LBL-22501 c.2

Lawrence Berkeley Laboratory

UNIVERSITY OF CALIFORNIA

RECEIVED
LAWRENCE
BERKELEY LABORATORY

MAR 30 1987

LIBRARY AND
DOCUMENTS SECTION

APPLIED SCIENCE DIVISION

ASSESSMENT OF NEGOTIATION OPTIONS FOR COAL-LEASE SALES

M.H. Rothkopf and C.B. McGuire

October 1986

TWO-WEEK LOAN COPY

This is a Library Circulating Copy
which may be borrowed for two weeks.

APPLIED SCIENCE
DIVISION

LBL-22501 c.2

Prepared for the U.S. Department of Energy under Contract DE-AC03-76SF00098

DISCLAIMER

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor the Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or the Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or the Regents of the University of California.

LBL-22501

Assessment of Negotiation Options for Coal-Lease Sales

Michael H. Rothkopf and C. Bart McGuire
Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720

October 1986

This work was supported by the U.S. Department of Interior, Bureau of Land Management, under contracts with Dames and Moore, and the U.S. Department of Energy under Contract No. DE-AC03-76SF00098.

EXECUTIVE SUMMARY

The Commission on Fair Market Value Policy for Federal Coal Leasing recommended that the government have authority to negotiate a fair price for coal leases when competitive bids cannot be obtained. This report analyzes the choices the government faces in designing a coal lease sale mechanism. It considers the impact of the alternatives on economic efficiency, government revenue, administrative workability, fairness and the appearance of fairness.

The report concludes that there are advantageous ways for the government to negotiate coal leases when there is only one serious potential bidder for a lease. First, the report notes the advantages of negotiating exchanges that leave the government with economically logical potentially minable tracts. It also notes the advantages of negotiating shares for the "cooperative leasing" by auction of such tracts.

For other one bidder tracts, the report concludes that there are potential advantages to lease negotiation provided that:

1) all negotiations are tentative subject to "validation" of their one bidder nature in a post-negotiation formal sale process,
2) the government negotiate on more leases than it will conclude, using whenever possible, a "round-robin" negotiation procedure,
3) government employees and not independent agents negotiate for the government, and
4) negotiations are narrowly confined to the amount of bonus.

The report also suggests that the government may wish to consider use of final-offer arbitration on those leases, such as bypasses, on which both the government and the private party have high interest in reaching an agreement.

The Bureau of Land Management should begin to develop a negotiation program based on the concepts outlined in this report. This will require both new legislation and new regulations.

I. BACKGROUND, PURPOSE AND SCOPE

A substantial portion of U.S. reserves of minerals including coal are owned by the United States government. It has long been the policy of the government to transfer these reserves to the private sector for development rather than develop them itself. Such leases often involve assets of large but uncertain value. From time to time, there have been criticisms that the government has apparently received inadequate compensation for its reserves.

It is in this context that the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes Commission) recently examined the government's coal leasing program and some recent sales [Linowes]. It made many recommendations, most of which were accepted by the Department of the Interior. One of the difficult areas it dealt with is the "captive tract" situation, commonly faced by the Bureau of Land Management (BLM), in which a coal tract is of substantial value to one private party and not to any others. In such a situation, the government is unlikely to obtain competitive bids. Often, this kind of situation is complicated by the fact that the substantial value cannot be estimated at all precisely. Such situations prompted the Commission to recommend that the BLM consider using negotiations as an alternative to competitive sales. The specific conclusion and recommendation was:

> While the Commission recognized the problems of establishing a negotiation procedure that would earn public confidence, it nevertheless concluded that there might be situations in which the sale of a Federal coal lease would be facilitated by negotiation.
>
> (Rec. V-6) WHEREVER POSSIBLE, LEASES SHOULD BE SOLD ON A COMPETITIVE BASIS. HOWEVER, WHERE REASONABLE EFFORTS OBTAIN COMPETITIVE BIDS HAVE FAILED, THE GOVERNMENT SHOULD HAVE AUTHORITY TO NEGOTIATE A FAIR PRICE.

The government, in arranging coal leases, has several different and sometimes conflicting objectives. The government wants to promote economic efficiency. In particular, it wants to lease the coal that is most economic to develop to the party and under the terms that will lead to its most efficient development. Within the range of prices that could be considered a fair market value, the government would prefer to collect more rather than less revenue in return for its asset. The government would like the leasing system to be fair to all interested parties and to avoid it even appearing unfair. Finally, the government is concerned that the leasing process itself be inexpensive and administratively workable. Below, we examine various approaches to negotiating coal leases and conditions under which they might outperform auctions with respect to some or all of these criteria.

In view of the long tradition in the U.S. of using formal competitive sales for resource transfers, it is worth noting that federal government negotiations with private parties are quite common. The GSA negotiates many purchases including electricity and office space leases. Some of these negotiations involve sellers with substantial monopoly power. In addition, attorneys in many government agencies routinely negotiate to settle substantial legal claims. Finally, the Department of the Interior itself negotiates exchanges of coal leases.

This report gives the results of a brief analysis of negotiations as an alternative to auctions as a mechanism for leasing captive coal tracts. In it, we state the factors that affect the appropriate choice of lease sale mechanism. An appendix discusses these factors more fully. We then examine and compare the various choices the Department of the Interior faces in choosing a lease sale mechanism. The choices we examine include whether to negotiate at all, the relationship between negotiations and formal sales, who should negotiate for the BLM, what should be negotiable, the use of arbitration, the relationship between different negotiations, and the use of negotiation fees. We discuss the impact of the various choices on the various governmental objectives discussed above.

We believe we have identified a number of situations in which negotiations of an appropriate kind are desirable. First, the report notes the advantages of negotiating exchanges that leave the government with economically logical potentially minable tracts. It also notes the advantages of negotiating shares for the "cooperative leasing" by auction of such tracts.

For other one bidder tracts, the report concludes that there are significant potential advantages to lease negotiation provided that:

1) all negotiations be tentative subject to "validation" of their one bidder nature in a post-negotiation formal sale process,
2) the government gain leverage in its negotiations by negotiating on more leases than it will conclude, using whenever possible, a "round-robin" negotiation procedure,
3) government employees and not independent agents negotiate for the government, and
4) negotiations are narrowly confined to the amount of bonus.

The report also suggests that the government may wish to consider use of final-offer arbitration on those lease, such as bypasses, on which both the government and the private party have high interest in reaching an agreement.

The Bureau of Land Management should begin to develop a negotiation program based on the concepts outlined in this report. This will require both new legislation and new regulations.

This report ends with a description of a potential decision sequence for selecting a coal tract lease sale mechanism and with a fuller summary of our conclusions, a list of topics deserving further study, and a brief discussion of the development of a negotiation program.

II. FACTORS AFFECTING CHOICE OF LEASING PROCEDURE

The process best-suited for transferring a federal coal tract to a private developer depends upon at least five characteristics of the tract. Here, we merely list them. The appendix to this report discusses them more fully.

The five characteristics are:

1. The intensity of anticipated leasing competition (The critical distinction for policy purposes is between one-bidder tracts and those that will attract two or more serious bids.),
2. The quality of government information about tract value,
3. The incentive of the developer for prompt development of the tract,
4. The incentive of the government for prompt development of the tract, and
5. The appropriateness of the tract for exchange or cooperative leasing in order to allow joint development with one or more adjoining tracts.

III. NEGOTIATION ALTERNATIVES AVAILABLE TO THE BLM

If the BLM engages in coal lease negotiations, there are a variety of choices it must make as to how it is to go about doing so. This section defines and discusses several major choices facing the BLM.

A. Whether to Negotiate

The first choice the BLM must make is not how to negotiate, but whether to negotiate at all. We believe that there are situations in which properly structured negotiations are preferable to auctions.

Clearly, there are advantages to the formality of a competitive sale when there are several serious bidders. These advantages include demonstrably obtaining a fair market value, providing a fair opportunity to all seriously interested parties, as well as the appearance of fairness, and making it difficult for corrupt or inept government employees to give away government assets for inadequate compensation. In addition, a formal competitive sale can sometimes result in an appropriate transaction even when there is only one serious bidder if the government knows to within close tolerance the fair market value of the lease and insists upon receiving it.

However, when there is a single serious bidder and the government does not know to within close tolerance the fair market value of a coal lease, formal competitive sales present difficulties. It is only in this context that coal lease negotiations have potential advantages over formal competitive sales. And it is only in this context that we consider the BLM's options on how to negotiate.

Even if the BLM decides that, in principle, it is willing to negotiate coal leases, it still must decide whether a particular tract is appropriate for lease negotiations and, if it is, when to begin the negotiations and how long to continue them. While we do not discuss sale timing or the tract nomination process, we do describe below conditions under which negotiation is relatively attractive.

B. Relationship Between Negotiations and Formal Sales

A critical question the BLM must face is the relationship between negotiations and formal auctions. Should a formal competitive sale precede a negotiation, follow one, or be completely replaced by one? Holding a negotiation without a formal competitive sale may save some administrative costs, but it leaves open the possibility that a mistake has been made and that competition for a tract does exist. Even if such mistakes are rare, the absence of a formal competitive sale will make every negotiated lease suspect. Therefore, with the exception of exchanges and share negotiations for cooperative leasing discussed below, we believe that every negotiation should be tentative subject to "validation" in a formal competitive sale procedure.

One alternative is "prevalidation." The BLM could start negotiations on a lease after a formal competitive sale has failed. Failure could be defined as failure to produce a bid that exceeds the BLM estimate of fair market value, failure to produce more than one bid, or failure on both counts. However, no matter which definition of failure is selected, this approach has the severe disadvantage that the knowledge that negotiations may follow a formal competitive sale provides incentives for bidders in those sales to reduce their bids.

The alternative of holding a formal competitive sale after a negotiation does not suffer from this shortcoming. In such a sale, a bidder would know that his bid was a best and final offer. In addition, a post-negotiation sale has the advantage of providing an incentive for the negotiating firm to make concessions. Of course such a sale would be held only if the negotiation succeeded in producing a tentative agreement on a lease. To do otherwise would make a sham of the negotiation process by giving the coal company the choice of the negotiation or an uncontested sale.

In a post negotiation formal sale, the terms of the negotiated tentative lease could be kept secret or could be made public. The firm with which the tentative lease was negotiated could be allowed to improve its offer or forbidden from doing so. Making public the tentative lease terms and forbidding the tentative lessee from improving his offer would put helpful pressure on a negotiating firm to improve its offer. If the assumption that this is a captive tract is correct, then the pressure would not be onerous. No other firm could compete seriously. Furthermore, such a requirement would give a firm aware of potential competition incentive to reveal this to the government.

C. Who Should Negotiate for the BLM?

Another choice the BLM must make if it engages in lease negotiations is who should negotiate for the government. In particular, should the negotiator be a BLM employee or an external agent? If the latter, how should such an agent be selected and compensated? Our analysis leads us to believe the BLM should use its own employees as negotiators.

The skills required for a negotiator will vary with the nature of the negotiation. If the negotiation is simple and highly structured, less skill, market knowledge, and judgment are required than if many different terms of the lease are simultaneously at issue. Below, we discuss the choices the BLM faces over what, precisely, should be subject to negotiation and how the negotiations might be structured. Here, we note that these choices may be constrained by the negotiation skills available to the BLM. However, even if the BLM uses its employees to negotiate, this constraint should not be too severe. The BLM could employ attorneys as negotiators and support them as necessary with information from external consultants.

There are problems associated with the use of independent agents. To be effective, an agent must be knowledgeable. However, a knowledgeable independent agent will have had substantial dealings with the coal industry and can be expected to have future dealings. Therefore, the agent may have incentives to negotiate for the government unassertively or even corruptly in order to create good will for future dealings. It seems unlikely that a qualified independent agent would accept the task of negotiating for the government if it entailed a prohibition of future dealings with the company and interests with whom he or she must negotiate. Yet, unless the BLM provides some other form of motivation such as a percentage of government revenue, such a condition seems necessary to avoid at least the appearance of conflict of interest. However, any lucrative compensation such as a percentage of the lease bonus would itself be politically suspect unless the negotiating agents themselves were selected competitively. But selling competitively the right to negotiate a lease without a prohibition on indirect self dealing is similar to selling the lease itself competitively. In other words, if I can sell the lease to myself, there is no significant difference between selling me the right to sell the lease and selling me the lease itself. However, this brings us back to the problem we started with; the reason we were negotiating the lease in the first place is that a competitive sale would not work. Hence, we are led to believe that BLM employees should conduct coal lease negotiations and that

the negotiations should be structured so that employee skills, supplemented with the use of consultants, are adequate.

D. What Should be Negotiated?

If the BLM undertakes coal lease negotiations, it faces choices over what is to be negotiated. At one extreme, the negotiation could be strictly a negotiation over the amount of the lease bonus. In effect, the negotiation would be no more than an alternative to sealed bids as a means for determining the amount of the bid. At the other extreme, the negotiation could be wide open. Many different issues besides the amount of the bonus could be at issue. These might include royalty rates, payment schedules, diligence requirements, tract boundaries, extra lease stipulations, and property exchanges. If options to lease are being used, option terms could be negotiated. This kind of negotiation occurs in the private sector. It is an effort to find the best mutual arrangement. Between these two extremes are a variety of possibilities in which a few specific items in addition to the lease bonus are included in the negotiation. With the exception of exchanges and share negotiations discussed in the following subsection, our analysis leads us to believe that bonus-only negotiations are preferable.

More wide open negotiations may provide an opportunity for an agreement that is mutually more advantageous. On the other hand, the bonus-only negotiation has several advantages. It is simple. It is less expensive for both parties to carry out, and it requires less expertise. It is much easier to manage in a way that assures that government policy concerns are properly respected. Consider, for example, a situation in which the potential lessee has short term financing difficulties. In a relatively wide ranging negotiation, a much larger total lease bonus mostly payable after five years might be agreed upon. This might be advantageous to the government. However, to reach such a conclusion, a government negotiator would have to evaluate the financial risk involved, the appropriateness and legality of the BLM competing with private financing opportunities, and the fairness of such terms for potential bidders in a post-negotiation formal sale process. These evaluations require specialized skills, such as credit analysis. They also involve important policy judgments that the BLM is unlikely to want to be decided at a low organizational level or on a tract-by-tract basis.

E. Exchanges and Cooperative Leasing

There is one situation in which there is a clear advantage to the government in negotiating something other than the lease bonus. Consider a situation in which the government owns part of an undeveloped economically logical potential mine and a single other party owns the remainder. In this situation, the government's tract is captive, and a formal sale will not produce effective competition. A fair price for the government tract lies somewhere in between its small value by itself and the much larger value of the entire economic unit (less the small stand alone value of the private tract). Most ways of arriving at a value for the government tract involve determining *both* the value of the entire economic unit and the share of that value to be attributed to the government tract. However, if only the share attributable to the government is negotiated, an auction of the entire economic unit may be highly competitive. If so, such an auction can be used to determine the economic unit's value. In such an auction, the BLM would lease the entire unit on behalf of itself and the private coal owner. The private coal owner would be free to bid in the auction, thus protecting his or her interest. This approach, sometimes called "cooperative leasing," has the advantage of making maximum use of competitive market

information. Thus, we view it as preferable to direct negotiation of a lease bonus.

There is an alternative to cooperative leasing for dealing with split economically logical potential mines. This alternative is negotiated exchanges that leave the government with a competitively leasable economically logical unit. Like cooperative leasing, the negotiation of such exchanges has the advantages of limiting the issues that must be decided by nonmarket mechanisms. The section on appropriateness for exchanges in the appendix to this report contains a fuller description of exchanges and a discussion of how the government's willingness to make simple exchanges can enable economically desirable but complex exchanges involving several properties to be completed.

Our analysis leads us to have a clear preference for negotiations that lead to either cooperative leasing or exchanges that allow the government to sell competitively an economically potential mining unit that it previously did not control. The benefits of these two approaches are similar in many ways. They both eliminate the necessity of the government evaluating certain factors. Cooperative leasing, however, goes somewhat further in this direction. It eliminates the necessity to evaluate differences between tracts. On this basis it is preferable.

However, there is a potential offsetting factor. To the extent that the terms of government leasing interfere with the economic use of the tract, exchanges can avoid part of this effect. For example, a tract might have a significant amount of economically marginal (e.g. hard to mine) coal. It might be that without any royalty, it would be economically efficient to mine this coal, but under government royalties, a mine operator could not afford to recover this marginal coal. However, if as a result of an exchange, the mine operator owned the coal, the marginal coal would be mined. This would increase the value of the tract. However, this effect would be small because the coal involved would be only the marginal coal and because its mining would not occur for many years. Furthermore, only part of the effect is eliminated. An exchange would leave the government with one of the two economically logical units -- although there would be a tendency for the exchange to leave the private party with the one in which the effect is more significant.

The relative advantages of cooperative leasing and exchanges are not easily compared without more specific data. Hence, our present analysis does not lead us to prefer one over the other.

F. Use of Models in Negotiation

Even when a negotiation involves only the amount of a lease bonus, the BLM has apparent choices. The negotiation could be directly over the amount of the bonus, over inputs to a particular economic model that will calculate the amount of the bonus, or over both the choice of such a model and its inputs. Both BLM negotiators and private negotiators may find economic models helpful, and at times, both may find them a useful medium for precise communication. However, we do not believe that the use of models in the negotiations process itself should be required. We also do not believe that competent negotiations of model inputs or of model choice and inputs will result in negotiation outcomes significantly different from those of direct negotiations. Competent negotiators discussing model choice or inputs will know, at least approximately, their implications for the lease bonus that the model will calculate. Therefore, they will not agree on inputs unless the resulting bonus is acceptable.

These comments are restricted to *requiring* the use of economic models in the negotiation process itself. In particular situations, indeed in most situations, government negotiators may well find the use of models useful for tactical purposes or as a medium of communications. In addition, the BLM may well wish to use such models for its own internal purposes. It may, for management purposes, require its negotiators to provide and obtain higher level approval of a full economic calculation before making or accepting an offer.

Finally, we wish to warn the BLM of a risk against which it must protect itself if it uses complex economic models directly or indirectly in the negotiation process. Selective correction of imprecise model inputs may convert an unbiased estimate of tract value into a highly biased one. For example, suppose that a model takes as input the coal seam dimensions and that length is overestimated by about 10% and width is underestimated by about 10%. In this situation, the estimate of the area of coal will be approximately right. However, if in the course of negotiations a prospective lessee informs the government of the length overestimate (but not of the width underestimate) and the government "corrects" its estimate, the "corrected" estimate of the coal area will be 10% too low. If the government wishes to make use of data "improvements" supplied by parties with whom it is negotiating, it must make a substantial allowance for the selective nature of the corrections it is likely to receive. In the absence of an appropriate allowance, the "corrections" may be much worse than useless.

G. Use of Arbitration

Another set of choices available to the BLM in coal lease negotiations has to do with the use or non-use of mediation and arbitration. Mediation can range from the casual use of third parties for information, exchange to the formal participation and non-binding recommendations by such a party.

Arbitration involves resolution of the issues at negotiation by a neutral third party. The issue presented to arbitration can be broad and unstructured, or it can be extremely narrow.

The use of mediation is a tactical issue upon which we have no strong opinion. However, the use of arbitration both raises concerns and presents the opportunity for resolving otherwise unresolvable negotiations. The concern with arbitration is that for political and administrative reasons the government cannot accept the power of a third party to set arbitrarily the terms of a lease. However, if this concern could be met, arbitration has the potential to end deadlocks in negotiations that both parties strongly wish to succeed. In addition, we are concerned about the effect that knowledge of the possibility of arbitration could have on the course of negotiations.

One form of binding arbitration that presents the possibility of meeting the political and administrative concern is final-offer arbitration. In such arbitration, each party presents to the neutral arbitrator its last offer and the reasons it believes it to be fair. The arbitrator is restricted to choosing one or the other of these final offers. Before such final-offer arbitration, the government could find out the private party's last offer and decide if it is tolerable before agreeing to go to arbitration. It would go to arbitration only if it believed that both final offers were within the range of fair market values and that the government had a good chance of winning the arbitrator's favor with its last offer. In addition, the amount agreed upon would still be subject to the formal post-negotiation market test recommended above. The effect on the negotiations of the possibility of final-offer arbitration may be favorable. If informed, neutral arbitrators can be

found, we favor its experimental use in situations in which both the government and the private party have a high desire for the negotiation to succeed. While there is some question whether, in theory, it should produce incentives to agree (see Raiffa, Chapter 8) the empirical evidence associated with its use is that is has done so (see Chelius and Dworkin). In standard arbitration, the arbitrator can "split the difference." If the negotiators think he might do this, they have an incentive to hold back from compromise. With final-offer arbitration, the arbitrator cannot "split the difference." Hence, concern about "splitting the difference" does not inhibit compromise.

A variant of final-offer arbitration is possible when the issues being negotiated include more than just bonus payment. Here each party's offer might be regarded as a package, and each issue arbitrated in final-offer fashion either independently or in linked fashion. The last possibility allows the arbitrator to do the kind of trading that helps resolve offers distant from one another but, at the same time, it brings final-offer arbitration back closer to conventional arbitration and, hence, worsens the incentive properties of final-offer arbitration.

H. Interrelationships of Negotiations

So far, our discussion of BLM's choices of negotiation alternatives have dealt with single negotiations. However, the BLM has important choices with respect to the interrelationship of different negotiations. Skillful exercise of these choices can provide the government with the opportunity to obtain market information and use market forces where these would otherwise be unavailable.

In order to discuss this, it is important to realize that in order to obtain any significant share of the economic rent in captive tract situations, the government must be prepared to insist upon that share even in the face of a real risk that an otherwise desirable transaction will not take place at all. This is so because if it is known that the government will back down, then the parties with whom it negotiates will have a strong motive to wait until it does so. In general, the government faces a tradeoff. The larger the share of the economic rent it insists upon, the larger the fraction of otherwise desirable deals that will fail to be completed. It is also true that the worse the government's independent information about the value of a captive tract, the less favorable this tradeoff is. Thus, the possibility exists of using information from one negotiation to improve the government's position in another. The government can do this if it can group related negotiations. Grouping can also improve the government's position by producing intertract competition.

Suppose several captive tracts in the same economic region are being considered for negotiations. Consider the following round-robin negotiation procedure: First, the BLM sets as a target the fraction of the total coal involved that it intends to lease. Then, the BLM rank orders the tracts by estimated value per ton of coal. It uses the estimated coal quantities to calculate the estimated fair market value of each tract. The BLM then opens negotiations with the tract "captors," starting with the highest ranked tract. If a "captor" offers more than the fair market value estimate for the tract, his offer is accepted. If not, negotiations are recessed, and negotiations are started on the next ranked tract. When the target fraction of coal has been sold, all of the recessed negotiations are ended. If all of the tracts have been negotiated and the target fraction has not been sold, the BLM can review its fair market value estimates in light of its experience and then begin another round of negotiations in rank order to attempt to sell the remaining amount of the target fraction of the coal. This process can be continued until the

target fraction is reached or the BLM concludes that it is not reachable.

This process has several attractive features. No coal is leased at less than its estimated fair market value. Even though each tract is captive, the "captors" have incentive to negotiate leases at near the fair market value because if they don't, they risk losing the opportunity to obtain any lease at all. Finally, the tracts with higher values per ton of coal are the ones more likely to be leased.

A variant of this round-robin procedure is also worth considering: In the variant, as before, the tracts are ranked in order of value of per ton of coal, and a target fraction of the coal to be leased is selected. Then, as before, a round of negotiations in order of rank is begun. In this case, however, the acceptance criteria is not estimated fair market value, but value per ton. In the first round, the government only accepts offers over a high value per ton. In each successive round, the government is willing to accept a lower value per ton. The negotiations cease when the target fraction of coal is leased or when the BLM decides that lowering the values further is unwise or inconsistent with its legal duty to obtain a fair market value.

Like the first round-robin procedure, this variant puts competitive pressure on tract "captors" to make good offers. It differs from the first procedure in several ways. It puts relatively less pressure on "captors" of tracts with high value per ton and relatively more on "captors" of low value per ton tracts. This variant puts less emphasis than the procedure described first on government calculated estimates and more on market behavior. Although formal analysis to support this has not been done, we conjecture that under most conditions the first procedure would tend to do somewhat better than the variant at capturing economic rent and somewhat worse at ensuring that the economically most efficient set of tracts was leased. We also note that if small increments of value per ton are used in the variant procedure, it is essentially a Dutch intertract auction. And Dutch auctions (as Vickrey pointed out) are theoretically equivalent strategically to sealed bid auctions. (Cox, Smith and Walker have obtained experimental results in which there is a small but consistent advantage to sealed bid auctions over Dutch auctions based on behavioral factors--apparently incorrect updating of probabilities. However, it is not clear that the behavioral factors would carry over persistently to intertract auctions or to round-robin negotiations with larger stakes. If they did, then the government could expect to receive slightly more revenue from a sealed intertract auction than from an equivalent round-robin negotiation).

On balance, the first procedure is probably preferable when the tracts vary greatly in value per ton, when government value estimating is relatively good and when tracts not sold are likely to be offered again within a few years. The latter variant is probably preferable when the tracts are relatively close in value per ton, when government value estimating is relatively poor and when future reofferings are unlikely for many years. Both procedures could benefit from formal study. Such study would help the BLM both in choosing between them and in deciding operational questions such as how many tracts are enough and what fraction of coal should be targeted for sale.

If efficiency of development is viewed as important and government revenue is not, then the variant procedure is probably preferable to the one first described. However, if tracts vary greatly in value per ton, the variant procedure will achieve much less revenue. Furthermore, the amount of inefficiency the first procedure will cause can be decreased if subsequent sales of unsold properties are held within a few years or if government estimating is improved.

I. Use of creditable fees or other devices to assure seriousness of interest by potential lessees

The BLM is interested in the use of fees for negotiations. The desire for such fees arises from concern about the cost incurred by the BLM in order to prepare a coal property for leasing negotiation. Understandably, the BLM does not wish to incur these costs if there is not serious interest in leasing the tract. If the BLM charges fees, it must then decide whether to refund them if the tract is not leased, credit them against the lease bonus if the tract is leased, or do neither.

There is a potential problem with fees, however, in a situation in which honest disagreements about tract value cannot be distinguished from negotiating positions. If the government, possessing imperfect information about tract value, is to capture any substantial part of the economic rent associated with captive tracts, then honest disagreements about value will sometimes lead to the failure to conclude a lease with a sincere private party. If acceptance of the negotiation fee in any subtle way represents a moral commitment to reach a deal if the fee payer is sincere, the government will face a dilemma. In its judgment, it should not conclude the deal, yet it will be under moral pressure to do so. If it refunds the fee, it will defeat the fee's purpose and find itself having to resist claims of sincerity after all unsuccessful negotiations. Therefore, we do not recommend any fee at all be charged unless the BLM can do so in a way that is sure not to create even an implicit moral commitment to conclude a deal.

If the BLM does charge such a fee, we recommend that it be neither refundable nor creditable. The reason for it not being refundable has already been discussed; refunding it defeats its purpose. There is a different kind of reason for not making it creditable.

A noncreditable fee paid to enter a negotiation is a sunk cost and should not, in principle, affect the outcome of the negotiations. A creditable fee adds to the value of the lease being negotiated since it is only creditable if a lease is agreed to. If the BLM could capture all of that added value, then creditable and noncreditable fees would be equivalent, at least in theory. But the reason for the negotiations is the difficulty faced by the BLM in capturing the value involved. Therefore, in theory at least, the BLM is better off with noncreditable fees. While the common (but theoretically suboptimal) behavior of not fully ignoring sunk costs may narrow this advantage, it seems unlikely to reverse it.

IV. SELECTING A LEASE SALE MECHANISM FOR A COAL TRACT

In this section, we combine the comments on the various issues discussed above into a potential decision sequence that the BLM could use for selecting a lease sale mechanism. The sequence is a series of tests. If a test condition is met, a sale mechanism is selected. If not, the next test is tried. In general, the more tests failed, the less satisfactory the sale mechanism. At some point, the BLM may wish to reconsider whether it wishes even to attempt a sale. Figure 1 illustrates the potential decision sequence described here.

The first test is whether there appears to be more than one serious bidder for the tract. If so, the test is met and a competitive sealed bid sale is held. If not, the second test is considered.

The second test is whether there is an opportunity to assemble an economically logical potential mine by exchange or by share negotiation. For this test to be met, the BLM should expect to end up with a noncaptive economically logical potential mine for which there will be two or more serious bidders. If the test is met, the BLM attempts to negotiate the exchange or the share agreement. If this negotiation is successful, a competitive sale is held.

The third test involves two subtests, both of which must be met. The first subtest is that the government has quite precise information on tract value (perhaps from closely comparable competitive sales). The second subtest is that the government have a relatively low interest in sale completion on this tract. If both subtests are met, the government holds a competitive lease sale and rejects the bid it receives if it is inadequate. In this situation, the superior information allows the government to use the competitive sale mechanism even though there is only one bidder, and the low government interest allows the government to be firm in rejecting bids it knows to be inadequate.

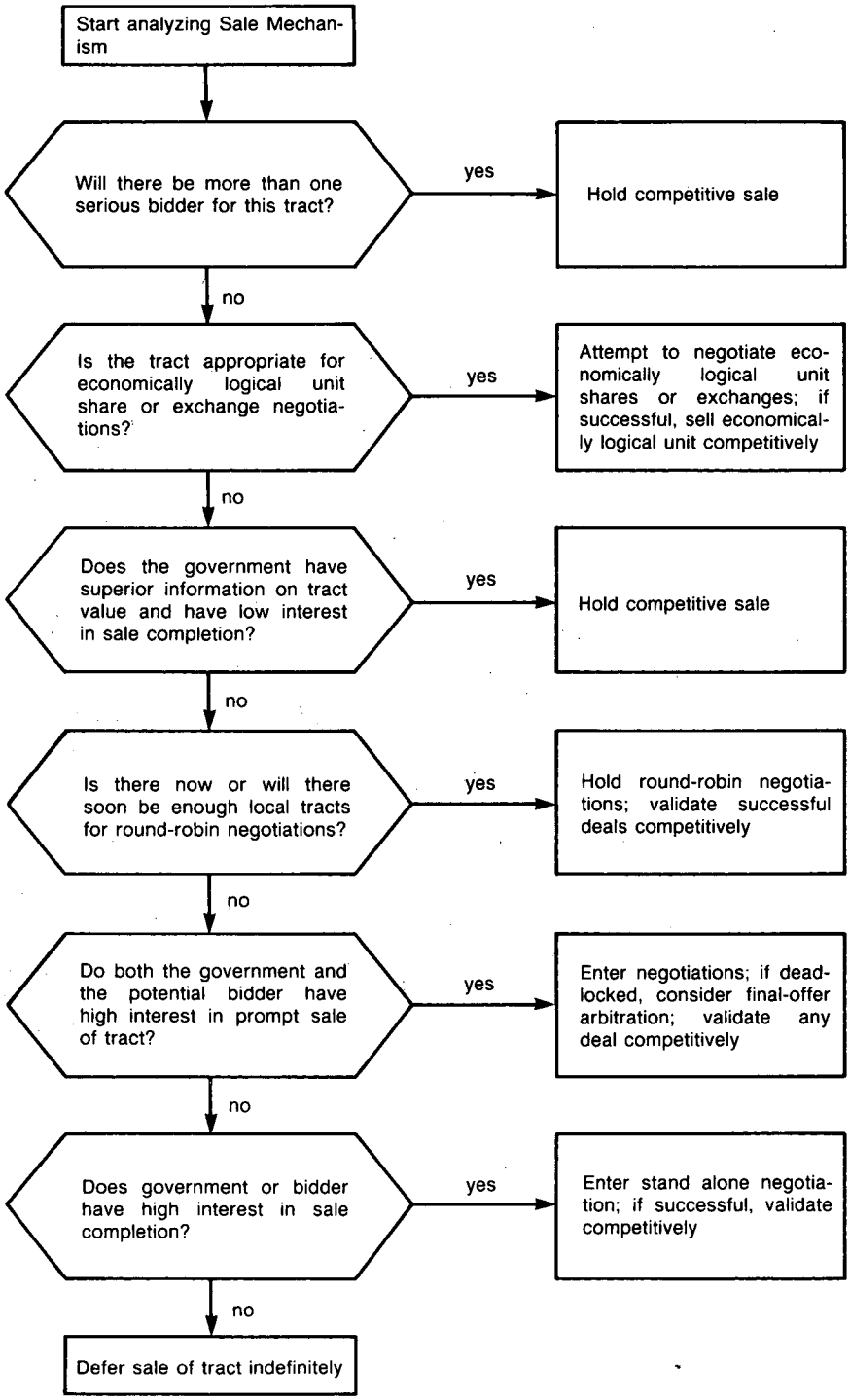
The next test is whether there is, or in a reasonable time there will be, a sufficient group of tracts in the economically significant region for a group of round-robin negotiations. If so, the tract is put into the group, and one of the forms of round-robin negotiations described above is held. The successful negotiations are then subject to the validation of a formal post-negotiation sale.

The next test is compound. The first subtest is, does the government have a high interest in lease sale completion? The second is, does the lone potential bidder have a high interest in lease sale completion? If both answers are yes, the BLM enters into negotiations prepared, if necessary, to resort to final-offer arbitration. If a tentative agreement is reached and whether or not arbitration was used, the results of such negotiation would be subject to validation in a formal post-negotiation sale open to others.

The next test is also compound. If either the government or the lone prospective bidder have a strong interest in lease sale completion, a negotiation is attempted and, if successful, validated with a formal post-negotiation sale. However, by this point the more favorable situations have been dealt with. Either there will be a high percentage of unsuccessful negotiations or else the government is giving away the bulk of the economic rent.

Finally, if all tests are failed, the leasing of the tract is of low interest both to the government and to the only potentially interested private party. Furthermore, the government does not know its value well nor currently have any potential market mechanism for improving that information. The government should defer indefinitely leasing the tract.

Figure 1. Potential Decision Sequence for Selecting a Sale Mechanism for a Coal Tract



XBL 8611-9695

V. CONCLUSIONS

A. Technical Conclusions

Bargaining theory has not yet considered models that encompass all of the particular complications of coal leasing. However, it offers some clues. In models of a single, stand-alone negotiation, two equally informed and motivated parties will tend to split evenly the gains from trade. However, in such models, if one party knows the gains available and the other does not, there is no strategy available to the less informed negotiator that will obtain any substantial fraction of the value [Wilson].

We believe that the government's market information is often inferior to that of the party with whom it is negotiating. When this is so, the government should take steps to avoid the giveaway inherent in an uninformed party negotiating in isolation with a well informed one. One possible step is to change the subject of the negotiation to one in which the government's information disadvantage is smaller. Cooperative leasing and exchanges do this. Another kind of step is to create an implicit market mechanism by linking negotiations. The competition in this implicit market can force informed private parties to reveal to the government by what they do part of their private information. These two kinds of steps are the only effective means of which we are aware for the government to gain leverage in negotiations in order to capture a significant share of the economic rent of the one potential bidder coal tracts it leases.

Overall, we conclude that it is to the government's advantage that:

- coal lease negotiations be considered in apparent one bidder situations only,
- the BLM encourage exchanges that will give it an economically logical potential mine that can then be sold competitively,
- the BLM negotiate shares of economically logical potential mine that can then be sold competitively,
- if the BLM has unusually precise knowledge of the fair market value of a tract, and a relatively low interest in sale completion, it offer the tract for lease competitively,
- all negotiations of coal leases be tentative, subject to a post-negotiation formal sale, and that in such sales, the negotiated terms be known and the company with which they were negotiated be barred from improving them,
- when several captive tracts in an area are available to be leased within a reasonable time period, the BLM use some form of round-robin negotiations and lease only some of them,
- when both parties have a high interest in the sale of a lease, the BLM negotiate and consider resort to final-offer arbitration,
- in all other captive tract situations, if the BLM is prepared to negotiate, it do so with the expectation that a substantial percentage of negotiations will fail,
- the BLM use employees and not agents to negotiate, and
- the BLM use negotiation fees only if it can be sure no moral obligation to complete a deal is created and that, if it does use such fees, it not refund or credit them.

In addition, we believe that the BLM should study further

- the best form of post-negotiation formal sale to use,
- the employee skills required for negotiating and the appropriate use of consultants to supplement them,
- the relative advantages of exchanges and cooperative leasing,
- the use of round-robin negotiations including the preferable form, the minimum number of tracts needed, and the percentage of coal in such negotiations the BLM should attempt to lease,
- the use of final-offer arbitration,
- the trade-off between the percentage of lease negotiations that fail and the percentage of economic rent the BLM will receive,
- where along this trade-off the BLM should attempt to fall,
- the precise criteria for the selection of different lease sale mechanisms, and
- the advantages and disadvantages of BLM revealing its value estimates under various circumstances.

B. Development of a Negotiation Program

The BLM should begin to undertake development of a negotiation program based on the concepts outlined in this paper. Here, we propose an outline of the major components of a negotiation program.

First, the program should have a defined scope. Based on our analysis, negotiated sales should be limited to cases in which competition is highly unlikely. All by-pass and maintenance leases are good candidates for negotiation.

Second, the program should have a clear goal. This should be to obtain both the substance and appearance of fair market value for leases through using negotiation to create competitive and other incentives for bidders to offer fair market value. For a negotiation program to work, industry cannot be leased all the coal in which it expresses interest. While satisfying national requirements for coal remains a valid goal, satisfying individual company objectives cannot be one.

A negotiation program should be conducted by a team effort involving three areas of activity. The first is a coordinating function to develop procedures and criteria as suggested in this paper (e.g. when to negotiate, proportion of negotiations/leases to conclude). The second is the effort by BLM field personnel to identify situations where negotiation is appropriate and to conduct negotiations. Third is a support activity, including experts on negotiation to assist field personnel and policy staff.

A negotiation program will require new legislation and regulations. This legislation should be as broad as possible. It should give the secretary specific authority to negotiate value sharing and to use negotiations and final-offer arbitration subject to post negotiation validation sales.

Regulations should be developed which address

- Criteria for negotiation,
- Single and multiple tract procedures,

- Use of arbitration, and
- Value sharing.

In order to formulate a more specific program of action and schedule, a review of field personnel should be made of pending and upcoming maintenance and by-pass leases and identified split-ownership mining locations.

Following this review, a policy decision can be made about when and where to test a lease negotiation approach.

References

1. Chelius, James R. and James B. Dworkin, "An Economic Analysis of Final-Offer Arbitration," *Journal of Conflict Resolution* 24, pp.293-310, 1980.
2. Cox, James C., Vernon L. Smith and James M. Walker, "A Test that Discriminates Between Two Models of the Dutch/First Auction Nonisomorphism," Journal of Economic Behavior and Organization 4, 1983.
3. Linowes, David F., Chairman; *Report of the Commission: Fair Market Value Policy for Federal Coal Leasing,* February 1984.
4. Raiffa, Howard, *The Art and Science of Negotiation,* Cambridge, Mass.: The Harvard University Press, 1982.
5. Vickrey, William, "Counterspeculation, Auctions, and Competitive Sealed Tenders," *Journal of Finance* 16, pp.8-37, 1961.
6. Wilson, Robert, private communication, 1985.

APPENDIX

TAXONOMY OF POTENTIAL LEASE-NEGOTIATION SITUATIONS

The policy best-suited for effecting transfer of a federal coal tract to private developers depends on five characteristics of the property: intensity of the leasing competition, quality of information about value of the property, relative interest of government and industry in immediate development, size of the asset, and suitability for property exchange. On the basis of these five characteristics, a taxonomy of federal coal properties can be defined which is useful for considering appropriateness of the various transfer-policy options described above in Section III.

A. Intensity of anticipated leasing competition.

Under current practice, the number of bidders in a lease sale is not known until the auction is complete. Participants could be required to register their intentions to enter bids some time before the sale, and the nomination process gives some hints on bidding prospects, but neither of these sources of information can distinguish serious as opposed to casual bidding interest. The disappointment in the level of competition experienced in some of the recent sales testifies to the difficulty in predicting whether the number of participating bidders will be sufficient to generate bids that accurately reflect the property's true value. Nevertheless, estimates must be made. The distinction we propose here is between one-bidder and many-bidder situations, where "many" is taken to mean two or more. This distinction is almost -- but not quite -- the same as the familiar distinction between "bypass" and "maintenance" tracts, on the one hand, and "new-production" tracts on the other. Maintenance tracts may sometimes have two bidders [see Linowes] and even new-production tracts may, for reasons described below, sometimes bring forth only a single bidder. The critical feature for policy choice is the number of serious bidders. Here, one-bidder tracts will be called captive tracts. A tract may be captive-- of interest to only one developer-- because:

- it must be mined now if adjacent mining operations are not to pass it by forever (a "bypass");
- it stands in the way of adjacent mining operations (a "maintenance" tract);
- the rest of the only economically logical mining unit containing the tract is owned by one private party (an even worse case can arise when the remainder of the logical economic unit is owned by several private parties, in which case even a **single** bid for the federal portion may be difficult to obtain).

When circumstances such as these limit leasing interest to a single firm, the price received in an auction is not a meaningful estimate of the tract's true social value. The share of the economic rent captured by the government is likely to be small.

In addition, the economic rent associated with a tract may be captured by a monopolist or monopsonist in other ways. This can occur if

- surface-owner consent is difficult or costly to obtain;
- market access is controlled by an aggressive price-discriminating transportation monopolist (a railroad captive);
- the coal market for this tract is under monopsonistic control (a utility captive).

Under such conditions, the government may have difficulty obtaining any significant share of the economic rent of a tract even if it obtains several bids from prospective mine developers. Neither negotiations with coal developers nor auctions can readily improve such situations. In a separate document, we plan to suggest that the use of options to lease be studied as a potentially appropriate policy.

B. Quality of government information about tract value

Accurate estimation of value prior to development requires information about resources, production costs, transportation costs, and market prices, the last three of which vary with the time of development of the tract. Private firms are best positioned to make these estimates. They have greater incentive to be accurate, and their skill and capability for gathering and processing the relevant information is greater than the government's.

Bid competition in auctions is one way to force profit-seeking firms to reveal this information. Where competition is lacking, firms have little incentive to provide reliable tract information to federal agencies. Among the methods the government may use to estimate value are:

- -- search for recent comparable tract sales;
- -- Discounted Cash Flow (DCF) analyses incorporating best available information on resources, market and transportation prices, and production technology and costs;
- -- reliable information gained in sales negotiations with prospective lessees;
- -- competition enhancing schemes, option sales, intertract bids.

The classification of tracts must take into account the extent and quality of information gained prior to sale by one or another of these methods.

One of the reasons for making use of some of the rather complex computer models employed in DCF analysis is that sales of exactly comparable tracts are difficult to find. Because the number of physical, technological, market and ownership characteristics, and leasing conditions of a given tract is so extremely large, no two tracts are alike. The difficulty of turning up comparable transactions has been further intensified by the decade of leasing moratorium. DCF computer models attempt to sort out the separate effects on value of all these different characteristics. In principle, this is a respectable approach, the continuing development of which should be encouraged. At the present time, unfortunately, the needs of practical value estimation outrun the capabilities of the technique, partly because the models do not now encompass all the complex interrelationships of the tract characteristics, partly because the data base called for by the models is imperfectly known. However, even with the best of modeling capabilities, uncertainty will be magnified because to a large extent tract value is a small difference between two large uncertain quantities, selling price and production cost.

For present purposes, it is useful to attempt to distinguish between those influences on tract value that are extremely difficult to know, and those that are merely difficult. The Report of the Commission on Fair Market Value Policy for Federal Coal Leasing cites a wide body of opinion quite critical of the practical applicability of both comparable sales methods and DCF models, with which we agree (Linowes, Ch. 6 "Appraisal"). The Report, however, is hesitant in suggesting means of improving appraisal practices. For purposes of negotiation, it will be useful to identify those value relevant bits of information about which we are relatively more certain.

C. Incentives of government and developer for immediate development

What features of the tract and the market context differentially affect the bargaining strengths of the parties to the negotiation? Even in the cases that come first to mind, such as by-pass and maintenance tracts, the effects bear investigation. What degree of asymmetry is consistent with negotiation?

Both economic efficiency in the social-welfare sense and private profit maximization in a competitive coal market dictate that optimal timing of development depends on net value per ton of coal produced from the tract. Economic efficiency is enhanced where high value per ton tracts are developed first. Pursuit of a high return to the government in lease sales negotiations can conflict with economic efficiency. The values estimated *prior* to negotiation should affect the question of whether to *negotiate* now; the more accurate values determined *in the process* of negotiation (or auction) should affect the decision of whether to *sell* now.

Government incentive for immediate development is higher for those tracts of high estimated value per ton not just because the government revenue received is greater, but because the social value of immediate development is greater. Postponement of development is a non-recoverable deadweight loss to all. But in addition to this "social efficiency" of development, government cares about who captures this social value of economic "rent". Other things equal, the government prefers that the rent go to the Treasury rather than to the developer. This is superior economically and fairer since the government owns the resource. Government incentive for immediate development of a tract is, therefore affected by two often conflicting forces: efficiency may call for development now, yet delay (or the willingness to threaten it) may bring about a bigger price--larger rent capture-- from the developer.

The developer's incentive with respect to timing is simply a function of profit: value of the tract minus price paid for it, both of which may depend upon time of development. If the tract is offered prematurely, profit will be greater if development can be deferred to later years. Thus, the firm that can satisfy diligence requirements by merging the federal tract into a mining unit and producing from an adjoining private tract with an ongoing mining operation (cf. Linowes pp. 105, 169-170) has a temporary competitive advantage over firms not so fortunately situated.

Clearly, government interest and developer interest are neither identical nor directly opposed. And since the strengths of both parties' interests vary with time, the outcome of negotiation depends critically on when it is carried out.

D. Size of the asset

What are the economies of scale in negotiation? If costs of negotiation for a high-value tract are not proportionately greater than for a low-value tract, then the already strong case for concentrating costly negotiation resources on high-value tracts is strengthened.

E. Potential for physical exchange

If negotiation can result in tract-for-tract exchange instead of sale, the possibility exists of changing a one-bidder situation into a many-bidder situation. Under what conditions is the government better placed than private developers to use negotiated exchanges to assemble saleable logical economic units (LEU's—we use this terminology to distinguish the generic economic concept we address from the legally significant Logical Mining Unit). And is the government gain from improved saleability lost in the process of exchange?

Consider the following case. Federal tract A adjoins private tract B owned by X Company and together they constitute a logical mining unit; neither can be profitably mined by itself. In a competitive sale of Tract A, only X Company can be expected to bid and, in this knowledge that it will not be outbid, it may well submit a bid significantly below its estimate of the value of the property. Suppose X Company also owns a distant Tract C, of approximately the same value as B. (See Fig. A-1) The BLM is reluctant to offer Tract A in a competitive auction since a fair-market value is not likely to be obtained from the single bidder. Perhaps a swap can be arranged: Tract A to X Co. for Tract C to the government. In what circumstances would such an exchange be attractive to X Co. and in what circumstances to the government? If Tract C constitutes a proper LEU by itself, it could be subsequently offered by BLM in a truly competitive auction, and a true fair-market value obtained for it. This would be an attractive swap for the BLM but probably not for X Co. which could also sell Tract C at fair market value and still exploit its advantageous single-bidder position on Tract A. Consider another Tract D also owned by X Co., but in this case part of a larger LEU, the remainder of which, Tract E, is not in the possession of X Co.

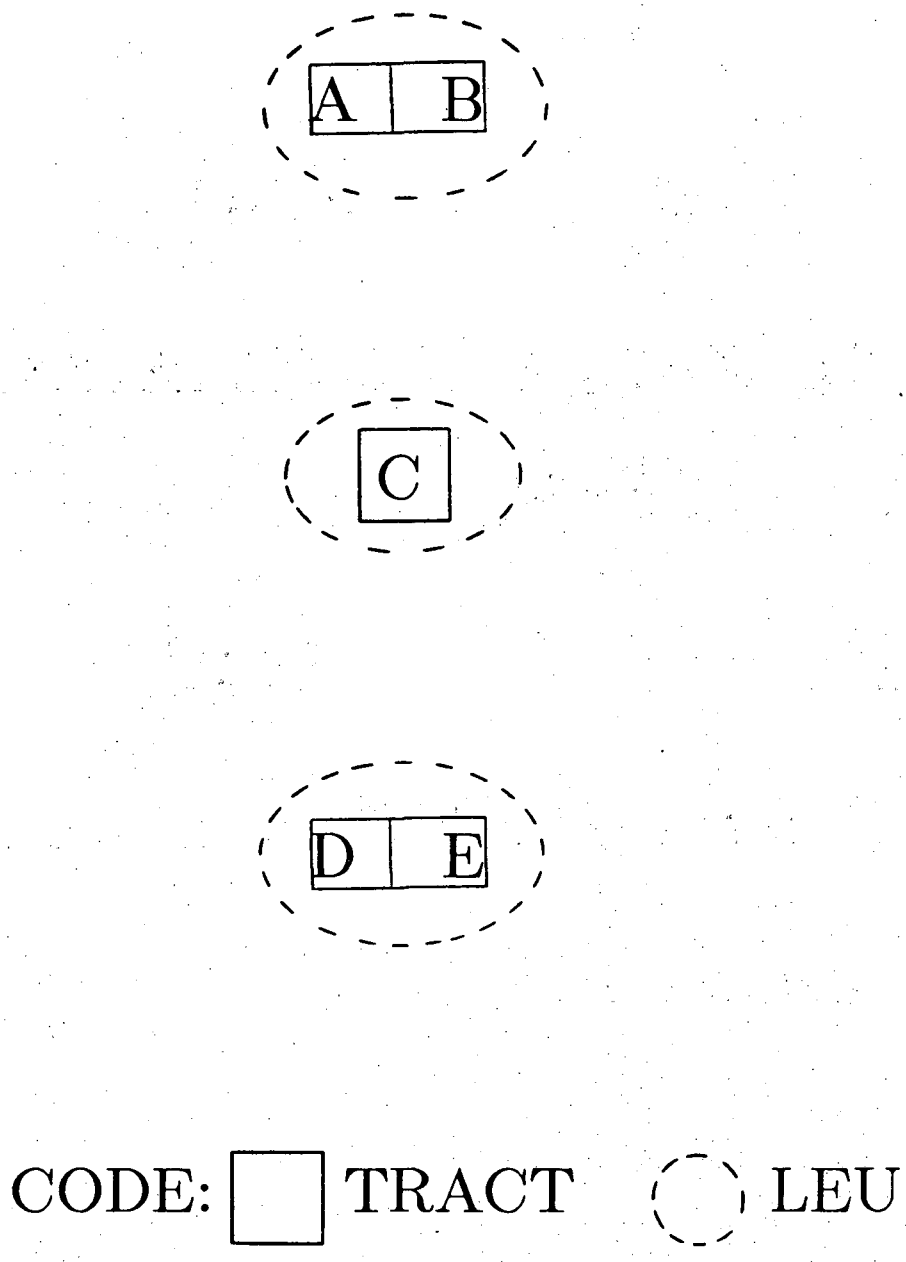
If the government owns E, the prospects are good for a swap, so long as government policy is firm-- and recognized and expected to be firm-- in resisting "competitive" auctions of captive tracts.

Now suppose that Tract E is owned by neither X Co. nor the government, but by Y Co. instead. Now, a more complicated situation exists. A swap with the BLM would only mean trading one captive tract for another, one single bidder for another single bidder, *unless* a similar swap can be arranged with Y Co.! (See Fig. A-2) But conditions for the first-described easy trade are probably not frequently found, while the more likely second-described situation calls heavily on government abilities to package properties into marketable LEU's.

But even if simple exchange situations are uncommon and LEU packaging too complex for government administration, the rent-capture potential of simple exchanges can be great. So long as the government makes widely known its interest in negotiating such simple exchanges, private coal owners can profit from carrying out the exchanges necessary to assemble the kind of simple swap acceptable to the government. Fig. A-3 portrays a situation where X Co., acting as a packager, effects an exchange with Y Co. which brings it into position to present the government with the possibility of a simple swap. In the first part of this transaction, X Co. can gain an edge in its exchange with Y Co. since Y Co. will recognize that the only other way to obtain near full value for its own property is to undertake the packaging effort itself: hence the return to the packager.

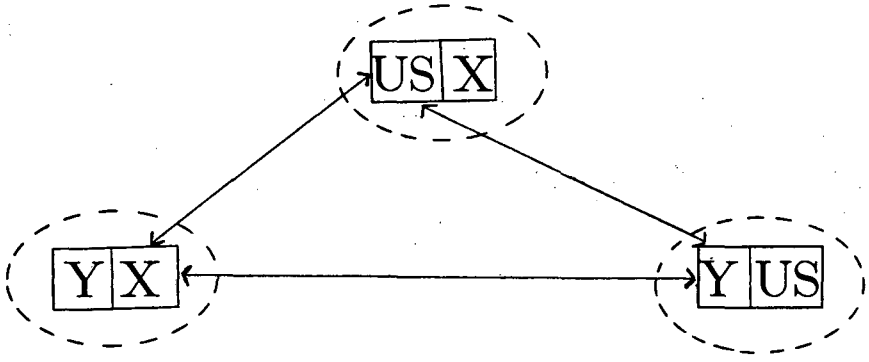
Still another characteristic which may present difficulties for physical exchange as well as other actions concerns the stage of development of the adjoining private tract. If the federal tract under consideration for sale is a captive tract, the appropriateness of some government choices for transfer to private developers depends upon the stage of development of the adjoining "capturing" private tracts. If investment in the

FIGURE A-1.

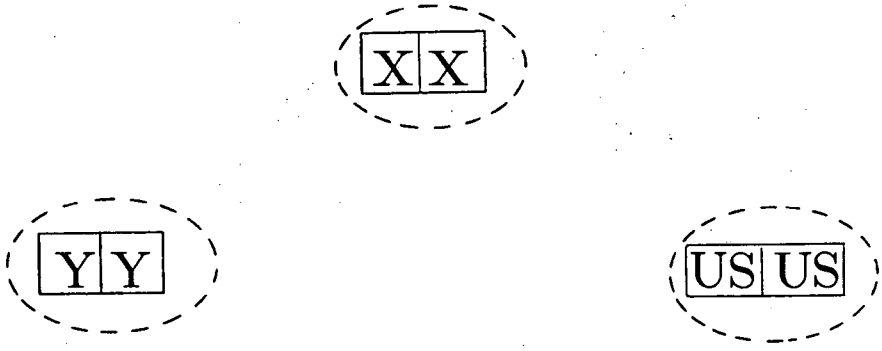


XBL 8611-4613

FIGURE A-2.



INITIAL OWNERSHIP & THE EXCHANGE

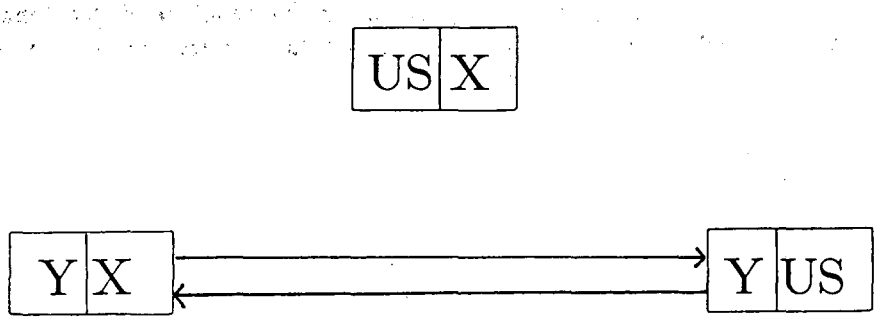


OWNERSHIP AFTER EXCHANGE

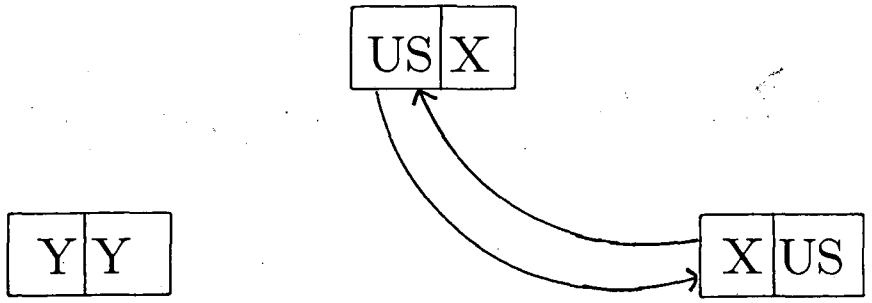
CODE: LEU TRACT

XBL 8611-4614

FIGURE A-3.



SWAP BY X TO ASSEMBLE A SIMPLE EXCH.



THE SIMPLE EXCHANGE

CODE: $\boxed{X}$ = TRACT BELONGING TO X

XBL 8611-4615

development of these adjoining tracts is already substantial, some of the government choices for effecting transfer are ruled out: tract exchanges involving the partly-developed private tract are probably infeasible; share bargaining, if not impossible, would be extremely difficult. These difficulties arise not merely from uncertainties concerning the developer's stake in the enterprise already underway, but because the very design of the mine depends upon the availability of the adjoining captive tract: a bigger dragline would have been built if the federal tract were included, a different electric utility would have been contracted with, etc.

This report was done with support from the Department of Energy. Any conclusions or opinions expressed in this report represent solely those of the author(s) and not necessarily those of The Regents of the University of California, the Lawrence Berkeley Laboratory or the Department of Energy.

Reference to a company or product name does not imply approval or recommendation of the product by the University of California or the U.S. Department of Energy to the exclusion of others that may be suitable.

LAWRENCE BERKELEY LABORATORY
TECHNICAL INFORMATION DEPARTMENT
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720