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TVA'S COAL PROCUREMENT PRACTICES--MORE EFFECTIVE MANAGEMENT NEE--ETC(U)
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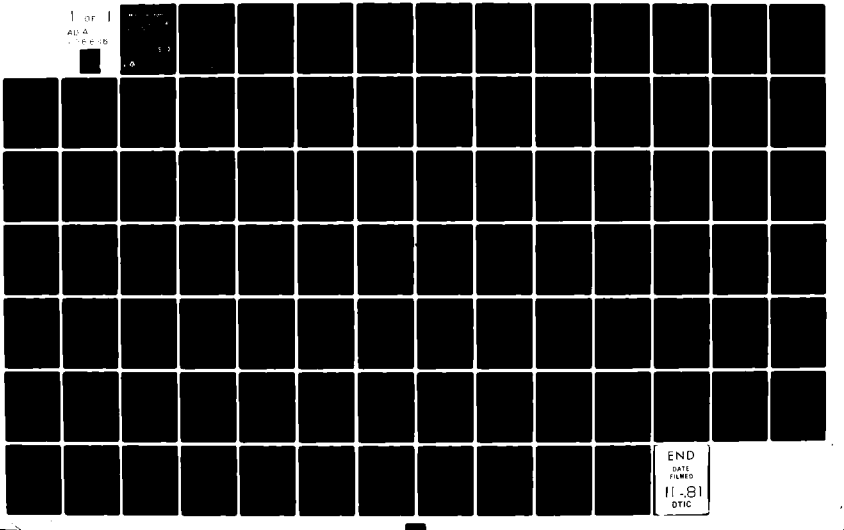

BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

TVA's Coal Procurement Practices--More Effective Management Needed

The Tennessee Valley Authority is one of the largest coal-buying utilities in the Nation. Coal costs are a major expense to TVA and thus affect power rates. The coal purchasing program should be managed more effectively in order to keep down coal costs.

TVA has purchased a great deal of its coal during times that were least favorable for buying coal. Consequently, TVA paid premium prices. The lack of a long-range comprehensive plan for buying coal has led to other problems as well.

GAO points out problems TVA has had with respect to its coal-buying practices and recommends that a long-range plan for coal purchases be developed and that procurement practices be improved.

GAO/EMD-81-85
AUGUST 14, 1981

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

B-201782

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses the coal purchasing practices of the Tennessee Valley Authority (TVA) over the past 10 years and analyzes the timing of TVA's coal purchases, the process used in buying the coal including type and length of contract, TVA's quality assurance practices, and the level of coal inventories at the powerplants.

We made this review because TVA's expense for coal burned in 1980 accounted for over 50 percent of total operating expenses; thus, TVA's coal purchases have a major impact on its costs and power rates.

Copies of this report are being sent to the Director, Office of Management and Budget; the Chairman, Board of Directors; TVA; and the House and Senate committees and subcommittees having oversight responsibilities for the matters discussed in the report.

Milton J. Socolar

Acting Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

TVA'S COAL PROCUREMENT PRACTICES--MORE EFFECTIVE MANAGEMENT NEEDED

D I G E S T

The Tennessee Valley Authority (TVA) is one of the largest coal-buying utilities in the Nation. In 1979, TVA bought more than 41 million tons of coal at a cost in excess of $1.2 billion and in 1980 bought 37 million tons at a cost of $1.3 billion. TVA operates 12 coal-burning powerplants with a capacity of 17,750 megawatts which supply about 67 percent of the electricity generated by its power system.

COAL CONTRACTS ARE AWARDED UNDER LEAST FAVORABLE CONDITIONS

During 1974-75 and 1977-78--two periods in the 1970s that were least favorable for buying coal--TVA contracted for about 283 million tons of coal or about 74 percent of the total contracted for in the 10-year period 1970-79. Because a sellers' market existed at those times, TVA had to pay premium prices for the coal.

In a sellers' market, one must expect to pay a premium price. But it also seems prudent that one would try to limit the length of time the premium price has to be paid. Apparently, this did not happen. (See ch. 2.)

During the period 1970 through 1979, TVA negotiated contracts for about 81 percent of its term coal, coal contracted for 6 months or longer. It usually negotiated the contracts on an emergency basis, but GAO questions whether the negotiated procurements qualified as emergency procurements. In some cases, the negotiated contracts awarded under the emergency conditions did not provide for deliveries to begin until several months after the contract date and many contracts were for periods longer than 6 months.

Furthermore, because most of TVA's coal contracts contain escalation clauses, the high base prices are "ballooning." The average base price on some contracts issued under one requisition have escalated at about a 15-percent annual rate.

While TVA has already paid high prices for its coal because of the high award prices and the escalation clauses, the continued escalation may be reduced by renegotiating those contracts that are still active. Almost all TVA coal contracts for longer than 5 years contain a provision for renegotiation at 5-year intervals. The present market prices for coal are substantially lower than some contract prices and renegotiation would result in savings on most of them. TVA recently renegotiated several contracts and reduced the price by $20 million. (See p. 13.)

POLICY OF BUYING COAL ONLY FROM EASTERN MARKETS IS COSTLY

One requirement of the TVA Act is that TVA contribute to the economic well-being of the Tennessee Valley. TVA believes that one way to contribute to the Valley's economy is to buy coal only from producers east of the Mississippi River. TVA has followed this policy despite a study conducted by its Office of Power which concluded that TVA could save from $31 to $36 million annually in 1978 dollars by buying western coal for the Shawnee Steam Plant. Limiting the market area to eastern producers could ultimately hurt the Valley's economy since higher coal prices result in higher rates for electricity. (See p. 16.)

SMALL COAL OPERATORS PLAY SMALL ROLE IN TVA COAL PROCUREMENT

TVA has frequently endorsed support of small coal operators as a means of maintaining competition in the coal industry and restraining cost increases to ratepayers.

TVA's main chance to deal with the small operator is through the spot market, but spot coal purchases have been low because TVA generally has enough coal under term contracts to meet its needs. Most of TVA's spot coal bids are from small companies and doing spot business can lend support to TVA's initiatives in regard to the small coal operator.

In 1979, TVA took positive action in support of small coal operators by formally adopting a Small Coal Operators Assistance Program. (See p. 23.) At the time of our review, the program had not been operating long enough to fully evaluate its effectiveness. However, there is evidence that the program may not be as effective as possible because not all set-asides provided under the program will be established. Also, the definition of a small operator under a recent requisition differed from that established under the small operator program, thereby excluding potential participants.

ACQUISITION AND DEVELOPMENT OF TVA-OWNED COAL RESERVES--CAUTION IS NEEDED

TVA has acquired ownership of coal reserves to ensure the availability of adequate supplies of coal. TVA currently has estimated coal reserves of about 630 million tons of recoverable coal located in eight different coal reserves.

Camp Breckinridge is currently being mined to supply coal to TVA's Cumberland Steam Plant. TVA has encountered several significant problems in developing the Breckinridge reserve. These problems should serve as an example as TVA approaches development of other reserve holdings such as Ewing-Northern Coal Association (ENCA). (See ch. 3.)

INTERNAL CONTROLS FOR QUALITY ASSURANCE

Quality assurance practices are adequate at most TVA steamplants. However, coal sampling facilities at one steamplant are not fully adequate to detect delivery of inferior quality coal. Moreover, at this plant, TVA has not aggressively enforced measures to make sure it receives the quality of coal paid for and new receiving and sampling facilities authorized in 1979 have not yet been installed.

Quality asurance controls for sampling coal at Breckinridge are poor. The mining contractor sends samples to TVA, but TVA does not monitor the actual sampling even though plant officials at the Cumberland plant which burns Breckinridge

coal acknowledge there are problems with the coal quality.

PRICE ADJUSTMENT FORMULA DOES NOT ADEQUATELY COMPENSATE FOR DIFFERENCE IN COAL QUALITY

Because coal varies widely in ash and sulfur content and in heat content, suppliers are not always able to deliver the quality of coal agreed to in a contract. When such discrepancies occur, TVA and other utilities use price adjustment formulas to calculate an evaluated price for the coal actually delivered. TVA implemented a price adjustment formula in 1957 to provide an accurate relationship between coal quality and maintenance costs. This formula needs to be revised, however, to make adjustments more commensurate with its actual costs for different quality coal. (See ch. 5.)

EXCESSIVE COAL INVENTORIES DUE TO INFLEXIBLE DELIVERY SCHEDULES

TVA's coal contracting procedures have resulted in acquiring coal inventories well in excess of target quantities at many of its steamplants. Long-term contracts do not permit TVA to consistently change delivery quantities when requirements for coal at a steamplant change. Extensive use of such contracts, together with lower-than-estimated burn levels and higher-than-estimated receipts, has resulted in TVA receiving more coal than it really needs. (See ch. 6.)

CONCLUSIONS

TVA's coal purchasing program could be managed more effectively. TVA has, over the past 10 years, purchased most of its coal during the two least favorable periods for buying coal. The long-term contracts that TVA entered into do not allow TVA to take advantage of decreases in market prices which usually follow periods of high demand.

TVA could have saved between $31 and $36 million annually at the Shawnee Steam Plant by buying western coal, according to a TVA study. However, TVA has adopted a policy of buying coal only from suppliers east of the Mississippi River in order to promote the Valley economy.

TVA currently holds reserves containing about 630 million tons of recoverable coal. Only one reserve is currently being developed, Camp Breckinridge. TVA has encountered problems in developing Breckinridge which indicate TVA needs to proceed cautiously in developing additional reserves.

To compensate for coal that is of a lower quality than contracted for, TVA in 1957, adopted a price adjustment formula. TVA has not revised this formula even though it recognized the formula was outdated in 1975.

Coal inventories at nine TVA steamplants are about 5.9 million tons over target inventories. This has occurred because of TVA's inflexible term contracts.

RECOMMENDATIONS

GAO recommends that TVA revise its coal purchasing practices. TVA should implement a better program of forward planning to minimize the award of contracts during periods when coal demand is high--for example, the predictable miners' strikes--and to limit the duration of contracts that must be awarded during these periods. TVA also should:

--Consider all responsive offers from coal suppliers regardless of geographic location; the economics of the source should be a primary consideration as to whether the offer is accepted or rejected.

--Exercise caution in proceeding with development of the ENCA reserves, particularly the economic feasibility of producing the desired quality and quantity of coal from ENCA. It should avoid the problems encountered at Breckinridge in developing ENCA.

--To provide adjustment in coal price commensurate with costs or benefits from the coal delivered, TVA should discontinue using the current coal quality price adjustment formula. Instead, it should review the alternate formula GAO developed or develop another formula that will reflect actual costs. In addition, the formula should be included in all future procurements.

--Include provisions in all term contracts which give it the option to cut back on deliveries when needs are not as great as forecast.

AGENCY COMMENTS

TVA, in commenting on GAO's draft report disagreed in most cases. TVA's response is negative and, in GAO's view, does not offer much optimism that needed improvements will be made in the coal purchasing program. While GAO recognizes that its report presents some critical findings on TVA's coal program, it hopes TVA officials will take a fresh and objective look at the final report and take actions in line with GAO's recommendations as part of developing a better forward planning system for coal purchasing and making other improvements in TVA's coal purchasing practices.

Because of the manner in which TVA responded to the draft report, we have provided in appendix I comments on a point-by-point basis to TVA's comments.

TVA's letter basically states the report contains material factual errors and displays a lack of understanding by GAO of TVA's coal procurement and the coal industry in general. GAO does not agree; GAO believes it closely examined TVA's coal purchasing practices and gained the understanding that there are significant problems which need to be addressed. GAO believes the report reflects such an understanding and presents a balanced discussion of areas of legitimate concern with TVA's coal purchasing practices and reasonable recommendations which would lead to improvements in such practices. While some changes were made to the report based upon TVA's comments, none were significant enough to materially change the report. The detailed comments in appendix I indicate what changes were made.

Contents

ABBREVIATIONS

Btu	British thermal unit
ENCA	Ewing-Northern Coal Association
EPA	Environmental Protection Agency
F.O.B.	Free on board
GAO	General Accounting Office
TVA	Tennessee Valley Authority

GLOSSARY

British thermal unit	The standard unit for measuring quantity of heat energy. The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit under stated conditions of pressure and temperature.
Coal ash	Mineral substances in coal that do not burn and become residue.
Coal seam	Geological configuration of coal deposits as they naturally occur in the earth's subsurface of determibale depth and volume through test core drills.
Consent Decree	Court approved agreements between TVA, EPA, the States of Alabama, Kentucky and Tennessee, and several private parties concerning TVA actions to bring its coal-fired steamplants into compliance with clear air emission standards as established by the Clean Air Act.
In-place tons	The estimated volume of identified coal resources which is of mineable depth and thickness.
Recoverable tons	That portion of the in-place tons that can be economically mined using current technology.
Requisition	The mechanism TVA uses to purchase coal both under advertised and negotiated bids.
Small coal operator	Defined by TVA as those coal operators supplying 200,000 or less tons a year and with 50 or less employees.
Spot contracts	Coal contracts with a maximum allowable delivery term of 25 weeks.
Term contracts	Contracts with a duration of longer than 6 months.

CHAPTER 1

INTRODUCTION

The Tennessee Valley Authority (TVA) is one of the largest coal-buying utilities in the Nation. In 1979, TVA bought more than 41 million tons of coal at a cost in excess of $1.2 billion and in 1980 bought 37 million tons at a cost of $1.3 billion. Its purchases have significant economic impact on the Appalachian region, which supplies much of TVA's coal. (See table 1 for deliveries to TVA.)

TVA operates 12 coal-burning powerplants with a capacity of 17,750 megawatts which supply about 67.2 percent of the electricity generated by its power system. (See app. II.) During fiscal year 1980, these 12 plants generated more than 82.6 billion kilowatt hours of electricity. TVA's expense for coal burned in 1980 of $1.236 billion accounted for over 50 percent of TVA's total operating expenses. Thus, TVA's coal purchases have a major impact on TVA's costs and power rates. Even though TVA is now building nuclear powerplants, it expects the coal-burning plants will operate close to the present level of usage into the mid-1980s.

OBJECTIVES, METHODOLOGY, AND SCOPE

Because TVA is such a large purchaser of coal, we decided to review TVA's coal purchasing practices over the past 10 years and how it planned for these purchases. Our objective was to determine whether TVA had sound coal purchasing plans and practices including buying coal under optimum market conditions. As we pursued this objective, it became apparent that coal purchasing is only the first step in the process of generating electricity from coal-fired steamplants. Our objective was subsequently broadened to include looking into (1) TVA's quality assurance practices, (2) the management of TVA's coal reserves, (3) the price adjustment formula used by TVA to adjust for coal of a lesser quality than that contracted for, and (4) the coal inventory level at the powerplants.

Before contracting for coal, TVA first issues a requisition. Each requisition specifies the type, amount, and period of time for which TVA is seeking coal for particular steamplants. Requisitions pertain to both coal purchased under competitive bid and negotiation. Our review covered the 16 requisitions that TVA issued during the 10-year period. We reviewed in detail, all documents available relating to TVA's largest coal purchase, Requisition 42.

Coal costs escalated significantly during the 1970s. TVA paid an average cost of $5.53 a ton for coal in 1970, $23.26 a ton in 1975, and $30.14 a ton in 1979. Thus, it is easy to see why coal cost has been a major contributor to TVA's operating costs and the resulting power rate increases. A review of TVA's

Table 1

Coal Delivered to TVA

Steam-Electric Plants in 1979

and Total U.S. Production

State where mine is located	Production (million tons) (note a)	TVA receipts	
		Million tons	Percent
Kentucky	110.9	28.6	25.8
Tennessee	7.4	4.8	64.9
Illinois	50.6	1.1	2.2
Indiana	26.7	1.0	3.7
West Virginia	49.6	.7	1.4
Virginia	13.7	1.1	8.0
Alabama	14.7	1.4	9.5
Ohio	39.8	2.8	7.2
Total	312.4	41.5	13.3
Total U.S. production	770.0	41.5	5.4

a/Reported data for coal deliveries to utility powerplants with a capacity of 25 megawatts or greater.

coal purchasing program to see how costs have escalated would have proven insignificant because these facts are publicized and well known. But, there were factors relating to TVA's coal purchasing program which we believed deserved reviewing. These factors included how the agency's total cost of delivered coal could have gone up from $1.2 to $1.3 billion from 1979 to 1980, when, at the same time, coal deliveries dropped from 41 million tons to 37 million tons and information provided to the Department of Energy on coal deliveries showed the weighted average price of TVA's coal is higher than the national average.

We also realized certain occurrences over the past several years could have had major impacts on the overall demand, supply, and cost of coal. Examples include coal miners' strikes, the oil embargo, and in TVA's case the agreement to a proposed Consent Decree on actions to be taken at its coal-fired powerplants in complying with the Clean Air Act. Since these factors occurred mostly during the 1970s, we decided our overall review objective would consider TVA's management of its coal procurements during the period 1970 to 1979. We believed this time frame would provide a broad perspective of its coal purchasing activities.

To get a clear picture on TVA's coal purchases during this period, we identified the specific times when actions occurred that interrupted or caused some change to the normal coal demand/supply picture and to the extent possible, whether any of these were predictable. The predictability of occurrences that could impact on coal demand/supply becomes a key element in looking at coal purchases over a range of years. Because TVA has been buying coal for many years, its knowledge of predictable occurrences such as termination of mine worker union contracts would have an impact on the timing of its purchases. We, therefore, viewed TVA's timing of purchases during the 1970s. We then looked at TVA's

--process used in buying the coal and

--type of contract, including the length and any specific arrangements in the contract.

We related these to TVA's overall directives for buying coal. Section 9(b) of the TVA Act, as amended, provides that, except in emergency situations and certain other limited cases, TVA is to award all contracts and make all purchases only after advertising for bids. In addition, TVA has implemented other operating policies and practices which provide for

--purchase of at least 75 percent of its coal under term contracts (i.e., contracts that provide deliveries over a period exceeding 6 months);

--escalation clauses in most term contracts to adjust for upward or downward changes in producer costs;

--reopener provisions in most term contracts allowing for renegotiation of contract terms at specific intervals, usually every 5 years;

--purchase of coal from sources east of the Mississippi River; and

--establishment of a Small Coal Operator Assistance Program under which small independent coal operators are eligible for certain types of assistance in supplying coal to certain steamplants.

To address the above, we gathered data from TVA's coal purchasing files to see when they bought coal and the process used in buying it. Contracts were reviewed to identify length, special provisions, and performance standards. We discussed specific purchases, as well as general procedures related to coal procurement, with TVA's Office of General Counsel and with TVA purchasing and fuel officials. In addition, we analyzed reports, studies, and other relevant data that TVA made available, including reports prepared by TVA's Office of Internal Audit.

Contracting for buying coal is only the first step in the coal management process. Getting the coal mined, delivered, and burned are the next steps. During these processes, good coal management would ensure that controls are in place to assure the coal actually received is what was contracted for, and that the coal is still needed. If not, management should have the flexibility to take appropriate action. In reviewing these processes, we focused on TVA's

--quality assurance practices,

--price adjustment formula, and

--level of coal inventories at the powerplants.

We visited several TVA steamplants in order to obtain information on coal inventories and quality assurance practices. We selected these powerplants because they were large ones which we believed were typical of TVA's system. At the Cumberland, Paradise, and Widows Creek powerplants we obtained information on coal inventories on hand. In addition, at the Cumberland and Paradise powerplants we also observed quality assurance practices. We reviewed procedures for sampling and obtained inventory data on the other coal powerplants, reasons for the quantities on hand, and determined related costs. In addition, we reviewed contracts for the existence of clauses for providing flexibility in adjusting coal deliveries.

In addition, as our review progressed, we noted that TVA was obtaining coal from one of its reserves (Breckinridge) to supply coal to the Cumberland powerplant. We also noted several problems related to production from this reserve. We reviewed these problems in more detail with the objective of whether the problems TVA encountered in managing this reserve could provide guidance for future management of TVA's other reserves. To do this, we reviewed information on the quality of coal at Breckinridge and the contracts for mining and delivering the coal. We visited the Breckinridge reserve and discussed the operation of the mines with the mining operators. We also reviewed TVA's other reserve holdings as to their coal quality and potential for use. One reserve we noted specifically, the Ewing Northern Coal Association (ENCA) reserve, has similar characteristics to Breckinridge. Because of the similar characteristics, we related the Breckinridge experiences to potential development of the ENCA reserve.

In conducting our overall study, we attempted to relate TVA's coal purchasing activities to other utilities that buy large quantities of coal. We were able to make some comparisons from data submitted to the Department of Energy. Our comparisons are limited, however, because of the lack of detailed data which we were able to obtain from specific utilities contacted.

Also, our review efforts at TVA were somewhat constrained because of the unavailability of some records. We were not able to examine the negotiation contract files associated with one of TVA's largest purchases--Requisition 42. TVA officials informed us that these files had been lost recently and were not available for review. Because of this, we could not verify the process TVA used in negotiating Requisition 42.

Our analyses of these issues shows that there is a need for improvement in TVA's coal management program. Our conclusions and recommendations are found in chapter 7.

CHAPTER 2

IMPROVEMENTS NEEDED IN TIMING OF COAL PURCHASES AND LENGTH OF CONTRACTS

During the 10-year period 1970-79, coal prices increased significantly. Thus, since TVA is one of the Nation's major coal purchasers, it is no surprise its coal costs increased. During this period, TVA contracted for 383 million tons of coal and renegotiated expiring contracts for an additional 98 million tons. While we do not question that coal costs in general had to escalate drastically during this period, we do question whether TVA's coal purchases could have been made under better market conditions and for different terms.

TVA contracted for 75.2 percent of the term 1/ coal during two periods of high demand--1974-75 and 1977-78. Rather than purchasing coal according to a long-range plan, TVA simply issues requisitions for additional coal when contracts are nearing expiration. Although TVA needed coal during these time frames because of miners' strikes and a proposed Consent Decree under the Clean Air Act, it bought most of its coal under contracts over 10 years in duration, during periods when conditions for buying coal were unfavorable. By doing so, TVA had to pay premium prices for the coal and was not able to take full advantage of decreases in market prices which generally follow the high demand periods. Also, by entering into contracts of long duration for a major portion of its coal needs, TVA has reduced the flexibility of meeting a portion of its coal needs through the short-term market. This factor, along with consistently buying from the same suppliers, has hampered the small coal operator program. In addition, TVA's policy of using strictly eastern coal has resulted in higher costs at the Shawnee Steam Plant.

A significant number of the contracts do, however, provide for periodic renegotiation of terms or termination, usually without penalty. Therefore, TVA may be able to negate some of the adverse impacts to the power system of buying coal during unfavorable conditions by renegotiating more favorable terms when able to do so.

TVA COAL BUYING POLICIES

TVA does not purchase its coal according to a long-range plan that would indicate when coal would have to be bought for a particular steamplant. Instead, when current contracts are near expiration, TVA simply advertises for additional coal supplies.

TVA's procurement policies provide that it acquire no less than 75 percent of its coal requirements through term contracts.

1/TVA defines a term contract as one having a duration of longer than 6 months.

It can acquire the remainder through spot purchases, which enable it to more closely match power system burn requirements to inventory supplies. Although the TVA Act does not specify either maximum or minimum duration for term contracts, TVA's contracts have ranged from a period of 6 months up to 24 years.

The Act stipulates that all purchases be made only after advertising for bids, 1/ unless an emergency requires immediate delivery of the supplies or performance of the services or certain other conditions apply. TVA's Code 2/ permits direct negotiation with coal suppliers if advertising procedures fail to yield acceptable bids. In addition, the TVA Code provides that

> "When the coal stockpile at any steamplant is insufficient for 60 days' continuous operation at full load, an emergency exists, and coal contracts for that steamplant for terms running six months or less may be made by negotiation, in lieu of advertising for bids, as may be required to maintain a stockpile sufficient for 60 days' continuous operation at full load." (Underscoring added.)

Another policy TVA has followed is buying coal from sources east of the Mississippi River. Accordingly, most of its purchases have been from the surrounding seven State area including the Appalachian and midwestern coal fields.

In 1979, TVA formally adopted a Small Coal Operator Assistance Program (SCOAP) under which small, independent coal operators are eligible for set-aside purchases and may be provided assistance in understanding and preparing bids, as well as technical and financing assistance. TVA has frequently endorsed support of small coal operators as a means of maintaining competition in the coal industry and restraining cost increases to ratepayers. Adoption of the SCOAP represented more positive action by TVA to aid the development of small coal operators.

COAL CONTRACTS ARE AWARDED UNDER LEAST FAVORABLE CONDITIONS

During 1974-75 and 1977-78, two periods in the 1970s that were least favorable for buying coal, TVA contracted for about 283 million tons of coal or about 74 percent of the total quantity of 383 million tons of the coal contracted for in the 10-year period 1970-79. Most of the coal contracted for had contract lengths of 10 years or more. However, a majority of contracts contained clauses permitting renegotiation or, in some cases, termination, usually without penalty. During 1974 TVA paid an

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1/TVA procurements are not subject to Federal Procurement Regulations.

2/The TVA Code is a compilation of its operating policies and procedures.

average price of $19.94 while its 1977-78 prices were $26.02 to $34.29 per ton. Because a sellers' market existed at those times, TVA had to pay premium prices for the coal. Naturally in a sellers' market, one must expect to pay a premium price. But it also seems natural that one would try to limit the length of time the premium price has to be paid. This does not appear to be the case.

The significance of the timing of TVA's coal purchases requires a look at the timing of purchases for the period 1970-79 and also a more finite breakdown during 1974-75 and 1977-78. Table 2 and figure 1 show the timing of purchases, average price per ton, and amount purchased. We have broken the years 1973, 74, 75, 77, and 78 into quarters to also see the significance of purchases surrounding key events during the decade. For example, prior to the oil embargo which occurred in late 1973 and the miners' contract which was due to expire in late 1974, TVA had not contracted for much coal (see 1971, 72, and first three quarters of 1973 in figure 1). While TVA could not anticipate the embargo, the miners' contract expiration was known. Yet, TVA contracted for 47.02 million tons of term coal through negotiated bids for the period January 1974 through March 1975 with the greatest amount being purchased in the first quarter of 1975, just after the miners' strike. Fifty-one percent of the 47.02 million tons was under contracts of 10 or more years. By the summer of 1975 and through 1976 coal prices had fallen and stabilized. However, as shown in figure 1, TVA bought little coal during this period--entering only one term contract during the remainder of 1975 for only 541,800 tons and two term contracts for about 5.16 million tons in 1976.

Again, during the 1977 and 1978 time frame TVA faced similar circumstances to the mine workers' strike in 1974. Tight market conditions existed during this period because TVA was purchasing low sulfur coal to satisfy system requirements to bring plants into compliance with TVA's proposed Consent Decree under the Clean Air Act. According to TVA Purchasing Division officials, the coal industry was well aware of TVA's requirements and many of the suppliers would offer coal only on their own terms. Adding to TVA's supply problems was the coal miners' strike from January 1978 through March 1978. As figure 1 shows TVA contracted for great amounts of coal during this period of a sellers' market. In fact, TVA bought over 60 percent of the term coal purchased in the 1970s during this 2-year period and at the highest prices it paid during the 10 years. Under one requisition during this sellers' market, TVA entered 71 contracts for delivery of 192 million tons of coal at an average base price of $31.04 per ton. Many of these contracts were for 10 years or more, and one for 17 years. During the 1977 to 1978 period, TVA (1) paid some of the highest prices it had ever paid for coal, (2) contracted for the largest quantity of coal ever committed under one requisition, and (3) the majority of the coal was under contracts for 10 years or more. Yet in 1979 (see figure 1) when coal prices had stabilized or dropped in some cases, TVA contracted for only 6.3 million tons under term contracts for durations up to 3 years.

In addition to the contracts awarded during the period 1970-79, TVA amended several of its contracts with major suppliers rather than advertising for bids. These contract amendments resulted in commitments for an additional 98.1 million tons of coal at an award price of $1.24 billion. At the same time, TVA pursuant to contractual provisions, renegotiated other contract arrangements, the result of which was price increases totaling over $1.15 bil ion. The commitment for these renegotiations totaled about $2.39 billion. As was the situation when TVA contracted for most of its other coal requirements during the 1970s, most of these contract amendments and renegotiations occurred during and surrounding the miners' strikes in 1974 and 1978 and during 1977-78 when TVA was purchasing low sulfur coal to satisfy its needs under the proposed Consent Decree.

We could not determine whether TVA was forced to negotiate the long-duration contracts in order to obtain coal. TVA contends that it was forced to agree to unfavorable provisions on some contracts because a sellers' market existed. We were not able to verify this because the negotiation contract files for Requisition 42, which provided for the largest coal purchase in TVA history, were not available for our review because they had been lost.

In summary, TVA bought coal during the decade at periods least favorable for buying coal and purchased little coal during periods when the market was more stable. This resulted from TVA buying coal by issuing requisitions for additional coal when contracts are nearing expiration instead of following a long-range plan.

Effects of escalation clauses on contracts awarded during unfavorable periods

Most of TVA's coal contracts contain escalation clauses which make the unfavorable terms even more onerous to TVA. Because of the escalation clauses, the high base prices are "ballooning." For the 40 contracts under Requisition 42 awarded in 1977 and 1978 that were still active at September 30, 1980, the average price has increased from $30.04 per ton to $40.15 per ton--about a 15-percent annual rate. During the latter part of 1980 TVA exercised its contractual right to renegotiate contracts at one plant which resulted in prices much lower than $40 per ton. In March 1981, just before the miners' contract was expiring similar quality coal was being bought on the open market at less than $30 per ton.

Table 2

Volume and Price of TVA Term Coal Contracts

Awarded 1970 Through 1979

	Advertised			Negotiated			Total		
Year	Tons	Price	Average price (note a)	Tons	Price	Average price (note a)	Tons	Price	Average price (note a)
1970	1,503,874	$ 200,354,000	$ 7.10	45,880,000	$251,669,000	$ 5.49	47,383,874	$200,354,000	$5.53
1971	1,727,812	14,530,876	8.41	-	-	-	1,727,812	14,530,876	8.41
1972	2,773,508	20,050,288	7.23	-	-	-	2,773,508	20,050,288	7.23
1973	23,116,298	198,522,532	8.59	91,000	698,750	7.68	23,207,298	199,221,282	8.58
Quarter									
1-3	(4,724,783)	(39,604,515)	(8.38)	-	-	-	(4,724,783)	(39,604,515)	(8.38)
4	(18,391,515)	(158,918,017)	(8.64)	(91,000)	(698,750)	(7.68)	(18,482,515)	(159,616,767)	(8.64)
1974	-	-	-	16,521,150	329,406,718	19.94	16,521,150	329,406,718	19.94
Quarter									
1	-	-	-	(182,900)	(2,066,770)	(11.30)	(182,900)	(2,066,770)	(11.30)
2	-	-	-	(6,482,860)	(92,015,486)	(14.19)	(6,482,860)	(92,015,486)	(14.19)
3	-	-	-	(5,772,720)	(109,874,885)	(19.03)	(5,772,720)	(109,874,885)	(19.03)
4	-	-	-	(4,082,670)	(125,449,577)	(30.73)	(4,082,670)	(125,449,577)	(30.73)
1975	541,800	9,237,690	17.05	30,408,900	710,796,091	23.37	30,950,700	720,033,781	23.26
Quarter									
1	-	-	-	(30,408,900)	(710,796,091)	(23.37)	(30,408,900)	(710,796,091)	(23.37)
2-4	(541,800)	(9,237,690)	(17.05)	-	-	-	(541,800)	(9,237,690)	(17.05)
1976	5,160,000	103,478,640	20.05	-	-	-	5,160,000	103,478,640	20.05
1977	25,624,200	621,088,974	24.24	80,936,420	2,151,733,477	26.59	106,560,620	2,772,822,551	26.02
Quarter									
1	(25,624,200)	(621,088,974)	(24.24)	-	-	-	(25,624,200)	(621,088,974)	(24.24)
2	-	-	-	(56,871,900)	(1,497,842,626)	(26.34)	(56,871,900)	1,497,842,626	(26.34)
3	-	-	-	(50,000)	(1,200,000)	(24.00)	(50,000)	(1,200,000)	(24.00)
4	-	-	-	(24,014,520)	(652,690,851)	(27.18)	(24,014,520)	(652,690,851)	(27.18)
1978	-	-	-	110,759,540	3,797,775,815	34.29	110,759,540	3,797,775,815	34.29
Quarter									
1	-	-	-	(11,888,900)	(309,882,078)	(26.06)	(11,888,900)	(309,882,078)	(26.06)
2	-	-	-	(26,100,970)	(727,940,507)	(27.89)	(26,100,970)	(727,940,507)	(27.89)
3	-	-	-	(72,769,670)	(2,759,953,230)	(37.93)	(72,769,670)	(2,759,953,230)	(37.93
4	-	-	-	-	-	-	-	-	-
1979	6,300,856	189,925,302	30.14	-	-	-	6,300,856	189,925,302	30.14
Total	66,748,348	$1,167,519,302	$ 17.49	284,597,010	$7,242,079,851	$ 25.45	351,345,358	$8,409,599,153	$23.94

a/Average prices are not weighted.

Note: Numbers in parenthesis reflect quarterly figures.

VOLUME AND PRICE OF TVA COAL CONTRACTS 1970 TO 1979

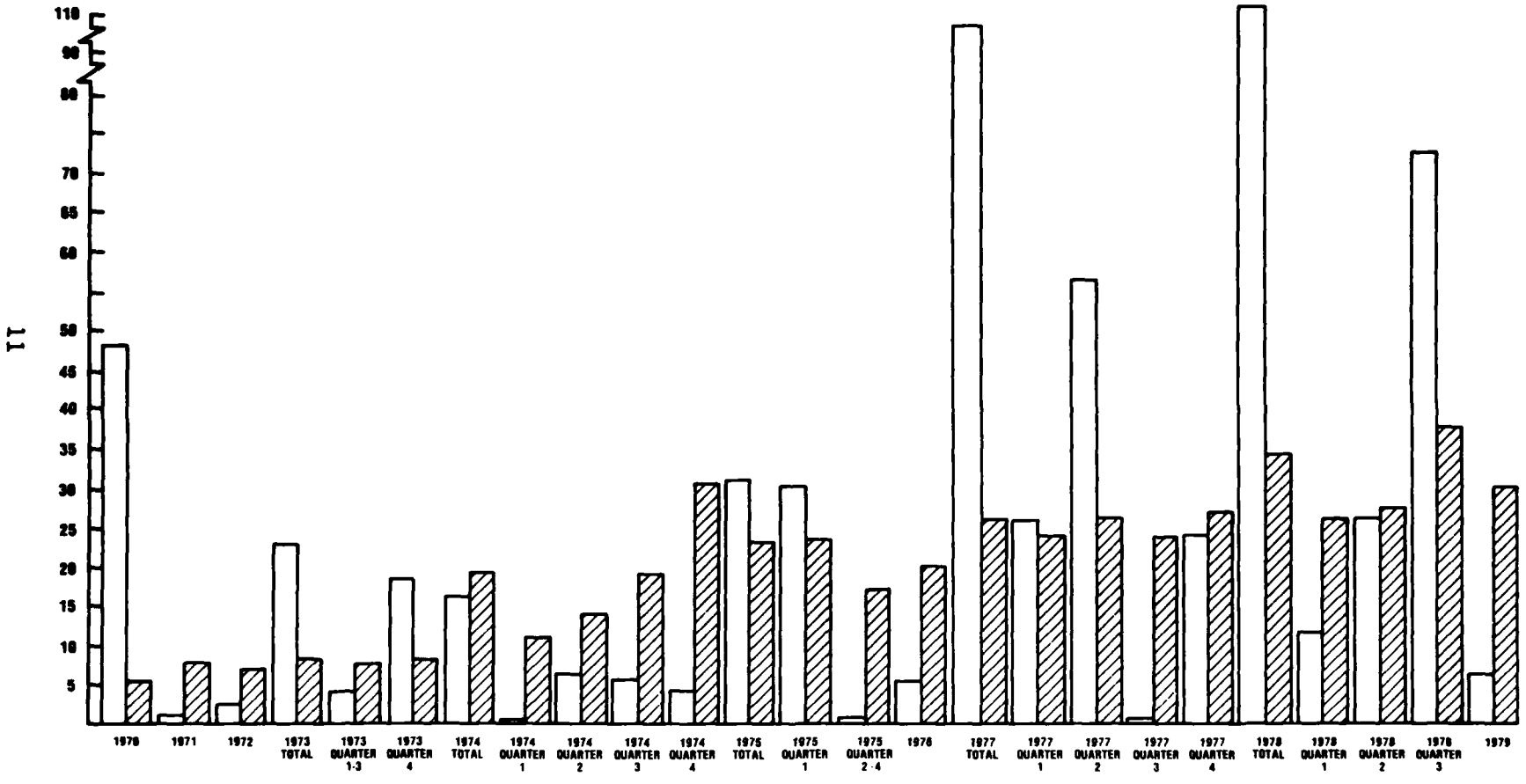


FIGURE 1

Table 3

Spot Coal Purchases

Fiscal Years 1970 Through 1979

Fiscal year	Number of contracts	Tons purchased	Weighted average price per ton	Cost
1970	492	590,644	$5.81	$ 3,431,642
1971	647	1,026,885	7.70	7,907,015
1972	576	1,761,860	7.01	12,350,639
1973	524	2,305,813	7.92	18,262,039
1974	148	522,798	8.17	4,271,260
1975	219	4,416,864	24.30	107,329,795
1976	395	2,995,400	17.91	53,647,614
Transition quarter 1976	65	335,350	16.73	5,607,052
1977	299	3,093,790	21.17	65,495,534
1978	806	10,700,930	30.41	325,415,281
1979	454	3,536,600	27.90	98,671,140
Total	4,625	31,286,934	$22.45	$702,389,011

If some contracts are maintained as presently stated and through periodic reopeners the price is not reduced, the price of coal per ton will probably triple in the last years of the contract, and the total payout may nearly double over the base price. For example, one contract which is escalating at a 10.57-percent annual rate will increase at that rate from the base price of $41.812 per ton to $115.74 per ton in fiscal year 1988, the last contract year. The contract provides for delivery of 14.2 million tons of coal at a current rate of 1.5 million tons a year. At a constant annual escalation rate of 10.57 percent, the coal will cost TVA a total of $1.1 billion, compared with the contract award price (base price) of $631 million.

Long-term effect of escalation can be reduced through renegotiation

While TVA has already paid high prices for its coal because of the high award prices and the escalation clauses, the continued escalation might be reduced by renegotiating those contracts that are still active. The majority of TVA coal contracts of long duration contain a provision for renegotiation at 5-year intervals. Prior to settlement of the coal miners' strike in 1981, market prices for coal were substantially lower than the price in some of these contracts, and renegotiation would result in savings on most contracts. For example, in October 1980, TVA accrued rights to renegotiate 13 contracts for delivery of coal to its Kingston Steam Plant. TVA reported in March 1981 that its renegotiations resulted in price reductions of about $20 million on these contracts. These particular contracts contained renegotiation clauses which accrued within 18 months to 34 months after deliveries began. If TVA had not renegotiated these 13 contracts, it would have had cancellation rights on all 13 contracts on April 1, 1981. During the past 10-years only 2 contract renegotiations resulted in price decreases. For one of these, however, a price reduction of $7.47 million was more than offset by price increases and additional coal purchases totaling $116.3 million on other contracts renegotiated at the same time.

The right to negotiate other contracts will accrue at different dates, beginning June 30, 1981, to December 1987. Cancellation rights will accrue a year later on these contracts, beginning June 30, 1982 to December 1988. Since most of the contracts were awarded during high demand periods and provide for escalation of already high prices, it seems likely that renegotiation of these contracts also will be advantageous to TVA.

NEGOTIATION AUTHORITY USED EXCESSIVELY

During the period 1970 through 1979, TVA negotiated contracts for about 81 percent of its term coal as shown in table 4. It usually negotiated the contracts on an emergency basis, but several factors lead us to question whether the negotiated procurements qualified as emergency procurements. First, the TVA Act authorizes

Table 4

Duration of Contracts Awarded

During 1970 Through 1979

Type contract	Contract duration: Less than 1 year	From 1 to 5 years	From 5 to 10 years	Over 10 years	Total tons and cost
Advertised:					
Contracts	31	83	7	2	
Tons	1,978,043	25,133,787	23,403,518	16,233,000	66,748,348
Cost	$32,075,646	$440,810,295	$289,941,371	$404,691,990	$1,167,519,302
Average price Per ton (note a)	$16.22	$17.54	$12.39	$24.93	$17.49
Negotiated:					
Contracts	4	87	18	16	
Tons	221,000	50,425,070	25,527,140	208,423,800	284,597,010
Cost	$ 3,430,750	$1,052,414,498	$677,236,589	$5,508,998,014	$7,242,079,851
Average price Per ton (note a)	$15.52	$20.87	$26.53	$26.43	$25.45
Total all term contracts:					
Contracts	35	170	25	18	
Tons	2,199,043	75,558,857	48,930,658	224,656,800	351,345,358
Cost	$35,506,396	$1,493,224,793	$967,177,960	5,913,690,004	$8,409,599,153
Average price Per ton (note a)	16.15	$19.76	$19.77	$26.32	$23.94

a/Average prices are not weighted averages.

emergency procurement when coal is needed immediately. In many cases, the delivery date of the coal was several months after the contract date. Second, the TVA Code provides for emergency procurement through contracts for no longer than 6 months when coal supply falls below a 60-day level at a steamplant. Most contracts awarded under emergency conditions were for periods longer than 6 months. Third, while the proposed Consent Decree only required coal for a 3-year period, many of the contracts were for periods longer than 3 years.

Procurement of coal under Requisition 42 illustrates extended use of TVA's emergency authority and the consequences of such use. Under Requisition 42, TVA sought to comply with terms of its proposed Consent Decree by buying coal that, when burned, met certain emission standards. The proposed Consent Decree required TVA to award contracts with durations up to 3 years for a total of 46 million tons of compliance coal. Commitment to contracts was to begin within 17 months of the issue date of the requisition. TVA was unable to fully satisfy both the proposed Consent Decree stipulations and its power system needs through Requisition 41, which was an advertised procurement and therefore issued Requisition 42 to satisfy the requirements through emergency procurement. Under Requisition 42, dated January 21, 1977, TVA ultimately contracted for delivery of about 197 million tons of coal.

By October 14, 1977, TVA had under contract from Requisition 41 and 42 about 75 percent of the compliance coal needed for all plants except Shawnee, Johnsonville, and Kingston. About 15 million tons remained to be purchased. On October 31, 1977, even though 8 months remained to negotiate contracts for the compliance coal still needed, TVA's Director of Purchasing requested an extension of Requisition 42 to continue purchasing coal on an emergency basis. To justify the extension, the Director cited conditions which then applied at several plants. Specifically:

--Kingston, John Sevier, Watts Bar, and Gallatin had less than a 60-day supply of coal.

--Watts Bar, Allen, Colbert, and John Sevier required additional coal to meet a 4-pound sulfur dioxide standard because only 55 percent of the supply needed for the next 5 years was under contract.

--Kingston, then under an interim 4-pound sulfur dioxide standard, only had under contract 20 percent of the 5-year supply and included some coal that did not meet the 4-pound sulfur dioxide standard.

--No compliance coal had been purchased for Shawnee and Johnsonville to meet the 1.2-pound sulfur dioxide emission standards.

TVA also believed that other considerations warranted extending the emergency authorization. For example:

--The 2-to-5 year leadtime needed to develop new mines could affect expeditious delivery schedules.

--The imminent threat of a nationwide United Mine Workers' strike further reduced the probability of making acceptable compliance purchases under competitive bidding.

--To award contracts under competitive bidding required considerably more time than contracts awarded on an emergency basis.

The Board approved the addendum to Requisition 42. Under this Requisition and Requisition 41, it agreed to buy a total of 225 million tons of coal. In addition, 75 percent of the coal purchased under Requisition 42 had contract delivery durations ranging from 10 to 17 years, even though the proposed Consent Decree required purchase of only 3 years of compliance coal. Some contracts were also awarded during this period with deliveries not beginning until 4 to 17 months after the contract date. It does not seem reasonable that TVA would, on an emergency basis, contract for such a large volume of coal--197 million tons--and for such long periods of time. Also, it seems reasonable, that the coal bought under emergency conditions would be needed earlier than 17 months from the contract date.

POLICY OF BUYING COAL ONLY FROM EASTERN MARKETS IS COSTLY

One requirement of the TVA Act is that TVA contribute to the economic well-being of the Tennessee Valley. TVA believes that one way to contribute to the Valley's economy is to only buy coal from producers east of the Mississippi River. TVA has followed this policy despite a study conducted by its Office of Power which concluded that TVA could save from $31 to $36 million annually in 1978 dollars by buying western coal for the Shawnee Steam Plant. The TVA study did not consider a better quality coal from a different western source that, according to our calculations, could have saved a total of about $133.3 million over the life of the proposed contract to supply Shawnee. On the surface, it would appear that limiting the market area to eastern producers could negatively impact the Valley's economy since higher coal prices result in higher rates for electricity. We did not examine the issue in depth.

In August 1977, the Clean Air Act Amendments had been passed, which tended to favor the use of local coal supplies. Section 125 authorized the President, a Governor, or the Environmental Protection Agency (EPA) Administrator to require the use of local or regional supplies in plants that are not meeting emission standards in order to minimize local economic impacts. There were,

however, no objections from either local State Governors, the President, or the administrator of EPA. Therefore, TVA was not restricted to buying compliance coal from local markets.

TVA's management offered several reasons in support of its decision to buy coal for Shawnee solely from eastern suppliers. These included

--unacceptable derating of the Shawnee plant (i.e., lowering of its rated capacity) as a result of using western coal,

--avoidance of high transportation costs and delivery reliability problems associated with western coal,

--policy judgment that buying western coal would not increase competition, and

--TVA's commitment to buy coal exclusively from the eastern market as part of its regional development responsibility.

We believe TVA's study had validity, and the following sections present some of the results of the study. TVA did not disagree with the study per se, but disregarded it in order to pursue the concept of promoting the valley's economy by purchasing eastern coal.

Results of TVA's East-West coal study

A 1978 study by the Office of Power 1/ considered the financial and social impacts and implications of using eastern and western coal at the Shawnee Steam Plant. The study originally evaluated the respective merits of limestone scrubbers, eastern low-sulfur coal, and western low-sulfur coal as strategies for meeting clean air emission standards at Shawnee. It found that scrubbers were the most expensive option and western low-sulfur coal the least expensive. The study was subsequently intensified and narrowed to looking at various issues of east-west coal

--economic issues,

--transportation costs and reliability,

--quality assurance, and

--qualitative comparison.

In almost all cases, the study concluded western coal was equal or superior to eastern coal. However, eastern coal was bought.

1/Comparative Evaluation of Cost, Resource Utilization, Socio-economic and Environmental Considerations for Possible TVA Decision Regarding Use of Western versus Eastern Coal.

Economics of eastern and western coal

The results of the study indicated that western coal is more economical--57 cents/million Btu cheaper in 1978 dollars.

TVA calculated the cost of east-west coal as follows.

	Eastern coal	western coal
F.O.B. mine price a ton	$39.15	$ 7.00
Transportation cost a ton	7.50	13.92
Total--F.O.B. plant	$46.65	$20.92
Btu/lb.	12,600	8,200
Cents/million Btu	185	128

During the TVA study, Shawnee was burning approximately 4.5 million tons of coal a year. However, based on the high cost of eastern coal offered under Requisition 42, the burn requirement drops to about 3.0 million tons of coal per year because Shawnee's power production costs increase substantially relative to other plants in the system and output at Shawnee would be cut back. In other words, TVA economically derates the plant due to the expensive fuel. Use of western coal increases the burn requirement to 5 million tons, although the low Btu value of the western coal also reduces Shawnee's generating capacity by almost 20 percent. Taking all the above factors into account using two production rates, TVA estimated that in 1978 dollars, the annual cost of eastern low-sulfur coal at Shawnee would exceed the annual cost of western coal by $31 million to $36 million annually, as the following calculations show:

	Production rate @76 x 10^{12} Btu/yr. (millions of 1978 dollars)		Production rate @82 x 10^{12} Btu/yr (millions of 1978 dollars)	
	Eastern	Western	Eastern	western
Baghouse collectors	$13	$13	$13	$13
Derating cost	-	11	-	11
Incremental coal cost	65	23	72	25
Total annual cost	$78	$47	$85	$49
Annual cost difference	$31		$36	

Transportation costs and reliability

The TVA study also considered the cost and reliability of eastern and western transportation. It noted that eastern coal prices, including transportation costs, were about twice those of western coal, despite higher transportation costs for western coal. Estimates of F.O.B. mine prices for eastern coal, based on prestrike United Mine Worker wages, were expected to increase 5 to 6 times more than those same estimates for western coal following a strike settlement. However, labor settlements in the transportation industry, according to the study, were likely to have a greater impact on western coal prices.

The study found that transportation problems were likely regardless of the source of supply and that, overall, eastern and western deliveries would probably be equally reliable. While the relative abundance of western reserves tends to make western sources more reliable, transportation problems offset this advantage. For example, strikes, rail car shortages, and bad weather could all interrupt western shipments to Shawnee. Also, mining and shipping of western coal does not have full public and environmental acceptance in the western States, so the long-term reliability of western supplies is uncertain. On the other hand, the study reported that the more active and strike-oriented labor unions in the East would probably have a significant impact on maintaining dependable coal supplies from eastern sources. Moreover, in recent years heavy traffic through small locks, low river flows, and ice buildup has frequently interrupted barge traffic on the Ohio River. On balance, TVA expected continuing problems in maintaining reliable coal deliveries from either source.

Quality assurance

Because of strict emission regulations and the variability of sulfur in coal, TVA recognized the importance of careful and sophisticated quality control at the mines. Based on discussions with coal producers, the study noted that western producers were better equipped and prepared to provide the degree of quality control needed to meet contract commitments.

Qualitative comparison

Qualitative results of TVA's study also pointed to western coal as the best alternative for compliance at Shawnee. In an addendum to the economics section of the study, TVA included four qualitative comparisons--cost, resource utilization, socioeconomic, and environmental. For example, the socioeconomic comparison considered the impact on jobs, miner safety and health, and Valley economics. In all instances, the comparisons either favored western coal or showed no adverse economic impact on the Valley.

Undesirable consequences occurred at Shawnee as a result of buying eastern coal

In support of its decision to buy eastern coal for Shawnee, TVA's management sought to avoid, among other things (1) derating of the plant due to poor quality western coal and (2) high transportation costs and reliability problems associated with western coal. However, because of its decision to buy eastern coal, the Shawnee Plant was economically derated and high transportation costs were incurred as well as shipment disruptions.

The generation level at Shawnee was reduced by almost 30 percent after TVA purchased the eastern coal, as shown below, because of the high coal costs for the plant.

Year	Tons burned for 100 percent practical capacity	Percent of capacity used
1977	4,580,000	100
1978	3,881,000	84.7
1979	3,590,000	78.3
1980	3,276,000	71.5

Buying the more expensive eastern coal also resulted in increased transportation costs without a corresponding increase in reliability of deliveries. Prior to awarding the contracts for Shawnee coal under Requisition 42, TVA had been paying about $3 a ton to ship coal to the plant. Average delivery cost for the compliance coal, however, was $9 a ton. Also, transportation costs to other plants have increased substantially because of a railroad's monopoly on service to the suppliers. Additionally, United Mine Worker strikes occurred in the East in early 1978 and heavy barge traffic on the Ohio River--with bottlenecks occuring at the small locks, during low river flows, and during ice buildups--interrupted deliveries to Shawnee. Western deliveries, as pointed out in TVA's study, were likely to have been at least as reliable as those from the East.

SMALL COAL OPERATORS PLAY SMALL ROLE IN TVA COAL PROCUREMENT

TVA has frequently endorsed support of small coal operators as a means of maintaining competition in the coal industry and restraining cost increases to ratepayers. TVA concluded in 1977 and 1979, as a result of its antitrust investigation into the coal and uranium industries, that coal company mergers and acquisition of coal reserves by oil companies and other large companies were resulting in a highly concentrated industry which could lead to higher prices and smaller supplies. TVA recommended legislation to provide assistance to small coal or uranium operators or potential operators to enable them to compete against the larger firms.

From 1970 to 1979 TVA received approximately 93 percent of its coal under term contracts and under these contracts, requisitioned approximately 96 percent of its term coal tonnage from large suppliers. As shown in table 5, the complexion of TVA's top suppliers has not changed much since 1971. Of TVA's top suppliers, four of them provided coal during the 10-year period. In fiscal year 1971, TVA received about 51 percent of its coal from these four suppliers. But, by fiscal year 1980, the amount of coal TVA had under active coal contracts with these four suppliers was about 71 percent. Because of this, TVA's main chance to deal with the small operator is through the spot market. Further, as of September 30, 1980, the active term contracts provided for delivery of about 458 million tons of coal of which only 3 million tons, less than 1 percent, was under contract with small suppliers.

Spot coal purchases have been low because TVA generally has enough coal under term contracts to meet the full needs of some plants. As table 3 shows, TVA's spot purchases through fiscal year 1979 have only totaled 31.3 million tons. In some years, TVA's spot purchases have been as low as .5 million tons. TVA acknowledges that most of its spot coal bids are from small companies and doing spot business can lend support to TVA's initiatives in regard to the small coal operator. Yet, TVA's contracting procedure of buying coal for long periods of time precludes spot purchases that would be available to the small operators.

TVA must, to a certain extent, rely on coal from large producers because at some steamplants, receiving and sampling facilities do not easily accommodate shipments from small suppliers. For example, the Paradise Steam Plant accommodates truck delivery but requires periodic sampling from a continuous belt conveyor. To sample coal from a number of different suppliers would require specific delivery times and time-consuming cutoffs between the deliveries from different suppliers. Contracts recently awarded to small suppliers for the Paradise plant--the first ever--therefore stipulated that all deliveries be made during one particular shift. During this shift, no deliveries will be made by large suppliers thereby avoiding cutoffs between deliveries.

Three other steamplants, Cumberland, Allen, and Colbert, have only barge receiving facilities, which are also better suited to large volume deliveries from large suppliers. For example, barge deliveries to Cumberland usually involve 15-barge tows, containing a total of 24,000 to 26,000 tons; its unloading facility can empty a barge tow in less than 24 hours. However, small suppliers generally do not ship in enough volume to warrant barge delivery.

Table 5

Ten Largest Suppliers of Coal For Fiscal Year 1971

	Producer name	Parent name	Percentage of TVA receipts
1.	Peabody Coal Company (note a)	Kennecott Copper Corp.	22.5
2.	Island Creek Coal Company (note a)	Occidental Petroleum	11.7
3.	Kentucky Oak Mining Co. (note a)	Falcon Seaboard, Inc.	9.0
4.	Ayrshire Coal Co. (note a)	American Metal Climax, Inc.	7.5
5.	Pittsburg & Midway Coal Mining Co.	Gulf Oil	6.2
6.	Old Ben Coal Corp.	Standard Oil of Ohio	5.5
7.	Bell and Zoller Coal Company		4.2
8.	Arch Mineral Corp.	Ashland Oil	3.7
9.	Freeman Coal Mining Co.	General Dynamics	2.0
10.	Webster County Coal Corp.	MAPCO, Inc.	1.9
			74.2

Eight Largest Suppliers Of Coal For Calendar Year 1975

1.	Peabody Coal Company (note a)	Kennecott Copper Corp.	24.6
2.	Island Creek Coal Company (note a)	Occidental Petroleum	12.2
3.	Falcon Coal Company (note a)	Falcon Seaboard, Inc.	7.6
4.	Pittsburg & Midway	Gulf Oil	5.6
5.	AMAX Coal Company (note a)	AMAX and Standard Oil of Calif.	5.6
6.	Havaco		4.4
7.	Old Ben Coal Corp.	Standard Oil of Ohio	4.1
8.	Webster County Coal Corp.	MAPCO, Inc.	3.4
			67.5

Eight Largest Suppliers with Active Coal Contracts As Of Sept. 30, 1980 (note b and c)

			Percentage by volume under contract
1.	Peabody Coal Company (1), (note a)	Peabody Holding Company	40.0
2.	Island Creek Coal Company (5), (note a)	Occidental Petroleum	20.4
3.	R & F Coal (44)	Shell Oil	6.5
4.	Falcon Coal Company (27), (note a)	Falcon Seaboard, Inc.	6.9
5.	AMAX Coal Company (3), (note a)	AMAX and Standard Oil of Calif.	6.0
6.	Pyro (60)	R. L. Burns	4.6
7.	Pittston (9)		2.9
8.	South Hopkins (102)	First Penn. Bank & Trust	1.0
			88.9

a/Indicates companies that supplied coal during all periods.
b/Number in parentheses is the company's 1979 national ranking.
c/All of the active contracts were negotiated.

Small Coal Operator Assistance Program

In 1979 TVA took positive action in support of small coal operators by formally adopting SCOAP. TVA defined a small coal operator as one who produces and sells less than 200,000 tons of coal in the previous year, employs less than 50 people, and is geographically located to make it a potential supplier to one of TVA's coal-fired steamplants. In the interests of promoting competition in the coal industry and aiding the development of small coal operators, TVA authorized setting aside a portion of its coal purchases exclusively for small, independent coal operators.

In addition, to preserve and strengthen qualifying small coal operators, SCOAP provides purchasing assistance and technical assistance to enable small operators to remain competitive in the market. Technical assistance in complying with current mining and reclamation laws is available through TVA's Office of Natural Resources.

During our review, the program had not been operating long enough to fully evaluate its effectiveness. However, some evidence indicates that the program may not be as effective as possible.

TVA may not make set-asides for small suppliers at all plants designated as being suitable. At the Kingston and John Sevier plants for example, TVA has not established all the set-asides planned, primarily because of existing term contracts. Also, it has not made any spot purchases for these two steamplants since those under Requisition 75 in October 1979.

Small coal operators, as normally defined by TVA, could not even qualify as small coal operators under Requisition 54 issued in July 1980. While TVA defines a small coal operator under SCOAP as one who produces less than 200,000 tons annually, that requisition required small coal operators to deliver a minimum of 400,000 tons of coal per year. Therefore, under the requisition's delivery requirements, no operator meeting the assistance program criteria could qualify to bid. Such an exclusion of small coal operators, as normally defined by TVA, conflicts with its policy and objectives to strengthen competition in the coal industry and could potentially damage TVA's credibility with the small suppliers.

Our conclusions and recommendations concerning the timing of TVA's coal purchases and the length of the contracts are found in chapter 7.

CHAPTER 3

ACQUISITION AND DEVELOPMENT OF TVA-OWNED COAL RESERVES-- CAUTION IS NEEDED

TVA has acquired ownership of coal reserves as a means of assuring the availability of adequate coal to supply system requirements. To this end, TVA currently has estimated coal reserves of about 630 million tons of recoverable coal. In April 1980 TVA had eight different coal reserve properties as shown in the chart below. Only one of these properties, Camp Breckinridge, is currently being mined to supply coal to TVA's Cumberland Steam Plant. TVA has encountered several problems, however, in mining the Breckinridge reserve (1) poor quality coal, (2) lower than expected coal production, and (3) a transportation contract tied to optimum production levels. These problems have been significant, and we believe they serve as an example for TVA to approach further development of its reserves with caution--especially the ENCA reserve in southern Illinois which may be the next TVA reserve to be developed because of its large volume of recoverable coal.

TVA Owned or Controlled Coal Reserves
(April 1980)

Property name	Tons when acquired	Remaining tons recoverable at current costs
Red Bird	25,000,000	5,000,000
Franklin County	65,000,000	65,000,000
Koppers	67,000,000	25,000,000
Camp Breckinridge	225,000,000	150,000,000
Waverly Coal Block	a/ 65,000,000	-
Fabius	b/ 10,495,000	5,000,000
Eads	b/ 4,803,000	10,000,000
ENCA	370,000,000	370,000,000
Total	832,298,000	630,000,000

a/Leased coal.

b/Additional reserves were purchased after property acquired.

ACQUISITION AND DEVELOPMENT OF BRECKINRIDGE RESERVES

The Breckinridge reserve is on the site of the Army's former Camp Breckinridge, Kentucky. TVA acquired the coal rights from the General Services Administration in 1965 for about $7.47 million. TVA justified acquiring the reserves for the following reasons:

--Its coal needs would increase significantly in future years.

--Uncommitted coal reserves in western Kentucky were rapidly being concentrated by about four major coal companies.

--Ownership and development of this reserve would provide some assurance to TVA that power could be produced at reasonable rates.

Amidst opposition from the coal industry to its acquiring the Breckinridge reserves, TVA maintained that

--the coal market would not be changed regardless of who owned Breckinridge;

--TVA would inevitably buy Breckinridge coal and by owning the reserves it could save about 10 to 25 cents a ton royalty payments; and

--it planned to develop the reserves with a number of interested qualified companies, thus promoting an open competitive market.

The General Services Administration sold the Breckinridge coal rights to TVA for about $209 an acre--the next highest bid was about $50 per acre. The purchase price represents about 8 percent of TVA's total capital investment in the Breckinridge reserve through fiscal year 1980. To confirm the reserve base at Breckinridge, TVA made 3 core drills--the next highest bidder made 25 core drills.

In addition, TVA assessed the mining conditions as fair to excellent to extract the non-metallurgical coal and believed seam number 11 would have to be mined before seam number 9 due to breakup. That is, if seam number 9 was mined first, the earth above would fracture and subsequent mining of seam number 11 would create significant problems.

In 1968, TVA issued an invitation to bid to supply coal to its largest steamplant--Cumberland--which was to begin operation in 1971. Two bids were received, one of them to mine Breckinridge. The Breckinridge bid was accepted, and in February 1969 the reserves

were leased to one producer to mine seam number 9 coal on a royalty basis at a rate of 7 million tons per year. Contract length was 23 years, beginning in 1973 at a price of about $4.75 a ton, F.O.B. mine. The contract also provided for a guaranteed delivered coal quality of 15.5 percent ash, 4.1 percent sulfur, and 11,100 Btu's per pound, and renegotiation rights every 5 years.

Because of mining problems at Breckinridge, TVA agreed in 1975 to reduce the quality and quantity provisions of the contract, with regard to seam number 9 coal only, as follows

--quantity delivered reduced from 7 million to 5 million tons a year,

--allowable ash content increased from 15.5 to 18.8 percent,

--Btu content reduced from 11,100 to 10,600 Btu's a pound, and

--price per ton increased to $13.82.

In 1974, because of inadequate production from seam number 9, the mining contract was modified to provide for deep mining of seam number 11 on a cost-plus, management fee basis. Delivery of seam number 11 coal was to begin in late 1977 and level off in mid-1980 at 1.5 million tons a year. The combined production of seams number 9 and 11 coal, after the 1975 amendment discussed above, was to total about 6.5 million tons.

In late 1977 TVA concluded that none of the coal produced at Breckinridge would meet the 5-pound sulfur dioxide per million Btu emission standard established for Cumberland under the Consent Decree. However, TVA's Office of Power determined that processing seam number 9 coal through a heavy media preparation plant would improve its quality and that a blend of seams number 9 and 11 coal could meet the 5-pound sulfur dioxide standard. In addition, the Office of Power determined that the preparation plant should be located at the mine and operated by the mining contractor. Subsequently, TVA awarded a noncompetitive, negotiated contract supplement to the mining contractor to build and operate the new preparation plant. The contract supplement was justified as a negotiated procurement on the basis of supplemental equipment and services required for supplies under a previous contract. The estimated cost of the plant is about $47 million.

As part of the agreement, TVA agreed to pay the contractor a managment fee of 25 cents a ton and an operating premium of 10 cents a ton for each ton of clean coal processed. However, the 25 cents management fee is subject to adjustment with changes in the Bureau of Labor Statistics' Index of Consumer Prices and for variances from the 80 percent clean coal recovery factor.

Breckinridge coal transportation

Since transportation was not a part of the Breckinridge mining contract, TVA contracted separately with a barge operator in November 1969 to ship the coal via barge from Breckinridge to the Cumberland Steam Plant. The contract provided for the barge company to ship a guaranteed volume of 6.8 million tons a year for 20 years. Through fiscal year 1980, TVA had paid an average cost of $2.538 per ton for coal shipments. The contract does not provide for scheduled reopeners. TVA also considered a shipment offer from a railroad, but the barge company price was considered the better offer. Also, the facilities at the Cumberland plant were not designed for receiving rail shipments.

Because the barge contract is dependent upon the mining contractor's performance at Breckinridge, the contracts cannot be considered separately. Through fiscal year 1980 TVA had paid the barge company about $31.3 million in deficiency payments for coal not transported because mine production had not met the original contract requirements. In addition, estimated future production of only 3.8 million tons a year at Breckinridge will increase the deficiency payments which are attributable to inability to produce the coal quantity required by the contract. Despite the transportation problems, TVA has concluded that the barge contract is still cheaper than the rail costs to ship the coal to Cumberland.

Past performance and future outlook

Through fiscal year 1980 TVA has received about 30.5 million tons of coal from the Breckinridge reserves. In total, as shown on the following page, considering its capital investment, coal costs, and transportation costs, TVA has spent about $625.9 million.

	Amount (000 omitted)
Reserve purchase price	$ 7,470
Overland Right-of-way	632
No. 11 seam development	31,637
No. 9 preparation plant cost	52,000
Haul Road - No. 9 seam	2,027
Capital investment	$ 93,766
Coal cost:	
Seam no. 9 - 28,446,000 tons	$392,514
Seam no. 9 washed - 466,000 tons	17,646
Seam no. 11 - 1,624,000 tons	48,309
Total	$458,469
Transportation (barge company)	$ 42,345
Deficiency payments to barge company	31,276
Total	$ 73,621
Total all payments	$625,856
Average cost per ton - all	$ 20.50
Average cost per ton, no. 11 washed (note a)	29.75
Average cost per ton, no. 9 unwashed (note a)	13.80
Average cost per ton, no. 9 washed (note a)	38.36

a/Does not include TVA capital investment, or transportation costs.

According to a TVA memorandum dated April 25, 1980, the processed coal from Breckinridge will total about 3.8 million tons per year because of the lower-than-anticipated production and the washout rate of the coal. This production is not adequate to supply Cumberland burn requirements and represents a major shortfall from the 1977 estimate of 6.5 million tons. Because mining costs vary with rates of production, this shortfall will adversely affect the cost per ton produced in the form of increased unit costs. That is, the contractor's production cost per ton produced will increase because capital investment costs will be allocated to fewer tons.

In late 1980, TVA reviewed its Waverly reserve which is adjacent to the Camp Breckinridge property, and contains an

estimated 70 million tons of recoverable coal in seams number 9 and 11. TVA decided not to develop Waverly because development would not be economical because of poor mining conditions and unfavorable royalty rates.

TVA expected mining conditions at the Waverly reserve to be poor and similar to those at Breckinridge. For example, mining the number 11 seam requires that the coal be washed at a 40- to 45-percent rejection rate if it is to yield suitable fuel, and the washing process nearly doubles the cost of the clean coal products. Moreover, while mining the number 9 seam at Breckinridge, the contractor experienced costly roof deterioration problems which were likely to be a problem at Waverly as well. This condition dictates that the overall mine design be one which facilitates rapid extraction and abandonment of large portions of the mine at a time. Consequently, the possibility of mining Waverly number 9 seam from existing Breckinridge number 9 mines would become costly due to maintaining deteriorating roof conditions.

The royalty rate for the Waverly reserves was judged unreasonable by TVA. TVA calculated that the royalty rate would exceed $1.50 per ton for a product requiring heavy washing to yield a 5-pound sulfur dioxide fuel. A contributing factor to this was that owners of large blocks within the reserves were demanding unreasonable prices for their coal interests.

ENCA RESERVES--ANOTHER BRECKINRIDGE?

The ENCA properties in southern Illinois contain about 370 million tons of recoverable coal from Illinois seams number 5 and number 6. The 39,000-acre ENCA reserves represent TVA's largest coal reserve and were acquired through negotiations that were completed in September 1977, with TVA agreeing to pay about $1,050 an acre for mineral rights. Also, the ENCA reserves are geographically considered part of the Eastern Interior Basin, as are the Breckinridge reserves.

An April 25, 1980, Office of Power memorandum to TVA's General Manager noted that the western Kentucky reserves are similar in quality to those found in Illinois. The memorandum further stated that ENCA reserves could be mined for about $25 a ton in 1980 dollars, F.O.B. mine, based on TVA financing and excluding capital costs.

The coal will require washing if it is to be used at steam plants most suited for the coal--Allen, Colbert, Gallatin, Johnsonville, Watts Bar, and Widows Creek 7 and 8. TVA conducted washability tests on the samples and concluded that it could obtain 75 percent weight recovery (83 percent Btu recovery) from the washed coal. This 75 percent weight recovery results in a 7-cents per ton in-place cost. In addition, seam number 6 coal will require blending to meet the 4 pound sulfur dioxide per million Btu emission

standard. Transportation costs to the above plants would be about $8 to $9 per ton in 1980 dollars. As a result, we estimate the price of ENCA coal at about $44 a ton--$25 for production, $9 for transportation, and $10 for washing (at 75 percent recovery rate), blending, capital investment, and profit margin.

Because ENCA coal must be washed before it can be burned in TVA steamplants, it seems highly probable that a coal preparation plant will eventually be constructed on the reserve site. If the cost to construct the preparation plant at Breckinridge is reasonable, TVA can expect to invest an additional $40 to $50 million to construct a preparation facility.

We believe there are similarities between the ENCA reserves and the Breckinridge reserves that would indicate TVA should proceed cautiously with development of the ENCA reserves. First, the ENCA coal is of similar quality to Breckinridge and will require washing and the expense of another wash plant. Second, since the two reserves are part of the Eastern Interior Basin, the production experience at Breckinridge should be used as a guide for production at the ENCA reserve. Third, if transportation for ENCA coal is contracted for separately, TVA should not lock itself into conditions such as having to pay for coal not shipped.

Our conclusions and recommendations covering TVA's coal reserves are found in chapter 7.

CHAPTER 4

INTERNAL CONTROLS FOR QUALITY ASSURANCE DO NOT IN ALL CASES ASSURE CONSISTENT RECEIPT OF THE QUALITY OF COAL PAID FOR

Quality assurance methodologies are adequate at most TVA steamplants as shown by a comparison of the quality of coal received and the quality of coal burned. However, the coal sampling facilities at one steamplant are inadequate to detect delivery of inferior quality coal. Moreover, at this plant, TVA has not aggressively enforced measures to ensure delivery of the quality of coal paid for. Also, the quality assurance controls for sampling the coal delivered to another steamplant are weak.

CONTINUED DELIVERY OF POOR QUALITY COAL TO KINGSTON STEAM PLANT BECAUSE OF TVA INACTION

At its Kingston Steam Plant, TVA has not installed effective sampling methods even in the face of evidence that the coal delivered by truck is inferior quality. TVA's own estimate reflected in a 1979 study showed that the ineffective sampling facilities at Kingston could be costing as much as $7.28 million annually. Though we do not know what actual savings might be, better sampling facilities and more consistent sampling could result in savings.

TVA coal contracts generally provide that coal delivered will be of a specified quality in terms of moisture, ash, sulfur, and heat content. They also specify price adjustments for deviations from the quality as determined by chemical analysis of mechanically taken samples. However, obtaining accurate samples of the quality of coal delivered to the Kingston Steam Plant has been a problem since 1960. Representative sampling of truck deliveries is possible only if the truck is uniformly loaded throughout, and TVA contracts do require uniform loading.

Because of discrepancies between the quality of samples of coal delivered to Kingston and the coal burned, TVA did an in-depth study in 1974 and found that layer-loading 1/ could be occurring. One supplier was investigated extensively. However, in an out-of-court civil settlement, TVA agreed to discontinue charges against the coal supplier in return for a promise to properly execute contract terms. Based on test results and other evidence, TVA's Division of Law and the U.S. Department of Justice investigated several suppliers for layer-loading.

1/Placing inferior coal on the bottom and sides of the delivery vehicle and premium coal on top where sample is taken.

No layer-loading indictments resulted from a subsequent Grand Jury investigation.

Because of these problems at Kingston, TVA set up a program to intensively sample truck deliveries using the more reliable, but more expensive, Galigher sampling technique. This program brought the quality of coal received and the quality of coal burned into closer alignment. In fact, TVA concluded the Galigher sampling would save an additional $1.2 million in coal costs on only three contracts for which it did a detailed analysis.

By 1977, however, TVA had cut back on its intensive sampling program. This occurred because of truck backups at the scale house and trucker protests. Additionally, from December 1977 through February 1978, wet or frozen coal hampered the truck sampling process, and the sampler was out of service part-time. Accordingly, the quality of truck-delivered coal continued to diminish through July 1979.

To correct this problem, TVA, in July 1979, approved a project for additional receiving and sampling facilities at the Kingston Steam Plant. Estimated cost of the project, scheduled for completion by July 1980, was $1,949,300, with annual operating costs of $100,000.

But TVA has not yet installed the new facilities at Kingston, even though its records of sampling indicated that suppliers were still delivering deficient quality coal. Contrary to its procurement policy, TVA has not debarred any of these suppliers. Also, the same supplier involved in the 1974 settlement is still supplying coal to the Kingston plant. By taking action, TVA could deter suppliers from delivering poor quality coal.

QUALITY ASSURANCE CONTROLS AT BRECKINRIDGE

TVA also has weak internal controls over quality assurance at Breckinridge for coal deliveries to the Cumberland Steam Plant. The purchase contract for Cumberland coal calls for the contractor to collect coal samples at the mine prior to loading and shipping the coal to the steamplant. However, according to a 1977 memorandum from the Cumberland Steam Plant Superintendent, coal sampling at the mine was bad and likely to deteriorate further. Problems detected included poor handling of coal samples, holes in sample bags, samples not collected after belt shutdown, and equipment out of service or missing. The plant superintendent noted that the only feasible way to maintain adequate sampling was to have TVA personnel monitor the contractor's sampling activities at the mine itself. However, during our visit to the plant in October 1980, plant personnel told us that TVA does not do this.

Our conclusions and recommendations relating to TVA's quality assurance procedures are found in chapter 7.

CHAPTER 5

PRICE ADJUSTMENT FORMULA DOES NOT ADEQUATELY COMPENSATE FOR DIFFERENCES IN COAL QUALITY

Because coal varies widely in ash and sulfur content and in Btu value (heat content), suppliers are not always able to deliver the quality of coal agreed to in a contract. When such discrepancies occur, TVA and other utilities use price adjustment formulas to calculate an evaluated price for the coal actually delivered. According to TVA officials, the formula it implemented in 1957 "provided a reasonably accurate relationship between coal quality and maintenance cost" and additional costs attributable to coal quality. TVA officials recognized, however, in 1975 that "as coal quality declined, the formula was biased for the supplier--that is, powerplant costs exceeded the penalty adjustment." Even so, TVA has not changed the 1957 formula.

CURRENT PRICE ADJUSTMENT FORMULA FAVORS SUPPLIERS

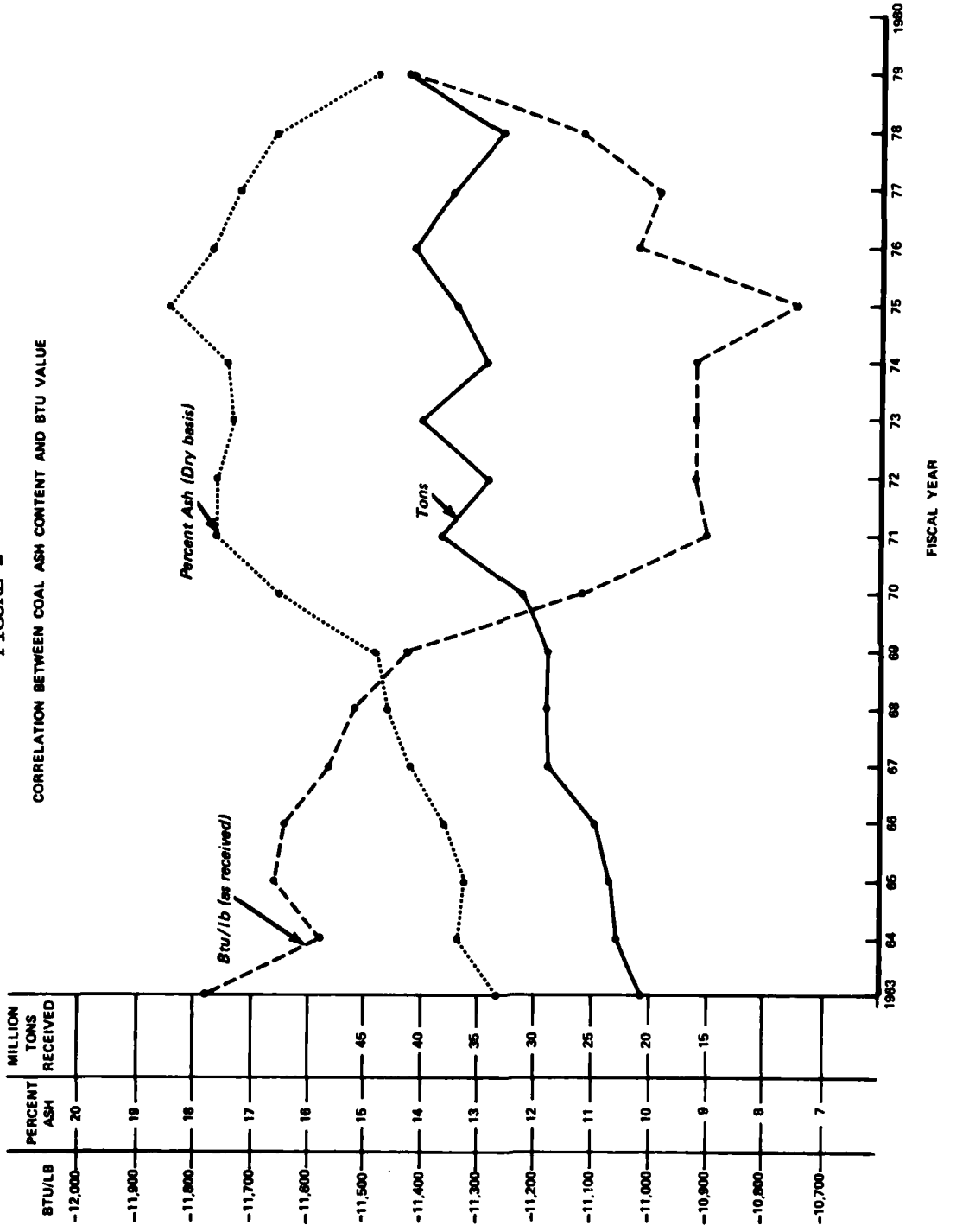
TVA's present price adjustment formula attempts to reward or penalize vendors who deliver better or poorer quality coal than guaranteed in their contract. To apply the formula, TVA first evaluates the delivered cost as bid by the vendor, taking into account the guaranteed ash, sulfur, and Btu value. By adjusting for ash, sulfur, and Btu value of the coal actually delivered, TVA then arrives at the cost per ton for the coal actually furnished. A detailed example of how the delivered cost is calculated and, ultimately, TVA's cost per ton for coal actually delivered is found in appendix III.

TVA recognizes that its price adjustment formula now favors the supplier--that is, powerplant costs now exceed any formula penalty adjustments imposed for the quality of coal delivered. When implemented in 1957, the formula reflected powerplant maintenance costs as a function of coal quality. But since then, coal quality declined and prices increased. For example, in 1963 TVA paid about 18 cents per million Btu's for coal averaging less than 13 percent ash content and over 11,700 Btu's per pound. During 1975, it paid an average of 60.93 cents per million Btu's for coal containing over 18 percent ash and 10,660 Btu's per pound. By 1979, average ash content had dropped to about 15 percent, and Btu value had increased to about 11,300 Btu's per pound; however, the price had also increased to an average of 131.15 cents per million Btu's. Figure 2 illustrates TVA's coal deliveries from 1963 to 1980 and how the ash and Btu values have fluctuated. TVA's Consent Decree was apparently responsible for the improvement in coal quality.

TVA has indicated that it knew the present coal quality price adjustment formula was inadequate in 1975 and proposed

FIGURE 2

CORRELATION BETWEEN COAL ASH CONTENT AND BTU VALUE



a different formula. However, because TVA started buying better quality coal, it never implemented the proposed formula.

AN ALTERNATE PRICE ADJUSTMENT FORMULA

Based on a study of the effects of coal quality on electricity generating costs, staff of TVA's Fuels Group concluded that coal quality directly influences six cost components:

1. Boiler maintenance--increases at the rate of 15 cents a ton for each percentage point of ash plus sulfur in excess of 12.5 percent.

2. Ash disposal cost--increases in direct proportion to coal ash content.

3. Coal transportation cost--decreases in direct proportion to the percentage of ash and sulfur removed from the coal.

4. Peaking capacity--one-third of total peaking capacity lost for each percentage point that ash plus sulfur exceeds 17.5 percent.

5. Rated plant capacity--declines by 3 percent for each percentage point that ash plus sulfur exceeds 17.5 percent.

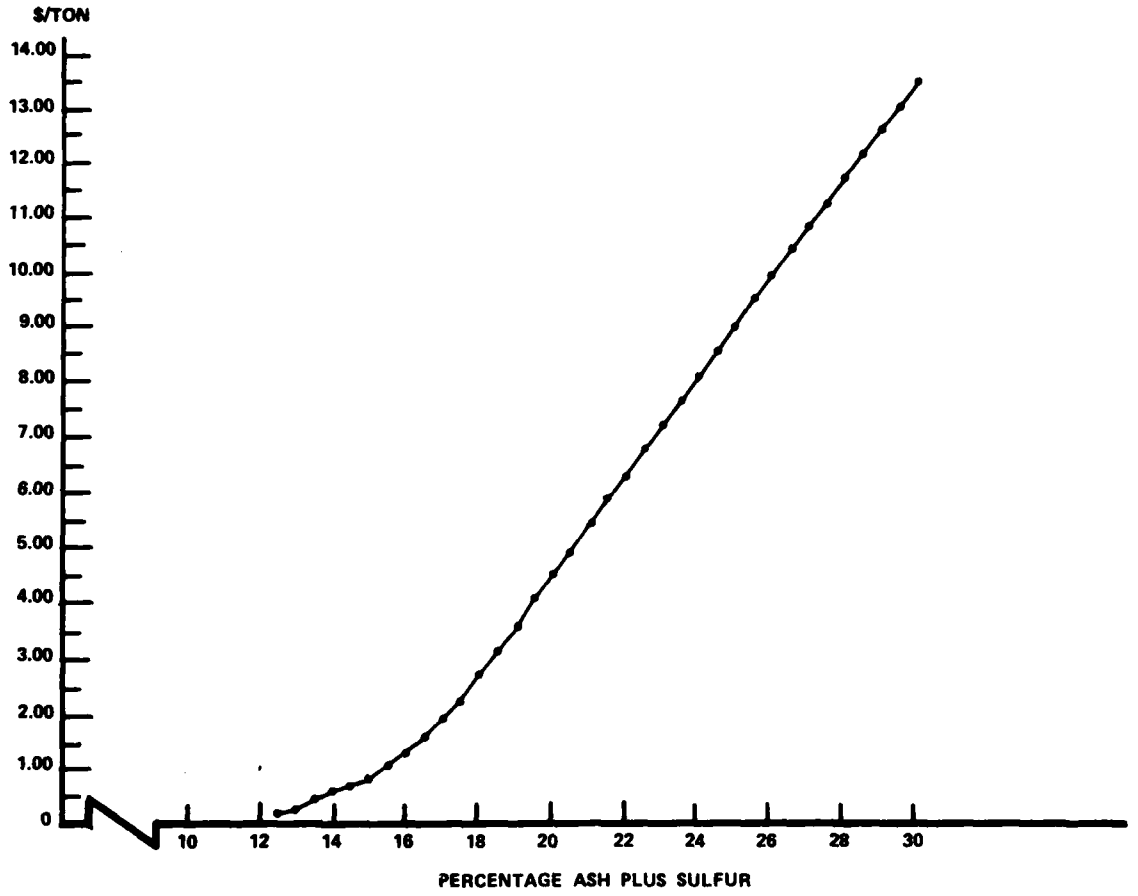
6. Plant availability--decreases 1 percent for each percentage point that ash plus sulfur exceeds 17.5 percent.

Using historical data for the 17-year period 1963-79, the Fuels Group staff calculated the cost to TVA for the above six components for each percentage point variance in the ash and sulfur content of coal burned. Its calculations took into account elements such as coal quality burned in the steamplants, boiler outages, boiler maintenance costs, ash disposal costs, coal transportation costs, and purchased electricity. Figure 3 shows the cost to TVA of the coal quality variances taking these factors into consideration. For example, if the combined ash and sulfur content was 12.5 percent, the cost to TVA would be about $0.09 per ton, but at 18 percent ash and sulfur content, the cost would be about $2.67 per ton.

Working with the basic data accumulated by the Fuels Group staff, and in coordination with them, we revised TVA's price adjustment formula to more accurately reflect the actual costs incurred for different coal qualities. A detailed example of how the quality adjustment would be calculated by the alternative formula is also found in appendix III. By using the same assumptions for all input variables for both TVA's formula and the alternative formula, we found that using the alternative formula the quality adjustment resulted in a penalty of 97 cents a ton compared to a premium of 18 cents a ton under the formula TVA now uses.

FIGURE 3

ECONOMIC PENALTIES FOR ASH PLUS SULFUR CONTENT IN COAL



Likewise, savings would have been significant in earlier years. For the 5-year period 1975-79, the ash and sulfur content of coal deliveries to TVA averaged 19.5 percent, ranging from a low of 17.0 percent in 1979 to a high of 20.9 percent in 1975. We compared TVA's price adjustments using the standard formula with the price adjustments using the alternate formula for the average coal quality delivered to the Cumberland Steam Plant during the period July 1975 through June 1979. The standard formula resulted in price decreases totaling $2.6 million while the alternate formula resulted in a price decrease of $13.3 million, a difference of $10.7 million for 13.2 million tons of coal delivered.

OFFER TO USE ALTERNATE PRICE ADJUSTMENT FORMULA IN REQUISITION 54 REJECTED BY TVA

Requisition 54, issued in July 1980, invited proposals from suppliers for delivery of 30 to 40 million tons of coal over a 10-to-15 year period beginning January to June 1983. Cost for this proposed procurement may exceed $1 billion. Requisition 54 contains the standard price adjustment formula, even though on September 4, 1980, our staff suggested that TVA consider modifying it to include the alternate price adjustment formula discussed above because of the significance of the proposed procurement and the potential benefits from using the new formula.

While officials from TVA's Purchasing and Fuels Divisions agreed their current price adjustment formula may need revision, they were opposed to modifying Requisition 54 to include the alternate formula. TVA officials said the alternate formula did not offer premiums when suppliers delivered better quality coal than guaranteed, and TVA was afraid some suppliers may increase coal prices to offset a new quality adjustment provision. These reasons, however, do not discount the inadequacy of TVA's present formula.

Our conclusions and recommendations concerning TVA's price adjustment formula are found in chapter 7.

CHAPTER 6

EXCESSIVE COAL INVENTORIES DUE TO INFLEXIBLE DELIVERY SCHEDULES

TVA's coal contracting procedures have resulted in acquiring coal inventories well in excess of target quantities at many of its steamplants. Long-term contracts do not permit TVA to consistently change delivery quantities when requirements for coal at a steam plant change. Extensive use of such contracts, together with lower-than-estimated burn levels and higher-than-estimated receipts, has resulted in TVA receiving more coal than it really needs. Target inventory levels for most TVA steamplants are based on the amount of coal needed to burn at full capacity for 60 days. However, at some steamplants we found inventory levels to be more than the established target levels. Also, the stockpiled coal is deteriorating, and the inventories are understated because of the measurement factors used.

EXCESSIVE COAL INVENTORIES AND THE MINERS' STRIKE

We are currently at the conclusion of one of the longest coal miners' strikes in history. We want to carefully point out that TVA has excess inventories not because it was managing purchases for a strike but because it was locked into long-term contracts that did not allow them to change delivery quantities.

We believe good coal inventory management would dictate recognition of the possibility of a miners' strike upon expiration of the union wage agreement and some increase in coal supplies would be warranted. This reason has been recently advanced by TVA for its excess coal inventories. However, the excessive inventories at TVA steamplants did not occur in just fiscal year 1980. For example, the actual inventories at the end of fiscal year 1979, were in excess by 4.6 million tons--18 months before expiration of the union contract.

Only recently have TVA officials indicated that coal inventories were being increased in anticipation of a miners' strike. Before, we were told lower-than-estimated burn levels at the steamplants and higher-than-estimated receipts have contributed to TVA's excess inventories. According to TVA officials, burn levels are sometimes less than estimated because:

--Abnormally warm temperatures and high hydroelectric generation reduce the need for coal-fired generation.

--The unreliability of some units results in less unit availability and therefore less coal burned.

--The low quality of coal burned forces TVA to derate the capacity of certain units.

--High levels of conservation lessen demand for electricity.

--Recession in the Tennessee Valley also reduces demand on the power system.

While demand has been less than anticipated, coal deliveries have exceeded expectations. Historically, TVA has received about 82 percent of its contracted and scheduled coal deliveries, but recent receipts have been almost 100 percent of contract requirements due to a depressed coal market, higher term coal prices than those on the spot market, and the high availability of transportation equipment. Thus deliveries to the Kingston Steam Plant, for example, which averaged 83 percent of contracted quantities during the preceeding 7 years, have been 102 percent of scheduled deliveries during the period January 1979 to September 1980.

TVA's term contracts do contain some provisions for altering delivery quantities, but these provisions are either too limited or contingent on factors beyond TVA's control. For example, of 64 term contracts in effect as of September 30, 1980, 30 allow TVA to unilaterally reduce deliveries from the contracted amount but by no more than 10 percent; TVA had exercised the cut-back provision on 12 of the contracts. Another provision, the gross inequity clause, allows for renegotiation but only if certain inflation indices change so significantly as to result in a gross inequity for either party. Still another provision, the reopener clause, limits renegotiation of term contracts to once every 5 years.

Utilities generally acquire coal inventories prior to a strike through spot purchases. Usually about 3 months before a strike spot market activity intensifies up until just before a strike.

TVA's excessive coal inventories

TVA bases its target inventory levels for most plants on the amount of coal needed to burn at full capacity for 60 days. One of the factors the inventory level takes into account is a miners' strike. As of September 30, 1980, TVA's excess coal inventories at 9 of its 12 steamplants amounted to 5.9 million tons, valued at $182.8 million. Carrying charges on this inventory for fiscal year 1980 was approximately $16.8 million.

Plant name	Inventory (tons) Target	Actual	Excess	Value of excess inventory
Bull Run	668,000	792,043 (89)	124,043	$ 3,812,089
Colbert	824,000	1,148,502 (84)	324,502	11,995,865
Cumberland	1,522,000	1,741,434 (69)	219,434	7,133,799
Gallatin	680,000	1,847,601 (163)	1,167,601	45,557,455
John Sevier	533,000	842,563 (95)	309,563	11,680,121
Johnsonville	918,000	1,150,179 (75)	232,179	8,780,081
Kingston	1,022,000	2,399,243 (141)	1,377,243	49,993,920
Paradise	1,389,000	3,327,338 (144)	1,938,338	36,735,381
Widows Creek (units 7 & 8)	675,000	858,994 (76)	183,994	7,108,792
Total	8,231,000	14,107,897	5,876,897	$182,797,503

Note: The numbers in parentheses indicate the day's supply at each plant.

As shown above, the day's supply of coal at these plants ranges from 69 to 163. This is in contrast to an "Electrical Week" article just before the strike which indicated that most of the large coal burning utilities had supplies for 90 days or more in anticipation of a strike. At TVA's average burn rate, these inventory levels will last for a longer period of time than shown above because the plants do not operate at full capacity on a daily basis.

UNDERSTATEMENT OF INVENTORIES

TVA's coal inventories are understated because TVA has based inventory calculations on understated coal pile densities. 1/ At the five plants where density surveys have been completed, understated inventories amount to 395,000 tons valued at $10.9 million. Although TVA has been aware of this problem for at least 13 years, it has not revised stockpile densities from levels established as early as 1958.

TVA measures the physical inventory at each steamplant about three times per year. To do so, it needs to know both the volume and density of each coal stockpile. TVA determines volume on the basis of physical dimensions derived from aerial photographs. Although the possibility of a 2-percent error in its aerial determinations is acknowledged, regular testing of the aerial method under operational conditions has shown it to be generally accurate.

1/Coal density is the weight of coal per cubic foot which varies based on the ash content of the coal.

One reason for the density understatement is declining coal quality. Since 1966, the ash content in coal received by TVA has increased, and the major constituents in ash have a density greater than the density of coal. While coal density generally ranges between 70 and 84 pounds per cubic foot, ash constituents have much higher densities:

Constituent	Density
Iron pyrite	312 lbs/ft3
Calcium carbonate	175 lbs/ft3
Sand	165 lbs/ft3

Because of the higher concentration of such elements in the coal TVA receives, its density may be substantially greater than the 72 pounds per cubic foot value now assumed.

Following investigation of its coal inventory in 1967, which included extensive density determinations, TVA found that its coal piles had an average measured density of 78 pounds per cubic foot, 6 pounds greater than the assumed value. Even so, TVA did not change the assumed density used in calculating physical inventories at the time. Yet internal studies done in 1967, 1976, and 1977 have all highlighted the inaccuracy of the density value assumed, but TVA has not changed the density factor for the past 13 years.

TVA's current effort to update densities with nuclear source detection methods will establish new, more accurate densities. However, TVA officials have stated that if these new densities vary significantly from those currently used, more substantiation may be necessary before it incorporates revised figures into its system for measuring physical coal inventories. Several northeastern utilities have also performed nuclear density studies and likewise found average density values higher than they had been accustomed to using.

STOCKPILED COAL HAS DETERIORATED

The problem with excess inventories is that coal in storage deteriorates, that is, the coal oxidizes resulting in a decrease in the thermal value of the coal and an increase in the acidity level. TVA does not know to what extent its inventories have deteriorated. TVA has conducted an analysis of the deterioration at the Paradise plant. This is the only plant where the level of deterioration has been studied.

TVA's analysis of the coal inventory at the Paradise plant concluded there is the potential that almost a third of the Btu value may have been irretrievably lost due to deterioration. This inventory loss at Paradise represents the equivalent of

about 1.1 million tons. The density of the Paradise inventory has been understated--that is, more coal is on hand than TVA recognizes--therefore the thermal value loss may be even greater.

Due to the high ash and sulfur content of the coal purchased for the Paradise plant, it will have to be washed before it is burned. Also, because of the increased acidity level the coal will have to be blended with fresh coal prior to washing because washing unblended, highly acidic coal may seriously damage the coal washing plant. In this regard, TVA recently stated:

> "An additional problem which now appears more serious than we had earlier anticipated is our ability to wash coal in the Paradise washing plant***which has been stockpiled for more than 60 to 90 days. We presently have approximately three million tons of coal in dead storage which we may not be able to wash without blending with fresh coal. We had always recognized the difficulty in washing this coal, however, we believed the coal could be washed directly with a high rejection rate. More recent discussions with other operators of washing plants and washing plant manufacturers indicate that serious damage to the washing plant can occur if we attempt to wash this stockpile coal without blending."

According to the contractor for the Paradise wash plant, corrosion caused by acidic water could damage some equipment almost permanently.

TVA and the contractor who performed the deterioration study at Paradise have concluded the best solution to the problem appears to be blending fresh coal with the oxidized coal at a 75-percent fresh to a 25-percent oxidized ratio. However, TVA may have to prematurely buy more than 10 million tons of fresh coal for blending purposes.

It appears that stockpile deterioration at Paradise is a significant problem. Stockpile deterioration could also be a problem at some other steamplants due to the large stockpiles. The type of study conducted at Paradise should be repeated at other plants with large excess inventories in order to assess the magnitude of deterioration systemwide.

Our conclusions and recommendations relating to TVA's coal inventories are found in chapter 7.

CHAPTER 7

CONCLUSIONS, RECOMMENDATIONS, AGENCY COMMENTS AND OUR EVALUATION

The Tennessee Valley Authority is one of the largest coal-buying utilities in the Nation. TVA's 12 coal burning steam-plants supply about 65 percent of the electricity generated by the power system. TVA's coal expense accounts for over 50 percent of its operating expenses and, therefore, has a direct impact on power system rates. We found that many aspects of TVA's coal purchasing program could be managed more effectively.

CONCLUSIONS

Listed below are our conclusions:

--During the 10-year time frame considered by our audit, TVA contracted for about 74 percent of its term coal during two periods that were least favorable for buying coal. TVA entered into term contracts during these periods and usually negotiated the contracts. Such contracts do not allow TVA to take advantage of decreases in market prices which usually follow periods of high demand.

--Many of TVA's contracts contain price escalation clauses which has the effect of greatly increasing high base prices over the duration of the contract. Some of these contracts also have reopener clauses whereby at certain times the price can be renegotiated. TVA recently renegotiated some contracts for a price reduction of about $20 million. TVA will, in the future, be able to renegotiate other contracts. If the recent contract renegotiations are any indication of future prices, TVA may be able to renegotiate lower prices in the future.

--To promote the economy of the Tennessee Valley, TVA has adopted a policy of buying coal only from markets east of the Mississippi River. However, TVA did have an opportunity to supply the Shawnee plant with western coal which, according to an internal TVA study, was either equal or superior to eastern coal except for Btu value. TVA's study showed that if western coal was bought it could have saved about $31 million to $36 million annually.

--TVA has frequently endorsed support of the small coal operator as a means of maintaining competition in the coal industry and restraining cost increases to the ratepayers. To aid small suppliers, TVA established the SCOAP, but its success is questionable because

TVA has not established all the set-asides anticipated under the program. Therefore, TVA has limited opportunities to deal with small operators.

--TVA currently has reserve holdings of about 630 million tons of recoverable coal. Only one of its reserves, Camp Breckinridge, is being mined to supply coal to the TVA system. In developing Breckinridge, TVA encountered several problems (1) poor quality coal, (2) lower than expected coal production, and (3) a transportation contract tied to optimum production levels. The ENCA properties in southern Illinois are similar to Breckinridge. If TVA decides to develop ENCA, it should proceed cautiously so the problems encountered at Breckinridge are not repeated.

--Although quality assurance methodologies are adequate at most TVA steamplants, we found the sampling facilities at one to be inadequate. Inadequate sampling has been a long-standing problem at this plant. Additional receiving and sampling facilities were authorized in 1979 which should eliminate the problems, but they have not yet been constructed. In addition, TVA has weak internal controls over coal delivered to another steamplant, in that, TVA allows the mining contractor to sample the coal.

--In 1957, TVA adopted a price adjustment formula to compensate for coal deliveries of poorer quality than that contracted for. TVA recognized in 1975 that the formula is outdated but has not revised it.

--Coal inventories at nine TVA steamplants are about 5.9 million tons over target inventories. This has occurred because of TVA's inflexible term contracts. These excess inventories have not been recently acquired because at the end of fiscal year 1979 there were about 3.8 million tons in excess of target levels. Inventories may also be understated due to underestimated density levels. Also the stockpiles may be deteriorating at plants other than Paradise which means TVA may have to blend stockpiled coal with fresh coal in order to satisfactorily wash and burn it.

RECOMMENDATIONS TO THE CHAIRMAN, BOARD OF DIRECTORS TENNESSEE VALLEY AUTHORITY

We recommend that TVA revise its coal purchasing practices. TVA should implement a better program of forward planning to minimize the award of contracts during periods when coal demand is high--for example, the predictable miners' strikes--and to limit the duration of contracts that must be awarded during these periods. TVA should also:

--Renegotiate at the earliest opportunity long-term contracts with reopeners entered during unfavorable conditions. If better prices cannot be renegotiated, TVA should consider cancellation.

--Consider all responsive offers from coal suppliers regardless of geographic location; the economics of the source should be the primary consideration as to whether the offer is accepted or rejected.

--work for the success of the Small Coal Operator Assistance Program by establishing all set-asides possible.

--Exercise caution in proceeding with development of the ENCA reserves, particularly the economic feasibility of producing the desired quality and quantity of coal from ENCA. It should avoid the problems encountered at Breckinridge in developing ENCA. Specifically, (1) ENCA production levels should be realistically established, (2) the coal quality of ENCA should be thoroughly analyzed to determine if it will need to be washed and, if so, the expense of another wash plant should be factored into the feasibility determination, and (3) if transportation is contracted for separately, the contract should not be tied to optimum production levels and should allow for reopeners.

To ensure that it is paying only for the quality of coal being received, TVA should install effective sampling facilities at the Kingston Steam Plant and take action against those vendors that continually provide lower quality coal. TVA should also assign someone to monitor the sampling at Breckinridge. In the future, TVA should also avoid contract provisions that allow contractors to do sampling.

To provide adjustment in coal prices commensurate with costs or benefits from the coal delivered, TVA should discontinue using the current coal quality price adjustment formula. Instead, it should review the alternate formula we developed or develop another formula that will reflect actual costs. In addition, the formula should be included in any planned procurements as soon as possible.

In order to obtain the flexibility to match coal deliveries with coal needs over the long term, TVA should revise its coal procurement procedures to

--make greater use of spot purchases at all steamplants and satisfy a specific percentage of forecasted coal requirements through spot purchases, and

--include provisions in all term contracts which give it the option to cut back on deliveries when needs are not as great as forecast.

Also, to reduce coal inventories in the near term, TVA should exercise its option to reduce deliveries by 10 percent to steamplants with inventories that exceed target levels.

We further recommend that TVA incorporate new density figures, based on density surveys recently completed and those now being conducted, into inventory calculations.

AGENCY COMMENTS AND OUR EVALUATION

TVA, in commenting on our draft report on May 18, 1981 (appendix I), disagreed in most cases. TVA's response is negative and does not offer much optimism that they will consider the findings in this report. While we recognize the report presents some critical findings on TVA's coal program, we hope TVA will review the final report with an objective and open look. By the tone of their comments on the draft report, we are not sure this occurred in the previous review.

TVA's comments consist of a cover letter which is essentially a summarization of their specific comments on a chapter by chapter basis. We therefore, in appendix I, addressed the detailed comments rather than the cover letter.

TVA's letter basically states the report contains material factual errors and displays a lack of understanding by GAO of TVA's coal procurement and the coal industry in general. We do not agree. While some changes were made to the report based upon TVA's comments, none were significant enough to materially change the report. The detailed comments in appendix I reflect where we agreed with TVA and notes the changes we made. Further, we believe we have closely examined TVA's coal purchasing practices and gained the understanding that there are significant problems which need to be addressed. We believe a careful reading of the body of our report evidences such understanding as well as a balanced discussion of areas of legitimate concern with TVA's coal purchasing practices and reasonable recommendations which would lead to improvements in such practices.

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE 37902

OFFICE OF THE BOARD OF DIRECTORS

MAY 18 1981

Mr. J. Dexter Peach, Director
Energy and Minerals Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

The Tennessee Valley Authority appreciates the opportunity to comment on GAO's report, "TVA's Coal Procurement Practices--More Effective Management Needed," received April 30, 1981.

We believe that the report contains material factual errors and in general displays a lack of understanding by the GAO auditors of TVA's coal procurement and of the coal industry in general.

The GAO report suggests that TVA's coal costs are too high but it fails to inform the reader that TVA pays less for its coal, and has for the period covered by the report, than five of the six neighboring utilities--the one utility with lower cost being located in the heart of the Kentucky coalfields. This has been accomplished in spite of the fact that TVA has for years required its contractors to do more than is required by neighboring utilities in surface mine reclamation, equal employment opportunity, and the support of other socioeconomic policies while at the same time purchasing coal of a generally higher quality.

TVA's consistent success relative to other purchasers competing in the same market is largely due to the dedicated effort and expertise of its coal planning and purchasing staffs. TVA has a reputation in the coal industry for hard bargaining and strict enforcement of its contracts. We believe that an objective review would recognize TVA's coal purchasing program for what it is--a Government procurement program that works well.

Enclosed with this letter is a more detailed analysis of the GAO report offering corrections, amplifications, and comments. We would like to point out, however, that the analysis covers only what TVA believes are the major errors. There are additional factual mistakes which we have not dealt with due to limitations on time to respond.

GAO's charge that TVA carries too much coal in inventory is typical of GAO's lack of understanding of the real world. The Nation presently is in the grip of a coal strike that began on March 27. In anticipation of this strike, TVA has increased its stockpiles to protect against being forced to

close down a plant for lack of supply. In reviewing the GAO report, TVA is concerned about its failure to note that this Agency's planning has resulted in a coal inventory able to withstand an extended strike. The report's implication that TVA is using the present strike as a fortuitous excuse for an accidental building in inventory is simply not true. The records of TVA's coal supply levels, which were available to GAO auditors, clearly show a peak in coal inventories immediately preceding every coal strike, followed by rapid depletion during the strike.

Some other general comments on the document are in order:

As to GAO's opinion that TVA is "locked into" long-term contracts requiring the Agency to pay more for coal than it would otherwise, the facts are contrary: TVA contracts contain reopener clauses and TVA renegotiates coal prices in long-term contracts when it is advantageous to the Agency.

GAO's criticism of TVA for not purchasing western coal assumes western coal was cheaper and that eastern coal was bought solely to enhance the economic development of the Tennessee Valley region. While TVA makes no apology for having considered the potential adverse economic impact on the region from which it traditionally purchases coal and which it serves, other economic realities made eastern coal more attractive in this instance. These included:

- Burning lower-Btu western coal in the Shawnee Steam Plant during the period under examination would have caused a 300 MW reduction in generating capacity. The only way to compensate for this 300 MW derating was installation of a new and larger boiler and other equipment, an extremely expensive proposition. If the boiler was not modified, the costs of power to replace the 300 MW during this period would have eliminated the potential lower costs of burning western coal at Shawnee.

- If TVA had purchased western coal for Shawnee, it could have been required under the terms of section 125 of the Clean Air Act to use extremely high-sulfur coal from the immediate vicinity of the plant. This would have required installation of expensive pollution control devices. Instead, by not relying on western coal, TVA was able to purchase lower-sulfur eastern coal, with consequent savings to ratepayers.

In other words, a decision to purchase western coal would have resulted in higher total costs for TVA ratepayers. In these circumstances, purchasing lower-sulfur eastern coal was clearly justified.

The GAO report fails to examine the nationwide rise in coal prices and its impact on TVA coal costs. By dismissing the issue of price escalation as "insignificant because these facts are publicized and well known," GAO has chosen to ignore the fundamental reason for the increase in TVA's coal costs. Many of the factors accounting for the coal price rise are not as "well known" as GAO would have one believe. Unprecedented events contributed to the increased coal cost, including the Arab oil embargo in 1973 which rendered coal a more attractive alternative fuel. Environmental restrictions imposed on utilities further drove up prices through additional processing facilities required to clean up the product as well as increasing demand for low-sulfur coal. In addition, new State reclamation laws and regulations, the Surface Mining Control and Reclamation Act of 1977, and the Federal Mine Safety and Health Act of 1977 all increased coal production costs. The lessening of competition is another factor, which TVA has documented. Inflation, too, was a culprit.

TVA is concerned about additional errors of fact and interpretation that occur in the report, as spelled out in the accompanying TVA analysis. We believe these problems limit the report's value as a device to improve management of TVA's coal procurement program. For example:

- TVA has a lengthy and continuing planning process for its coal purchases, contrary to GAO's assertion that all the Agency does is "simply" advertise for additional coal supplies.

- Contrary to GAO's assertion that TVA purchased only very small tonnages from small independent coal operators, the fact is that nearly 62 percent of all coal TVA purchased between 1970 and 1979 was from small, independent operators.

- Contrary to GAO's assertion that TVA purchased mineral rights for the Ewing-Northern Coal Association properties "without the right to mine," TVA in fact does have such rights which are clearly set out in the deeds TVA received.

- GAO's discussion of layer loading investigations by TVA and a Federal grand jury is factually incorrect.

For the most part, GAO's recommendations are proposals that TVA do things that it is already doing. For example, TVA has always evaluated contract reopener provisions against the availability of comparable coal in the open market. TVA believes the small coal operators assistance program is generally a success and intends to continue its present support of relationships with small operators. TVA has exercised caution in the development of its ENCA reserves in Illinois and will continue to do so.

APPENDIX I

However, TVA disagrees with the GAO recommendation that the Agency increase its use of spot purchasing. Spot purchases can never fulfill TVA's needs. The spot market is one tool among many in TVA's coal procurement program. It is used when TVA needs the coal and spot prices are attractive. To predetermine a specific percentage of spot coal purchases at all steam plants, as GAO implies should be done, would impose inflexibility on the spot coal program, thereby eliminating the principal value of spot purchases. It would also likely result in higher coal costs.

Thank you for this opportunity to comment on the GAO analysis.

Sincerely,

S. David Freeman
Chairman

Enclosure

TVA ANALYSIS OF GAO COAL PROCUREMENT REPORT

GLOSSARY

GAO's attempt to define words commonly used in the coal purchasing field is in some cases inaccurate and misleading.

GAO's definition of the Consent Decree under which TVA is to comply with air emission standards cites TVA and EPA as the two parties to the agreement. In fact, the States of Kentucky and Alabama as well as ten environmental groups were parties to two court-approved agreements on compliance with emission standards at ten TVA coal-fired steam plants.

GAO defines spot contracts as those "with a minimum allowable delivery term of four weeks." In fact, TVA defines a spot contract as one with a maximum allowable delivery term of 25 weeks.

GAO's definition of British thermal unit is the amount of heat needed to raise water temperature "to one degree Fahrenheit under stated conditions of pressure and temperature." In fact, a Btu is the amount of heat needed to raise one pound of water by one degree under standard conditions of pressure and temperature.

[GAO Response: We have made changes to the glossary where we believe them to be appropriate. The Consent Decree description was changed to reflect all groups involved. We also changed the spot contract definition to reflect the maximum delivery term of 25 weeks. We also recognize that there was a typographical error in our definition of British thermal unit which has been corrected.]

CHAPTER 1

This chapter, setting forth the manner in which TVA purchases coal and the scope of the GAO examination, is erroneous in significant details. Among the misstatements are these:

- TVA does not issue a requisition "in order to contract for coal." A requisition is an internal document setting in motion the Agency's issuance of an invitation to bid or request for proposals.

[GAO Response: We recognize that a requisition is an internal document which sets in motion the process for advertising for bids or requests for proposals. If the process were not set in motion, TVA would not be able to enter into coal contracts.]

APPENDIX I

- TVA does not have, as GAO asserts, an "Office of Internal Review."

  [GAO Response: We have changed the word "Review" to "Audit."]

- TVA does not have, as GAO asserts it does, requirements that escalation clauses be included in term contracts or that reopener provisions be included in term contracts.

  [GAO Response: We disagree with TVA. In fact, most of their contracts have escalation clauses whether required or not. TVA submitted information on its coal purchasing practices to the Senate Environment and Public Works Committee prior to March 1981 hearings. In that material, TVA stated there are certain provisions contained in purchase contracts as conditions under which TVA contracts for coal. Among these provisions are "price escalation (clauses) designed to reflect changes (upward or downward) in the cost of producing coal." TVA also said that as a result of changing market conditions that it, in order to maintain "supply sources under contracts that were expiring or subject to reopening" renegotiated these contracts as early as possible.]

- "Getting the coal mined" is not part of TVA's coal management process, contrary to GAO's assertion.

  [GAO Response: We believe TVA has taken this statement out of context. We certainly do not mean that TVA should get involved in mine management. We believe that in buying coal, there must be assurances and controls that coal contracted for will in fact be mined and delivered, which we believe is part of the coal management process. We hope that TVA is concerned that controls are in place to assure it receives coal under contract.]

- The comparison of TVA's coal costs to the national average is of limited value because the national average includes the extremely low coal costs of western utilities burning the cheap local coal. The true measure of the effectiveness of TVA's coal purchasing program is TVA's coal costs relative to those of neighboring utilities which compete in the same market, showing that TVA pays less for coal than five of its six neighbors.

[GAO Response: We recognize that a national average of coal prices reflects many different types of coal. How much western coal affects a national average price may be insignificant due to the low amounts of western coal being produced. We compared, based on Department of Energy data, TVA's coal costs with 27 utilities located in the eastern coal mining areas and found that TVA generally ranked somewhat in the middle on cost. More detail concerning this issue is found in our discussion of TVA's comments on chapter 2 and in appendix IV.]

In addition to these errors, GAO claims that its review efforts were "somewhat constrained" because of the unavailability of some records regarding Requisition 42. In fact, some general correspondence was lost while offices in the Fuels Procurement Branch were being remodeled; however, all of the files containing the individual coal proposals and vital information related to each were in the branch records and were available to GAO auditors. Written recommendations to TVA's Board for each contract awarded under Requisition 42 were also available. These recommendations were specific with respect to price comparisons of the proposed contract with market and other offers, purchasing strategy, and other important aspects of the procurement. Therefore, GAO's claim that it could "not verify the process used by TVA in negotiating Requisition 42" is not an accurate and fair statement of the facts.

[GAO Response: TVA acknowledges some of its files regarding Requisition 42 were lost. The files in question contained the memorandums of negotiation and correspondence which could have contained details on the negotiation process. However, since these files were lost we have no way of knowing their details or content.]

CHAPTER 2

Coal Purchase Planning

In its analysis of TVA's timing of coal purchases and length of contract, GAO asserts that TVA does not have a long-range plan for coal purchasing indicating when coal would need to be purchased for particular steam plants; "instead," GAO says, "when current contracts are near expiration, TVA simply advertises for additional coal supplies." In fact, a lengthy and continuous planning process is applied to all of TVA's coal buying. Estimates of future consumption by plant are prepared and reviewed regularly. Factors considered include system load requirements, availability of nuclear and hydro power, and the comparative costs of operating various coal-fired plants. TVA uses various information on coal under contract to develop detailed supply plans for each plant. Through the preparation of these plans a purchasing strategy is developed. Based on anticipated market conditions, TVA devises purchasing plans for both future spot and term purchases. This process reflects careful, thorough planning on a continuous basis and is contrary to GAO's characterization.

[GAO Response: Throughout our review, we were told by TVA that a written long-range strategic plan for buying coal did not exist. After receiving the above comment from TVA which infers there is a long-range plan, we again asked TVA for a copy. We were advised "TVA is in the process of drafting a formal long-range strategic plan," but none currently exists. Although we are pleased to see TVA is proceeding to develop a plan, it has been over two years since we recommended in a previous GAO report ("Electric Energy Options Hold Great Promise For The Tennessee Valley Authority," EMD-78-91, Nov. 29, 1978) that TVA needed to develop a long-range comprehensive plan for its power program. In addition, in January 1980, the consulting firm of Booz Allen, in reporting on a comprehensive management audit of TVA's Office of Power, made observations similar to ours about TVA's process of planning for coal purchases. Booz Allen recommended that TVA "Develop a formal planning process supported by improved analytical capabilities in:

--Coal market analysis.
--Energy price forecasting.
--Energy/environmental policy."

We stand by our statement that "when current contracts are near expiration, TVA simply advertises for additional coal supplies." We believe our point is also substantiated by the Booz Allen report which noted that "Long term strategic planning to meet objectives is not employed; procurements are conducted as current supply sources expire."]

Although GAO contends that TVA's coal purchases were awarded under "least favorable conditions," the report fails to note that throughout the 1970's TVA paid less for coal than did five of six neighboring power systems--a fact that is still true today. The only neighboring utility with lower costs, Kentucky Utilities, has the advantage of proximity to the Kentucky coalfields; however, the average cost of coal at TVA's Kentucky steam plants is lower than that of Kentucky Utilities.

[GAO Response: TVA contends that its coal costs have been lower than five of six neighboring utilities. In our contacts with utilities bordering TVA we were unable to obtain specific coal contract data. In lieu of such data, industry does report to the Department of Energy on its fuel cost. DOE publishes this data in a report titled, "Cost and Quality of Fuels for Electric Utility Plants." From this publication we developed a comparison of coal price and quality data for a 4-year period for 27 utilities located in the eastern coal mining area. This listing would probably include those utilities identified by TVA. The comparison for 1976-79 is found in appendix IV and shows TVA in the middle of 27 utilities for both costs and coal Btu content. However, other factors must also be considered. For example, TVA was receiving poorer quality coal (sulfur/ash) than 20 of the

utilities--a factor which should result in a lower price for TVA coal. Further, TVA buys much more coal than any of the other utilities, more than doubling the tons of the next highest user. Certainly TVA's large purchase volume should place them in a good position to obtain the best price for coal. Still another factor when comparing delivered prices of coal to utilities is the distance of the utility from the coal mines. TVA plants are located close to many of its eastern coal supply sources while some of TVA's neighboring utilities to the south and east would likely incur a relatively higher delivered coal cost due to transportation.]

Contrary to one GAO statement, it was the Clean Air Act and the emission standards established pursuant to the Act, and not TVA's agreement to the Consent Decree, which caused the impact on TVA's cost of coal. TVA also challenges GAO's conclusion that the Consent Decree was the primary reason for the tight market conditions in 1977 and 1978. During that time period, utilities were attempting to buy coal to build up their stockpiles before the impending UMW strike. In addition, utilities were competing for the available supplies of low-sulfur coal in order to meet the Clean Air Act requirements.

[GAO Response: The Consent Decree was a function of the Clean Air Act and emission standards to which TVA agreed in order to operate its steamplants. Further, concerning tight market conditions that existed in 1977-78, we acknowledged in the draft report that two factors contributed to this condition--a miners' strike in 1978 and the demand for low sulfur coal.]

Coal Purchase Timing

A further point, overlooked by GAO, must be made about the timing of TVA's coal purchases in relation to market prices. Because of the magnitude of the TVA power system's demand for coal, TVA's entering into the market to purchase coal has an effect on market prices in the area. Thus, any time TVA attempts to make major coal purchases, coal prices increase. Similarly, when TVA is not purchasing large amounts of coal, as at present, market prices may rise more slowly or even decrease. This, combined with the lack of precognition as to future prices, makes it difficult or impossible to purchase only when prices are lowest, as GAO suggests.

[GAO Response: We have not overlooked the fact that the magnitude of TVA's coal purchases may affect market prices. This is precisely why we believe that TVA's coal purchasing program needs to be driven by a long term strategic plan. We are pointing out, as has Booz Allen, that better planning is needed so TVA can have some "precognition as to future prices."]

In its criticism of TVA for paying "premium" prices on long-term coal contracts, GAO suggests that TVA should have made more spot coal purchases. The fact is that during the 1970's the price of spot coal, according to reports published by the Department of Energy and the President's Commission on Coal, has been from $3 to $18 per ton more than term coal. Had TVA done what GAO now advocates, i.e., purchasing substantially less coal under long-term contracts, TVA would have paid many millions of dollars more for coal than it has in the past few years. The true test of the success of a coal buying strategy is the actual coal cost paid over time.

APPENDIX I

The Department of Energy's January 1981 draft report "Coal Competition: Prospects for the 1980's" states that utilities nationwide purchase an average of 78.8 percent of their coal requirements under term contracts. In addition, the report states that the average length of utility term contracts is about 13 years. Most of TVA's contracts provide renegotiation rights after five years, so the parties are not locked into contract prices for "10 or more years" as the GAO report concludes. Because of the rapid increase in the market price of coal during the period, some of TVA's lowest price contracts are those with the longest terms. The Department of Energy's 1981 coal competition report also points out that:

> Long-term coal contract prices in general are lower than spot coal prices in part because the former typically have noninflating capital and coal reserves costs, and because long-term agreements impart better information on long run coal supply and demand to the market place.

[GAO Response: TVA has misinterpreted our position regarding term contracts and purchasing coal on the spot market. We recognize that utilities purchase most of their coal under term contracts and we do not take issue with this practice, as TVA infers. We are recommending that in order to obtain flexibility to match coal deliveries with coal needs the spot market should be used more. We recognize that spot prices react more quickly to demand and sometimes are higher than contract prices. At no time have we stated that TVA should use the spot market to fulfill its entire needs. In fact, TVA's goal is to buy at least 75 percent of its coal through term contracts. It has been buying over 90 percent through term contracts while other utilities generally buy about 79 percent of their coal through term contracts. Our draft report recognizes that most TVA term contracts provide for renegotiation after 5 years. However, there are four contracts outstanding that do not provide for renegotiation. The amount of coal intially contracted for under these four contracts totalled 132.3 million tons. Thus, TVA is locked into some contracts for periods of time from 10 to 24 years and for significant amounts of coal.]

Negotiating Strategy

It should further be noted that TVA takes advantage of the renegotiation rights under its contracts when it is in TVA's interest to do so--a fact GAO does not mention. For example, TVA recently renegotiated several long-term contracts for the Kingston Steam Plant, reducing costs by over $20 million in the process. It must also be recognized that in the rapidly rising market which existed during the review period, a renegotiation right operates to the advantage of the seller by allowing an increase in the existing contract price to the new market price.

[GAO Response: Our draft report pointed out that TVA has renegotiation rights and also discusses the recent renegotiation of the Kingston contracts. During the past 10 years only two other contract renegotiations resulted in price decreases. For one of these, however, a price reduction of $7.47 million was more than offset by price increases totalling $116.3 million at the same time on other contracts.

We agree that in a rapidly rising coal market the reopener provision may operate to the advantage of the seller. This is precisely why we recommend that when contract reopeners can be exercised, TVA seek lower prices or cancellation.]

TVA strongly disagrees that its negotiation authority was used excessively. Section 9(b) of the TVA Act provides that all purchases "shall be made after advertising, in such manner and at such time sufficient in advance of opening bids, as the (TVA) board shall determine to be adequate to ensure notice and opportunity for competition," except that advertising is not required in an emergency and under certain other conditions. The simple fact is that TVA did advertise for bids for the coal required to meet the Clean Air Act emission requirements. Requisition 41, mentioned in the draft report, was a formally advertised procurement. TVA did not receive a sufficient number of responsive bids under the invitation to satisfy its coal requirements because many suppliers refused to accept TVA's terms and conditions. Since TVA was not able to meet its coal needs under the rules of formal advertising and since TVA urgently needed to get compliance coal under contract in order to meet the schedule of the Consent Decree, TVA again solicited for the same coal requirements, but used a "request for proposals" rather than the original "invitation to bid" document. GAO's present position differs markedly with its 1976 review of TVA's negotiations procedures and some of the very same contracts to which it now objects. In that report, GAO noted with approval:

> To preserve maximum competition, proposals were requested from all coal vendors on TVA's mailing list. This gave (TVA) the flexibility to accept or possibly negotiate improvements in proposals which normally would have been rejected as nonresponsive to specifications or excessive in price. (Report of the Comptroller General of the United States, B-185101, December 29, 1976, page 4.)

[GAO Response: The report reviewed by TVA points out they did advertise for bids under Requisition 41 to buy coal. We also recognized in the draft report that TVA was not able to fully satisfy its needs under Requisition 41 and, therefore, declared an emergency and issued Requisition 42. We do not object to this, but we do question certain aspects surrounding the purchase of coal under emergency conditions where a large amount of coal was purchased --197 million tons, and where the coal was not needed immediately since some of TVA's contracts did not call for deliveries until 4-17 months after the contract date.]

APPENDIX I

[Regarding our 1976 report, we believe TVA is taking statements out of context. This report was issued in December 1976, before Requisition 42 was initiated. Further, this previous work focused strictly on numbers of contracts and not specifically coal contracts. This prior work does not reflect the magnitude of coal purchased under emergency conditions in Requisition 42.]

In its discussion of the factors TVA considered in extending Requisition 42, the report omits an important one--TVA was at that time not meeting the emission standards established under the Clean Air Act at several plants, and any delay in coal procurement would have lengthened the time required to come into compliance. The report also incorrectly refers to greater "staff" time for advertising as being one of the reasons for negotiation. The greater time referred to in the Director of Purchasing's October 31, 1977 memorandum is not "staff" time, but the greater length of time from solicitation to award of contract caused by the fact that many of the actions in advertised procurements must be sequential. In negotiations the actions may be concurrent with a resultant shorter "elapsed" time from solicitation to award. The total amount of "staff" hours required is probably greater for negotiations than for dvertising.

[GAO Response: We agree that any delay in procuring compliance coal would have lengthened the time to come into compliance. However, as our report shows, when the emergency extension was requested TVA had under contract from Requisition 41 and 42 about 75 percent of compliance coal needed for all plants and only two steamplants--Shawnee and Johnsonville--did not have any compliance coal.

We have deleted the word "staff" in our report. The report now reflects that the elasped time to issue an advertised contract is greater than a negotiated contract.]

The report incorrectly refers to the amount of coal purchased by negotiation as 225 million tons. The correct amount is 197 million tons, as stated elsewhere in the report.

[GAO Response: Change made. However, we still consider this to be a significant amount.]

Competitive Negotiations

While GAO maintains that coal purchased through advertised bids tends to be lower priced than negotiated purchases, a better understanding of the coal marketplace would have made clear to GAO that this is not necessarily so. Coal contractors' bids are frequently nonresponsive to the specific terms and conditions governing coal quality and delivery requirements, particularly during tight market conditions. TVA has found negotiations effective in adjusting previously disqualified bids to its own requirements. Moreover, these negotiations frequently result in lower prices than those initially bid by suppliers.

APPENDIX I

For example, GAO, in discussing a negotiated 17-year contract of which it was critical, fails to note that through the negotiation process the award was $96 million below the company's earlier bid which was rejected under Requisition 41.

Both the Office of Federal Procurement Policy and the Energy Department recognize the importance of competitive negotiation in obtaining the best possible coal prices for utilities. An October 1980 OFPP report to Congress described competitive negotiation as "equally as valid as formal advertising for promoting competition among suppliers." A January 1981 Energy Department coal competition report states that "competition is enhanced by the buying utility's choice to negotiate with a number of potential suppliers after weeding through the initial bids. It is during the negotiating process that many price concessions and production efficiencies are agreed upon, and frequently a less attractive bid can turn into the most efficient contract in terms of the efficient use of resources." In effect, GAO's claim that lower prices could have been obtained through advertising is not supported by the facts and is inconsistent with its own 1976 report and with the findings of DOE and OFPP.

[GAO Response: We do maintain that coal purchased through advertised bids tends to be lower priced than negotiated purchases. As table 4 of our report shows, during the 10-year period of our study the total cost of TVA's negotiated coal purchases averaged about $8 more per ton than its advertised purchases. The difference is even greater if one looks at contract length. On contracts with 5 to 10 year lengths the average negotiated price was about $14 per ton more than the advertised price. The price difference is also apparent on TVA's negotiated and advertised spot purchases during 1977 and 1978 as shown in appendix V.

As for TVA's statement that negotiations can adjust previously disqualified bids to its own requirements, we agree this can occur. On the other hand, negotiations have resulted in unfavorable terms for TVA such as the escalation clauses, guaranteed profits on some contracts, and deficiency payments on transportation.

We do not agree that our statement that lower prices could have been obtained through advertising is consistent with our 1976 report. As pointed out on pg. 57, the 1976 GAO report did not concentrate on coal contracts and does not reflect the magnitude of coal purchased under Requisition 42.]

The GAO report also argues that TVA should have negotiated contracts for no longer than six months as provided in the TVA Code or three years as required by the Consent Decree. The TVA Code is an internal management tool used by the TVA Board to establish and communicate to its employees general policy and procedures, but in no way is it intended to require TVA to follow blindly a rigid preordained course without consideration of special circumstances. The code provision referred to allows the TVA staff immediately to enter into negotiations without advance Board approval whenever the coal supply falls below a 60-day level at a steam plant. It is obviously not intended to state the only conditions under which coal contracts may be negotiated, and it does not prevent the Board from authorizing different procedures when business judgment indicates that to do so would be in TVA's best interests.

APPENDIX I

[GAO Response: Our draft report recognized the TVA Code is a "compilation of its operating policies and procedures." The specific Code provision, or operating policy, we refer to states that when coal stockpiles get down to a 60-day level, contracts can be negotiated for 6 months or less. We would agree that some judgment should be exercised, but we have doubts that contracts awarded under emergency conditions for large amounts of coal, periods of 10 to 17 years, and delivery dates not beginning until 4 to 17 months after the contract date are in TVA's best interest.]

Although the Consent Decree only required that TVA immediately contract for a three-year supply of coal, TVA nevertheless had to comply with the Clean Air Act emission standards even after the three years. If TVA had entered into only three-year contracts, the unfavorable market conditions could have occurred again three years later. In addition, some suppliers needed longer terms to be able to open new mines and coal washing facilities. These suppliers would have been eliminated from competition, resulting in higher prices, if TVA had not considered terms longer than three years. TVA elected to negotiate the best deal for TVA considering both price and term.

[GAO Response: We recognize that TVA will have to comply with the Clean Air Act emission standards after the 3-year period specified in the Consent Decree. The emission standards that were set in 1977 under the Clean Air Act are currently being reviewed in the Congress as to their economic and environmental impacts. This review may result in either somewhat relaxed or more stringent standards. The fact that these standards were to be reviewed was part of the Amendments when they were passed in 1977. Because of this review, coal quality requirements could change. While we recognize TVA could not foresee the result of this review at the time they were buying compliance coal, we believe shorter duration contracts could have provided more flexibility. If the standards are relaxed, TVA will be buying high priced coal to meet lower standards. If the standards are made more stringent, TVA may have to award additional contracts in order to blend with the coal already under contract to meet the new standards.

We do not understand TVA's comment, that in justification for these long contracts, "some suppliers needed longer terms to be able to open new mines and coal washing facilities." In our review, we identified no instances where new mines were opened as a result of acquiring compliance coal.]

APPENDIX I

East/West Coal

GAO's treatment of TVA's purchase of eastern coal instead of western coal for the Shawnee Steam Plant displays a serious misunderstanding of the reasons behind that decision and of the complex economics of operating a large power system. The report implies that TVA's only real reason for purchasing eastern coal was to contribute to the economic development of the Tennessee Valley, and that TVA disregarded an internal report and fabricated flimsy excuses to justify the decision. This is not the case.

[GAO Response: We are not implying that TVA "fabricated flimsy excuses to justify the decision" to buy eastern coal for Shawnee. What we are saying is that TVA's own comparative analysis of 20 factors showed that except in a few categories western coal was equal to or superior to eastern coal.]

The purchase of western coal would have had a significant economic impact on TVA's traditional coal supply area, and no apologies are necessary for TVA's consideration of these potential adverse impacts. Congress expressed its concerns about such impacts when, in 1977, it enacted section 125 of the Clean Air Act Amendments authorizing a prohibition against the use of nonlocal or nonregional coal upon a finding by the governor of any State, the Administrator of EPA, or the President that such an action was necessary to prevent or minimize significant local or regional economic disruption or unemployment. The statement on page 22 of the GAO report that section 125 "tended to favor the use of local supplies" is a gross understatement since the provision actually allows the prohibition of nonlocal or nonregional coal and can require utilities to enter into contracts of at least ten years' duration for supplies of locally or regionally available coal.

The GAO report discounts the effect of section 125 by stating that there were no objections to TVA's use of western coal. The statement is not true. During settlement discussions in the Clean Air Act citizens' suits brought in June 1977, the representative of the Kentucky attorney general's office stated that Kentucky would initiate a section 125 proceeding if TVA insisted on purchasing western coal. Attorneys for both EPA and Kentucky said that they would not agree to any settlement agreement that allowed the use of western coal. A section 125 proceeding could have restricted TVA's purchase of coal for Shawnee to the locality where the plant is located which, due to the local unavailability of low-sulfur coal, would have made the installation of very expensive scrubbers unavoidable. Even if the proceeding had left TVA free to purchase coal anywhere in the United States, the requirement that the contracts be of a minimum duration of ten years would have significantly decreased TVA's bargaining flexibility. Accordingly, section 125 was a very important factor in the decision not to purchase western coal.

[GAO Response: GAO was aware that representatives of the State of Kentucky and EPA had made statements that they were opposed to the purchase of western coal. We reviewed TVA records which indicated the parties informed TVA that they might initiate a section 125 proceeding. But, we were unaware that because of these statements, section 125 became a very important factor in TVA's decision not to purchase western coal.

We do not believe that these officials' statements were a sufficient basis for making section 125 a very important factor in TVA's decision for several reasons. First, under section 125, State and EPA

officials are not delegated responsibility for initiating a section 125 proceeding. Only the President, a State governor, or the Administrator of EPA may start such a proceeding. Neither one of these persons objected to the purchase of western coal. Second, section 125 establishes a complicated procedure to arrive at a decision to prohibit non-regional and non-local coal. A hearing is required; the President and the State Governor, in effect, have to agree; and they must consider the cost to the consumer before issuing an order prohibiting the use of non-regional or non-local coal.

We do not understand TVA's statement that "Even if the proceeding had left TVA free to purchase coal anywhere in the United States, the requirement that the contracts be of a minimum duration of 10 years would have significantly decreased TVA's bargaining flexibility." The correct interpretation of section 125 is that if a utility is forced to buy local or regional coal the contracts must be for 10-years or longer. TVA's statement is contradictory to a statement in the preceding paragraph of TVA's comments which states the provision "can require utilities to enter into contracts of at least 10 years' duration for supplies of locally or regionally available coal."]

Nor did TVA "disregard" the results of the internal study on the economics of using western coal. *That study, which concluded that the annual cost of* eastern low-sulfur coal at Shawnee would exceed the cost of western coal by $31 to $36 million, was based on the assumption that the 300 MW derating of Shawnee caused by the use of western coal could be made up by other coal-fired or nuclear generating capacity within the TVA system. During hours of peak demand, however, this would not have been possible during the next three to five years. Rather, the lost generating capability at Shawnee due to the use of western coal would have had to be replaced by operating higher cost oil-fired turbines or by purchasing power from neighboring utilities, if available. The cost of providing this higher cost replacement power would eliminate the savings from burning western low-sulfur coal at Shawnee. The GAO report's discussion of "economic" derating misses the point since, by using eastern coal, the extra 300 MW of generating capacity is available and has in fact been used to reduce TVA's costs during periods of peak demand.

[GAO Response: TVA contends a 300 MW derating of Shawnee generating capacity would have required operating higher cost operating oil-fired turbines or purchase of high priced electricity from neighboring utilities during peak periods which would eliminate the savings of buying western low sulfur coal. This contention is not supported by a study or other evidence and cannot be substantiated for several reasons.

First, TVA had an offer of 1 million tons per year of western coal comparable in quality to the eastern coal actually bought.

Second, annual statistics on coal burned at Shawnee show that the plant was in fact economically derated by about 29 percent by using eastern coal.

Third, the TVA study of using eastern versus western coal included a derating of $11 million for western coal.

Fourth, we do not question that on some occassions TVA used Shawnee for peaking; however, we do question TVA's decision to buy the higher priced eastern coal in the absence of a study or other convincing evidence that peaking power from other sources would be more costly.]

Shawnee and Western Coal

GAO's assertion that TVA did not consider a different western source that could have saved a total of $133.3 million is misleading. The total cost of coal at Shawnee in fiscal year 1980 was $144.7 million. For TVA to have been able to save $133.3 million, it would have had to purchase the entire coal requirement for Shawnee at a delivered price of about $4 per ton, which is absurd. On the other hand, if GAO is referring to a $133.3 million saving over some period o years, this should be made clear since the TVA figures in the preceding sentence, to which GAO is inviting comparison, are annual figures.

[GAO Response: The $133.3 million savings was calculated over the life of the proposed contract and as the report points out TVA "could have saved a total of $133.3 million." (underscoring added) we, nevertheless, changed the sentence to reflect this was over the life of the proposed contract.]

GAO's claim that the qualitative comparisons performed in the TVA study all favored western coal or showed no adverse economic impact on the Valley is also untrue or misleading. The study clearly shows that considerations of plant derating, use of fuel oil for transportation of coal, disturbance of land surface area, and effects on ground water all favored the use of eastern coal.

TVA's decision to use eastern coal at Shawnee was based on all available information and not merely the economic study.

In light of all the factors discussed above, TVA's decision to use eastern coal was the correct one.

[GAO Response: According to TVA's study, eight factors showed western coal superior, four factors showed eastern coal superior, and eight factors were equal. Therefore, we have changed the report to show that almost all of the 20 factors in TVA's study showed western coal was equal or superior to eastern coal.]

Small Coal Operators Program

GAO's criticism of TVA's small coal operators assistance program is based in large measure on a limited understanding of a small independent coal operator. While the definition mentioned by GAO (a producer selling less than 200,000 tons of coal in the previous calendar year, employing less than 50 persons, and geographically capable of supplying TVA's coal-fired steam plants) is used by TVA for some aspects of the program, TVA does not limit the program to gets to these very small companies. In considering the nature and geography of coal mining and the makeup of coal producers in areas likely to submit bids on a particular invitation, TVA also recognizes the small, independent operators needing such assistance to remain competitive. For some purposes, TVA uses the Small Business Administration's definition of a small business concern.

GAO's implication that TVA's invitation for Requisition 54 was designed to exclude small suppliers is erroneous. That invitation allowed small, independent suppliers (using the SBA definition) to offer smaller quantities of coal and to submit bids "subject to financing." This would allow these operators to obtain financing, based on TVA's contract commitment, in order to increase their production to meet 1983 delivery requirements. The invitation also permitted small operators to receive accelerated payments for coal.

By persisting in its assumption of the 200,000-ton, 50-employee definition, which is unique to TVA, GAO concluded that TVA had purchased very small tonnages from small, independent businesses. In fact, from 1970 to 1979, TVA purchased 221 million tons--62 percent of the 355 million tons purchased during this period--from independent operators defined by the SBA as small business concerns.

The TVA small coal operators assistance program is an innovative step taken by TVA on its own initiative and is designed to preserve and strengthen small, independent operators in the TVA service area so that low fuel costs through increased competition will result. To achieve this TVA has set aside solely for small, independent operators portions of its term coal contracts for each plant for which coal was purchased since August 1979. In asserting that not all of the term coal set-asides planned for the Kingston and John Sevier plants have been implemented, GAO ignored the fact that no new coal contracts have been awarded for these two plants since August 1979, and 17 of the 23 contracts currently supplying these plants are already held by small business concerns.

[GAO Response: We would like to point out that TVA's efforts to aid the small coal operator through such a program is a positive step. We stated that SCOAP was too new a program for us to evaluate, but saw indications that the program may have problems. TVA's response affirms our concern. TVA points out that it uses a different definition for small business for different situations. For example, printed material on who is eligible for SCOAP refers to a small business as less than 200,000 tons of coal per year and less than 50 employees. But the TVA order implementing the program leaves the size open-ended. We believe such use of various definitions of who is eligible to participate in the program is an example which may lead to confusion among operators.

TVA states that the SBA definition of a small business concern is also used to define a small coal operator. SBA defines a small business concern as one with less than 500 employees. This may not be an appropriate definition for the following reason. Assume that out of the 500 employees, 250 are actually mining the coal and work 250 days per year. Using 1979 production rates of 1.3 tons per worker per hour, the company could produce about 650,000 tons of coal per year. The "Keystone Coal Manual" categorizes mining operations into nine classes. Production of 650,000 tons per year would classify as a class 5 mine, certainly not a small operation for coal mining. For example, of the 674 companies listed in the 9 classes as producing 100,000 or more tons per year, a company producing 650,000 tons would be ranked in the top 25 percent of the coal producers.]

CHAPTER 3

Breckinridge Coal Reserves

In GAO's analysis of TVA's development of its coal reserves, GAO implies that TVA made the decision to purchase the Breckinridge coal rights on the basis of only three core drills. Although it was pointed out to GAO representatives, the report fails to mention that these samples simply confirmed information (already in TVA's possession) available from drill holes and past mining of adjacent property--information sufficient to appraise the property for acquisition purposes.

GAO also implies that, in paying $209 per acre, TVA spent too much for the reserves. This figure equates to 5 cents per ton of coal for only the No. 9 coal seam. The property also has extensive deposits of Nos. 6 and 11 seams. TVA maintains that the Camp Breckinridge property was a good investment. Similar quality reserves cost several times as much today, with prices rangin from $1,000 to $1,300 per acre.

[GAO Response: The information on TVA's acquisition of the Breckinridge reserves is presented as informational background material. It is not presented to question TVA's judgment in making the decision to purchase.]

While it is true that adverse mining conditions which were unanticipated at Breckinridge did increase production costs, these difficulties are an anomaly and were unpredictable. Given the circumstances faced by TVA at the time it was seeking a coal supply for the Cumberland Steam Plant, there was no feasible alternative to using the Breckinridge reserves. In fact, the development of Breckinridge has been advantageous to TVA's power customers since the cost of coal produced at Breckinridge and delivered to Cumberland has consistently been lower than the system average price TVA has paid for coal.

[GAO Response: TVA agrees that adverse mining conditions occurred, but believes these were unpredictable. We are not convinced of this. TVA's assessment of mining conditions prior to acquisition

of the Breckinridge reserve showed seam number 11 should be mined before number 9. The assessment showed that if seam number 9 was mined first the earth above would fracture making mining of seam number 11 difficult. Yet, TVA contracted to mine seam number 9 first. The mining contractor experienced costly roof deterioration problems which contributed to the low production from seam number 9.]

GAO contends further that TVA awarded a "noncompetitive, negotiated contract" to its Breckinridge mining contractor to build and operate a coal preparation plant. Actually, no new contract was awarded, but the existing contract was supplemented to provide for the construction and operation of the plant. Because of the necessity to coordinate the construction and operation of the preparation plant with the mining contractor's existing activities, the most efficient arrangement was for the mining contractor to perform all of the related work. The report also neglects to mention that Section 9(b) of the TVA Act expressly provides that advertisement is not required when purchasing supplemental equipment or services for supplies or services which were previously furnished or contracted.

[GAO Response: We are making no contention, only pointing out factual information--which TVA agrees with--that a coal preparation plant costing $47 million had to be added at Breckinridge and was transacted through a negotiated noncompetitive contract supplementing the mining contract. The draft report was revised to reflect the cost of the plant and that the contract was a supplement.]

GAO's review of the contract for barge transportation of coal from Breckinridge to Cumberland addresses past and future payments that TVA may have to make for deficiencies in tonnage caused by lower than expected production from the mine. GAO fails to note that TVA chose the least expensive shipping method. The average rate per ton transported in 1981 was the same as it was in 1980--$3.45 per ton including deficiency payments--a significant occurrence at a time when transportation costs are going up 15 percent annually. Moreover, the $3.45 per ton by barge and conveyor is considerably less than TVA currently pays for truck-barge movement to the Cumberland plant from Pyro, Kentucky.

[GAO Response: TVA states they may have to make payments for deficiency tonnage not delivered. We would point out they have already made deficiency payments of $31.3 million. In addition, we acknowledged in our draft report, which TVA reviewed, that the barge contract was the cheaper mode of transportation. The point we are bringing forth in this discussion--which TVA chose not to comment on--is that because of the contract to transport Breckinridge coal the ratepayers have paid $31.3 million thus far in deficiency payments to the barge contractor for coal not delivered because of low production at Breckinridge.]

ENCA Coal Reserves

GAO contends that TVA should use the experience at Breckinridge as a lesson for development of the Ewing-Northern Coal Association (ENCA) properties in southern Illinois. GAO further contends, without any apparent basis, that ENCA coal will cost $44 per ton. GAO additionally states that TVA bought mineral rights to the property "without the right to mine."

TVA believes that conditions at Breckinridge are not comparable with ENCA; that conditions found throughout the southern Illinois fields, where successful operations have been conducted for many years, will be found at ENCA as well. Moreover, TVA's preliminary estimate is that ENCA reserves will cost $35 per delivered ton and not the $44 in GAO's estimate. TVA finds the assertion that it does not have the right to mine the ENCA properties both incomprehensible and irresponsible. The form deed used in acquiring these properties expressly states the TVA has the "right to make and use underground passages or entries through (the described land) . . . for the removal of coal . . ." It also provides that TVA has, insofar as the grantor has the right to grant it, "the right to enter upon the surface of the described lands to mine and remove by any method except strip mining all said coal . . ." In any event, there is no doubt that a mineral owner has the common law right to mine and remove the minerals conveyed to him, even if the conveyance creating the mineral estate were silent on the question of mining. GAO's unexplained statement on this point leads one to assume GAO either did not review the ENCA contract or the deeds or is unfamiliar with acquisition and development of mining properties.

In no event will TVA develop any coal reserves without extensive drilling and mine planning in advance.

[GAO Response: The estimated cost of $44 shown by GAO consists of TVA's preliminary estimate of $25 for production and $9 for transportation, plus a GAO estimate of about $10 a ton for washing, blending, return on capital investment, and profit margin. This breakdown was presented in the draft report reviewed by TVA. Although TVA did not specifically mention the cost with which they would take exception, we assume their objection is with the $10 a ton for washing, blending, etc. We believe the additional $10 is justified in that TVA's investigation report of the ENCA property concluded that the coal must be washed to meet a 4-pound sulfur dioxide emission limit and it is reasonable to expect a return on capital investment.

TVA is correct in pointing out the editing error "without the right to mine." This has been deleted.]

CHAPTER 4

Quality Control Enforcement

TVA agrees that coal sampling facilities at its Kingston Steam Plant need upgrading to detect delivery of inferior quality coal. TVA does not agree, however, that it has failed to enforce aggressively quality control. The GAO report indicates a lack of clear knowledge about TVA's actions relating to alleged layer loading at Kingston Steam Plant and the grand jury investigation conducted by the Department of Justice. GAO mixed the facts and chronology of different settlements and out of this confusion has concluded that TVA should take additional unspecified action to deter the delivery of poor quality coal. The actual facts are as follows.

APPENDIX I

In the fall of 1974, during a period of rapidly increasing coal prices and decreasing stockpiles, Shemco, Inc., refused to deliver coal under its contract. TVA also discovered evidence indicating that Shemco may have layer loaded some coal before deliveries ceased, although Shemco denied it. TVA filed suit against Shemco and its agent seeking an injunction requiring Shemco to perform the contract and damages for layer loading. The lawsuit was settled when the defendants agreed to an injunction requiring delivery of the coal under the contract. TVA released the defendants from civil liability for layer loading as part of the settlement, but the matter was reported to the FBI for possible criminal prosecution if sufficient evidence existed. The settlement was favorable to TVA since it obtained the major result TVA was seeking--an injunction ordering Shemco to deliver coal under the contract.

TVA's investigation of layer loading continued throughout 1975 and included special sampling of coal trucks and clandestine observation and filming of contractors' loading operations. TVA reported its findings to the U.S. Attorney, and on January 28, 1976 suspended deliveries under five Kingston contracts for suspected layer loading. The contractors vehemently denied layer loading, claiming that they were only blending coal of different qualities, as permitted by the contracts, to meet quality guarantees. TVA later allowed deliveries under the contracts to resume, but expressly reserved its claims of damages due to the alleged layer loading and notified the contractors that the contracts would terminate if the contractors were convicted for defrauding TVA by layer loading.

Meanwhile, a Federal grand jury was convened by the U.S. Attorney to investigate the charges of layer loading. During the grand jury investigation, TVA witnesses testified and made available to the U.S. Attorney all evidence collected by TVA. The grand jury failed to return a true bill of indictment against anyone. Contrary to the obvious and unfair implication on page 45 of the GAO report, the grand jury's failure to indict did not in any way result from TVA's settlements with its contractors. As a matter of fact, the settlement with Shemco was reached before the grand jury was even convened, and the settlements with the other suppliers were not reached until long after the grand jury investigation had terminated.

TVA would have been unlikely to succeed in a contractual action terminating the contracts for layer loading in light of the grand jury's failure to indict after considering all the available evidence. Nevertheless, TVA continued to press its claims for damages in the amount of $851,983. These claims were later settled in a package settlement which also settled contractors' claims against TVA totaling $6.8 million for increased reclamation costs and gross inequities. The ultimate settlement took TVA's claims into account, and we believe the settlement was favorable to TVA.

Since it was never proved that the contractors had practiced layer loading and, in fact, the Federal grand jury had failed to indict anyone, there was no legal basis to debar the suppliers or to refuse to enter into future contracts with them when they were the low bidders or offerors. To reject their lower bids or offers would cost TVA additional money and would not have been supported by the evidence.

Kingston Coal Sampling

TVA periodically takes special samples of coal at Kingston to detect any occurrence of layer loading. The Agency has investigated several reports of layer loading received from the public. Special samples collected at Kingston

in 1980 under this program have again raised suspicions of layer loading by several contractors. TVA is presently collecting additional samples in order to ensure that sufficient evidence exists to prove layer loading and justify contractual actions. TVA has also reported these latest incidents to the U.S. Attorney. TVA is concerned that GAO's public disclosure of this matter may have hampered TVA's ability to collect evidence necessary to prove layer loading.

The only long-term solution to ensure that TVA is not receiving layer loaded coal at Kingston is the installation of a sampling system which takes a representative sample of the entire truckload regardless of how the truck is loaded. TVA has issued an invitation to bid for such a system for Kingston. The bids are being evaluated.

In addition to actions taken at Kingston, several Widows Creek contracts have been terminated for layer loading. After TVA reported these incidents to the U.S. Attorney, a grand jury in the northern district of Alabama indicted the contractors. One conviction has resulted from these incidents.

[GAO Response: We are pleased to see that TVA recognizes Kingston truck sampling facilities need upgrading and just recently issued an invitation to bid to upgrade the facilities. We cannot understand, however, why TVA disagrees that it has failed to enforce quality control since it has known this to be a problem for many years and, as they indicate, are only now moving to obtain equipment.

The report presents in summary fashion the events TVA describes in detail. We would like to point out that these details have been highly publicized. In fact, the details described by TVA in its response demonstrates the degree to which TVA has been aware of problems at Kingston, yet it has moved slowly in getting the equipment that could provide tighter controls. We have revised the report to make clear that the out-of-court settlement of the layer-loading investigation was separate from the convening of the Grand Jury.]

With respect to the GAO assertion that TVA "has weak internal controls" over quality assurance for coal deliveries to the Cumberland Steam Plant, GAO quotes from a 1977 memorandum from the Cumberland Steam Plant superintendent and an October 1980 visit with "plant personnel" to support this contention.

TVA does not agree that its quality assurance controls for Breckinridge coals are inadequate. The report fails to mention TVA's internal checks of Breckinridge coal quality. Coal samples are collected by the contractor by use of automatic sampling machinery and are then forwarded to Cumberland Steam Plant for analyses. The results of the TVA lab analyses are used for contract quality enforcement purposes. TVA personnel regularly inspect sampling procedures at Breckinridge. As a check of the samples obtained from the coal contractor, TVA samples practically every barge of coal received from the Breckinridge complex at the Cumberland Steam Plant, and the average analyses of these samples as indicated on the accompanying chart are virtually identical in coal quality to samples obtained from the contractor at the mine. Thus, TVA's checks on coal quality are sufficient to protect its interest at Breckinridge. Coal monitoring continues to improve at Breckinridge and receiving powerplants. This data is far more reliable than a four-year-old memorandum and unofficial comments from "plant personnel."

APPENDIX I

1980 ANALYSIS OF COAL QUALITY
BY CONTRACTOR AT MINE AND BY TVA AT CUMBERLAND

	Moisture	Ash	Sulfur (Dry)	Dry Btu	AMF Btu
First Quarter					
Breckinridge	9.7	16.5	4.0	11,986	14,354
Cumberland	10.1	16.6	4.0	11,960	14,340
Second Quarter					
Breckinridge	9.5	17.5	4.3	11,765	14,261
Cumberland	10.2	17.7	4.0	11,753	14,281
Third Quarter*					
Breckinridge	10.1	15.8	4.2	11,991	14,241
Cumberland	10.6	17.0	4.1	11,839	14,264

*The differences reflected during the third quarter are due to very little mine production and the Cumberland samples reflecting the analysis of coal which occurred during the depletion of the Uniontown stockpile.

[GAO Response: We recognize, as TVA points out, that the coal analyses at Breckinridge and Cumberland on a quarterly basis are similar. TVA stated that it regularly inspects contractor sampling procedures at the Breckinridge mine. This is contrary to what we were told by TVA personnel. We were told that the visits to the mine were only to calibrate scales on the conveyor belt. This was confirmed by the individual who made the visits to the mine and by contractor officials at the mine.

The point that needs to be made is that TVA may be missing an opportunity to assess penalty payments by not closely monitoring Breckinridge coal samples. The contract allowing for mining of seam number 9 provides for penalty payments for poorer quality coal than contracted for. TVA is relying on a blend of both seams number 9 and 11 for comparison between mine and steam plant. Given the problems noted, damaged samples and equipment out of service, TVA needs to closely monitor Breckinridge coal samples, especially seam number 9 to make sure it does not miss an opportunity to assess penalties.]

CHAPTER 5

TVA agrees that its price adjustment formula, based on the variation of ash and sulfur content and the Btu value of coal, needs modification. GAO implies that TVA's price adjustment formula caused a decline in the quality of coal delivered. In fact, this is not the case. TVA rejects GAO's proposed price adjustment formula and believes that coal prices would have been higher had GAO's proposed adjustment formula been imposed. TVA believes that it might have run out of coal with a more stringent formula since suppliers would have been able to sell their coal elsewhere under contract provisions giving them a higher price for the same coal.

[GAO Response: We are pleased that TVA now agrees with us that its price adjustment formula needs modification. TVA did not, however, indicate that it has taken or will take any action to develop an alternate formula. Instead, TVA offers comments to discredit an alternate formula offered by us for its consideration.

As we state in the report, it is not our position that TVA must adopt the alternate formula proposed by us. Instead, we used this alternate formula to demonstrate the impacts of different formulas and the belief that TVA should develop and adopt a price adjustment methodology that penalizes, or rewards, suppliers for delivery of different quality coal than specified commensurate with TVA's costs, or benefits, from using the coal.]

CHAPTER 6

GAO's assertion that inflexible delivery schedules produce excessive inventories is inaccurate. As one of the largest coal purchasers in the Nation, with requirements of 35 million tons per year, TVA could not possibly fulfill its needs with spot purchases. Yet this is essentially what GAO advocates. Should TVA follow this course, the Agency would be subject to drastic fluctuations of both prices and availability. Its long-term coal contracts provide financial stability and reliability system-wide. The coal producer also relies on long-term contracts to maintain financial stability.

Nevertheless, TVA's long-term contracts provide for shifting deliveries among plants, utilization of cutback rights on coal deliveries, and renegotiation rights which can produce termination of contracts or reduce coal deliveries. In addition, TVA can shift generation (which is coal burn) from one plant to another through system dispatch, thereby adjusting inventories at a particular plant as required.

Coal Strike Planning

GAO's assertion that TVA's inventory is excessive ignores data previously made available which explained that the present inventory levels did not occur because of "long-term inflexible contracts." Even if TVA had not received the coal contracted for, it would have purchased additional coal to build inventory in excess of the 60-day full-burn target level for additional inventory protection in anticipation of the United Mine Workers coal strike.

TVA's 60-day target level inventory at full burn is equal to a 90-day supply at expected burn. As noted in the attached chart, the cycle of TVA inventory in anticipation of a strike is to protect against depletion of this fuel source. During the last strike, which lasted 111 days, even with prudent inventory management, one of TVA's plants was within six days of exhausting its supply. TVA, as of May 11, 1981, had 135 days of supply. While this was slightly more than utilities in the region, TVA's system requires more generation from its coal plants due to the drought-caused reduced output from hydro units. Moreover, any further reduction in TVA's nuclear or hydro generation would result in an increase in coal burn.

GAO commented that carrying charges for excess inventory in fiscal year 1980 resulted in additional costs of $16.8 million. In fact, this coal in inventory has appreciated in value more than the carrying costs.

[GAO Response: We recognized in our draft report to TVA that some increase in inventories because of strike possibilities may be appropriate. We also recognized that one of the factors TVA considered in establishing target inventory levels is a coal strike. Throughout our review, however, TVA offered various reasons for its excessive inventories, none of which were in anticipation of a strike. Only recently did TVA officials indicate anticipation of a strike as a reason for inventory buildup. We take exception to this and believe it demonstrates the need for TVA to have a long range strategic plan for buying coal. TVA's attached chart shows that coal inventories in 1974 were dropping for the 6 months preceeding a miner's strike. Yet in late 1979, over a year before a potential miner's strike, TVA had inventories in excess of target.

We would also like to point out that as of June 1, 1981, a week before the end of one of the largest coal strikes in history, TVA had coal inventories in excess of 11 million tons. This translates into about a 120 day supply at expected burn levels. We believe this further demonstrates the need for developing and following a strategic plan for buying coal.

Further, at no point in the draft report do we indicate that TVA should fulfill its coal needs through spot purchases. All we are saying is that TVA has a goal to purchase at least 75 percent of its coal needs through term contracts, but has been getting over 90 percent from term contracts. We believe TVA could obtain the flexibility to match

coal deliveries with burn requirements through a greater use of spot purchases, along with other changes, such as including options in all term contracts to cut back on deliveries when needs are reduced. In short, we are saying that TVA's coal purchasing program can be more balanced and well thought out.]

Stockpile Measurement

With regard to the GAO comment that TVA stockpile densities are understated, this is an area where TVA is leading the utility industry by using nuclear source detection. GAO has chosen to criticize TVA for not immediately applying the initial results of this new measurement method which TVA believes are still inconclusive. The nuclear source detection measurements made during 1980 showed higher densities at some stations, lower densities at others, and approximately the same densities at still others compared to the densities presently being used to calculate the coal in inventory. Additional nuclear source detection measurements have been scheduled for the summer of 1981 and, if they confirm the measurements made in 1980, will be utilized to establish new official density values.

[GAO Response: We are pleased TVA will be establishing new official density levels after measurements are taken in the summer of 1981.]

GAO commented that stockpiled coal has deteriorated and that approximately one-third of the Btu value of the Paradise coal inventory may be irretrievably lost. Stockpiling coal results in very little deterioration of heating value. If the coal is properly compacted (which it is at TVA plants), loss of heat content is negligible. Furthermore, of the 14 coal piles at TVA's 12 generating plants, 10 have been completely depleted and fresh piles of compliance coal stockpiled during the past 3 years. Of the remaining four plants, all were drawn down to a near zero stockpile during the 1978 coal strike or are scheduled to be turned over during the next year as part of the air compliance program. Thus, there has been little opportunity for deterioration and TVA does not plan to make the tests to measure the possible deterioration at TVA plants suggested by GAO.

With regard to the Paradise plant, the heating value of the coal has not deteriorated to a significant degree. The coal has become oxidized (as will any coal within approximately six weeks of mining). Thus, if the coal is washed in the coal preparation plant at Paradise, the recovery of heating value from washing the coal could be low. Since Paradise is the only plant on the TVA system where coal is washed at the plant, this is a problem unique to Paradise. TVA has begun a program to attempt to burn a large portion (if not all) of this stockpiled coal in the Paradise units without washing in order to avoid a high loss rate in washing the coal. The program has been successful to date. GAO indicated TVA had 3.3 million tons of coal which would be subjected to high loss of heat content. Through the program discussed above, TVA has reduced the inventory of dead storage coal from 3.3 to 2.4 million tons. Thus, nearly one-third of the coal has been burned without washing and with no loss in heating value. TVA expects to continue with this same program to avoid washing any of the coal in dead storage at Paradise Steam Plant.

[GAO Response: we would agree that stockpiling coal results in very little loss of heating value if the coal is properly compacted. TVA asserts that its stockpiled coal is properly compacted at all plants. we can neither confirm nor deny this. However, a January 14, 1981, report to TVA from DOE's Pittsburgh Mining Technology Center pointed out that oxidation at the Paradise plant was greatest at the surface of the pile and at the 40-60 foot depth. This would indicate the Paradise stockpile is not properly compacted since there is oxidation at the bottom of it (the stockpile is 60 feet in height). Without similar type tests, TVA cannot assure itself that its other stockpiles are adequately compacted.

TVA asserts that its stockpiles have been significantly depleted and replaced with fresh coal. This implies that TVA has a policy to rotate its coal inventories when this, in fact, is not the case. TVA has no policy to rotate its coal inventories. In fact, data we were able to gather shows that in March 1978, TVA's coal inventory system-wide was about 6.4 million tons. Of the twelve steam plants, only four had inventories under 200,000 tons.]

CHAPTER 7

GAO's recommendations to the Chairman are, for the most part, proposals that the Agency do things it is already doing. Specifically, TVA has always evaluated contract reopener provisions against the availablility of comparable coal in the open market. If better prices cannot be negotiated, then the contract is terminated. With respect to purchasing coal from western sources, TVA will continue to be flexible, and will only enter into purchase agreements that are the most beneficial to the rate-paying public.

TVA believes that the small coal operators assistance program is already a success and intends to continue its present support of relationships with small operators.

TVA has exercised caution in the development of its ENCA reserves, as GAO recommends, and will continue to do so.

Another superfluous recommendation involves including provisions in term contracts for cutbacks in delivery when needs are reduced. This, too, is already done to the extent practicable.

TVA disagrees with the GAO recommendation that the Agency increase its use of spot purchasing. Spot purchases can never fulfill TVA's needs. The spot coal market is one tool among many in TVA's management of the coal procurement program. It is used when TVA needs the coal and spot prices are attractive. To predetermine a specific precentage of spot coal purchases at all steam plants, as GAO implies TVA should do, would impose inflexibility on the spot coal program, thereby frustrating the principal value of spot purchases. It would also likely result in higher coal costs.

APPENDIX I

[GAO Response: TVA only chose to comment on a few of our recommmendation and, thus, we do not know their position on the others. Overall, we generally do not believe TVA was responsive to our recommendations. For example, TVA says including provisions in contracts for cutback in delivery is already done to the extent practicable. We have already pointed out this provision applied to less than half of the contracts in effect as of September 30, 1980. For those that had the cutback provision, TVA seldom used it. Also, we pointed out in the report that TVA does not have a long-range strategic plan for buying coal and, in fact, many of our other recommendations flow from the one that TVA develop a plan. We disagree that TVA is doing the things it says it is, therefore, negating the need for the recommendations.

Specifically:

--In only a few cases over the 10-year period considered by our study has TVA negotiated lower prices on coal contracts when it could exercise the reopener provision. Therefore, we believe TVA should renegotiate contracts as soon as possible that were entered during unfavorable conditions and seek lower prices or cancellation.

--We are delighted that TVA will be flexible with respect to buying coal from all sources that are beneficial to the ratepayers. As our report points out, a TVA study shows it could have saved from $31-$36 million annually in 1978 dollars by buying western coal for Shawnee.

--The small coal operators' assistance program has not been successful, in our opinion. TVA needs to firm up its definition of who is eligible for the program in order to alleviate confusion among the small operators.

--TVA's comments concerning development of the ENCA reserve do not specify exactly how they are being cautious in the development of ENCA with regard to the problems TVA encountered in developing the Breckinridge reserves. We continue to believe TVA needs to exercise caution in developing ENCA reserves.

--TVA misinterpreted our recommendation concerning spot purchases. We never recommended as TVA asserts that its coal needs be fulfilled by spot purchases. Our recommendation is

APPENDIX I

that TVA not enter into term contracts for full powerplant needs but leave some specified margin for the spot market in order to match coal supplies with power system needs.

--While TVA agreed that its price adjustment formula needs modification, TVA did not indicate it has or will take action to develop an alternate formula. Accordingly, we recommend TVA develop a formula which more closely matches power system costs to coal quality and implement it in all future coal purchases as soon as possible.]

TVA Steam Plants

Steamplant and unit		When built	Kilowatt generating capacity (nameplate)	Btu - as received		Ash		Sulfur	
				Design	Minimum	Design	Maximum	Design	Minimum (note a)
Allen	1-3	5-22-59	990000	10,750	10,700	11.0	15.0	3.5	1.8
Bull Run	1	6-12-67	950000	11,910	11,000	14.0	17.0	3.0	3.0
Colbert	1-4	1-18-55	846500	11,530	10,800	14.0	18.0	3.5	2.8
	5	11-07-65	550000	11,200		16.25		4.34	0.8
Cumberland	1,2	3-01-73	2600000	11,200	10,500	16.25	22.0	4.34	2.8
Gallatin	1,2	11-08-56	1255200	11,160	10,800	14.0	18.0	3.5 b/	3.5
	3,4	8-09-59		11,530		14.0		3.5 b/	3.5
Johnsonville	1-6	10-27-51	794000	11,160	10,800	14.0	18.0	3.5	1.1
	7-10	2-22-53	691200	11,530		14.0		3.5	2.0
		8-20-58							
		11-30-58							
John Sevier	1-4	7-12-55	846500	11,530	10,800	14.0	18.0	3.5	1.1
		10-31-57							
Kingston			1700000	11,530		14.0		3.5 b/	0.9
West Kentucky	1-4			12,220	10,800	14.0	20.0	2.2 b/	0.9
Tennessee	1-4	12-07-55		11,530		14.0		3.5 b/	0.9
	5-9								
Paradise	1,2	11-01-63	2558200	9,830	10,000	21.0	21.0	5.0	3.3
	3	2-27-70		10,870		17.5	17.5	4.5	3.3
Shawnee	1-10	4-09-53	1750000	11,530	10,800	14.0	17.0	3.5	2.5
		6-17-57							
Watts Bar	1-4	2-15-42	240000	11,000	---	15.0		---	2.3
		4-08-45							
Widows Creek			852975	11,530					
West Kentucky	1-6	7-01-52		12,220		14.0		3.5 b/	0.9
Tennessee	1-6			11,600	10,800	14.0	18.0	2.2	0.9
	7	2-01-61		11,530		14.0		3.5	3.0
	8	2-07-65	1125010			17.0		5.0 c/	3.0

a/Minimum sulfur required to meet particulate emission standards.
b/With new precipitators under construction.
c/Will not meet emission standards. Minimum sulfur is for optimum precipitator efficiency.

APPENDIX II

PRICE ADJUSTMENT CALCULATION USING TVA FORMULA AND ALTERNATIVE FORMULA

TVA's current price adjustment formula

Using TVA's current price adjustment formula, the price adjustment for coal actually furnished would be as follows.

Assume a delivered cost of $20.98 a ton and a guaranteed analysis of 11.6 percent total moisture, 12.4 percent ash (dry basis), 2.8 percent sulfur (dry basis), and 11,000 Btu/lb (as received). The evaluated delivered cost per million Btu would be calculated as follows.

$$\frac{2098 \text{ cents/ton} \times 1{,}000{,}000}{11{,}000 \text{ Btu/lb} \times 2{,}000 \text{ lb/ton}} = 95.36 \text{ cents/million Btu, apparent cost}$$

Adjustment for ash and sulfur:

$$0.1[(12.4 + 2.8) - 5] = 1.02 \text{ cents/million Btu}$$

Evaluated delivered cost/million Btu 96.38 cents/million Btu

Assume the coal actually furnished had the following characteristics:

Moisture (total)	11.1 percent
Ash (dry basis)	14.5 percent
Sulfur (dry basis)	2.8 percent
Btu/lb. (as received)	11,120

The quality adjustment would be calculated as follows:

Evaluated delivered cost/ million Btu as bid	96.38 cents/million Btu
Less adjustment for ash and sulfur content of coal received - $0.1[(14.5 + 2.8) - 5]$	1.23 cents/million Btu
Apparent delivered cost/million Btu	95.15 cents/million Btu

$$95.15 \text{ /M Btu} \times \frac{11{,}120 \text{ Btu/lb} \times 2{,}000 \text{ lb/ton}}{1{,}000{,}000 \times 100} = \$21.26$$

Alternative price adjustment formula

Using the alternative price adjustment formula, the price adjustment for coal actually delivered would be as follows. For comparison purposes we have used the same assumptions both TVA's formula and the alternative formula.

Assume a delivered cost of $20.98 per ton, a guaranteed analysis of 11.6 percent total moisture, 12.4 percent ash (dry basis), 2.8 percent sulfur (dry basis), and 11,000 Btu/lb. (as received). (The same data used in the prior example.)

The evaluated delivered cost per million Btu would be calculated as follows:

$\frac{2098 \text{ cents/ton} \times 1{,}000{,}000}{11{,}000 \text{ Btu/lb.} \times 2{,}000 \text{ lb. ton}}$	95.36 cents/million Btu, apparent cost
Adjustment for ash and sulfur 1/:	
$\frac{87 \text{ cents/ton} \times 1{,}000{,}000}{11{,}000 \text{ Btu/lb.} \times 2{,}000 \text{ lb. ton}}$	3.95 cents/million Btu
Evaluated delivered cost/million Btu	99.31 cents/million Btu

Assume the coal actually furnished has the following characteristics (same data as in prior example).

Moisture (total)	11.1 percent
Ash (dry basis)	14.5 percent
Sulfur (dry basis)	2.8 percent
Btu/lb. (as received)	11,120

The quality adjustment would be calculated as follows:

Evaluated delivered cost/million Btu as bid	99.31 cents/million Btu
Less adjustment for ash and sulfur 1/ contents of coal received	

1/The amounts for ash and sulfur adjustments are from figure 2.

$\frac{207 \text{ cents/ton} \times 1{,}000{,}000}{11{,}000 \text{ Btu/lb.} \times 2{,}000 \text{ lb/ton}}$	9.41 cents/million Btu
Apparent delivered cost/million Btu	89.90 cents/million Btu

Adjusted delivered cost/ton (ash plus sulfur:

$$\frac{89.9 \text{ cents/M Btu} \times 11{,}000 \text{ Btu/lb.} \times 2{,}000 \text{ lb./ton}}{1{,}000{,}000 \times 100} \quad \$19.78$$

Adjusted delivered cost/ton (Btu):

$$\frac{95.36 \text{ cents/M Btu} \times (11{,}120 - 11{,}000 \text{ Btu/lb.} \times 2{,}000 \text{ lb/ton}}{1{,}000{,}000 \times 100}$$

	.23
Adjusted price a ton	$20.01
Less delivered cost a ton	20.98
Total adjustment for quality a ton	-$ .97/ton

COMPARISON OF TVA'S COAL COSTS WITH UTILITIES IN THE EASTERN COAL BUYING AREA

	1979				1978				1977				1976			
	TONS	BTU	SUL/ASH	PRICE	TONS	BTU	SUL/ASH	PRICE	TONS	BTU	SUL/ASH	PRICE	TONS	BTU	SUL/ASH	PRICE
KENTUCKY PWR	02132	11339	14.69	27.50	02436	11343	14.59	25.11	02909	11562	14.16	21.87	02420	11556	14.12	18.17
S. CAROLINA	03041	12610	11.08	37.25	03695	12349	12.76	32.87	03689	12249	12.90	29.91	03008	12445	11.69	25.51
ELEC ENERGY	03084	11577	12.08	31.17	02570	11498	13.16	29.70	02977	11459	13.46	24.30	03145	11520	12.58	22.13
OHIO VALLEY	03159	11188	18.03	23.71	02955	10985	18.94	19.11	03519	10793	19.43	14.77	03183	11107	19.28	14.20
IND & MICH	03406	11376	13.66	33.30	02589	10900	15.31	26.29	03262	10911	16.75	15.49	02931	11020	16.09	13.60
IND-KENT	03842	10954	17.15	21.12	03642	10434	17.41	21.17	03834	10750	17.81	16.02	04226	10861	15.87	13.39
LOUISVILLE	03957	10946	16.96	23.40	04413	10713	18.63	20.86	02951	10943	17.82	16.95	03439	10989	17.63	14.07
SO IND G&E	04007	11004	13.92	22.74	03524	10769	14.84	20.44	03550	10883	14.13	14.79	03027	10766	13.98	11.22
COLUMBUS	04130	11064	18.31	23.86	04303	11021	18.69	23.65	04300	10941	19.06	19.21	03314	10865	19.92	18.99
KENTUCKY UT	04271	11727	13.20	29.89	03991	11527	14.28	29.04	04093	11390	14.53	23.48	03825	11305	14.50	16.67
VIRGINIA	04834	11872	16.79	33.57	04149	11651	17.73	30.15	05331	11763	16.65	25.27	05740	11761	16.34	22.55
N. INDIANA	05345	10881	12.53	33.95	04751	10721	12.97	30.18	04927	10581	13.36	22.39	03816	10584	14.40	17.28
CINCINNATI	05486	11141	17.64	27.68	05130	11046	18.32	26.29	04440	10768	20.07	20.25	04439	10961	18.86	19.41
INDIANAPOLIS	05510	10939	12.48	21.86	04646	10895	13.22	22.10	05099	10910	12.53	15.99	04528	10905	12.81	14.24
CLEVELAND	06550	12040	14.48	34.91	05524	11808	15.68	30.64	08027	11630	16.86	26.34	08101	11706	16.37	24.00
OHIO EDISON	07106	12057	14.47	30.01	06327	11521	17.30	26.16	07370	11290	18.41	21.18	07761	11355	17.78	20.46
CAROLINA	07317	12280	12.56	34.29	06139	12084	14.06	31.27	07751	11956	13.96	28.37	07064	12209	12.93	25.08
DAYTON	07321	11360	15.94	31.40	05460	11113	16.89	28.65	07212	10971	18.26	23.91	06375	11018	18.71	21.58
ILLINOIS PWR	07689	10845	13.05	27.56	07235	10737	13.52	25.48	06481	10668	13.75	20.42	07329	10727	13.88	15.69
OHIO POWER	09074	11316	20.58	24.85	07584	11120	20.80	24.15	09771	10974	21.53	19.82	09197	10952	21.79	17.18
APP POWER	10681	11630	15.19	35.34	09951	11627	15.99	31.33	10185	11601	16.41	27.92	09982	11699	16.17	23.89
ALA POWER	11600	11998	14.49	35.34	11107	11967	14.64	32.31	12670	11727	15.30	26.44	10786	11782	15.38	22.41
PS OF INDIANA	12321	10679	14.03	22.31	09139	10697	15.12	22.76	09607	10830	13.87	16.71	08728	10795	14.03	14.46
UNION ELEC	12341	10999	11.33	24.66	11739	10918	11.46	23.84	12190	11175	12.62	17.75	11998	11171	13.15	14.67
DETROIT EDI	13994	11937	11.29	34.24	11887	11505	11.84	28.20	13231	11799	12.65	24.82	12322	11813	12.96	23.24
DUKE PWR	14794	12130	13.10	35.90	13864	11998	14.05	34.17	15377	11920	14.21	30.26	13207	11949	14.89	27.21
GA POWER	16884	11872	12.50	32.66	16860	11872	13.05	29.64	18093	11855	13.10	26.02	14603	11883	12.92	23.19
TENN VALLEY	41336	11444	16.12	30.44	35056	11191	17.61	26.27	35867	10994	19.07	21.47	38852	11069	18.72	19.44

APPENDIX IV

APPENDIX V

Comparison of Prices Paid For Spot Purchased Coal-
Advertised and Negotiated Contracts-1977 and 1978

	Advertised			Negotiated (Req. no. 42)		
Period	Tons	Price-weighted Avg.	Total Cost weighted	Tons	Price-weighted Av	Total Cost weighted
1977						
Jan.-Mar.	893,540	$19.00	$ 16,977,260	160,000	$22.25	$3,560,000
Apr.-Jun.	572,950	19.68	11,275,656	352,000	23.61	8,310,720
Jul.-Sept.	307,050	22.38	6,771,779	382,200	27.43	10,483,746
Oct.-Dec.	538,425	25.85	13,918,286.25	682,850	27.84	19,010,544
1978						
Jan.-Mar.	1,320,860	$32.41	$42,809,072.60	2,168,000	$28.72	$62,264,960
Apr.-Jun.	2,422,300	29.33	71,046,059	675,050	33.86	22,317,153
Jul.-Sept.	2,023,445	29.99	60,683,115.55	870,000	38.40	33,408,000
Oct.-Dec.	2,064,200	27.77	57,322,834	-	-	-
Grand Total	10,142,770	$27.69	$280,904,062.40	5,290,100	$30.12	$159,355,123

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