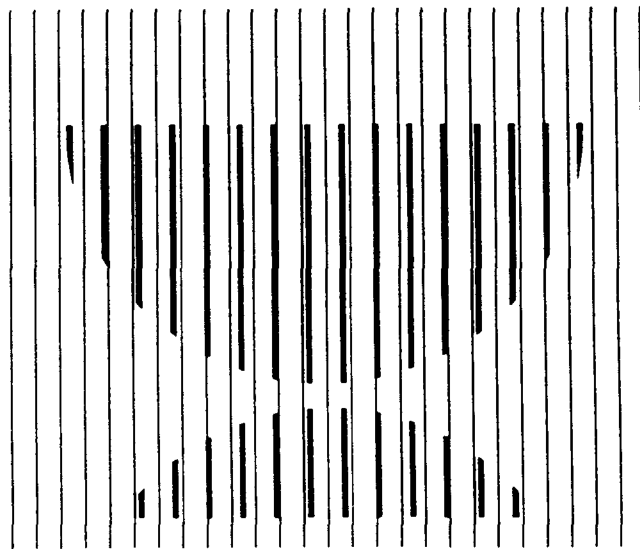
CBO STAFF MEMORANDUM

A REVIEW OF THE
AMERICAN MINING CONGRESS STUDY
ON CHANGES TO THE MINING LAW OF 1872

April 1992



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This memorandum reviews the methodology and assumptions of a study, sponsored by the American Mining Congress, to analyze the effects of two bills, H.R. 918 and S. 433, that would reform the Mining Law of 1872. It was written by Rajagopalan Kannan, Richard Farmer, and Theresa Gullo. This work was done in CBO's Natural Resources and Commerce Division, under the direction of Jan Acton and Roger Hitchner.

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Congress is considering two bills that would reform the Mining Law of 1872. Under the current law, miners who locate certain "hardrock" minerals on federal lands can establish claims that give them the exclusive right to extract the mineral resources discovered. In these cases, the title to the land remains with the government; the claimant has the right to the mineral resources only. To maintain this right, the claimant must fulfill the so-called diligence requirements by performing at least $100 of development work annually.

Claimants can obtain title to the land through a process called patenting after meeting certain conditions and paying a relatively modest fee per acre of land acquired. No royalties or rentals are collected by the federal government for minerals taken from either patented or unpatented lands.

The House bill, H.R. 918, would impose more stringent diligence requirements than does the current law. It would replace the current $100 assessment work requirement with these diligence requirements. After the claim is five years old (or five years after passage for preexisting claims), the requirements could be replaced by a fee--paid to the federal government--that would rise with the age of the claim. Most claims that are being actively mined, referred to as project claims, would probably meet the new diligence requirements without additional expenditure. Nonproject claims--those that have not yet been developed for mining--would be subject to these higher

requirements. Those claimants might pay the federal fees in lieu of meeting the diligence requirements, or might forfeit the claim.

The Senate bill, S. 433, would replace the assessment work requirement with holding fees paid to the federal government. These fees would rise over time and, like the House bill, would make holding undeveloped claims more costly compared with current law. Unlike the House bill, however, S.433 would also impose a royalty of 5 percent of the gross income from minerals production. For producing mines, the royalties would reduce the holding fees due on the claim. Both the House and Senate bills impose fees to recover part of the cost of administration of the new law.

Both bills propose many other changes that would affect firms that search for and develop hardrock minerals. New costs to the mining industry would stem mostly from the new fees and royalties and the changes in diligence requirements that the bills would impose.

The American Mining Congress (AMC) recently commissioned a study of the effects of the two bills on the mining industry, particularly in the Western parts of the country.[1] Among the study's conclusions are the following: either

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1. *Economic Impact of Mining Law Reform*, by Stephen D. Alfers of Davis, Graham and Stubbs, and Richard P. Graff of Coopers and Lybrand; Second Printing (January 28, 1992).

bill would seriously harm the hardrock mining industry, causing an economic slowdown in the states affected; the new fees H.R. 918 imposes could lead to a loss of about 11,600 jobs in the mining and related industries and could cost the states concerned about $1.5 billion per year in economic output; H.R. 918 would increase the federal deficit by about $127 million per year; and the new fees the bill imposes would be more than offset by administrative costs and the direct or indirect losses in federal tax revenue it would cause.

S.433, the AMC study estimates, would produce larger employment losses--about 30,000 workers and an aggregate drop in economic output of about $3.8 billion. The study concludes that the Senate bill would produce a net loss to the federal government of $232 million annually.

After reviewing the AMC study, the Congressional Budget Office (CBO) has reached the following conclusions:

- o The sampling method used to gather the data underlying the analysis is poor, leading to a low degree of confidence in the conclusions reached.

- The analytic methods the authors use lead them to overstate the effects of the changes in the mining laws on mining firms and on the economies in which they operate.

- Other assumptions in the study also tend to overstate the effects of the fees and royalties upon the economies of Western states.

- The finding that the bills would cause an increase in the federal deficit in the long run is based on extreme assumptions about the incremental costs of diligence requirements and the administrative costs involved. In the short run, the study overstates the fees that will go to the federal government.

The remainder of the memorandum expands on those criticisms. The analysis is qualitative; that is, CBO does not present its own estimates of the economic effects of the two bills.

THE DESIGN OF THE SAMPLE

The AMC study relies on confidential information supplied by a small number of mining firms. CBO cannot reproduce the results of the study or even

examine the original data. What it can do is to determine if the sample of firms surveyed accurately represents the total population of mining firms in the states considered.[2] CBO believes the sample is not representative.

The aggregate data in the AMC study indicate that the sample was biased toward larger firms. The authors of the study contacted 524 mining firms, of which 35 (6.7 percent) responded with necessary information. In 1990, these 35 companies were responsible for 62.2 percent of mining revenues in the states considered--but for only 18.3 percent of the claims that would be affected by the bill. Only larger firms responded to the survey. Yet the bills could be expected to have the most effect on the smaller mining firms, which account for a larger percentage of unpatented claims.

In addition, the characteristics of the surveyed firms may not represent the overall population of mining firms in the states. That undercuts the authors' ability to draw inferences about the population from the sample. The authors first estimated, for the firms in the survey, project losses resulting from passage of either bill; they then increased those figures to levels for each state according to the percentage of unpatented claims in the survey. The age distribution of claims in the state was also assumed to be the same as in the

2. The twelve states in the study were: Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming.

sample. That could be a valid procedure if the initial survey had selected mining companies at random. The sample, however, was not randomly chosen. In addition to its being biased toward larger firms, the firms responding to the survey selected themselves to be part of it, and no analysis of possible selection bias was reported. The costs of responding might have determined participation since only larger firms are likely to have personnel available for such a task. Of greater concern is the possibility that the firms responding may have a particular interest in the legislation being analyzed.

To summarize, the sample was not selected using appropriate sampling methods. The aggregation procedure and the results are therefore suspect because the sample may not reflect the characteristics of mining companies in the states surveyed.

THE ECONOMIC METHODS OF THE AMC

The AMC study assesses the effects of S.433 and H.R. 918 on the mining industry in the West by simulating the performance of the mining projects affected after the bills have become law. The simulation uses information on mining projects gathered from the sample of 35 companies and a minimum rate of return on invested capital in projects to decide when a project must be

dropped because of the fees the bills require. Dropped projects lead to dismissal of workers, smaller economic activity in the states concerned, and smaller corporate and personal income tax collections.

The results of the AMC study hinge on the following points of economic analysis:

- The criteria for dropping a project;
- how long it takes workers to find another job; and
- the application of economic impact multipliers to the base of expenditures corresponding to dropped projects.

The Decision to Drop a Project

CBO believes that the criteria used to decide when a project is discontinued are too stringent and that they cause the authors to overstate the number of projects that would shut down. In addition the analysis would have been improved by presenting a base case (that is, examining the performance of the

mining industry without passage of the bills) to compare against the results in the study. The number of projects affected by the diligence requirements is also likely to be smaller than the AMC study claims.

The mining companies in the sample provided information on projects that were currently in production or development or for which feasibility studies had been made. Detailed information on both project and nonproject claims were given for the year 1990. For each project, the bills are assumed to have gone into effect when the claim on which the project is located was first made. The diligence requirements in the two bills are deemed incremental project costs that increase expenditures. The AMC study argues that the costs of exploring claims and of developing and producing at projects do not cover such fees. If the extra costs are sufficiently large, the project is forced to shut down, and its workers--as well as those who are involved at nonproject sites--are dismissed.

The AMC study assumes that a project with positive income will be shut down if the fees or royalties associated with either bill exceed 5 percent of total expenditures in a year <u>and</u> if the return on invested capital that year falls below 15 percent. For projects with negative income, the project will close only if the fees and royalties exceed 5 percent of total annual expenditures.

An example of how a project is dropped may clarify the consequences of that assumption. Suppose a claim was located in 1979. The fees associated with the two bills go into effect. In 1990, a project on the claim must pay diligence fees appropriate for an 11-year-old claim. Suppose the project had a rate of return of 10 percent in 1990 and fees and royalties exceeded 5 percent of expenditures. The project is shut down; and workers associated it are dismissed. They include not only miners but also engineers, lawyers, and accountants. Once shut down, the project is not reopened.

Mining companies also have nonproject claims that are still in the exploratory stage; that is, production, development, or feasibility studies have not yet been done. The AMC study assumes that mining companies do not abandon any claims because of the diligence requirements the two bills impose; instead, workers on nonproject claims are dismissed.

Requiring an annual return of 15 percent on invested capital is not a good decision rule for the viability of a project. A mining company might require a 15 percent return on invested capital before beginning a project. Once the project is in the production stage, however, the firm can be expected to continue mining at the project site as long as variable production costs are being covered. The alternative is to close the mine, lay off many skilled

workers for a year or two, and then start operations again when extraction becomes economically attractive. Given the high start-up costs of mining, that is not likely.[3]

A project should be shut down when the additional cost of labor, equipment, and fees associated with continued production exceed the additional revenues from the mined minerals. This decision rule is quite different from requiring a project to return 15 percent a year on invested capital.

An alternative to the decision rule used in the AMC study would require that the present value of future earnings net of costs from a project exceed zero when discounted by a 15 percent rate of return. This forward-looking rule includes the returns and costs of a project in future years instead of a single year. In this way, projects would not necessarily be dropped because of one bad year as long as they were expected to yield greater returns in the future.

3. In the 1970's for example, although the price of copper fell below the cost of mining it, many companies continued to operate copper mines. Their persistence was eventually rewarded as the price of copper rose to a profitable level during the 1980's.

The study lacks a reasonable base case against which to measure its results. The AMC study does not mention that some projects could be expected to close even if the bills do not become law. All projects pass through the cycle of development, production, and shutdown. Passage of a bill now may cause some projects to close earlier than a mining company would have liked. But the loss in employment and revenues to the state may be for one or two years, not for years into the future since the project was nearing the shutdown phase of its life.

The study ignores the likelihood that mining companies would abandon unpromising claims to avoid the diligence requirements. Mining companies rank their claims in order of profitability. Under present federal policy, it costs little to hold lands that are currently uneconomic to develop for mining purposes. The diligence and holding requirements the two bills impose would raise the costs to the point where a sizable proportion of these claims would no longer be economic even to hold undeveloped.[4] Thus, the diligence expenditures and in-lieu payments the AMC estimates are too large since they would no longer be required for abandoned claims. That, in turn, means lower costs to the mining industry after abandonment of claims; it also means fewer

4. Smaller operators who prospect for hardrock minerals on a part-time basis would be likely to abandon their claims quickly. Judging from the present trend, additional fees could lead to abandonment of up to one-third of the claims now held.

workers dismissed and smaller reductions in corporate and personal income taxes. The decrease in in-lieu payments would also lower receipts to the government.

The study does not reflect the fact that costs of production, development, and detailed exploration at most project sites exceed the diligence requirements. The new requirements need not always be an extra cost of mining activity. For mining projects that are in production or development, annual costs can reach the millions of dollars. Thus, the diligence requirements would already be met. Claims that are being explored with detailed sampling of promising areas also have exploration costs that can run into the hundreds of dollars per acre per year; hence these claim holders would likely meet the diligence requirements without spending any more money than they now spend. The AMC makes no allowance for that and therefore overestimates the impact of the requirements on the industry.

A mining company may claim thousands of acres surrounding a project in order to maintain access to the mine entrance. But that acreage would be part of the development associated with the project; so here, too, the diligence requirements could be at least partly met.

The Duration of Unemployment

CBO believes that more realistic assumptions could have been made about the reemployment opportunities of dismissed workers. The methodology of the AMC study leads to a longer duration of unemployment for dismissed workers and a greater number of workers dismissed from project and nonproject claims than is likely to occur.

The AMC study implicitly assumes that dismissed workers are permanently lost to the economy. That assumption stems from the argument that even if a dismissed mine worker finds another job, he or she would be displacing someone else who would have taken that job.

The assumption about dismissed workers is unrealistic, and it represents only one end of a spectrum of re-employment possibilities. At the other extreme is the assumption that all the dismissed workers will immediately find employment at their previous wages, with no net job loss resulting. Neither assumption is plausible.

A dropped project has several effects on the labor market. First, the dismissed workers will seek employment in their next most profitable line of

work. Some will accept lower paying jobs in the mining industry. Similarly, part of the capital formerly invested in the dropped project may be sold off at reduced prices and used elsewhere, thereby creating more jobs.[5] The job creation from these effects may not be as great as the number of jobs dropped, but the assumption that the workers are permanently lost to the economy is unwarranted.

A more realistic assumption (based on surveys of the unemployed) would be that 70 percent of the workers do find employment elsewhere.[6] Such an assumption would render the lost earnings and hence the multiplier effects smaller and not so long lasting as those estimated in the AMC study.

Some of the displaced workers would seek employment in states other than those the AMC study includes, or for that matter in other states which were included in the study. That implies, however, that the states absorbing these displaced workers will enjoy a positive economic impact offsetting the

5. Although the material used to build scaffolding and pathways for miners cannot be transferred elsewhere, drilling machines, surveying equipment, and trucks for hauling ore can be used in other mines.

6. The U.S. Department of Labor periodically surveys the duration of unemployment for workers who have lost their jobs because of plant closings or the abolition of their positions or shifts and who had been at those jobs for at least three years. Of the 135,000 workers who lost their jobs between January 1985 and January 1990, in the mining sector (which includes oil and coal as well as hardrock minerals), 76.9 percent were employed again in January 1990. Of the remainder, 11.1 percent were unemployed, and 12.8 were no longer in the labor force.

The AMC study supposes that many of the dismissed personnel are white collar workers. The corresponding figures for professional services are 247,000 workers, 81.5 percent employed, 5.3 unemployed, and 13.2 no longer in the labor force.

negative one the affected mining states suffer. It also implies that federal tax revenues would not decrease by as much as the AMC study claims.

The study assumes that when a project is rendered nonviable, it completely shuts down and all the workers at the project site are dismissed. That means no workers are transferred to other viable projects, and no more new projects absorb some of the unemployed. That is unlikely: at least some transference, especially of skilled and experienced workers, is possible, and a project may reopen when extraction of the mineral once again becomes economic.

Total Economic Impact at the State Level

The closing of projects and dismissal of workers at nonproject sites in the mining industry adversely affect the entire economy of the state. The AMC study uses the multipliers developed by the Bureau of Economic Analysis to estimate the ripple effect that occurs when a project is dropped. The study's estimated total economic impacts of the House and Senate bills on the 12 states in the survey are about $1.5 billion and $3.8 billion, respectively.

As mentioned above, however, if the effects of diligence fees, the required rate of return, and duration of employment assumptions are modified, the number of dropped projects and their effects on the state economies concerned are likely to be less than the AMC estimates.

The study supposes that all project expenditures occurred in the region. But costs such as consulting services, corporation office expenses and dividend payments could have been made elsewhere, reducing the regional economic impact of nonviable project shutdown.

OTHER ASSUMPTIONS UNDERLYING THE MINING STUDY

The AMC study employs a host of subsidiary assumptions about prices and costs in the mining industry. The assumptions are not explicitly stated, and indeed, it would have been impossible to list all of them. Nevertheless, some have an important bearing on the results of the study.

The study does not estimate the legal complications arising from the bills and the associated social costs. It also assumes no effects and, hence, no costs of the bills in some states because the sample of mining companies in these states was too small to draw any inferences concerning mining activity.

By assuming the above factors to be negligible, the study underestimates the costs to society of the fees and regulations in the two bills.

Overall, however, the subsidiary assumptions in the AMC study tend to increase the costs to the mining industry and the concerned state economies of the two bills. Among the assumptions, the following appear to be particularly relevant:

- The future resembles the past;
- mineral prices are independent of domestic mining activity;
- capital equipment has no value after a project is dropped;
- mining companies keep all claims and dismiss workers to cover extra fees;
- economic estimates need not take account of flows back to the states from the treasury; and
- estimates need not include all tax receipts.

The Future Resembles the Past

The study does not look at the incremental impact of the bills. By tying itself to the past record of current projects, it takes no account of the effect of future developments in mining on the viability of projects.

For example, gold mining is the biggest mining activity in the West. If the price of gold continues on its present downward trend, many gold projects will have to be closed whether or not the Senate and House bills pass. In addition, producers of domestic metals can expect to face pressure from the exports of the East European countries. That again could result in many project closures--without respect to the passage of the bills.

Mineral Prices Do Not Depend on Domestic Mining Activity

The AMC study assumes that the dropped projects would have no effect on world prices of the minerals concerned. That may be true for minerals such as platinum or zinc, whose domestic production amounts to less than 5 percent of world production. But for those such as molybdenum, whose U.S. production

accounts for about half of world output, the dropped projects would raise prices. That, in turn, would lead to formerly unprofitable mines becoming profitable and to an increase (or smaller reduction) in mining employment. By supposing a constant world price, the study overestimates the job losses associated with the fees in the two bills and consequently overestimates the impact on the states concerned.

Capital Equipment Has No Value After a Project Is Dropped

The assumption that firms scrap all machinery associated with a defunct project is extreme. The trucks and drills can be transferred to another project or sold. Technological advances have made possible the use of compact cutting tools that can be assembled and disassembled quickly. In general, the nonlabor resources at a discontinued project would be released to still-viable projects or to other companies, and these transfers would lead to the hiring of additional workers. The AMC study does not account for this effect.

Mining Companies Keep All Claims and Dismiss Workers to Cover Extra Fees

The AMC study assumes that the increased fees lead to the dismissal of workers at nonproject claim sites. The increased fees themselves do not make companies give up any of their claims. Rather, the fees reduce non-landholding expenditures (such as field office and personnel expenses) by the smaller of two figures: 100 percent of the increased diligence fees or 50 percent of total corporate expenses.

The number of nonproject personnel dismissed could be many fewer if different assumptions were made. For example, mining companies could cut back on the number of claims they hold and not dismiss any workers. In that case, the House bill would lead to 6,316 jobs being lost rather than 11,610 when nonproject workers are dismissed. Alternatively, a company could cut back equally on nonproject claims and workers associated with them until it met the extra cost of the fees.

Economic Estimates Need Not Take Account of Flows to the States from the Treasury

Both bills include a partial return to the states of fees collected for mining activity. The AMC study calculates the positive impact of these funds and subtracts it from the negative impact of the fees on state economies. That procedure provides an accurate picture of the net economic impact of the two bills. But the study assumes that the funds for administering the two bills are not spent in the states concerned. In fact, much of that money will also go to local staff at the Bureau of Land Management and the Forest Service, giving a boost to the state economies.

Estimates Need Not Include All Tax Receipts

The AMC study focuses on federal taxes foregone through dismissed workers and lower corporate mining taxes. But secondary impacts on federal taxes should also have been included. As the study mentions, nonmining industries would pay lower corporate income taxes because of the reduced economic activity in the states the bills affect; that amount needs to be estimated. In addition, funds returned to the states for reclamation of mining lands have a

positive impact on the state economies and, consequently, on corporate income tax receipts.

The net effect on the treasury of the above changes in corporate income taxes would probably be positive rather than negative. Especially under the House bill, nearly all of the fees collected would be returned to the states. That would lead to increased corporate activity in land reclamation and in non-mining industries.

THE EFFECT OF THE BILLS ON THE FEDERAL BUDGET

The AMC study estimates that enactment of H.R. 918 and S.433 would result in additional receipts to the treasury in the form of claim holding fees, in-lieu payments, royalties, and fees to cover administrative costs. Such federal receipts, net of payments to states, are estimated to total between $170 million and $210 million annually.

The study also estimates, however, that enactment of the bills would result in lost tax revenues totaling between $210 million and $310 million a year, as well as additional annual administrative costs for certain agencies amounting to about $100 million. On balance, the study concludes that

enactment of the bills would result in a net loss to the treasury, on an annual basis, totaling between $125 million to $230 million.

While CBO has not attempted to reestimate these impacts, it believes that the AMC study overstates both the additional receipts that would accrue to the treasury as well as the potential losses in tax revenues. Although the ultimate impact of the bill on the treasury is unclear, CBO believes that the study's assessment of that impact is inaccurate.

It is important to correct these inaccuracies because they result in an overestimate of the negative impacts on the mining industry.

Overestimated Fees. Fees that would be collected in the short run are calculated to be larger than will actually be the case. In addition, the amount of fees that would be collected either in the short or long run are overestimated because: i) historically, administrative costs have only been partially covered by fees and ii) companies could choose to abandon acres in viable projects or nonproject acres.

The AMC study assumes that fees that are assessed based on the age of claims--most notably the payments-in-lieu of diligent development in H.R.

918 and the holding fees in S.433--would be assessed according to the age of claims under the current system. Because all claims will have to be reestablished under the proposals, fees would be assessed at a much lower rate than assumed in the study for the next five to 10 years. Consequently, claim holders will pay less to the treasury over this time period than the study estimates.

The study calculates administrative fees based on the assumption that federal administrative costs to implement the new proposals would total about $100 million annually for the next 10 years and that the federal government would set fees at a level high enough to recover all of those costs. Historical experience in collecting fees for similar programs, however, indicates that it would be more realistic to assume that only about 50 percent of administrative costs would be covered by fees. Thus, if experience is any guide, receipts to the treasury from administrative fees are likely to be significantly lower than estimated in the study.

Finally, all fee calculations in the study are based on the assumption that only acres contained in nonviable projects would be relinquished under the new systems. But if companies choose to relinquish marginal acres within

viable projects or to relinquish nonproject acres as well (which is likely), then receipts to the treasury would be lower than estimated in the study.

Overestimated Losses of Tax Revenue. Tax losses to the treasury from the bills are overestimated for two reasons. According to the AMC study, the incremental costs of diligence requirements reduce mining industry income and thus corporate income taxes. But, as pointed out above, the diligence requirements are already being met in most projects. Thus the study overestimates the reduction in corporate income taxes. In addition, the number of dropped projects is likely to be smaller. That implies that the reductions in corporate income taxes given in the study would be smaller.

Similar reasoning applies to the tax losses associated with dismissed workers. Such losses would be smaller as the number of dropped projects decreases. In addition, many of the dismissed workers would find employment elsewhere, adding to federal taxes collected. Thus, the reductions in personal income taxes of the study would both be smaller and less likely to continue year after year than the study suggests.

CONCLUSION

The AMC study can be viewed as a case study of the effects of the two bills on selected Western mining companies in 1990. As such, it could have been improved by comparing project performances before and after passage of the bills. As it stands, the study does not deal satisfactorily with the effect of the proposed bills on the future conditions of the economies of the major mining states. In addition, the assumptions about the incremental costs of diligence requirements and the duration of unemployment for dismissed workers do not agree with the empirical information available on the mining industry.