite; for Oil - FO2, FO4, FO5, FO6, CRU = crude oil, KER = kerosene, LPG = liquefied petroleum gas, PC = petroleum coke; for gas - NG = natural gas, SNG = synthetic natural gas, LNG = liquefied natural gas, RG = refinery gas, BFG = blast furnace gas, COG = coke oven gas; for other fuels - MTH = methanol, REF = refuse; otherwise indicate an "X" and specify its meaning in a footnote.	Column (j)	Enter the average British Thermal Unit (Btu) content of each fuel in terms of Btu per pound for coal, Btu per gallon for oil (and other liquid products), and Btu per cubic foot for gas.
Column (d)	Report for coal only. Enter S for surface mined or U for underground mined. If coal is a mixture, use S/U or U/S. This notation will result in a 0.67/0.33 allocation. If a more accurate estimate of the surface/underground ratio can be made, break down each delivery according to that estimate and report separate entries.	Column (k)	For all fuels except gas, enter sulfur content of each unit of fuel in terms of percent sulfur by weight. Show to nearest 0.01%.
Column (e)	Enter the coal producing district code from the list provided indicating the district in which the coal was mined.	Column (l)	For all fuels except gas, enter ash content of each unit of fuel in terms of percent ash by weight. Show to nearest 0.1%.
Column (f)	Use the U.S. Postal abbreviation to show the State in which the coal was mined.	Column (m)	Enter cost in cents per million Btu Free on Board (FOB) plant. Show to nearest 0.1 cent. The purchase price should include all costs incurred by the utility in the purchase and delivery of the fuel to the plant.

Quarterly Mine Employment
and Coal Production Report

U.S. Department of Labor
Mine Safety and Health Administration

Do Not Write in This Space

O.M.B. Number 1219-0006; Approval Expires July 31, 1988.

This report is required by law (30 U.S.C. § 813; 30 C.F.R. Part 50). Failure to report can result in the institution of a civil action for relief under 30 U.S.C. § 818 respecting an operator of a coal or other mine, and assessment of a civil penalty against an operator of a coal or other mine under 30 U.S.C. § 820(a). An individual who, being subject to the Federal Mine Safety and Health Act of 1977 (30 U.S.C. § 801 et seq.) knowingly makes a false statement in any report can be punished by a fine of not more than \$10,000 or by imprisonment for not more than 5 years, or both, under 30 U.S.C. § 820(f). Any individual who knowingly and willfully makes any false, fictitious, or fraudulent statements, conceals a material fact, or makes a false, fictitious, or fraudulent entry, with respect to any matter within the jurisdiction of any agency of the United States can be punished by a fine of not more than \$10,000, or imprisoned for not more than 5 years, or both, under 18 U.S.C. § 1001.

Important:

This form must be completed and mailed within 15 days after the end of each calendar quarter.

1. Fill out this form as completely as possible and return the first sheet of this report to:
2. If it is necessary to make any address changes, indicate corrected information on this form.
3. When preaddressed, this form is only for the operation with I.D. number as shown.
4. Do not use for any other operation.
5. *Sand and Gravel* operators report employment data under code 03 or 06 as appropriate, except for data on office workers which should be reported under code 99.
6. All mine operators and independent contractors reporting as required by 30 C.F.R., Part 50, should show persons working and employee-hours worked, those producing coal show also production data.
7. Independent Contractors should complete quarterly only one form for activities at all coal locations, and one form for activities at all metal and nonmetal locations.

MSHA, Health and Safety Analysis Center
P.O. Box 25367
Denver, Colorado 80225

Date Report Completed

Mo. Day Yr.
For Quarter

Mail Before

()

Check here if this report is
being submitted by a contractor ☐
If Any Information Below Is Incorrect Please
Enter Correct Information Here:

County

Operation Name

Operating Company Name and Mailing Address

MSHA ID Number Contractor ID

County:

Operation Name

Operating Company Name and Address

1. Persons Working, Employee-Hours, and Coal Production		Code	(2) Average number of persons working during quarter	(3) Total employee-hours worked during the quarter	(4) Production of clean coal during quarter, (short tons)
Underground Mine	Underground	01			
	Surface Shops, Yards, Etc.	02			
	Strip, Open Pit, or Quarry	03			
	Auger (Coal Mine Only)	04			
Surface Mine (including shops and yards)	Culm Bank or Refuse Pile (Coal Mine Only)	05			
	Dredge	06			
	Other Surface Mining (Metal/Nonmetal Only)	12			
	Independent Shops or Yards	17			
Mill Operations, Preparation Plant, or Breaker (include associated shops and yards)		30			
	Office (professional and clerical workers at the mine or plant)	99			

2. Other Reportable Data

How many MSHA reportable injuries or illnesses did you have this quarter?

Person to be contacted regarding this report
Name
Title
Phone (incl. Area Code)

MSHA Form 7000-2, May 85 (Revised)

Return to MSHA

Instructions for MSHA Form 7000-2 (Quarterly Mine Employment & Coal Production Report)

Section 50.30 of Part 50, Title 30, Code of Federal Regulations, requires all metal/nonmetal mining and coal mining operators, after the close of each calendar quarter, to prepare and submit to the Mine Safety and Health Administration's (MSHA) Health and Safety Analysis Center (HSAC) a report (Form 7000-2) on employment for that quarter. Coal mine operators must also include data on the number of short tons of clean coal produced, if any, during the quarter reported. Form 7000-2 must be completed and mailed within 15 days following the end of each calendar quarter. Detailed instructions for completing Form 7000-2 are contained in Part 50 and MSHA Policy Memoranda (referenced below).

Under the initial guidelines set forth in the Federal Mine Safety and Health Act of 1977, P.L. 91-173 as amended by P.L. 95-164, independent contractors performing services or construction at a mine site were included in the definition of "operator," Sec. 3(d), and thus required to comply with all provisions of Part 50. These provisions were later modified by MSHA Policy Memoranda Nos. 81-35C dated October 26, 1981, 82-6MM dated May 26, 1982, and amended by 82-6A MM and 81-35A C dated December 3, 1982. This modification determined that an independent contractor need only file quarterly employment reports for certain types of activities at mine sites. These activities include mine development, including shaft and slope sinking; construction or reconstruction of mine facilities, including building or rebuilding preparation plants and mining equipment and building additions to existing facilities; demolition of mine facilities; construction of dams; excavation or earthmoving activities involving mobile equipment, equipment installation, such as crushers and mills; equipment service or repair of equipment on mine property for a period exceeding 5 consecutive days at a particular location; material handling within mine property, including haulage of coal, ore, refuse, etc., unless for the sole purpose of direct removal from or delivery to mine property; and drilling and blasting. Employment and employee-hours involved in other types of work performed by independent contractors at mine sites should not be reported. To minimize the reporting burden by independent contractors, only one MSHA Form 7000-2 must be completed and filed by each independent contractor for work performed at metal and nonmetal mines and only one MSHA Form 7000-2 must be completed and filed for work performed at coal mines.

Specific Instructions

Near the end of each quarter, MSHA will send a computer-addressed Data Mailer (Form 7000-2) to operators and independent contractors that are identified as being active or temporarily inactive during the quarter. Information preprinted on the Data Mailer (Form

7000-2) shows the quarter to which this report pertains, MSHA Mine ID number or contractor ID number, mine name, company name (or independent contractor name), the name of the county where the mine is located, codes for previously reported sub-units, and mailing address. If any of the preprinted information is incorrect, please make the necessary correction(s) in the space provided. Show the month, day, and year when you complete the report. If you do not receive a preprinted Data Mailer form, you should request a blank Form 7000-2 from your district or subdistrict office, and complete ALL required information. Also, it is very important that you send any changes in your address or status of operation to the district or subdistrict office in addition to indicating the change on the report form sent to HSAC, P.O. Box 25367, Denver, Colorado 80225.

Independent contractors should be sure to report their data on the correct mine operation sub-unit line for the number of persons working and employee-hours worked, e.g., underground (Code 01), strip (Code 03), mill operation (Code 30). If constructing for mill operations, report on the ninth line (Code 30). If constructing or assembling surface mining equipment, report on the third line (Code 03). If working at the surface around the shaft or slope, report on line 2 (Code 02); anything below the shaft collar or slope portal should be reported on line 1 (Code 01). If you are unable to determine the line on which to report, then contact the mine operator. *Independent contractors should only report employment and hours worked data on the types of work activities previously mentioned.*

If, after submitting the Form 7000-2, the operator or contractor discovers an error, an *amended* copy should be prepared and mailed to the MSHA address shown on the form. The amended copy should clearly show the necessary corrections to be made on the earlier submitted report, the mine ID, and the quarter to which the amended copy pertains.

1. Persons Working, Employee-Hours, and Coal Production

Underground mine operations should report employment and hours-worked data on employees working underground on the first line (Code 01). Coal mine operators and independent contractors should report short tons of clean coal produced from underground operations on this line. If there are any employees working at any time (during the quarter) in *associated surface shops and yards* (except mill operations, preparation plants, or breakers) at the underground mine, report data on those employees on the second line (Code 02). Report officeworkers on line 10 (Code 99).

Strip, Open Pit mine, or Quarry operations should report data on employees working at the surface mine on the third line (Code 03). Include associated shop and yard employees. Coal mine operators and independent contractors should report short tons of clean coal produced from strip mining on this line. Report officeworkers on line 10 (Code 99).

Auger mines (coal only) report data on employees and short tons of clean coal produced on the fourth line (Code 04). Include associated shop and yard employees. Report officeworkers on line 10 (Code 99).

Culm bank or refuse pile operations (coal only) report data on employees and short tons of clean coal produced on the fifth line (Code 05). Include associated shop and yard employees. Report officeworkers on line 10 (Code 99).

Dredge operations report data on employees on the sixth line (Code 06). Employees included are those on the dredge and all associated plant, shop and yard employees, both dredge and land based. Coal dredge operators should report short tons of clean coal produced from dredging on this line. Report officeworkers on line 10 (Code 99).

Other surface mine operations (metal/nonmetal only) not included above should report employment and hours-worked data on the seventh line (Code 12). Include associated shop and yard employees. Report officeworkers on line 10 (Code 99).

Sand and gravel operations should report employment and hours-worked data under line 3 (Code 03) or line 6 (Code 06) as appropriate except for officeworkers, which should be reported on line 10 (Code 99).

Independent shops or yards or both are those operations not associated directly with a specific mining operation. Such operations have a unique MSHA ID number which is not shared with any other mining activity. Report data on these employees on the eighth line (Code 17) and officeworkers on line 10 (Code 99).

Processing plants, mill operations, preparation plants, or breakers report data on all employees on the ninth line (Code 30). Include crushing, sizing, grinding, concentrating, and associated shops and yards that are not a part of any mining operation and not reported under any of the above categories. Sand and gravel operations should only report under Codes 03, 06, or 99.

Officeworkers (all professional and clerical personnel at the mine or plant) should be reported on line 10 (Code 99).

2. Other Reportable Data

Indicate the number of MSHA reportable injuries or illnesses for this calendar quarter on the line provided. If none occurred, write "none." Reportable injuries are defined in 30 CFR Part 50, and for each of these a Form 7000-1 must be submitted. Give the name, title, and phone number (including area code) of the person who should be contacted regarding any data reported on the form.

Definitions

Average Number of Persons Working During the Quarter. Show the average number of employees on the payroll or other persons working during all active periods in the quarter. Include all classes of employees (supervisory, professional, technical, proprietors, owners, operators, partners, and service personnel) on your payroll, full or part-time. *Report each employee under one sub-unit only.* For example: If one or more persons work both in the mine and the mill, report data on them to the sub-unit where they spend most of their time. If necessary, you may estimate for the major activity. The average number of employees may be computed by adding together the number of employees working during each pay period and then dividing by the number of pay periods. Do not include in the count those pay periods where no one worked. We can use as an example a quarter with five pay periods in which employees worked. The number of employees in each pay period was 10, 12, 13, 14, and 15, respectively. To compute the average, add the number of employees working each pay period ($10 + 12 + 13 + 14 + 15 = 64$); divide by the number of pay periods (64 divided by 5 = 12.8). Rounding 12.8 to the nearest whole number, we get 13 as the average number of persons working.

Total Employee-Hours Worked During the Quarter. Show the total hours worked by all employees for each sub-unit reported during the quarter. The hours that should be reported are *actual hours worked*. Report each overtime hour worked as one hour, not as the overtime multiple. Do not include vacation, holiday, sick leave, and any other off-duty time, even though paid. Data for the hours worked may be obtained from payroll or other time records if those records show straight-time hours actually worked. If actual hours are not available, they may be estimated on the basis of scheduled hours.

Production of Clean Coal (Short Tons) is to be completed only by operators of underground or surface coal mines or independent contractors involved in extracting coal, but not by operators of central or independent coal preparation plants or operators of metal or nonmetal mines. Enter the total production of clean coal from the mine. The production figure must include coal shipped from the mine and coal used for fuel at the mine, but exclude refuse and coal produced at another mine and purchased for use at the mine.

Glossary

Anthracite: A hard, black lustrous coal is the highest rank of economically usable coal. It has a high percentage of fixed carbon and a low percentage of volatile matter.

Ash: Impurities consisting of silica, iron, alumina, and other incombustible matter that are contained in coal. Ash increases the weight of coal, adds to the cost of handling, and can affect its burning characteristics. Ash content is measured as a percent by weight of coal on an "as received" or a "dry" (moisture-free, usually part of a laboratory analysis) basis.

Auger Mine: A mine in which coal is recovered through the use of a large-diameter drill driven into a coalbed in a hillside. It usually follows contour surface mining, particularly when the overburden is too costly to excavate.

Average Daily Production: The ratio of the total production at mining operation to the mining operation total number of production days worked at the operation.

Average Mine Price: The ratio of the total value of the coal produced at the mine to the total production tonnage.

Bituminous Coal: The most common coal. It is dense and black (often with well-defined bands of bright and dull material). Its moisture content usually is less than 20 percent. It is used for generating electricity, making coke, and space heating.

Btu (British Thermal Unit): A standard unit for measuring the quantity of heat energy equal to the quantity of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit.

Captive Coal: Coal produced and consumed by the mine operator, a subsidiary, or the parent company (for example, steel and electric companies).

Clean Coal: Coal that has been processed to reduce the amount of impurities present and improve the burning characteristics.

Coal: A black or brownish-black solid combustible substance formed by the partial decomposition of vegetable matter without access to air. The rank of coal, which includes anthracite, bituminous coal, subbituminous coal, and lignite, is based on fixed carbon, volatile matter, and heating value. Coal rank indicates the progressive alteration from lignite to anthracite. Lignite contains approximately 9 to 17 million Btu per ton. The contents of subbituminous and bituminous coal range from 16 to 24 million Btu per ton and from 19 to 30 million Btu per ton, respectively. Anthracite contains approximately 22 to 28 million Btu per ton.

Coal Preparation: The process of sizing and cleaning coal to meet market specifications by removing impurities such as rock, sulfur, etc. It may include crushing, screening or mechanical cleaning.

Coal-Producing Districts: A classification of coalfields defined in the Bituminous Coal Act of 1937. The districts were originally established to aid in formulating minimum prices of bituminous and subbituminous coal and lignite. Because much statistical information was compiled in terms of these districts, their use for statistical purposes has continued since the abandonment of that legislation in 1943. District 24 was added for the anthracite-producing district in Pennsylvania.

Coal-Producing Regions: A geographic classification of coal-producing States. The States in the Appalachian region are Alabama, Georgia, eastern Kentucky,

This glossary is based on definitions found in the glossaries of the Energy Information Administration's Coal Division publications.

Maryland, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. The States in the Interior region are Arkansas, Illinois, Indiana, Iowa, Kansas, western Kentucky, Louisiana, Missouri, Oklahoma, and Texas. The States in the Western region are Alaska, Arizona, California, Colorado, Montana, New Mexico, North Dakota, Utah, Washington, and Wyoming.

The three regional groupings by district are as follows:

Appalachian: Coal-Producing Districts 1-4, 6-8, 13, 24

Interior: Coal-Producing Districts 5, 9-12, 14-15

Western: Coal-Producing Districts 16-23

Coal Rank: A classification of coal based on fixed carbon, volatile matter, heating value, and agglomerating character. It is an indication of the progressive alternation, or coalification, from lignite to anthracite. The rank of coal can also be determined by measuring the reflectance of vitrinite, one of the several organic components (macerals) of coal.

Coalbed: A bed or stratum of coal. Also called a coal seam.

Coke (Coal): In general, coke is made from bituminous coal (or blends of bituminous coal) from which the volatile constituents are driven off by baking in an oven at temperatures as high as 2,000 degrees Fahrenheit, so that the fixed carbon and ash are fused together. Coke is hard and porous, has a gray, submetallic luster, and is strong enough to support a load of iron ore in a blast furnace. It is used as a fuel and a reducing agent in smelting iron ore in a blast furnace. Coke has a heating value of 26 to 28 million Btu per ton.

Coke Plants: Plants where coal is carbonized in slot or beehive ovens for the manufacture of coke.

Continuous Mining: A mining method in which a continuous mining machine removes and loads coal from the working face in one operation.

Contract: An agreement to do something, usually in writing, enforceable by law.

Contract Cost: Price of fuels marketed on a contract basis covering a period of 1 or more years. Contract

prices reflect market conditions at the time the contract was negotiated and therefore remain constant throughout the life of the contract or are adjusted through escalation clauses. Generally, contract prices do not fluctuate widely.

Contract Price: The delivery price determined when a contract is signed. It may be a fixed price or a base price escalated according to a given formula.

Conventional Mining: A mining method which involves a series of operations that require cutting the working face of the coalbed so that it breaks easily when blasted with explosives or high-pressure air, and then loading the broken coal.

Culm and Silt: Culm and silt are waste materials from preparation plants. In the anthracite region, culm consists of coarse rock fragments containing as much as 30 percent small-sized coal, and silt is a mixture of very fine coal particles (approximately 40 percent) and rock dust that has settled out from waste water from the plants. The term culm sometimes includes silt. The terms culm and silt are sometimes used interchangeably and are sometimes collectively called refuse. Culm and silt have heat value ranging from 8 to 17 million Btu per ton.

Delivered Price: The cost of fuel, free on board (f.o.b.) plant. Included is the invoice price of fuel, transportation charges, taxes, commissions, insurance, and expenses associated with leased or owned equipment used to transport the fuel.

Depletion: The subtraction of both the tonnage produced and the tonnage lost to mining from identified resources to determine the remaining tonnage as of a certain time.

Direct Labor Hours: Hours worked by all mining employees at a mining operation during the year. Includes hours worked by those employees engaged in production, preparation, development, maintenance, repair, shop or yard work, office work, management, and technical or engineering work. Excludes vacation and leave hours.

Escalator Clause: A clause in a purchase or sale contract that permits adjustment of price or profit under specified conditions.

FERC: The Federal Energy Regulatory Commission.

In Situ Mining: The recovery, by chemical leaching, of the valuable components of a mineral deposit without physical extraction of the rock (also referred to as "solution mining").

Lignite: A brownish-black coal of low rank with high inherent moisture and volatile matter (used almost exclusively for electric power generation). It is also referred to as brown coal.

Long-Term Contract Price: Delivery price determined when contract is signed; can be either a fixed price or a base price escalated according to a given formula.

Longwall Mining: A mining method in which long sections of coal, up to about 600 feet, are removed and no pillars are left to support the mined-out areas. The working area is protected by a movable, powered roof support system.

Low-Sulfur Coal: Low-sulfur coal generally contains 1 percent or less sulfur by weight.

Market Price: The prevailing price level in the coal market at a given time. It generally reflects a published spot price, is mutually agreed upon by the contracting parties, or is independently determined by an unbiased outside arbitrator.

Metallurgical Coal: Metallurgical coal (or coking coal) meets the requirements for making coke. It must be low in ash and sulfur and form a coke that is capable of supporting the charge of iron ore and limestone in a blast furnace. A blend of two or more bituminous coals is usually required to make coke.

Mine Count: The number of mines, or mines collocated with preparation plants/tipples, located in a particular geographic area (State, coal producing district). If a mine is mining coal across two counties within a State or across two States, then it will be counted as two operations. This is done so that EIA can separate production by State and county.

Open Market Coal: Coal production that is sold on the open market to other coal companies or directly to consumers.

Preparation Plant: A mining facility at which coal is crushed, screened, and mechanically cleaned.

Recovery Factor: 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. 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.

Recovery Percentage: The percentage of coal that can be recovered from the coal deposits at existing mines.

Reserve: 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 coal resource designated as the demonstrated reserve base.

Short Ton: A unit of weight equal to 2,000 pounds.

Spot Market: Buying and selling of fuel for immediate or very near-term delivery by contracts to meet peak demands.

Spot Market Price: Price for material being bought and sold on the spot market (i.e., small quantities of material for short-term delivery).

Spot Purchases: A single shipment of fuel or volumes of fuel, purchased for delivery within 1 year. Spot purchases are often made by a user to fulfill a certain portion of energy requirements, to meet unanticipated energy needs, or to take advantage of low-fuel prices.

Steam Coal: Steam coal is best suited for generating steam to produce electricity or for other purposes.

Strip (Surface) Mining: A method used on flat terrain to recover coal by mining long strips successively; the material excavated from the strip being mined is deposited in the strip previously mined.

Subbituminous Coal: Subbituminous coal, or black lignite, is dull black and generally contains 20 to 30 percent moisture. The heat content of subbituminous coal ranges from 16 to 24 million Btu per ton as received and averages about 18 million Btu per ton. Subbituminous coal, mined in the western coal fields, is used for generating electricity and space heating.

Surface Mine: A coal-producing mine that is usually within a few hundred feet of the surface. Earth above or around the coal (overburden) is removed to expose the coalbed, which is then mined with surface excavation equipment such as draglines, power shovels, bulldozers, loaders, and augers. It may also be known as an area, contour, open-pit, strip, or auger mine.

Underground Mine: A mine where coal is produced by tunneling into the earth to the coalbed, which is then mined with underground mining equipment such as cutting machines and continuous, longwall, and shortwall mining machines. Underground mines are classified according to the type of opening used to reach the coal, i.e., drift (level tunnel), slope (inclined tunnel), or shaft (vertical tunnel).

Surface Mining Methods: Surface mining methods include the following:

An *auger mine* recovers coal through the use of a large-diameter drill driven into a coalbed in a hillside. It usually follows contour surface mining, particularly when the overburden is too costly to excavate.

Area mining is practiced on relatively flat or gently rolling terrain and recovers coal by mining long strips successively; the material excavated from the strip being mined is deposited in the strip pit previously mined.

Contour mining is practiced when coal is mined on hillsides. The mining follows the contour of the hillside until the overburden becomes uneconomical to remove. This method creates a shelf, or bench, on the hillside. Several variations of contour mining have been developed to control environmental problems. These methods include *slope reduction* (overburden is spread so that the angle of the slope on the hillside is reduced), *head-of-hollow fill* (overburden is placed in narrow V-shaped valleys to control erosion), and *block-cut* (overburden from current mining is backfilled into a previously mined cut).

Explosives casting is a technique designed to blast up to 65 percent of the overburden into the mine pit for easier removal. It differs from conventional overburden blasting, which only fractures the overburden before it is removed by excavating equipment.

Open-pit coal mining is essentially a combination of contour and area mining methods and is used to mine thick, steeply inclined coalbeds. The overburden is removed by both power shovels and trucks.

Underground Mining Methods: Underground mining methods include the following:

A *drift mine* is driven horizontally into coal exposed or accessible in a hillside.

In a *hydraulic mine*, high-pressure water jets break the coal from a steeply inclined, thick coalbed that would be difficult to mine with the usual underground methods. The coal is then transported to the surface by a system of flumes or by pipeline. Although currently not in commercial use in the United States, hydraulic mining is used in western Canada.

A *shaft mine* is driven vertically to the coal deposit.

A *slope mine* is driven at an angle to reach the coal deposit.

In a *room-and-pillar mining system*, the most common method, the mine roof is supported mainly by coal pillars left at regular intervals. Rooms are places where the coal is mined; pillars are areas of coal left between the rooms. Room-and-pillar mining is done either by 1) *conventional mining*, which involves a series of operations that require cutting the working face of the coalbed so that it breaks easily when blasted with explosives or high-pressure air, and then loading the broken coal or 2) *continuous mining*, in which a continuous mining machine extracts and removes coal from the working face in one operation. When a section of a mine has been fully developed, additional coal is extracted by mining the supportive pillars until the roof caves in; the procedure is called *room-and-pillar retreat mining*.

In a *longwall mining system*, long sections of coal, up to about 600 feet, are removed and no pillars are left to support the mined-out areas. The working area is protected by a movable, powered roof support system. The caved area (gob) compacts and, after initial subsidence, supports the overlying strata. Longwall mining is used where the coalbed is thick and generally flat, and where surface subsidence is acceptable.

A *shortwall mining system*, generally refers to room-and-pillar mining in which the working face is wider than usual but smaller (less than 150 feet) than that in longwall mining.

Roof support and mine ventilation are paramount in all underground mining operations. *Roof bolting* is the principal method of supporting the mine roof. In roof bolting, long bolts, 2 to 10 feet long with an expansion shell or with resin grouting are placed in the mine roof.

Roof bolts reinforce the roof by pulling together rock strata to make a strong beam, or by fastening weak strata to strong strata.

Mine ventilation, accomplished with fans, is essential to supply fresh air and to remove gases and dust from the mine. To reduce the possibility of coal dust explosions, *rock dust* is sprayed in an underground coal mine. Rock dust is a very fine noncombustible material, usually pulverized limestone.

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