CLOSURE OF UNDERGROUND COPPER MINES

HEARING

BEFORE THE

SUBCOMMITTEE ON MINERALS, MATERIALS AND FUELS

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

UNITED STATES SENATE

NINETY-THIRD CONGRESS

SECOND SESSION

TO

REVIEW THE ANACONDA COMPANY'S PLANS TO CLOSE ITS UNDERGROUND COPPER MINES IN BUTTE, MONTANA

NOVEMBER 25, 1974

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CLOSURE OF UNDERGROUND COPPER MINES

MONDAY, NOVEMBER 25, 1974

U.S. SENATE,
SUBCOMMITTEE ON MINERALS, MATERIALS AND FUELS,
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m. in room 3110, Dirksen Office Building, Hon. Lee Metcalf, presiding.

Present: Senators Metcalf, Metzenbaum, and Hansen.

Also present: Jerry T. Verkler, staff director; D. Michael Harvey, special counsel, and W. O. Craft, Jr., deputy minority counsel.

Senator METCALF. The subcommittee will be in order.

OPENING STATEMENT OF HON. LEE METCALF, A U.S. SENATOR FROM THE STATE OF MONTANA

This morning, we are holding this hearing to review The Anaconda Company's plans to close its underground copper mines in Butte, Mont. This action will have a disastrous impact on the miners involved, their families, and the economy of Montana.

We have asked the company to explain the reasons for its plans. Montana Governor Thomas Judge, Representative-elect Max Baucus, and Jim Murry of the Montana AFL–CIO will testify on the probable impact of the company's action on Montana's people and economy.

We have also asked Dr. John D. Morgan of the Bureau of Mines to testify about general conditions in the copper mining indusutry.

We want to determine if Anaconda's proposed shift away from underground mining is based on the particular circumstances of the company and the nature of the ore body involved or if it is indicative of general trends in the copper mining industry.

We are equally concerned about the potential long-term social, economic, and environmental implications of elimination of underground copper mining.

We want to identify any needs for new mining or processing technology, more trained personnel or new sources of ore, such as deep ocean mining.

I am going to ask our Congressman-elect Max Baucus who is to be the Congressman from the 1st District of Montana, the district in which the Butte mines are located, to testify first this morning. He is, of course, interested and concerned and will be representing that district for the next 2 years.

STATEMENT OF MAX BAUCUS, A U.S. REPRESENTATIVE-ELECT FROM THE STATE OF MONTANA

Congressman-elect BAUCUS. I want to express my gratitude for the opportunity to appear before you today. I am grateful for your warm reception and the ability to testify at this time.

I was especially eager to present my views before this subcommittee because the problem under its consideration is one that profoundly affects the district I have been elected to represent in the next Congress.

It is a problem that adds to the already heavy burden of economic recession, inflation, and high unemployment that we, in Montana, are unfortunately facing.

Its emergence serves to reinforce a widespread suspicion among my constituents that big corporations conduct their affairs not in the public interest, as they tell us through public relations programs, but rather solely in the interest of ever higher profits.

On Friday, November 15 of this year, the Anaconda, Co. laid off 106 miners employed in the deep mining operation in Butte, Mont. This layoff, according to an announcement made by Anaconda a short time earlier, was to be the first of several in a program to suspend the deep mining operation altogether.

Within 2 to 4 months, according to its announced plans, the company will lay off an additional 540 deep miners.

The total effect of this company action on the community of Butte and subsequently on the State of Montana cannot yet be fully assessed. There are, however, certain projections that can safely be made.

It is known, for example, that each Anaconda, Co. employee supports an average of 3½ dependents, that for every worker displaced through job termination or transfer, an average of 2½ service employees are adversely affected.

Based on these reasonable and rather conservative assumptions, it can be deduced that Anaconda's plan to lay off or transfer a total of 646 workers would negatively affect a minimum of 3,876 people in the city of Butte.

Considering that Butte's current population is approximately 24,000, those suffering from the closure directly comprise approximately 16 percent of the city's population.

It should be remembered, Mr. Chairman, that these figures represent a bare minimum, that Anaconda has, at various times, projected layoff totals of 750 to 1,500 workers in terminating its underground operations.

There exists no quantitative means of assessing the total economic repercussions of the company's plans. Suffice it to state, for the moment, that the purchasing power of those transferred or laid off will be lost to the city of Butte.

The effect of this loss will, in turn, serve to depress the community's economy by decreasing the markets of its retail establishments and service enterprises. Any such depressive effect could prove disastrous at a time of rampant inflation and already high unemployment.

It is, perhaps, an understatement, Mr. Chairman, that the decision by Anaconda to halt its underground mining came as a surprise to the

people of Butte, to the company's employees, and to government at the State and local levels.

Prior to the ratification of a new 3-year labor contract last June 28, for example, Anaconda made no mention whatever, either publicly or during the course of the contract negotiations, of possible cutbacks in its operations; much less of suspending its deep mining altogether.

On the contrary, the company gave its employees and the community every reason to believe that its Butte operations were on solid ground, that stability was assured for at least 3 years.

The Anaconda Credit Union, following the ratification of the new contract, began granting a high volume of loans to employees for home improvements, automobiles, trucks, and recreational vehicles. Moreover, the Anaconda Co., had been participating actively in a manpower training program in conjunction with VO–TECH for the purpose of recruiting and training miners.

Our State, Mr. Chairman, is already suffering the pangs of unemployment. Because of a depressed housing and building market nationwide, our timber products industry has been forced to cut back its operations and has thereby suspended or terminated the jobs of more than a thousand workers.

Montana's employment security division and unemployment service, already faced with a serious challenge, must now expand their efforts to cope with increased unemployment due to events in Butte, events for which there was virtually no warning.

Prior to Anaconda's announcement, the city government of Butte had anticipated undertaking a program to rejuvenate and relocate the business district by mobilizing the efforts and financial support of the city's merchants and businesses.

The need for such a program grew out of the expansion of the Anaconda Co.'s pit mining operation, the result of which is a growing open pit that will eventually engulf a great portion of Butte's present "up town" business district.

The specter of economic stagnation and depression in the wake of layoffs, transfer, and suspended deep mining by Anaconda has shattered the hope of initiating such an enterprise. That specter, Mr. Chairman, casts a shadow over the future of Butte.

Businessmen simply cannot be expected to invest in an economy at the mercy of massive, spur-of-the-moment layoffs and suddenly decreased markets.

What we are seeing in Butte is a vivid example of the staggering effects within a community of corporate decisionmaking. I submit, Mr. Chairman, that it is not unreasonable for a community such as Butte to ask a company such as Anaconda; Why? Neither is it unreasonable for the community to expect a clear, believable answer.

Unfortunately, the company has not seen fit to deliver that answer. It has said only that deep mining of copper in Butte is no longer profitable. Beyond this, Anaconda does not venture.

We are expected to believe, without proof or corroboration, that an operation employing nearly 1,500 people has been unprofitable, an operation for which Anaconda, only months ago, was recruiting trainees.

I, personally, have attempted, through direct questioning of company officials, to determine the degree to which Anaconda's deep min-

ing is unprofitable. Like a number of others, I have met only with tight lips.

Attempts have been made by community leaders in Butte, by unions, by the State government, and by members of Montana's congressional delegation to determine the exact number of workers to be laid off at specific times and who they would be. Again, tight lips.

Newspeople and other interested citizens have asked how the company can pay enormous increases in dividends per share of common stock, how it can report third quarter earnings of $142.1 million, and deem one of its major operations "unprofitable."

These figures represent a 119 percent increase from 1973 third quarter earnings, excluding the $51 million reparation payment for holdings nationalized in Chile. The questions were asked but were met with tight lips.

Mr. Chairman, it would seem that the Anaconda Co. is pursing a calculated policy of silence; that it is deliberately refraining from answering reasonable questions. The unfortunate result of this policy is the rise of speculation in the mind of the public.

There are those who, after reviewing the copper futures market, after noting, as well, that large new mines are soon to be in production, wonder if America's three major copper producers are voluntarily cutting back production to raise prices.

If this were the case, it follows that such cutbacks would occur in marginally profitable operations, if there were no actually unprofitable operations.

Such action might very well be collusive and in violation of antitrust provisions. It cannot be determined, however, without complete disclosure of a company's financial and management records whether or not corporate abuses are occurring.

My contention, Mr. Chairman, is that the time has come for Congress to examine the need to regulate more thoroughly large, powerful corporations. Such regulation should seek to safeguard the security and economic interests of communities whose livelihoods and future are dependent upon decisions made in corporate boardrooms.

It should be the aim of new legislation to define the responsibility of a corporation, such as Anaconda, to its employees and to the communities wherein it resides and, further, to place the responsibility in a proper perspective to the desire for increased profit.

It has been shown that Anaconda's decision to suspend a major mining operation is of enormous consequence to the city of Butte and to western Montana. For this reason, I believe it fitting that Congress undertake to insure that corporate action as sweeping and potentially devastating as this be in accord with the public interest.

I submit that it is the responsibility of Congress to guarantee that communities do not suffer unduly as a result of corporate desires to continually inflate profits.

Mr. Chairman, I want to make it clear that I am not leveling a charge of collusion or illegal activity at the Anaconda Co.; nor do I contend that Government should be involved in the corporate decisionmaking process.

I do contend, however, that the possibility of the kind of corporate abuse I described earlier is a very real one in this and other industries

and that corporations enjoying oligopolistic market conditions owe a greater responsibility to the communities they serve.

Inasmuch as corporate actions can have substantial effects akin to those of state actions, I believe that Congress should require full disclosure by corporations capable of wreaking such impact.

Through disclosure, compliance with existing antitrust laws could be assured. Through disclosure, appropriate regulatory agencies could guard against unfair and illegal practices. Through disclosure, Congress could be made aware of appropriate means of safeguarding the public interest from the merciless pursuit of ever greater profit.

If adequate information were made available, the Congress might have cause to contemplate a differential subsidy program to curb the losses sustained by producers in unprofitable operations while, at the same time, aid in deterring the evils of massive and sudden joblessness.

Mr. Chairman, it is my opinion that, in the last general election, the people of America voiced their belief that government should undertake substantive programs to combat inflation, guarantee jobs, and stabilize the economy.

I believe, therefore, that Congress has the responsibility to examine, in depth, every sector of the economy to ascertain whether or not inflationary practices are being put into effect.

There is certainly ample reason, Mr. Chairman, to question the practices of those industries associated with minerals, materials, and fuels. We know, for example, that, in the copper industry, three major firms account for 90 percent of America's copper production.

We also know that it is exceedingly difficult to obtain reliable, consistent information pertaining to the decisions and actions of those firms' decisions and actions which profoundly affect the lives of countless Americans and ultimately the consumer prices which we all must pay.

In order to pursue effectively an inflation fighting program, Congress must be afforded access to all information accurately reflecting the financial condition, reserves, profits, tax liability, ownership, and direction of those major firms.

I am hopeful, Mr. Chairman, that legislation will emerge that effectively provides for this kind of disclosure.

Thank you very much.

Senator METCALF. Thank you very much, Mr. Baucus.

Mr. Place, do you have a copy of Mr. Baucus' statement?

Mr. PLACE. No, we do not, to the best of my knowledge.

Mr. BAUCUS. I have only two copies here. I can have copies made.

Senator METCALF. Will you provide him with a copy? We will provide the reporter with another copy immediately.

You are evidently in the same position we are. Copies of your statements were just delivered this morning, too.

Mr. PLACE. We delivered our statements at 6:30 Friday afternoon, Senator.

Senator METCALF. I asked my staff to stay and they did stay until 6:30.

Mike, what time did you leave?

Mr. HARVEY. At 6:30.

Senator METCALF. We were told they would be delivered at 5:30 and we stayed over but the first opportunity I had to look at them was when Mr. Meacham brought them in this morning so we are floundering.

My point was that, if you want some questions asked of Mr. Baucus or some of the other witnesses, I will ask them or Senator Metzenbaum will ask them or Senator Hansen will ask them. We do not want to make this an adversary proceeding but we do want to have all of the information developed that we can this morning.

Unless there is objection, I am going to ask Mr. Baucus, who will be representing our district in a few days, to sit with the committee this morning. I will, if you wish, have him called as a witness and propound to him any questions that you might want to present to him.

Mr. PLACE. All right.

Senator, I would like to mention just for the record, that we have a receipt here signed by Laura Beaty that the statements were delivered.

Senator METCALF. Fine.

Mr. PLACE. On November 22.

Senator METCALF. It was sometime after——

Mr. PLACE. It was after 6:30. I appreciate your staff staying around.

Senator METCALF. It does not make any difference I was not able to get hold of the statement until this morning and I know you have not been able to get hold of some of the statements, either, so we are starting even.

Mr. PLACE. Starting even.

Senator METCALF. This is a little extraordinary but I think the Anaconda people should be permitted to either rebut or propound questions through the committee.

Our next witnesses will be John Place who is president of the Anaconda Co. and he is going to be accompanied by Mr. Perry O. Sandstrom, project manager, Butte underground study, and Mr. Richard Miller.

Is Mr. Richard Miller a geologist with the Anaconda Co.?

Mr. PLACE. Mr. Miller is not here. He has illness in the family. We have an associate of his who will testify at the appropriate time and read Mr. Miller's statement.

Senator METCALF. Please introduce for us your colleagues at the table and go ahead with your statement or in any way you wish.

Mr. PLACE. Be delighted to.

STATEMENT OF JOHN B. M. PLACE, PRESIDENT, THE ANACONDA CO.; ACCOMPANIED BY PERRY O. SANDSTROM, PROJECT MANAGER, BUTTE UNDERGROUND STUDY, ATLAS COPCO, INC.; WILLIAM E. QUIGLEY, VICE CHAIRMAN OF THE BOARD, NEW YORK; FRANK M. MONNINGER, PRESIDENT, MONTANA MINING DIVISION, BUTTE, MONT.; AND RICHARD B. STEINMETZ, JR., VICE PRESIDENT AND GENERAL COUNSEL, NEW YORK; AND OTHER COMPANY PERSONNEL TO BE CALLED UPON AS NEEDED

First of all, let me say we appreciate the opportunity to be here.

My name is John Place. I am president of the Anaconda Co.

I mentioned the words "Anaconda Company" because, as you know, Senator, we have very large aluminum operations also in your good State at Columbia Falls.

My appearance before the subcommittee today is in response to your request to explain our reasons for the suspension of underground mining operations at Butte, Mont., and to report on the company's future plans in the Butte district.

Essentially, there are two reasons underlying the decision to curtail our underground mining. One, of course, is economic.

We are confronted by the simultaneous declining copper price—on which, by the way, Phelps Dodge lowered the price to 72 cents on Friday from 75 cents—and the dramatic rise in costs that all industries have experienced in these inflationary times.

The second reason is of a technical and operating nature and it is one that has consequences of great magnitude for the community of Butte.

We have reached the conclusion that continuation of vein mining would seriously impair the mineral potential of the large zones of lower grade underground ore beneath the Butte Hill.

Our hopes for another half century of operations in Butte rest upon our ability to mine this deposit by innovative large-scale bulk mining methods.

I plan to outline these twin reasons in greater detail.

In addition, another witness will read a statement and we will file with the subcommittee an additional statement for background information. Also, we have present, in the hearing room, several Anaconda executives and technical experts and I would like to introduce them to you.

With me at the table on my right is Mr. William E. Quigley, vice chairman of the board, New York. On my immediate left is Frank M. Monninger, president, Montana mining division from Butte.

Richard B. Steinmetz, Jr., vice president and general counsel from New York is also with me. Other company personnel are with us in the hearing room who can be called on if needed.

From an economic standpoint, the Butte underground operations have been unprofitable for a long period of time. From the time that work was resumed after the 1959, 1960 labor strike until the next prolonged strike in 1967, the costs of underground production exceeded the sale price in each of those 8 years and our total losses from underground operations in that period exceeded $38 million.

When a labor settlement was finally achieved in 1968, the company was faced with a hard decision on whether we should reopen the underground mines.

It was finally concluded that we would continue underground operations in a limited fashion, utilizing some innovations to reduce costs. At that time, we advised the representatives of organized labor that the reopening would be on a trial basis.

The resumption, in 1968, was on a considerably reduced scale. The Leonard mine was not reopened and curtailments were made at the two remaining mines; the Mountain Con and the Steward.

As a result, the underground work force was 425 miners, a reduction of 1,315 miners from the prestrike employment level. Many other economies were initiated as work resumed in 1968.

We reduced development costs to a minimum by a pay-as-you-go program that limited development work to an as-mined basis. We held down our equipment and supply costs by the use of salvage materials from the discontinued mines.

By these and other measures, we managed to hold our pound costs below the selling price from 1968 through 1971.

However, the problems proved unrelenting. There was a gradual decline in the grade of underground ore. We encountered high ground temperatures, water difficulties, and incompetent rock.

Good veins became a thing of the past. We were required to work smaller stopes in scattered locations which created horrendous logistical problems in transporting men, equipment, and ore to and from the work locations.

By 1972, our pound costs had again exceeded the selling price. As productivity per man shift declined and operating expenses continued to climb, this margin of loss widened.

In 1973, our underground pound costs were 52.3 cents against a delivered price of 49.9 cents. In 1973, our cost was 63.3 cents against a price of 58.4 cents.

When price controls allowed an increase at the end of 1973, we were able to keep our costs below the price level for the first four months of this year but, in May, our costs again climbed upward to 83.3 cents and, in August, mainly due to lower ore grades, the pound costs rose to $1.18.

A major increase in labor rates becoming effective July 1 was also a factor and, as these costs mounted, the world and domestic copper prices turned downward, falling from $1.52 to 58 cents in a period of about 4 months.

Attached as appendix A to this statement are schedules of production, costs, and profit and loss for the vein mines from 1960 to the present.

Senator METCALF. Mr. Place, I notice you have a footnote there. That is a statement that was in the statement Mr. Baucus said to you. We will put both of those letters in the record at the conclusion of your remarks.

Mr. PLACE. No objection, at all, Senator.

Senator METCALF. That exchange of correspondence will be put in the record immediately after Mr. Place's remarks are concluded.

[The letters referred to appear on p. 16.]

Mr. PLACE. I will read the footnote. I think it is important.

Senator METCALF. Yes; it is important here, but I think the whole correspondence is important.

Mr. PLACE. In this connection, I might add, in the letter to the gentleman; I quote:

> As to the "high, stable price of copper", the London Metal Exchange price went from 48 cents on January 2, 1973 to a high of $1.52 and back to 58 cents in a period of 21 months. The Anaconda price was limited to 60 cents under price controls until December 8, 1973 when it was permitted to increase to 68 cents per pound.
>
> With the termination of price controls on May 1, 1973, the price moved to 80 cents and then to 85 cents on June one, back to the 79 cents on September 17th, and to the present price of 75 cents on October 16, 1974.
>
> Ample supplies are in prospect for the midterm and there certainly is no upward pressure on the domestic copper price at the present time. We do not,

however, plan on the basis of the fluctuations in the price but rather on the basic production costs and there is no future for the present underground mining methods in Butte based on this criterion.

Caught between escalating expense and a declining price, Anaconda had to face the hard fact that continuation of underground vein mining at Butte could not be justified. Our losses were $1.1 million in 1972 and $2.2 million in 1973.

We projected a loss of $3.2 million for 1974 and even greater losses for future years.

I realize the thought has been expressed that, since Anaconda has improved its profits on a corporate basis, we should be able to carry the Butte underground operations at a loss to avoid community hardship.

As you Senators have a duty to your constituents, the management of a corporation has a duty to its stockholders, its employees, and its pensioners. We cannot allow unprofitable operations to drain away the funds we need to maintain and expand healthy operations.

While the loss of jobs resulting from the suspension of vein mining is indeed painful, it would be most imprudent to continue these losses and thereby threaten the jobs of those other employees who will be maintained in our other operations in Butte.

It cannot be assumed that improved Anaconda profits this year are sufficient to permit us to continue operation of an unprofitable mine. We are much stronger financially than 3 years ago but we started from a low base and have a long way to go to become as profitable as other companies in our industry.

Based on published data for the first 9 months of this year, even with improved sales and profits, Anaconda reported the lowest return on shareholders' equity and on investment of seven principal copper producing companies.

We are obligated to our shareholders, our employees, and our customers to take the necessary steps to improve the efficiency and profitability of our overall operations.

The return for Anaconda for the 9 months ended September, 1974 was Kennecott, 16.0; Phelps Dodge, 15.3; Amax, 17.1; American Smelting and Refining, 19.9; International Nickel, 23.7; and Inspiration Copper, 14.8.

There is, perhaps, a corollary to our present situation.

Following the expropriation in 1971 of our Chilean operations, drastic measures were required for the company's survival. Unprofitable and marginal operations had to be shut down at mining and manufacturing locations throughout the company.

This included the zinc operations at Great Falls that affected some 770 employees; we shut down four brass mills in the Eastern States; shut down our lead smelter in Utah; disposed of our beryllium manufacturing unit; sold our zinc fume plant at East Helena; curtailed our corporate headquarters staff from 520 to fewer than 200 employees; and curtailed payrolls throughout the company.

Proceeds from the sale of our large timber holdings in Montana were used to give us greater financial flexibility.

These measures were painful but they were necessary at that time.

Let me add, parenthetically, that the Anaconda organization has emerged from those very dark days of 1971 as a financially strong and operationally sound company that, with proper business policies, will continue to prosper as one of America's great companies.

The improvements in our financial position enabled us to strengthen and expand many of our operations in Montana. Only by maintaining this financial strength and generating profits to increase our capital can we afford to make new investments in Butte and the other locations where we do business in Montana.

The funds available to any large corporation are limited and the demands are heavy. As you know, much of our capital has been committed to environmental control programs in Montana.

As of this date, our company has spent more than $29.4 million for emission controls at the Anaconda smelter and we will spend an additional $18.5 million to complete the program.

In Butte, we have expended more than $9.5 million for water quality control and reclamation of mined lands. These two activities carry an ongoing price tag of approximately $2 million per year.

It is the clear duty of management to invest its remaining funds in projects that have the potential for a fair profit return.

Not only would continuation of vein mining incur substantial losses, but it would require an additional investment of $10.3 million for ventilation shafts to maintain proper working conditions.

The commitment of this money simply cannot be justified when it is needed for other projects that have a profit potential.

Let me add, Senator, that Montana has had, and will have, a healthy share of these new investments. Recent examples include development of the East Continental Pit, expansion of dump leaching and precipitation operations, construction of the $40 million Arbiter hydrometallurgical plant at Anaconda, and the $9 million expansion of the refinery at Great Falls.

Let me point out here that every effort was made to find some way to restore the underground operations to a profitable posture. I am proud to say that our Montana staff is both resourceful and stubborn.

Many of them have spent their professional lives in vein mining and have been dedicated to finding solutions to the problems of our Butte underground mines. They are an affirmative group, looking for answers in the face of relentless problems.

With their own experience and that of outside experts, they represented the top expertise available in the fields of giologica interpretation, rock mechanics, mining methods, mining equipment, drilling and blasting, materials handling, miner training programs, and organizational techniques.

In 1973, Montana management also selected Perry O. Sandstrom, an internationally recognized authority on underground techniques, to consider long-term answers, a study that will be mentioned in more detail later.

I would like to introduce Mr. Sandstrom. He is a distinguished mining engineer from Sweden. He is a technical director of Atlas Copco, Incorporation and project director of the Butte Underground Study.

Senator METCALF. I understand Mr. Sandstrom will testify right after you have finished.

Mr. PLACE. That is correct, sir. We had our period of optimism.

The load-haul-dump system seemed to have considerable promise and we also had hopes for increased productivity through mechanized mining in selected stopes. However, the pressure of higher costs was inexorable.

Earlier this year, our Butte staff undertook a last-ditch effort to come up with a plan that could show viability for the Butte underground operations. All alternatives were explored and five separate plans were developed.

Unfortunately, each plan had a negative result. The projected losses ranged from $10.8 million for the plan that was limited to load-haul-dump methods to a staggering $22 million deficit under the worst plan.

The first plan was rejected on August 7. A second plan was formulated and reviewed on September 10 with the conclusion that the Steward, Leonard, and Mountain Con should be curtailed.

The third and fourth plans were analyzed on October 7 and it was decided that the Kelley near-shaft operation was not feasible but that further consideration should be given to continuation of the load-haul-dump operations.

The fifth and final plan on load-haul-dump was considered on October 24 and 25. Due to the projected high costs, we decided that even these operations could not be continued.

As you can appreciate, this was not a precipitous decision and, contrary to some impressions, it was not one that was dropped with shocking suddenness upon an unwary community.

Over the years, the marginal nature of the underground operations has been explained many times to the public. For instance, in 1969, our vice chairman, William E. Quigley, outlined these problems in a speech to community leaders. Over the years, the problems encountered in vein mining have been explained on numerous occasions by our local management and in communications to our employees. Last November, Frank Monninger pointed out, in a public address, that the underground operations were in serious jeopardy. In August of this year, we placed a hold on all hiring at the Butte operations. On September 17, we advised employees of the curtailment of the underground mining operation. This was released to the press 2 days later.

In late October, however, when it was determined that even these nearsurface operations would not be practical, our employees were notified of this decision by individual letters on October 31, well before the actual layoffs began. Union and public officials were informed the same day. In your letter, you indicated that our failure to notify public officials until our decision to close was an accomplished fact aggravated the situation. We are charged with the burden of decisionmaking for our company and there is no way we can delegate that responsibility to public officials or anyone else. We did make a deliberate decision to notify the work force, first of all. We thought it unfair that our employees, those who are affected most by the mine closing, should have to learn of the decision in the newspapers. Then, immediately after, a letter was mailed to the employees, the union, and public officials were notified.

We believe that with the curtailment taking place over 4 months there is ample opportunity for us to work together to ameliorate the impact. Actually, with all of the industrial layoffs around the Nation in recent weeks, we have not seen another curtailment announced that is to be as gradual as our announced 4-month period.

In view of our disclosures over the years and the on-going speculation about the future of our underground operations by our employees and other knowledgeable citizens of Butte, I believe that the suspen-

sion of vein mining was foreseen by a large segment of the community.

We have since announced that 106 employees were to be laid off on November 15. The remainder of the curtailment is to be carried out in an orderly fashion over approximately 4 months.

The exact timing of individual layoffs will depend to some extent on the cleanup mining we expect to do in some stopes. While the exact number of additional jobs to be eliminated is not now certain, the number could reach 540.

We plan to reassign many of our underground miners to other jobs in the Butte operations on a seniority basis and we also will retain about 165 underground workers for jobs in the geological study and drilling program.

For those miners who wish to continue in their occupation, there are numerous opportunities at other locations. Eleven other companies have been advertising in Butte for skilled miners and nine companies have been actively recruiting in the area.

I do not minimize the hardship and dislocation that will result from the suspension of underground operations. This is particularly true in view of the high unemployment rate in Montana.

There have been large layoffs in Montana's lumbering industry. There are also depressed conditions in the agricultural and construction industries.

Likewise, there are massive layoffs throughout the Nation in the automobile industry and housing industries which are, incidentally, major consumers of Anaconda's fabricated products, but it should be pointed out that our present layoff at Butte involves far fewer people than our Montana curtailments in 1968 and 1972 and far fewer workers than are being terminated in other industries.

Let us now turn to what I said at the outset was our second reason for suspending the vein mining operations which is the technical and operation problem.

For many years, we have known that the Butte Hill contains a tremendous tonnage of mineralized material. It cannot be mined by our present underground methods but we have been unwilling to abandon this great natural resource.

Various methods have been examined over the years to find a key to this challenge. Now the work of several generations of Montana mining men has been reviewed and distilled through the Butte Underground Study undertaken in 1973 by the group headed by Mr. Perry O. Sandstrom.

This study is combining the thought of some of the world's outstanding mining experts and is testing the applicability of mining methods and techniques at modern mechanized underground mines throughout the world.

The study, in which we have invested more than $500,000 to date, confirms that what has been needed is a high volume, low cost system of mining this deposit.

The Sandstrom group reached the conclusion, shared by our own people, that the only practical way to mine this huge mineralized zone is by high volume, bulk mining methods. Mr. Sandstrom will present a statement on this subject to the subcommittee.

However, even this system could not succeed unless the remaining high-grade and medium-grade mineralized zones were left intact.

Taken alone, the bulk of the mineral deposit has a projected grace of 0.5 to 0.6 percent.

This would not be economically mineable but, when the remaining vein structures and medium-grade zones are included, the projected grade of the total deposit is increased significantly to an improved grade high enough that may make it possible to mine the deposit by improved bulk mining methods.

In essence, if we continue vein mining, it will be like pulling raisins out of a pudding. The continued extraction of vein ore would render what can be a great resource into a mass of worthless rock.

Moreover, continued mining will result in oxidation and contamination of the deposit and additional openings and interstices in the rock will further complicate the mechanics of future bulk mining operations.

From this standpoint, the decision was easy. We had two choices.

One was to continue vein mining for a few years at a loss. The other was to suspend vein mining and preserve the viability of this mineral deposit.

We elected this latter course.

This low grade deposit beneath the Butte Hill has been calculated at between 500 million to 1 billion tons. With successful bulk mining methods, it would provide 50 to 60 years of mining and a potential of more than 14 billion pounds of copper; nearly as much again as has been recovered from the Butte Hill in the last century of mining.

I am confident that our course is in the best interests of the people of Butte, the State of Montana, the company, our employees, and for the fulfilment of this Nation's future copper requirements.

I also believe, with strong conviction, that the people of Butte will agree that it is worthwhile to endure a short-term hardship for the potential of a much greater benefit from eventual underground mining operations.

We are doing what we can to minimize the impact of this curtailment. As we announced, the shutdown will proceed in an orderly plan over the next 4 months.

There will be adequate time for public officials and agencies to assist in minimizing the effects of the mine closing and we are obviously going to cooperate with the concerned agencies to the fullest extent.

It is coincidental that the economic and technical reasons for our decision converged at the same point in time. From an economic viewpoint, underground operations had become unprofitable and there was no prospect that these losses could be reversed.

From a purely business basis, that fact alone would dictate closure of the underground mines but more important was the technical and operation conclusion that vein mining should be suspended to make possible a long range underground mining program.

Senator HANSEN. May I interrupt right there?

Did you mean what you say: "To make possible a long range underground program or bulk mining"?

I am confused.

Mr. PLACE. It is long range bulk mining, underground. I do not say it will be the same method but we will be moving substantial tonnage as against the relatively small vein mine but it will be a completely different type of mining.

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Senator METCALF. Mr. Sandstrom or someone is going to tell us the difference between this bulk mining operation and vein mining.

Mr. PLACE. We will be delighted to explain the difference. Mr. Monninger can explain the difference and we will be delighted to do so, Senator.

Senator METCALF. Whoever is going to explain that to us.

Mr. PLACE. Absolutely, sir.

Senator METCALF. As Senator Hansen's question indicates, this is going to be different from an extension of the Berkeley Pit. Is that correct? Considerably different?

Mr. PLACE. Yes, sir.

The best answer I think I can give to this, although it may not be the same method, Senator; if you look at San Manuel where they are mining underground today, they are mining underground at the rate of about 60,000 tons a day, whereas our underground mining rate is about 2,000.

It is a high-level bulk mining operation as compared to the small vein mining of 2,000 versus 60,000 and it uses completely different methods, also.

I do not want to leave the impression that Anaconda is prepared to commence this large scale, bulk mining project at this time. We have begun an extensive 2-year program of underground drilling and geologic study at a cost of $6.3 million to better define this mineral deposit.

After that is done, the feasibility of the project will have to be analyzed.

If a decision to go ahead is made, at least 5 more years would be required for the planning, engineering, development, and construction of extensive surface, shaft, and underground facilities prior to initial production.

With the phaseout of the underground operation, we will concentrate on our open pit operations—the Berkeley and the Continental pits—together with the related dump leaching and Week Concentrator operations.

Ore reserves presently delineated continue to indicate 15 to 18 years of pit operations.

Before the ultimate termination of open pit operations, which, of course, may be extended by the discovery and delineation of additional open pit reserves, we fully expect the mining of the vast underground ore potential in the Butte district will provide a continuity of competitive operations for many years.

The subcommittee, of course, understands that, until we see the results of the underground study, precise commitments on our future course of action must be deferred.

Mr. Chairman, in your invitation to appear here today, you stated the subcommittee wants to determine if the shift away from underground mining is based on the particular circumstances of Anaconda and the characteristics of the mineral deposits involved, or if it is indicative of general trends in the copper mining industry.

From the foregoing, it is evident that the "shift" away from our historical underground mining operations is, indeed, based on the particular circumstances of Anaconda and the characteristics of the mineral deposits involved.

The "trend" that can be discerned is not a trend away from all underground mining, as such, but a trend away from high cost, low productivity underground mining methods and a trend toward highly mechanized, bulk mining methods where high productivity will enable the mining of lower grade underground ores at acceptable costs.

The new techniques will result in superior working conditions, a high-level safety environment, reduced worker fatigue, and highly specialized equipment operation.

If, as we hope and believe, we can develop a satisfactory master plan for the bulk mining of lower grade ores at Butte at projected costs that will support an adequate return on the necessary investment, then the Butte underground mines can be the type of mines toward which the copper industry is moving.

If not, they will be remembered as underground mines of the type away from which the copper industry trend is clearly moving.

This company has the skills and we probably will need some luck. We, most certainly, will need the understanding and cooperation of our employees, the public, and, particularly, the government officials whose support can be essential to the success of this project.

But, if our hopes and plans materialize, we can have a stable and successful mining operation in Butte for many decades to come.

Mr. Chairman, allow me to close on a personal note.

While I have been a director of Anaconda since 1969, I have been the chief executive officer for only the past 3 years.

I did not have the benefit of a long background in Montana such as that enjoyed by my valued colleague, to my right, Bill Quigley, who began his distinguished career as a timekeeper on the Butte Hill 38 years ago.

Nevertheless, any man in my position soon realized the heritage that the Anaconda Co. has in Montana. Looking back, one soon recognizes the leadership and foresight of Montanans such as Marcus Daly, John D. Ryan, C. F. Kelley, Harold Hoover, and Roy Glover who helped build Anaconda from a small Montana mining company into an international corporation.

One also should acknowledge the generations of miners, engineers, geologists, and other workers whose skills and sweat kept Butte going and I have genuine admiration for the spirit and resiliency of the people of Butte.

Together, the company and Butte's citizens have experienced momentous times and dark moments—the Great Depression, the demands of two world wars and later conflicts, labor strife, the Greater Butte project, and the advent of open pit mining.

Butte has been doomed many times before by an assortment of experts but ways and means have always been found to carry on. We are, perhaps, at another milestone in that long and difficult history.

I am sure, however, that, once again, Butte will be equal to the challenge.

Mr. Chairman, we would be pleased to respond to your questions but would prefer that you first hear the statements of Perry O. Sandstrom and Richard N. Miller, our chief geologist, Butte operations, which will respond to the request in the notice of hearing to describe precisely what our plans are.

Thank you.

Senator METCALF. Unless there is objection, these charts will be incorporated in the record.

[The exchange of correspondence mentioned on p. 8 and charts referred to above follow:]

NOVEMBER 7, 1974.

Mr. JOHN B. M. PLACE,
President, The Anaconda Co., New York, N.Y.

DEAR MR. PLACE: We are writing to ask that the Anaconda Company delay its planned suspension of underground mining operations, and any intermediate steps toward that end in Butte, Montana.

Our request is made for two major reasons. First, we are not satisfied on the basis of the information at hand, that such a termination of operations is necessary. On the contrary, your announced plans seem contradictory on the basis of the recently announced record profits and earnings of your company and the high stable price of copper on both the domestic and international markets. Another concern in this regard is your admission that there is copper remaining in the mines to be closed at a time when the United States is about to become a "have not" nation, in terms of basic strategic materials.

Second, this decision will have a devastating effect on the people of the city of Butte and the entire State of Montana. Your failure to notify the unions involved, State and local governments, Montana's Congressional delegation, and business and commercial interests in Butte until it was an accomplished fact, aggravates the situation. No time has been allowed for a sufficient inquiry into the facts surrounding your decision or for discussion, negotiation or planning for the potential impact of this decision on the community, State and Nation.

For all these reasons, and others that naturally surround such a situation, we feel it incumbent upon you to produce company records supporting such a hasty suspension of operation and that you delay further actions toward that end until Federal, state and local governments can adequately cooperate with you to plan to take care of the human needs so obviously involved in this situation.

We look forward to your prompt action on this request both for the benefit of Butte and the continued profitable operations of your company.

Very truly yours,

LEE METCALF,
THOMAS JUDGE,
MAX BAUCUS.

THE ANACONDA CO.,
New York, N.Y., November 12, 1974.

Hon. LEE METCALF,
U.S. Senate.
Hon. THOMAS L. JUDGE,
Governor, State of Montana.
Hon. MAX BAUCUS,
Congressman-Elect,
U.S. House of Representatives.

Gentlemen: I have your letter of November 7th and have seen at least some of the publicity resulting from public comments attributed to you and others. I understand and appreciate your deep concern over the effects of our decision to suspend underground mining operations at Butte. However, the officers of the company have a responsibility to the shareholders, the employees and the community to manage the company in the most efficient, effective and profitable manner and to assure the continued long range operations of the Butte mines and related facilities in Anaconda and Great Falls. Our decision with respect to the underground mines is essential to the fulfillment of that responsibility. Your understanding and cooperation is also necessary to accomplish this objective and I welcome this opportunity to respond to your letter.

The decision to curtail the present underground operations is the result of very detailed and careful analysis extending over the past two years. These underground operations are not profitable and have not been competitive for an extended period. More important, any further continuation of these operations will definitely jeopardize the entire future of the vast lower grade underground reserves which we are convinced from present studies represent the long range future potential for the Butte district.

The present operations, which are conventional cut and fill stoping of scattered small veins are no longer viable. The tonnage and grade of ore available for mining by these methods has been steadily declining over many years and the costs to maintain access to the numerous working places, let alone the labor, supplies and sundries of actual productive operations, have escalated dramatically. All efforts to increase productivity per man shift have been frustrated by either antiquated work practices protected by union contracts or the basic physical characteristics of the mining problem. Our studies, which have also been supplemented and confirmed by the most knowledgeable people in the industry, have convinced us that there is absolutely no way these present operations can be made even reasonably competitive. This, however, is only a secondary consideration in our decision to proceed immediately with the orderly curtailment of these operations. The primary consideration is the fact that these scattered higher grade veins that remain are essential to maintaining an overall lower grade reserve of very substantial tonnage that we believe will eventually provide a source of copper to extend the life of our Montana operations for many years beyond the life, as presently projected, for the open pit operations.

We are, therefore, as announced, proceeding immediately with a complete and thorough underground geological development and drilling program which will take at least two years and involve 150 to 200 employees. This will also require the continuation of some of the hoisting, pumping and ventilation facilities, the maintenance of the shafts, crosscuts and underground openings to provide access to the target areas for this program. It is an expensive undertaking and is consistent with the very point you raise—so the United States will not become a "have not" nation in terms of copper.

From the above, you can see that our decision was difficult, but it was the only reasonable one considering all the facts, and any delay in its implementation would not be in accord with long term interests of either the company or the community.

You refer to the company profits and the high, stable price of copper. I can assure you these underground operations did not contribute to our reported profits and if profits were the sole consideration these operations would have been closed down long ago. But profits or losses for limited periods are not the sole consideration. The problem is whether a given operation can be made competitive and profitable over the long term and how that particular operation affects the related facilities and overall life of competitive mining operations in the Butte district.

As to the "high, stable price of copper," the London Metal Exchange price went from 48¢ on January 2, 1973, to a high of $1.52 and back to 58¢ in a period of 21 months. The Anaconda price was limited to 60¢ under price controls until December 8, 1973 when it was permitted to increase to 68¢ per pound. With the termination of price controls on May 1, 1974, the price moved to 80¢, and then to 85¢ on June 1, back to 79¢ on September 17th, and to the present price of 75¢ on October 16, 1974. Ample supplies are in prospect for the midterm and there certainly is no upward pressure on the domestic copper price at the present time. We do not, however, plan on the basis of the fluctuations in the price but rather on the basic production costs, and there is no future for the present underground mining methods in Butte based on this criterion.

You feel we have been engaged in a "hasty suspension of operations" and "failure to notify." The facts are that we have advised the unions, the employees and the public from time to time for many years of the marginal and non-competitive character of these underground operations. The announcement of curtailment was made on September 17th. Shortly thereafter, when a decision was made that even continuation of limited near surface operations would jeopardize the long range underground mining potential in Butte, we communicated on October 31 our decision to close the mines to our employees, the unions, to you, Governor, and to the offices of the congressional delegation. An open press conference was held in Butte on November 4th.

This will be an orderly curtailment which will be carried out over a period of approximately four months. The first actual layoffs will take place on November 15th and will involve 106 empoyees.

We are acutely aware of the community and people problems involved and are making every effort to relocate workers at other locations and with other companies. One of our problems is the high turnover of employees in this operation so we stopped hiring in mid-August and encouraged other companies to recruit

underground miners so that normal attrition and alternate job oportunities would minimize the impact of this curtailment as much as possible. This program is working well. A material reduction has occurred through attrition and I am advised that eleven companies are now recruiting in Butte and that to date some 60 miners have accepted employment with other companies. I invite your collective assistance in this effort.

I understand the Senate Subcommittee on Minerals, Materials and Fuels, chaired by Senator Metcalf, will hold hearings in Washington on November 25th in connection with this curtailment and related trends in the copper mining industry. I assume each of you will be present and I will be happy to participate and supply such information as may be required to facilitate this investigation.

Respectfully yours,

JOHN B. M. PLACE.

APPENDIX A

STATEMENT OF REVENUE AND COSTS, VEIN MINES 1960–73 INCLUSIVE, AND 9 MONTHS OF 1974

[Thousands omitted on production and profit and loss]

	Pounds of copper produced	Selling price of copper per pound (cents)	Cost per pound of copper produced (cents)	Profit or loss
Year:				
1960	45,863	32.05	33.72	($765)
1961	57,427	29.92	35.97	(3,475)
1962	72,180	30.60	35.83	(3,775)
1963	85,689	30.60	38.16	(6,476)
1964	88,587	31.96	35.23	(2,893)
1965	93,846	34.24	40.95	(6,295)
1966	77,249	35.48	44.53	(10,857)
1967	38,048	36.77	46.32	(3,633)
1968	27,049	41.11	32.77	2,256
1969	38,259	46.54	39.05	2,869
1970	38,791	56.83	43.26	5,267
1971	26,505	51.00	47.71	872
1972	41,879	49.89	52.32	(1,020)
1973	43,648	58.40	63.35	(2,159)
1974 (estimated)	35,511	75.28	84.28	(3,200)
Months in 1974:				
January	4,116	67.38	61.74	
February	3,909	67.38	64.78	
March	3,952	67.38	64.57	
April	3,670	67.38	66.18	
May	3,140	80.90	83.31	
June	2,870	85.95	91.96	
July	2,889	86.00	89.09	
August	2,304	86.00	118.16	
September	2,558	83.00	96.06	

STATEMENT OF ORE TONS PRODUCED—GRADE AND COST—VEIN MINES 1960–73 INCLUSIVE, AND 9 MONTHS OF 1974

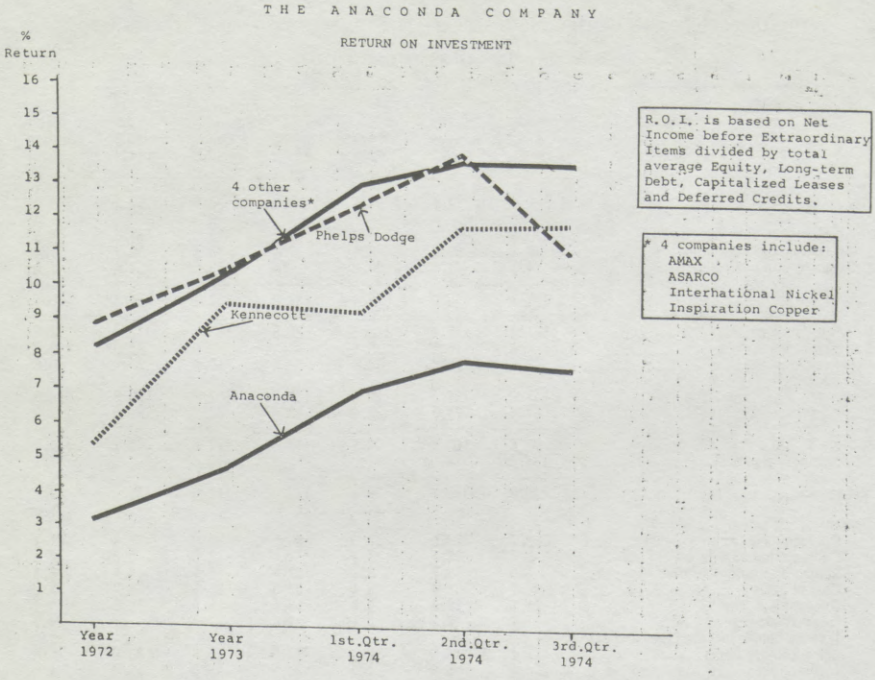
Year	Wet tons of ore produced	Grade	Mining cost per ton of ore	Year	Wet tons of ore produced	Grade	Mining cost per ton of ore
1960	683,570	3.93	$11.80	1968	311,363	4.38	16.80
1961	942,950	3.94	14.18	1969	510,891	3.76	17.14
1962	980,432	3.99	15.90	1970	543,125	3.67	18.46
1963	1,249,978	3.91	16.03	1971	357,914	3.77	20.93
1964	1,464,394	3.59	14.03	1972	578,484	3.73	24.29
1965	1,584,390	3.40	13.53	1973	668,335	3.39	27.87
1966	1,445,930	3.10	14.47	1974 (9 mo)	694,226	2.92	24.57
1967	779,744	2.75	14.88				

APPENDIX B

THE ANACONDA CO.—9 MONTHS ENDED, SEPT. 30, 1974 COMPARATIVE INCOME STATEMENTS

[Dollars in millions except per share amounts]

	Anaconda	Kennecott	Phelps Dodge	Amax	American Smelting & Refining Co.	International Nickel	Inspiration Copper
Net sales	$1,328.9	$1,277.9	$793.9	$902.8	$1,021.9	$1,192.2	$63.0
Operating costs and expenses	1,090.8	932.4	627.2	781.3	823.2	684.6	51.3
Depreciation and depletion	36.8	66.2	26.4	NA	25.4	69.7	7.8
Selling and administrative expenses	54.1	41.4	24.8	NA	19.5	NA	1.3
Cost of sales	1,181.7	1,040.0	678.4	781.3	868.1	754.3	60.4
Operating income	147.2	237.9	115.5	121.5	153.8	437.9	2.6
Interest expense	22.6	16.5	16.5	NA	6.9	31.9	2.3
Other revenue	22.4	16.4	30.9	32.2	10.8	23.2	10.6
Income before taxes and extraordinary items	147.0	237.8	129.9	153.7	157.7	429.2	10.9
Income taxes	54.4	74.7	33.0	40.4	35.7	197.5	1.0
Income before extraordinary items	92.6	163.1	96.9	113.3	122.0	231.7	9.9
Extraordinary items	138.3	(4.5)		5.1	(10.0)		(2.2)
Net income	230.9	158.6	96.9	118.4	112.0	231.7	7.7
Percent of net sales:							
Operating costs and expenses	82.1	73.0	79.0	86.5	80.6	57.4	81.4
Depreciation and depletion	2.8	5.2	3.3	NA	2.5	5.8	12.4
Selling and administrative expense	4.0	3.2	3.1	NA	1.9	NA	2.1
Cost of sales	88.9	81.4	85.4	86.5	85.0	63.2	95.9
Operating income	11.1	18.6	14.6	13.5	15.0	36.8	4.1
Interest expense	1.7	1.3	2.1	NA	.7	2.7	3.7
Income before income taxes and extraordinary items	11.1	18.6	16.4	17.0	15.4	36.0	17.3
Income taxes	4.1	5.8	4.2	4.5	3.5	16.6	1.6
Income before extraordinary items	7.0	12.8	12.2	12.5	11.9	19.4	15.7
Extraordinary items	10.4	(.4)		.6	1.0		3.5
Net income	17.4	12.4	12.2	13.1	10.9	19.4	12.2
Earnings per share	$10.46	$4.78	$4.71	$4.66	$4.19	$3.11	$3.17
Return on investment, before extraordinary items (percent)	7.6	11.9	11.1	10.3	16.2	14.8	9.2
Return on equity, before extraordinary items (percent)	10.7	16.0	15.3	17.1	19.9	23.7	14.8



Senator METCALF. Unless there is objection, we will hear from Mr. Sandstrom next.

STATEMENT OF PERRY O. SANDSTROM, PROJECT MANAGER, BUTTE UNDERGROUND STUDY, ATLAS COPCO, INC., BUTTE, MONT.

Mr. SANDSTROM. Mr. Chairman, my name is Perry O. Sandstrom. I am the project manager of the Butte Underground Study being performed by the Atlas Copco, Inc. for The Anaconda Co.

Atlas Copco is an international leader in the development and manufacturing of highly mechanized systems and equipment for underground mines and construction projects.

I was selected as project manager because of my academic training and experience in mechanized underground mining. I moved my family from Montreal to Butte a year ago and have resided there since that time.

Senator METCALF. I wonder if you would provide us with a little more information about this.

Is this a specialized industrial firm? You just said international leader. I think that is self-serving. I will let you boast a little about it but let me——

Mr. PLACE. Would it be all right for Mr. Monninger to answer that?

Senator METCALF. I would be delighted if anybody would tell us about Atlas Copco.

Mr. MONNINGER. Atlas Copco is a very large organization headquartered in Stockholm. They have several branch offices throughout the world.

They are highly specialized in underground mining equipment. They are particularly devoted to highly mechanized equipment; drills,

loaders, et cetera. They are, I think, one of the finest organizations of this type and this is why we went to them.

We looked pretty hard to find the best that we could and this is the one that we came up with after several recommendations from other operations throughout the United States and Canada.

We are confident that we chose the best.

Senator HANSEN. Could I ask a question, Mr. Chairman?

Mr. Monninger, does this company, in addition to the expertise—it has actually manufactured equipment and that sort of thing, I suppose?

Mr. MONNINGER. Yes, indeed; yes.

Senator METCALF. It is a manufacturing and sales organization for heavily mechanized equipment.

Mr. MONNINGER. That is correct. Something like Joy for example or Garden in Denver.

They also maintain an engineering group that Mr. Sandstrom is connected with.

Senator METCALF. Engineering and research, too.

Mr. MONNINGER. Right.

Senator METCALF. You may proceed, Mr. Sandstrom.

Mr. SANDSTROM. Thank you, Senator.

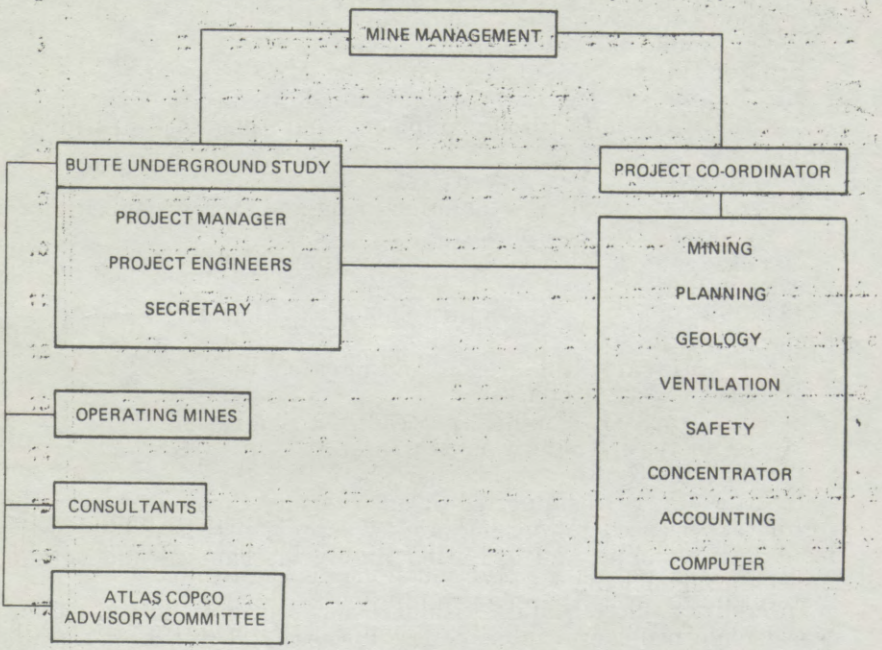
I would like to refer to this chart, here.

In my work, I am supported by an Advisory Committee consisting of nine experienced mining engineers who previously have been instrumental in planning and operating highly mechanized underground mines throughout the world.

In addition, close contact with such modern mines and the use of world renowned consulting expertise for special detail studies insures that the most modern and advanced engineering approach is taken for this study.

The chart below indicates the organization of the Butte Underground Study.

ORGANIZATION CHART
BUTTE UNDERGROUND STUDY



As Project Manager for the study, I am here today in response to the inquiry of the subcommittee on Anaconda's plans. I would like to summarize the investigations and recommendations of the study as they relate to present and future deep mining in Butte.

In preparation of this study, three very important priorities were established, namely:

One, short range improvements of present vein mining and logistic systems so that very marginal or uneconomic stope operations could be changed to profitable ones.

Two, medium range plans—to improve all over mining efficiency and working environment by, hopefully, being able to lay out concentrated mining areas using modern mining methods and equipment.

And three, long range plans—to insure that economic production from Butte will continue for decades after the open pits are completed.

In the following few minutes, I will review the steps taken in the feasibility study, the results obtained, and recommendations given to The Anaconda Company management.

Short range improvement—the initial investigation of the present underground mining practices revealed extremely high costs, ranging around $40 per ton.

Dominant parts of the total cost were overhead, stoping and logistics.

To lower these costs, the following steps were suggested:

One, the underground production to be increased from 2,000 tons to approximately 6,000 tons per day so that the fixed overhead costs could be cut in half; two, to change mine layouts and mine practices so that stopping costs could be cut in half as well; and three, to improve the productivity, cost, and utilization of the logistic systems by launching a major work study project.

A mechanized vein stoping method was developed along successful practices used in Canadian Mines and a complete analysis of logistic problems and their solutions resulted from the extensive work study project.

The conclusions of these combined efforts were that a certain cost improvement could be projected for stoping and bringing the ore to surface. However, due to the excessive development and rehabilitation work required to improve the logistic systems, there was no possibility to substantially increase the present underground production without employing the services of outside mine contracting companies bringing in many hundreds of their own workers.

Improvements in stope layout, practices, and logistics have continuously been carried out since then, however the resulting improvements in productivity have quickly been offset by the increases in wages and supplies.

Also, as the developed ore reserves for vein mining are quite limited, it has been difficult to justify a major investment in entirely new equipment, haulage, ventilation, and communication systems.

Accordingly, the Anaconda mining costs, during the past several years, have continued to rise to a point where the entire vein mining concept is a losing proposition.

Medium range plans—parallel to the immediate improvements, this group began investigations with the objective to establish a modern mining system within a few years.

Senator METCALF. When did you come to the conclusion that vein mining was unproductive?

Mr. SANDSTROM. That has been a slowly upcoming process. I would say when I definitely felt we had to do away with that, it was approximately June of this year; 3 or 4 months ago.

Senator METCALF. You finally arrived at the conclusion that vein mining would have to be abandoned about June.

Mr. SANDSTROM. In the study, we more or less proved to ourselves we had to deal away from that kind of system.

Senator METCALF. Go ahead.

I am just trying to keep the chronology in order.

Mr. SANDSTROM. In so doing, three mineralized zones or blocks were selected where the chances for sufficient tonnage and grade were good. These zones were the Kelley Block, the Southeast Steward-Belmont Block, and the Rarus-Minnie Healy Block.

As all geologic information of historic reasons are obtained from drifts, raises, and mined out stopes, a very tedious interpretation work was carried out on the Kelley Block as a start.

Senator METCALF. Now, Mr. Sandstrom, Senator Mansfield and I and Congressman-elect Baucus—we know where the Kelley Block is, the South East Steward-Belmont Block is and where the Rarus-Minnie Healy Block is but people who read this record will not know.

Will you give us a little more detail on that, please?

Mr. MONNINGER. Senator, the next paper that will be given, Mr. Miller's paper, will go into detail and there are maps submitted to the subcommittee. I think that will explain it.

[The maps referred to appear on pgs. 33, 34, 35, and 36.]

Senator METCALF. Thank you.

I make these interruptions because I have not had an opportunity to read all of these papers.

Mr. MONNINGER. I think the maps will explain it very well, sir.

Mr. SANDSTROM. Senator, these are three major areas, zones, inside the Butte Hill.

The geologic projection resulted in a promising picture justifying investing in a $200,000 exploration program to better define this particular block. Simulation studies on the projected ore reserves indicated that approximately 7 million tons would be available at a mineable grade of 1½ percent copper.

A highly mechanized cut and fill mining system was designed for this block to be mined by some 150 miners during a period of 5 years. The same tedious geologic interpretation of old data then carried on to the second target, the Rarus-Minnie Healy Block.

The results of the definition drilling in the Kelley Block have, to some extent, proven up the previous projections indicating that this block could possibly have been mined as previously described if the copper price would have stayed at $0.87 per pound and if the supply of mechanized drilling equipment and especially front end loaders would have been normal.

Unfortunately, deliveries of such equipment are now over a year making an immediate start impossible.

Moreover, drilling did not sufficiently confirm the geologic projections on grade and continuity of the mineralization as required for the above method.

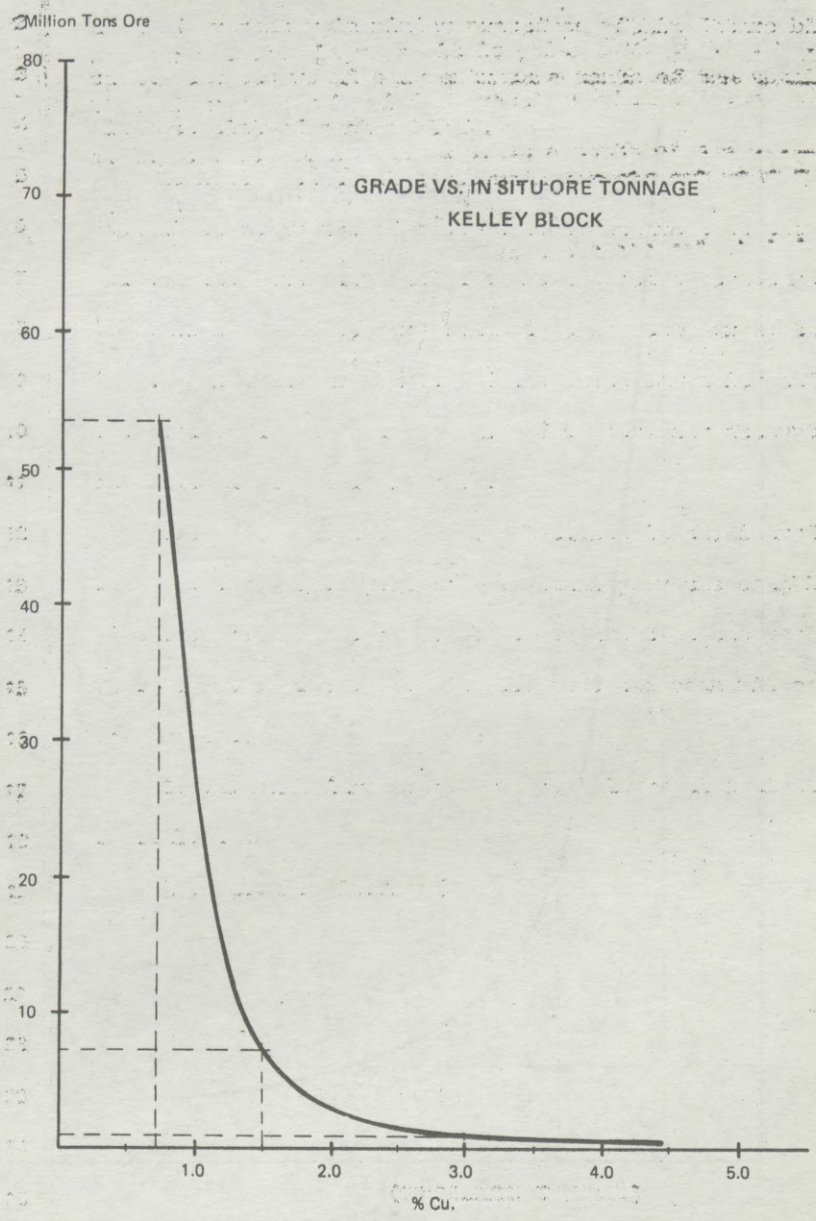
On the other hand, the results of the Kelley Block definition drilling indicated a very interesting relationship between copper grade and tonnage. With the present vein mining requiring a grade of at least 3 percent copper, only 1 million tons would be available.

By applying the method as described above, requiring 1½ percent copper in situ, 7 million tons could be mineable.

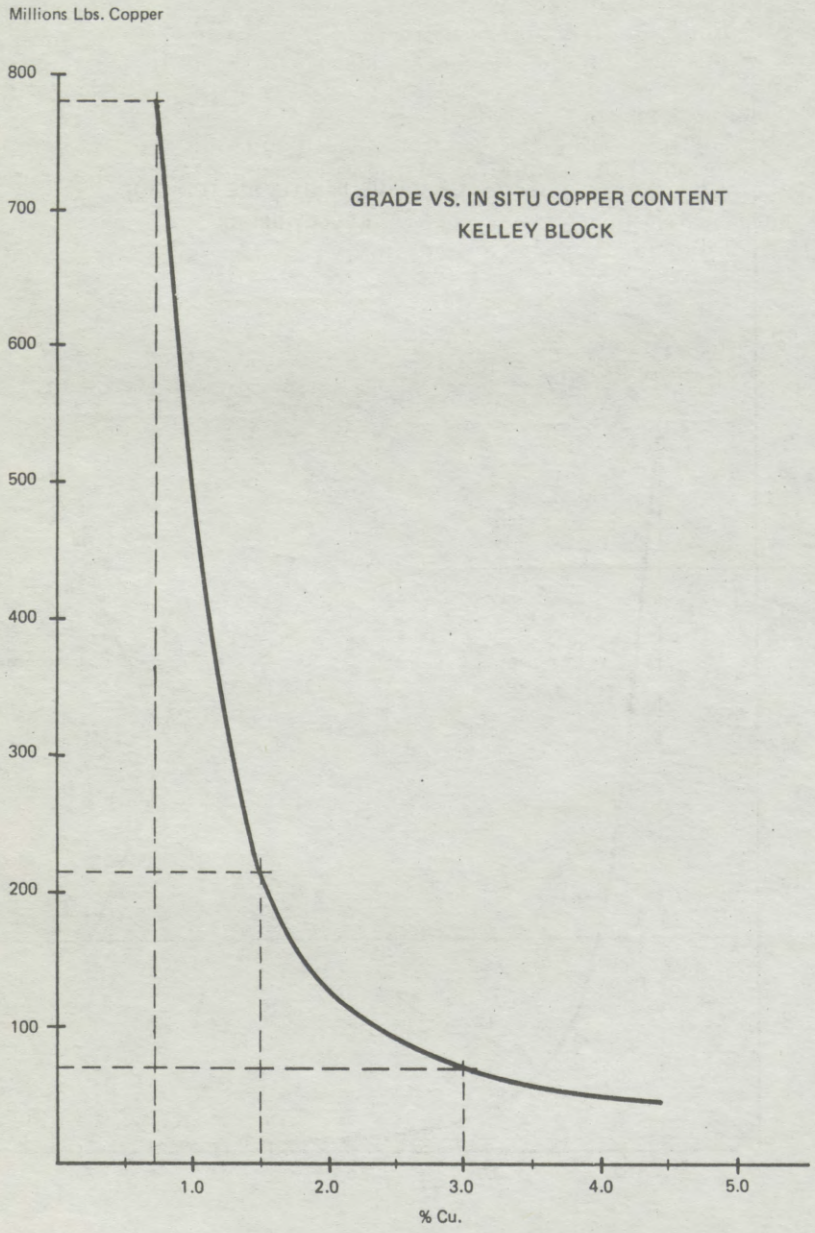
However, by going full out to a flock caving system, probably only requiring a mining grade of seven-tenths of 1 percent copper, well over 50 million tons of copper ore could be mined.

This is illustrated in the following diagrams showing the relationship between the grade and the in situ tonnage but, more importantly, the relationship between the grade and the in situ pounds of copper.

7


Million Tons Ore
80
70
60
50
40
30
20
10
GRADE VS. IN SITU ORE TONNAGE
KELLEY BLOCK
1.0
2.0
3.0
4.0
5.0
% Cu.

8


Millions Lbs. Copper
800
700
600
500
400
300
200
100
GRADE VS. IN SITU COPPER CONTENT
KELLEY BLOCK
1.0
2.0
3.0
4.0
5.0
% Cu.

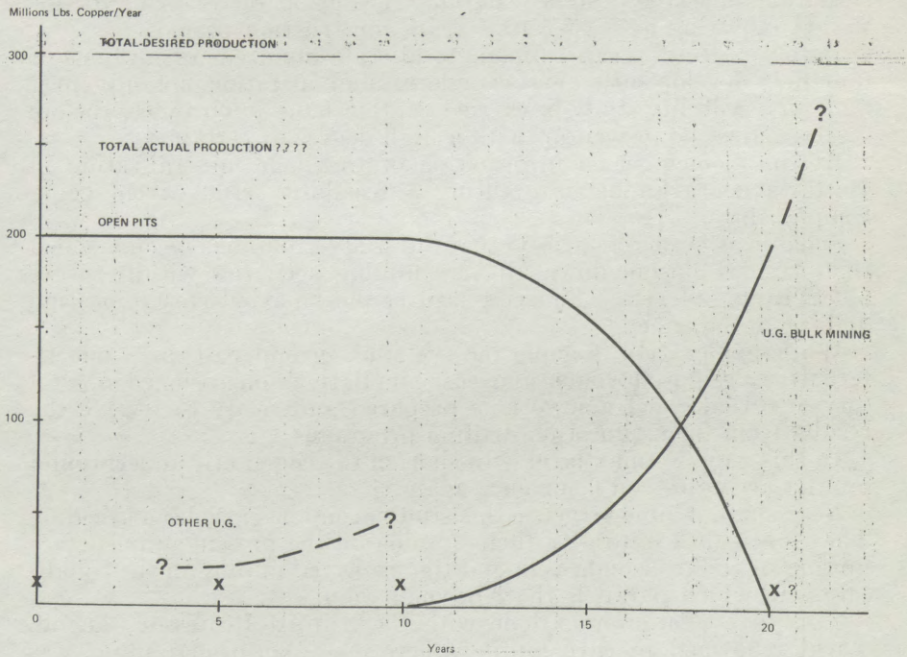
From these diagrams, it is quite obvious that a continuation of present vein mining practices within future block caving targets would only extract a tenth of the total possible potential of such a block.

Realizing that all three main targets selected for mechanized study of such geologic nature that the ground between the main stage and the premain stage structures is disseminated made it very clear to this study group that, for the life and prosperity of the Butte community and in the interest of the domestic supply of copper, any attempts to rob such blocks must be avoided.

Long range planning—as mentioned in the introduction, the objective of the long range planning or the establishment of a long range master plan is to insure that the copper production can continue out of Butte once the open pit operations are completed.

In the following diagram, a preliminary time timetable is indicated.

PROJECTIONS ON FUTURE OPEN PIT AND UNDERGROUND COPPER PRODUCTIONS



This timetable suggests that the pit production will gradually fall off after 1985 with a possible completion 10 years thereafter. This timing establishes some very definite points in time for the underground escalation.

This is representative for the targets we are looking for in the future. By going to the block system, we can, hopefully, extract 10 times more.

Senator METCALF. This is the chart labelled Projections of Future Open Pit and Underground Copper Productions.

It is difficult for those who read the record to know which chart you are referring to.

Please go ahead.

Mr. SANDSTROM. For example, in order to have an underground system fully operative prior to pit phase-out, one must expect a period of up to 10 years of gradual increase in production.

This means that all shafts, surface, and underground haulage installations must be designed, developed, and operative prior to this period requiring at least 5 to 7 years construction period.

Before a decision can be made to allocate hundreds of millions of dollars to develop such a major underground operation, not only must a major feasibility study be carried out, but more importantly the ore reserves must be proven up with a high degree of certainty.

At the moment, such information of the huge mineralization in Butte is not available, preventing a feasibility study from being completed.

Senator, it is for this reason that the study group has recommended that, besides closing down all vein mining activities within future block caving targets, major emphasis be put on extensive exploration drilling of the same.

While exploration is going on, the study group will carry out alternative designs, layouts, and cost simulations on assumed ore reserves so that the framework is prepared and ready to receive the results from the exploration drilling program.

In this way, we may be able to shorten the time until underground mining activities can commence again.

Near surface mine targets—this study group has also been asked by The Anaconda Co. to give their opinion on the present near surface mining of the Anaconda vein and the projected mining in the Syndicate vein which parallels the Anaconda vein.

This investigation was done with the help of Professor Janelid, world renowned in cave mining operations. Additional input was given by his assistant, Professor Sven-Gunnar Bergdaul and by Dr. Rudolf Kvapil, formerly assistant to Professor Janelid and now general manager of mines of the Gecamines Mines in Zaire.

The combined opinions of this group of experts were that both veins could possibly be mined with a new mining method called vein caving; however, only after considerable testing of the method.

During the process of determining the suitable mining method for these veins, the group came to some long reaching conclusions, particularly influenced by the subsidence effect by mining these veins.

The conclusion of most immediate nature was that to continue mining of the Anaconda vein would seriously weaken the southwestern pit wall and thereby make further open pit mining very hazardous.

By mining deeper in the Anaconda vein, the Kelley Shaft installations, including main machine shop and warehouse, will eventually be effected thereby endangering the central pumping facilities in the Kelley Shaft which are essential for any underground activity in the near future.

It was recommended by this group that the mining of these so-called near surface targets should be timed with the first block caving activity, at which time solutions for additional shafts, pumping facilities, et cetera, will have been considered.

Conclusions—The above is a review, in substance, of our investigations and recommendations.

The project manager considers it important and significant that it be understood that the solutions and conclusions stated herein have been arrived at independently by all Advisory Committee members and the consulted mining experts.

Senator METCALF. I have visited the mine several times and seen some of the methods but I do not know some of these new methods you are suggesting. I think, for the record, it would be helpful if Mr. Monninger or somebody, would describe the difference between your present proposal for underground mining and the block caving method and others you have had in the past.

Is that going to be a part of your statement you are reading from, Mr. Miller?

Mr. PLACE. No.

Mr. Miller's statement will strictly be a geological statement.

If the committee would like to address itself to this point now, Senator, Mr. Monninger will be glad to explain it.

Senator HANSEN. It would be important to me.

Senator METCALF. This is just the beginning of some of the hearings we are going to have on this business of open pit mining as we get to surface mining of minerals other than coal in the next Congress.

We have been concerned for the last 2 years with large scale operations in the coal mines. We have been told we cannot develop any of those by large underground methods. We have to go to surface mining.

Tell us about some of these new methods, Mr. Monninger.

STATEMENT OF FRANK M. MONNINGER, PRESIDENT, MONTANA MINING DIVISION, BUTTE, MONT.

Mr. MONNINGER. To get into the new, we should look at the old.

You know, Butte has been mined for about 100 years. If you have seen the pit recently, you will have noticed all of the old workings, the old underground workings up on the benchings, particularly in the western part of the pit. These are the old square set mines, the first in the district.

I think, at one time, there were over 150 operating mines on the Butte Hill, most of them done by square set which required keeping the ground open by millions and millions of board feet of good Montana timber which, by the way, is still in the ground.

These veins, like the Anaconda vein, were up to 35 feet wide. They were very, very high grade veins. They were cut off, in those days, at something like 4 percent so everything below 4 percent was left in the ground and every above 4 percent was hoisted.

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As we got through these larger veins, we got into smaller veins; we got deeper into Butte Hill and mining, of course, became more expensive.

I cannot tell you which year they finally went to the cut and fill. Cut and fill is the same type of mining, chasing out these veins; instead of using square set timbers, they were using hydraulic fill. This is tailings actually, pumped underground.

These would hold the veins open. In this system of cut and fill, you are mining out a section of vein progressing up and filling behind you.

This is very, very selective mining. In those days, you could not take the hanging wall and the foot wall of the vein. The veins, particularly, are inclined about 70 degrees so the top part of that vein is a hanging wall and the lower portion is what they call a foot wall so they are mining between the hanging wall and the foot wall. They are progressing upward.

They are raising on the veins and, as they are raising, they are filling behind it with this hydraulic fill; again, to stabilize the ground.

Butte's ground conditions are extremely poor, very unstable, and, as Mr. Place mentioned, very, very worn in some places.

Senator METCALF. But you follow the vein.

What was the minimum of copper content?

Mr. MONNINGER. We were mining just recently, Senator. Our grade has come down to less than 3 percent, almost down to 2 percent. The reason that this is occurring is that these veins—well, the good veins are not there anymore.

What we are doing is mining some of the remnant veins. These pinch and swell; they narrow and they widen and all of a sudden they stop and, in the same way, raising on these veins, they pinch and swell in that direction, the vertical direction.

So, in order to mine, to get men and equipment in these very, very small veins, we have to take a lot of wall rock, the hanging wall and the foot walls. This diluted the grade.

There is another point about this type of mining, Senator. The old contract miner, God bless him, is a jack-of-all-trades. He did everything. He did his drilling, his blasting, his mucking; he did everything.

Now, this is where we stand today in our vein mining. We have very, very few veins. They are very narrow. They are very, very expensive. They are farflung.

When John Place said the logistics is horrendous; getting the men, material, and ore from the working place to the surface.

Now, the first attempt we made in an attempt to overcome this on this Alex D project which is on the western edge of the Berkeley—this was one of the first veins mined in the district and it averaged about 30 feet thick.

Now, we are mining this for the third time. This was mined for the high grade; the backfill material was a cutoff grade of 4 percent. This was gobbed.

They found that was profitable some years ago so they went back at it again and now we are back into it for the third time.

It is something nobody has ever done before; a very unique type of mining. The ground is very, very incompetent. It is difficult to mine down in the vein. This was an experiment in mechanized mining.

We found, instead of the productivity of 3 tons per manshift getting into the deep veins, we were getting up around 10 tons per manshift and were hoping, if we continued this operation, we would get up in the 20 tons per manshift range.

The endeavor in the underground vein mining is to mechanize and, as Mr. Sandstrom alluded to, we tried a few of the veins in the Mountain Con area. These are narrow veins and we tried to mechanize these.

We wanted to stay very close into our hoisting shaft so we did not have these logistical problems.

Unfortunately, the grade just was not there nor was the ore. They were very, very narrow. We did see some improvements, however, in productivity.

So; we are talking now about a very low productivity, selective mining and this is the difference; against our bulk mining methods.

Now, bulk mining—you take it all and we are looking at a block caving mechanism something similar to the greater Butte project. I think you recall the greater Butte project, Senator.

This ran successfully——

Senator METCALF. Yes. I recall it.

I remember the Anaconda Co. people came out and told us that they would be mining in that area for 50 years.

Mr. MONNINGER. There is a story on that.

The block caving was successful and we have records on that. This gave way to the beginning of the Berkeley Pit. The Berkeley Pit was started and the western portion of our pit and the block caving coincided and it was at that time it was decided that the open pit mining would be far more economical than block caving.

However, the block caving was economically successful.

Now, as we are looking at this method now, we are talking about moving all of the material; not selective parts of it. The method will be set up so that we undercut a very large block of ore, several millions of tons.

This is done very successfully at Climax and also in Arizona and they are running very high tonnages; 60,000, 70,000 tons a day by this block caving method.

But, you are taking the good with the bad. You are taking a lot of dilution but you are moving a very, very high tonnage so we are looking at the productivity now of upwards of 30 to 50 tons per manshift and this spells a difference of whether it is economic or not.

This is high productivity even though it is a lower grade.

Senator METCALF. Your technological improvements in recovery have enabled you, as I understand it, to utilize this very low grade material.

Mr. MONNINGER. Well, I think that Magma is hoisting about seven-tenths material right now so it shows what can be done.

Senator METCALF. As I understand it, in about 15 years we are going to see the end of the Berkeley Pit and an increase in underground mining in this new expensive method you describe.

Mr. PLACE. This is what we are shooting for.

Mr. MONNINGER. These are what our hopes are.

Senator METCALF. These are the long range plan?

Mr. MONNINGER. Yes.

Mr. PLACE. As I mentioned in my statement, Senator, we cannot commit to going underground until we see the results of this 2 years of drilling to define what these deposits are.

We have to do this drilling before we can come up with a plan and that is what we are undertaking to do right now at a cost of about $6.3 million.

Senator METCALF. Now, I interrupted.

Do you want to give us some of Mr. Miller's statement? It does have the maps.

Mr. PLACE. I think that will be fine. Mr. Brimhall is one of our geologists. He will read Mr. Miller's statement.

Mr. Brimhall is from Butte.

STATEMENT OF RICHARD N. MILLER, CHIEF GEOLOGIST, BUTTE OPERATIONS, THE ANACONDA CO., MONTANA MINING DIVISION, BUTTE, MONT., PRESENTED BY GEORGE BRIMHALL, GEOLOGIST

Mr. BRIMHALL. Mr. Chairman, my name is Richard N. Miller. I am chief geologist for Butte operations of the Anaconda Co.'s Montana Mining Division.

My purpose in presenting a statement today is to describe Anaconda's integrated exploration program at Butte.

The exploration plan for the Butte district in 1975—which, in certain areas, was initiated in October 1974 and is now in progress—reflects the phase-out plan for Butte's deep underground mines and the load-haul-dump—Anaconda vein—project referred to in previous statements.

Very importantly, the geological program includes projects deemed absolutely necessary for development of exploitable copper resources underground which may be the future of the Butte district.

The principal thrust of this underground plan lies with several large projects which will ascertain the configuration, tonnage, and grade of shallow bulk mining resources under the Berkeley Pit and also of deeper copper-molybdenum resources situated on or near the very important Leonard-Belmont axis of mineralization.

Senator METCALF. Are these the long-range plans?

Mr. BRIMHALL. They are.

The location of the important shafts in the Butte district are on the right-hand side of the base map and there are some explanations.

Senator METCALF. On the right-hand side of the diagram is what?

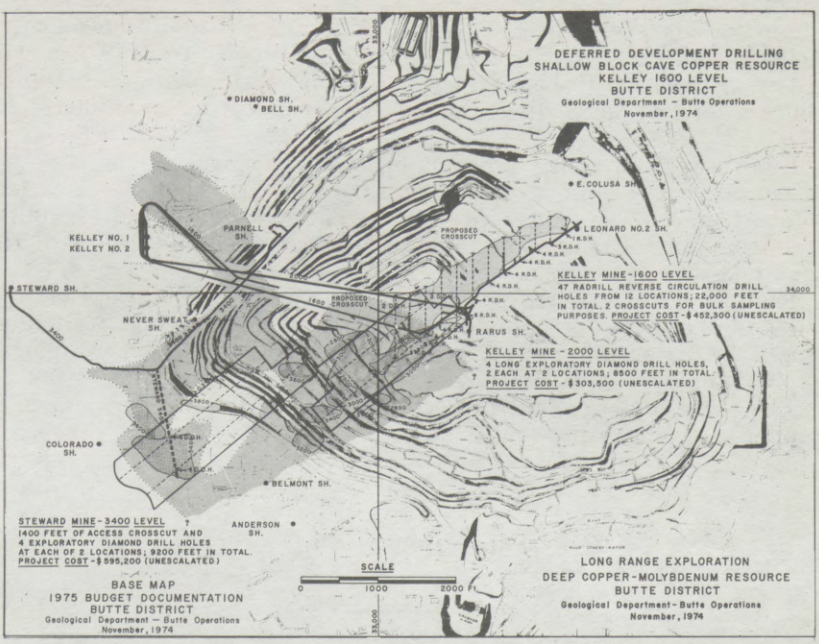
Mr. BRIMHALL. Some explanations.

For example, it says Kelley Mine—1,600 level. Below that, it says Kelley Mine—2,000 level and, scattered around the rest of the diagram are small circles with the names of the important shafts.

For example, it says E. Colusa Shaft, Leonard No. 2 Sh. These are just the geographic positions.

Mr. BRIMHALL. Exhibit One, following, is a base map of a part of the Butte district showing the location of the 1975 underground drilling program.

EXHIBIT 1



I would like to call your attention to several features:

First, the principal contours of the Berkeley Pit, the location of the Kelley and Steward shafts on Butte Hill above the central business district, and the 1,600 and 2,000 levels of the Kelley Mine and the 3,400 level of the Steward, extending under the Berkeley Pit, should be pointed out.

The Leonard-Belmont mineralized axis, which includes the large prolific zones of "horsetail" copper mineralization at Butte has, historically, supported mining operations which have produced well over one-half of all copper won from underground mines at Butte to date.

Large zones of disseminated mineralization alined along and near Butte's Leonard-Belmont axis will have to also yield heavy copper production in the future if its underground operation is ever again to become viable and to remain so.

Thus, because of the known fact that this portion of the Butte deposit contains a high concentration of metal values, underground drilling programs planned for 1975 are strongly alined along the very productive axis of mineralization discussed above.

In detail, on the Kelley 1,600, we intend a series of 47 Radrill reverse circulation drill holes—22,000 feet in total from 12 locations at a direct cost, in 1974 dollars, of $452,300.

The project will develop a relatively near surface, bulk mining copper resources.

As you can readily observe, the mining and caving of the ore zones in this area will, of necessity, be deferred until the Berkeley Pit reserves are depleted. Otherwise, the surface subsidence from such a

program would interfere with the continued extraction of Berkeley Pit ores.

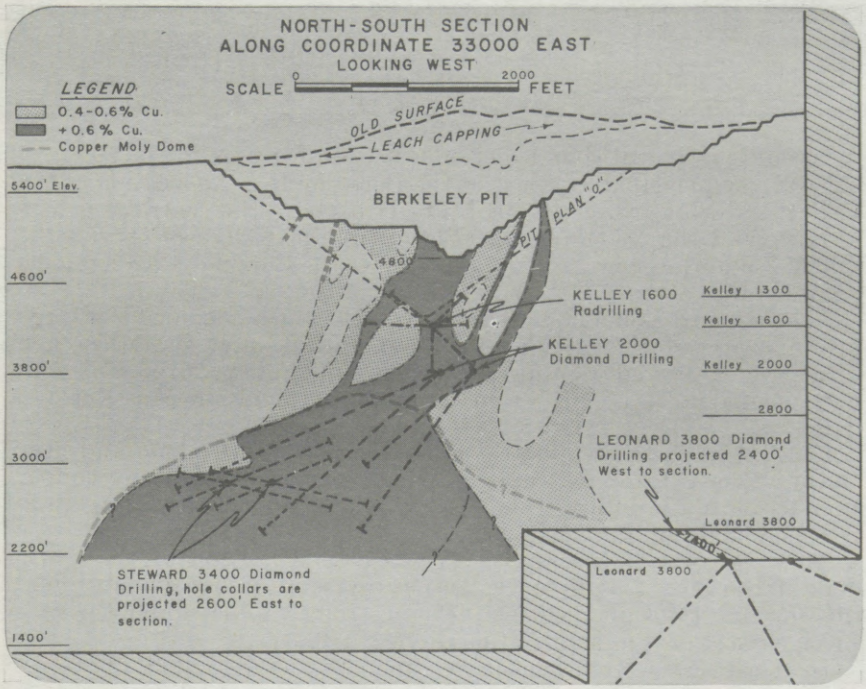
On the 2,000 level of the Kelley Mine, we will drill four long—8,500 feet in total—exploratory diamond drill holes from two sites at a cost of $303,500 to better identify the northeast flank and top of Butte's zone of deep disseminated copper-molybdenum mineralization.

Likewise, from a new crosscut on the 3,400 level of the Steward Mine, we plan eight exploratory diamond drill holes—9,200 feet total—from two sites at a project cost of $595,200 to better understand mineralization trends in the southwest edge and center of the same deep low grade zone.

Exhibit Two, a north/south cross section through the Berkeley Pit and the deep disseminated copper-molybdenum zone, well illustrates the dimensions of the large mineralized zone which we plan to explore and develop at Butte.

The three underground projects outlined above are also shown in proper vertical prospective.

EXHIBIT 2



Expectations are very high that these projects may find the copper reserves to not only allow full recovery of a profitable underground operation at Butte, but to nourish that operation and allow for its logically planned expansion in the future.

Successful application of today's bulk mining techniques to such reserves should support large-scale copper production from Butte for decades to come.

Additionally, the 1975 geological department program also includes a modest but accelerated exploration project in the Leonard Mine which must be completed before shaft and mine level access is lost.

A program of exploratory diamond drilling, underway with two drill rigs at the present time, will be complete by mid-1975. Four deep holes will probe below the Leonard 3,800 level for significant geologic change that would, if found, indicate the possible presence of large, high grade copper deposits—bornite-rich—at depth, of a type not yet seen in the Leonard Mine.

The planned drill hole penetrations will also determine to what depth high grade pyrite-chalcocite-enargite-covellite assemblages continue downward in known vein systems and, therefore, what deep, new, high grade vein ore body possibilities remain in the Leonard Mine which is considered by far the best exploration target for high grade ore in the Butte district.

Exhibit Three shows the location of the Leonard Shaft and the drilling seeking these high grade targets.

EXHIBIT 3

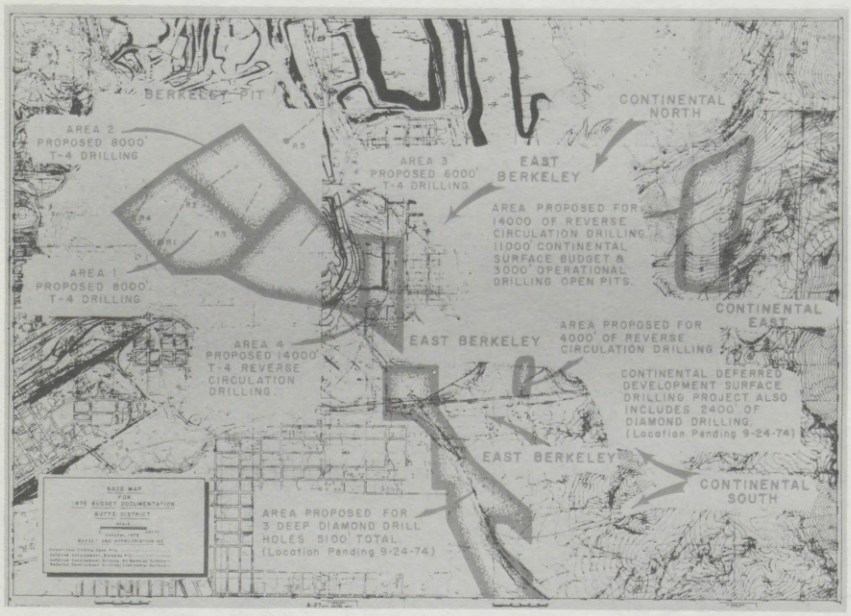
Because open pit mining at Butte must, of necessity, carry the entire production load during this period of exploration and development of major underground copper resources, a solid program of operations drilling and of exploration and development drilling, all in close support of open pit mining and pit planning, is also included in the 1975 plan.

Of specific importance is the fact that in-pit operational drilling in the Berkeley Pit along the Horsetail Zone axis will probe the upper portions of the same heavily mineralized zone as being developed in the subsurface Kelley 1,600 level program.

An immediate result will be the best economic partitioning of the ore body between open pitting and shallow bulk mining; the latter very hopefully initiating again a future profitable underground operation at Butte.

Exhibit Four indicates the location and the extent of the open pit drilling efforts.

EXHIBIT 4



This program covers the Berkeley Pit and the Continental East Pit, now in production, and the potential open pit mining areas we have designated as the Continental South, Continental North, and East Berkeley.

What I have outlined is limited to our 1975 program. The high level of underground exploration will continue through 1976.

The refinement of targets and definition of scope of that program will occur during 1975 as information is developed from the drilling shown on the exhibits.

The total proposed 1975 Geological budget for Butte is $3,114,000 or about $1,722,700 more than the 1974 Geological budget of $1,391,300.

The large increase in the 1975 budget request is almost entirely in underground exploration and development projects directed at investigating Butte's very large low grade copper and copper-molybdenum potential, in part relatively shallow and in part deep.

Based on my many years of experience as a mining geologist and work on copper deposits, I am very confident that we will be able to delineate and develop reserves that will support future mining plans for Butte.

Thank you.

Mr. PLACE. Senator, that completes our prepared testimony and we will be delighted to answer any questions that you may have.

Senator METCALF. I am sure all of us have questions.

When you suggested your last two documents were interchanged so three was four and four was three, Senator Hansen echoed my own ideas, that he wished that was the only source of the confusion here; just the interchanging of the diagram.

This is new material for us. I have been talking to Mr. Harvey of the staff, and I think maybe this subcommittee should take a look at Magna and some of the other areas before we open hearings on regulation of open pit and other mining activities.

Mr. PLACE. I think that would be very desirable.

Senator METCALF. Mr. Place, this is just the beginning of some investigations we are going to make.

In the course of the energy hearings, we have had people continually come in and tell us; yes, you have a shortage of oil, a shortage of fossil fuels but just stick around a couple of years and see some of the other shortages you are going to have in natural resources; in lead, zinc, manganese, and these other materials.

In the course of the Law of the Seas hearings we have held, we have had the same declaration.

This is one of the real concerns we are facing in this Subcommittee as to how we plan for the long term future utilization of America's resources so, all at once, we will not find ourselves dependent on an international cartel such as we found ourselves last year from the oil producing countries.

As I say, this is just the beginning of some of these inquiries we are going to make into the utilization of the large mining companies in connection with our underground resources.

Since you have completed your testimony and it is 12 o'clock, would you like to come back about 1:15 or do you want me to run this hearing on for a few minutes?

Mr. PLACE. I leave it completely up to you.

Senator METCALF. Very well.

Some of us have to get over on the floor and perform some routine matters. We will run along about half an hour and then come back after lunch.

Now, Mr. Place, you suggest perhaps your duty to your stockholders is such that you should not inform public officials of your plans for a large closure or layoff of men in the mines or expansion of some of your activities.

Now, in spite of your disclaimers to the contrary, in conversations with public officials in Butte—and I think later we will learn some

of the status of this—we have not been informed as to what your plans are so we do not know what to do about it—what compensation, what changes we might make or recommend in various activities where we could help, not only to alleviate the unemployment problem at the local level, but to transfer these men into some other activity.

The President, himself, has said we have to have some other public works activity to pick up unemployment when he comes to the large unemployment we have in Montana of 6 percent or more.

We were not informed. The mayor of Butte tells us he was not informed. We are going to have testimony, later on, from the Governor of the State of Montana that he was not informed of these plans and these programs.

I am sure you do have a responsibility to your stockholders but exploiting the resources of such a huge area as you have in Butte Hill in Montana, you have a responsibility to the public, too.

I must say that the information technique you have developed has not been as forthright as you indicated this morning. Senator Mansfield and I did not learn of the potential closing until after it had been announced in the newspapers.

While Mr. Meacham came trotting up to my office with a letter addressed to the miners, he knew, as you knew, that both Senator Mansfield and I were in the State of Montana and yet you delivered that information after it had been announced in the newspapers.

So we could not help you make any plans.

Now, heretofore, we have tried to work out, with the Anaconda Co., any national Federal assistance that we could have. We have not interfered and we do not propose, at this time, to interfere with the internal operations of the company.

But, all at once, given the desperate need for resources confronting our Nation and the desperate need for employment, not only in the mining area, but as you mentioned in wood products in Montana, or the automobile industry, means these are national problems, a national crisis that must be resolved through the cooperation of the industry involved. That is the reason you are here this morning.

On another matter, you said if I had not made the statement, you would have been glad to inform me about it but it has been very difficult to find where the Anaconda Co. is going, where the pit is going, and what kind of activities you are going to embark upon. Despite the fact you said, a year ago, you made a speech in which you told about this, my information from the local people has been that they have not had full and forthright disclosure from the Anaconda Co. that the public interest would require.

I am delighted you are here this morning and I think all of us have gained a new insight into the plans and prospects of the Anaconda Co. in the future.

But how can you say the interest of your stockholders is above the public interest of informing, at least, the mayor of Butte and the Governor of the State of Montana?

Mr. PLACE. I do not think I did say that the interest of the stockholders is above—I think what I said was that, in making the decision to close them down—as I recall it, to informing the Governor and,

actually, almost as soon as we made the decision and informed our employees, we also did inform yourself, your office, and Senator Mansfield and, also, Governor Judge and I think the communications did not get through.

We would like to have had you have this information before you arrived in Butte. I will have to check and see where I mentioned something about the stockholders as compared to informing you.

I do not think that was in my——

Senator HANSEN. I believe in your statement; that is the only statement I heard you make, maybe you have made others of which I am not aware.

Mr. PLACE. Where is that?

Senator HANSEN. On page 5 of your prepared statement.

Mr. PLACE. Senator, I say, as you Senators have a duty, we cannot allow unprofitable operations to drain away the funds we need to maintain and expand healthy operations.

I do not really see where that relates to informing you. It has an entirely different approach; that we are not going to bleed the Anaconda Co. dry and hurt a great many other people.

As you know, we have over 120,000 stockholders but I think I was relating that not to the question of informing you, sir, but to the values we had to put on making the decision as to whether to close these vein mines.

Senator METCALF. Mr. Place, I think Senator Mansfield and I have demonstrated over the years concern for the Anaconda Co. It is one of the great industries; especially to the State of Montana. It employs many of our constituents.

We are interested in its welfare and in its future. We have consistently refused to interfere with its activities in a time of strikes, in times of other unrest. But we feel—and I know I am talking for Senator Mansfield, as well as myself and Congressman-elect Baucus has already outlined his ideas—we feel, in these times of economic stress, we should be advised and we feel there is a need for the public interest and concern of the people of Montana.

You just cannot brush off the welfare of a city because you go into so much red ink.

You can answer, in a moment, if you please, but you can put a full page ad in the Montana papers, if you want, if you dispute what I am saying.

It has been our experience, since you took over the management of the Anaconda Co., that you have not been concerned about the welfare of the city of Butte or anybody else except you have been concerned about the balance sheet, the dollars—the balance sheet on the Anaconda property.

I want a viable and financially strong Anaconda Co. because it is vital to the welfare of the people of Montana, but we certainly want to have an opportunity to help the impact of some of these things, such as the layoff that just happened the other day so we can have an exchange of labor or we can keep those people in Montana.

It is not enough to just shrug it off and say, before I informed you, and, before I informed the employees, we told some of the other companies about it so they could get ads in the paper.

You did not tell the unemployment people about it so they could make plans and programs. This is one of the things I am going to inquire, not only with the Anaconda Co., but some of the other activities to see if we cannot work together to cushion the impact of these things.

Now, go ahead.

Mr. PLACE. I take exception to the comments that we are only concerned with the balance sheet.

Senator METCALF. You have already taken exception in ads in the newspapers and so forth and we will continue that peripheral sort of discussion at some other date.

I will withdraw it from this hearing and advance it when I respond to your full-page ad in the Montana papers.

Now, how much did it cost you to put those full-page ads in?

Mr. PLACE. We do not have it. We will get it for you.

Senator METCALF. Did you charge that up to the shareholders or do you charge that up to the Butte operation?

Mr. PLACE. I think it is charged to the Anaconda Co.

Senator METCALF. You must make some sort of allocation.

Mr. PLACE. We felt it necessary. I do not know how the accounting way. Maybe Jack Haggarty—are you here, Jack Haggarty?

Mr. HAGGARTY. It was charged to the Montana division.

Senator METCALF. It was charged to the Montana mining operation.

I wish Senator Metzenbaum were here right now. He was here and was prepared to be here but he was called away.

It was on his bill that I testified, Senator Hansen, and I used the Anaconda international operation as an example. I used it because the Anaconda Co. is a constituent of mine. I could have picked out several other companies, but I am going to document that statement in a little while.

Anyway, Mr. Place felt, because I put it in the record and I had gone home for a recess, that he would have to have a full-page ad in the State of Montana to refute that.

Now, I have no way of putting full-page ads in the newspapers in the State of Montana. I do not have stockholders in my Montana operation but you know full well I would have given you the same opportunity to extend your letter in the record that I had to put my letter in the record except you made the challenge during the time the Congress was not in session and we were in recess.

I am going to put your letter in the record, of course. That is equal time involved and I am going to disprove almost every statement you made by your reports, Mr. Place.

I am going to demonstrate that the people of Butte believe, just as I do, that, since you took over the operation of the Anaconda Co. 3 years ago as president, you have looked at the totals down at the bottom of the balance sheet, rather than at a social, economic, and long-term impact of your policies on the people of Montana and maybe on other States; I do not know.

Mr. PLACE. Would you like me to respond?

Senator METCALF. I want you to say anything you wish. You have the floor.

Mr. PLACE. In the first place, Senator, with respect to the letter I put in, I put that letter in because the statements you had made had

received such wide publicity which were not in accordance with what I considered the facts to be.

In view of the fact that this had received such wide publicity in Montana, I felt it only proper we put the record straight from at least our point of view.

It was not done with the thought of Congress being adjourned or anything else like that. We just felt it should be answered expeditiously and I, again, come back to the question which is my whole thrust in terms of the Anaconda Co.

I think you will recall that it was back in 1971 when I came to see you in connection with a certain other matter regarding the EPA and, after we got over that, I had a chance to sit down, I think, and tell you about the serious condition the company was in.

My continued concern for the Anaconda Co. has been to try to look at the whole picture so we can have a healthy, viable company so I will have the opportunity to stand up more times with people like Governor Judge and inaugurate an arbitor plan and those sorts of things but we cannot do that unless the company is financially sound.

I think it was particularly significant, this morning, in reading off our return on our invested capital as compared with seven of our major competitors, that we are still, despite the strides we have made, still substantially below them and we need to improve that return in order to attract the capital to make new investments and employ people.

Now, that is all I have to say.

Senator METCALF. Now, this morning, I was concerned about the fact that, in spite of the statement Mr. Monninger made that these veins do go down and down I was concerned about the impact on the reserves of the closure of the underground mines.

You give us the explanation that these reserves will not be lost.

Is that a correct inference to be drawn?

Mr. PLACE. We are very hopeful, Senator, that the drilling program will confirm that.

Senator METCALF. And the large scale underground program may be confirmed by this drilling program, so that even after the pit is abandoned, there will be recovery of a lot of the copper still in the ground.

Mr. PLACE. Right on that chart, as you can see, Senator, we show the underground going up very substantially.

Senator METCALF. Where is that? Fifteen years?

Mr. QUIGLEY. It is between 15 and 18 years.

Mr. PLACE. But the underground is starting at 10 and moving up to where the production is even in excess of what is coming out of the open pits today but that must be confirmed by the drilling program.

Senator METCALF. So, abandonment of underground operations in Butte will not be abandonment of those ore mines, of the present underground ore mines?

Mr. PLACE. Right.

Senator METCALF. As I understand it, at the present time, the mines are going to be filled to the 3,800, 3,900 foot levels.

Mr. MONNINGER. Our plans, Senator, are that, when we finish mining the available blocks which we have estimated will take up to 4

months, we would shut the pumps off in the Con and let the water come up to 3,900. We have a main Kelley pump station on the 3,900. We are pumping way over 5,000 gallons a minute from those pumps.

This will keep the mines dry while we complete this program. That is our plan, at present.

Senator METCALF. Are you going to have copper recovery from that water pumped out of the mines?

Mr. MONNINGER. We do not know at this time, Senator. We have abandoned the underground leaching. This has been a little over a year ago.

There is some residual copper in this water but we do not plan to reclaim at the present time.

Senator METCALF. You are not going through the leaching process?

Mr. MONNINGER. It is not presently running through. It is all discarded.

Senator METCALF. What would be the environmental impact, then?

Mr. MONNINGER. None whatsoever.

This goes into our major water treatment plant, there. This is referred to in Mr. Place's letter.

Senator METCALF. So, while you will not run it through the leaching process you formerly had over there, it will go through a cleaning process.

Mr. MONNINGER. It has to.

Senator METCALF. We had testimony that you could not get delivery for a year on this mining machinery.

Is this mining machinery from Mr. Sandstrom's company?

Mr. PLACE. No, sir.

Senator METCALF. He did some of the research and planning but you ordered it from somewhere else?

Mr. MONNINGER. Equipment delivery, whether in the underground or other—leadtimes on major equipment is just fantastic.

We have pit equipment, for example, for which we have orders in now that will be delivered 3 to 5 years from now. This applies to all equipment. The underground equipment Mr. Sandstrom referred to; a good part of that is at least a year away.

We have to order this. We have to put money down on it for delivery a year or more ahead.

Mr. PLACE. We just passed an appropriation for a new shovel in the pit. It will not be delivered until——

Mr. MONNINGER. I believe it comes in 1978; something like this.

Mr. PLACE. Leadtimes are very long.

Senator METCALF. What is the capacity of that shovel?

Mr. MONNINGER. It is a 15-yard shovel. We also have an 18½-yard dragline. I think you know we have one. We have another one on order.

Senator METCALF. When do you estimate you will definitely know about your drilling, the results of your drilling experiment so you can tell us if this large underground operation is feasible and you will go forward with it?

Mr. MONNINGER. We have a 2-year plan on this, Senator, and we feel this will delineate two major reserves, we hope; to include the copper-molybdenum dome.

All that program is already in operation.

Senator METCALF. You think, in 2 years, we will have, instead of this "iffy" situation—and I am not deprecating your program—I am just wondering when your drilling project will enable you to make a decision.

Mr. MONNINGER. The purpose of our underground study is to take in this information, crank it into a program, into a long-range plan, similate the methods so, hopefully, these two things will be going on at the same time.

Mr. PLACE. But then you have a lot of engineering.

Mr. MONNINGER. A tremendous amount, when this is all completed. We are looking at at least another 5 years, 5 to 7 years before the first ton of ore will be hoisted.

Senator METCALF. I know. I gathered that from the first statement but you will know enough about your core drilling program in 2 years to know whether or not you would be justified in embarking on this program and then, of course, you have described the leadtime for ordering the machinery.

We find that in every mining operation, these days, of course; the large custom made machinery which you have to order; sometimes it takes a long time to deliver.

So that we may be able to anticipate, if your drilling is successful, long-term underground programs would this entail the employment of additional underground miners again? Or is this so highly mechanized no new miners would be needed?

Mr. MONNINGER. This is the beauty of this when we get into this type of mining. These are very highly specialized jobs. We do not require the old contract miner.

We need a man who does nothing but drill, a man who does nothing but load holes for blasting, a person who does nothing but operate the holding machine, and so forth.

Hopefully, if and when this program is implemented, we will have with it a very intense training program. The contract miner is almost extinct. They are very, very difficult to come by.

Mr. PLACE. You know, we even brought some in from Canada. I think there were 50. We had so much trouble getting them into the United States, Senator, because they do not even exist any more. We brought some in from Canada to help augment our work force in the underground.

Senator METCALF. You are telling me the underground miner no longer exists in Butte?

These underground miners are getting jobs in the Coeur d'Alene region. They are still operating underground like this and, as I understand it, there have been ads in the paper to move to Homestake, N. Dak., and some other areas.

Mr. PLACE. That is right.

Senator METCALF. That takes care of the miner but it does not take care of the State of Montana with that loss of population.

We are glad to have some solution to the situation. Is it going to be, then, the Coeur d'Alene region? That it, in a couple of years, is going to go into this same thing.

The copper operation in Arizona is a prototype of a whole new mining operation for the United States that we have to take into consideration when we consider the business of this committee?

Mr. MONNINGER. Of course, they are mining different minerals over there as they are in Homestake. They have different types of methods. It is a high selective type of mining.

I have no idea of what the economics will be at those mines in the next few years. I do know their methods are nearly the same as ours and they are trying to get into some kind of mechanized mining.

Senator METCALF. Can we carry over this new mining method into coal?

Mr. MONNINGER. Are you talking about new underground mining methods?

Senator METCALF. Yes.

Mr. MONNINGER. I think they have a highly sophisticated mining method in the eastern coal seams.

Senator METCALF. We are consistently told, in the deep seams of Montana and Wyoming, for example, that the only way to recover the coal is by surface mining methods and yet, all at once, you describe a new underground method that, apparently, would take care of those huge deposits.

Mr. MONNINGER. I have seen the huge deposits back there and the ground is very incompetent. It is a sandy loam material for a bed so, from my point of view, it would be very difficult.

Senator METCALF. Page 10 of your testimony is what I was referring to, Mr. Place. You said:

> We are charged with the burden of decisionmaking for our company and there is no way we can delegate that responsibility to public officials or anyone else.

No one has asked you to delegate any of your decisionmaking to public officials. We just want to know, when you are making changes, how we can cushion that impact on some things such as unemployment, change of working conditions, new public works projects; to help these men over that period of unemployment that the economic situations require.

Again I say, we have not been and were not informed.

Mr. PLACE. Senator, I am sorry. A difference of opinion exists on that.

Let me say this. This will take place over a 4-month period, as I mentioned in the statement, so I think there will be ample opportunity for us to work together with the public authorities and do everything we can to ameliorate it.

Senator METCALF. I have been told that Butte is a special principality and their rumormongering is as efficient as any place in the world but I have been told you do have some outcrops you are going to mine by traditional surface methods.

Mr. QUIGLEY. Open pit?

Senator METCALF. No—well, yes; maybe open pit—outside of the Berkeley Pit and the Continental Pit.

Mr. MONNINGER. I think you might be referring to the Syndicate vein.

Senator METCALF. Yes. The Syndicate is the one.

Mr. MONNINGER. This is also a gob-fill vein. This was mined previously; I think, twice. This is similar to the Anaconda. This is west of the pit they used to outcrop.

This has been a potential target for an L-H-D operation; however, it is not feasible at this time. Number one, it requires the extension of the Kelley Shaft. It will affect the Kelley Shaft. It will affect our main warehouse, our main machine shops. So that little deposit there will be there.

It is not mineable today. There is no way we can get in there. There are too many surface features that would be affected by that operation.

Senator METCALF. There are people in Butte who allege some of this layoff was without notice or adequate notice and it is just to drive property values down so you can acquire property in the area.

Mr. MONNINGER. Yes, sir. I hear that every day.

Senator METCALF. For the record, you say that is just not true?

Mr. MONNINGER. I think the testimony today has indicated two reasons why we had to make the decision to shut down. There is just no way, at this time, that these mines can be run at the profit.

We are and have been going into this Butte underground study—it is a very intensive study, a very expensive study—to find out exactly what we do have underground.

There is certainly no motive that we have to acquire uptown Butte cheaper by shutting the mines down. I am sorry, there is no way.

Senator METCALF. That makes the record and differing opinions made differing ideas but you have heard the rumors?

Mr. MONNINGER. Yes, sir.

Senator METCALF. I have. All of you have.

Miss Reporter, show that all of them nodded.

[Witnesses nodded.]

Senator METCALF. Now, we have reached the hour of 12:30. I do have a couple of errands on the floor of the Senate.

Would it be convenient for you people to come back at 1:30? It is sometimes hard to get fed around here.

Do you think a little later would be more convenient?

Mr. PLACE. 1:30 p.m. will be fine.

Senator METCALF. Very well.

We will be in recess until 1:30.

[Whereupon, at 12:30 p.m., the hearing was recessed to reconvene at 1:30 p.m.]

AFTERNOON SESSION

Senator METCALF. Our next witness is the Honorable Thomas L. Judge, the Governor of Montana, and is Mr. Morgan here.

Mr. Morgan, I know we will not be able to reach you this afternoon. I will call you as we can work it in in correspondence back and forth. Since you are here in Washington, I would be delighted to have you stay and listen to the testimony for the rest of the hearing.

Mr. MORGAN. The hearings have been very informative to us so far and, if I may, I will stay and listen.

Senator METCALF. I am delighted you are going to stay, but I am sure we will not have time to reach you today and we will make other arrangements for your testimony; and, I hope the Anaconda people will stay.

Governor Judge, we are very pleased to have you here.

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STATEMENT OF HON. THOMAS L. JUDGE, GOVERNOR OF THE STATE OF MONTANA

Governor JUDGE. Thank you very much, Senator Metcalf. I certainly want to express my appreciation for this opportunity to testify before this committee on the problem of extreme importance to my State.

In Montana, we are faced with a mine closure of massive impact and little, if any, information upon which we can plan to alleviate some of the disastrous effects. Today, we do not know how many jobs may be lost. The first layoff, 102 men, occurred on November 15. As of this moment, the Anaconda Co. has not said exactly how many more will be laid off and when.

Our appeals for more information have not been met. All we can do is guess about the impact, but here is our best guess.

We estimate that from 950 to 1,000 workers were involved with the underground operation. Two hundred have been lost due to attrition since August. The company has indicated that they will retain 150 to 200 employees for an exploration project over the next 2 years.

Senator METCALF. Is that the drilling project?

Governor JUDGE. Yes.

Senator METCALF. Is that the drilling project?

Mr. PLACE. Yes. It is about 165.

Senator METCALF. But when he is talking about an exploration project over the next 2 years, that is the one you described to us as exploration for this massive underground project.

Mr. PLACE. That is the $6 million underground project I referred to in my testimony.

Senator METCALF. Thank you, and thank you for letting me interrupt.

Governor JUDGE. This means a direct employment loss of close to 850 workers as a result of the mine closure. The direct payroll loss will approach $11 million per year.

About 2,500 people, members of families, will be directly affected by the closure. The mining industry in Butte is a primary industry which creates additional supportive jobs by bringing capital into the economic community. These secondary jobs are found in all the other industries in a community.

In Silver Bow County, metal mining is the only primary industry in the area of any size. The closure of the mines, and the loss of 850 primary jobs, will result in an additional loss of 1,450 jobs in supportive industries such as trade and services.

This represents an additional payroll loss of nearly $9 million. The total loss appears to be 2,300 jobs and nearly $20 million. Over 14 percent of the jobs, and nearly 14 percent of the payroll in Butte will be lost by this closure.

Using the Federal Reserve System for judging the total economic impact of payroll dollars on a community, the impact on Butte's economy will approach $60 million.

The tax loss to the State of Montana will be approximately $1 million per year. There is very little chance of recovering these moneys by expansion of other industries or the start up of new industries.

There are no alternatives for these affected by the shutdown other than to pack up and move to locations where jobs are available. Twelve companies are currently recruiting mine personnel for other parts of

the country, in cooperation with our Butte local office of the employment security division; however, how successful these efforts will be remains to be seen.

The side effects of any massive economic withdrawal in a small area, on those who are left even if they still have jobs are aften far reaching. Real estate values drop as the population shrinks to accommodate a narower economic base, taxes rise as a smaller population tries to maintain the same streets and water and sewage system, and more abandoned houses and buildings appear, just to name a few.

I want to know why out-of-State mining companies were notified about this closure before the workers or the unions or the State of Montana. The first real notice of a closure came to us from advertisements in Butte newspapers by the 12 out-of-State mining companies who were recruiting miners in Butte.

Why were these companies notified before we were? Why were they notified before the workers and the unions were?

The relationship of the Aanaconda Co. to the other mining companies in the west. regarding the closure in Butte, suggests a corporate agreement to desroy the city of Butte, Montana.

This idea may seem far fetched in Washington, D.C., but it's close to reality in Butte. Is the closure of the underground mine setting the groundwork for the ultimate destruction of the city of Butte?

This question is being asked on the streets of the mining city. It is on the minds of all who see nothing but difficult times ahead.

At a meeting with the workers in Butte, I was told that the closure of the mine would result in the significant deterioration of the economy of the city. They feel that the company would benefit from the destruction of the economy, by being able to buy out downtown Butte at a cheap price and expand their open pit mine.

Senator METCALF. May I temporize with you a little bit on semantics? It has been denied.

Governor JUDGE. Yes, sir; it has been denied.

Corporate agreements can be suggested by the dichotomy between the alleged unprofitability of Anaconda's underground mining operation in relation to the profits of other western mining companies. How can other western mining companies afford to operate underground mines and hire Butte miners and pay for their relocation while the Anaconda Co. maintains that their own operation cannot continue?

If other underground mines are profitable, why isn't ACM's? With ACM's high profit picture, why should the underground mines be closed. If the Anaconda Co. cannot explain its relative profitability versus non-Montana mines, then they should not be allowed to close. If they can explain this difference, steps should be taken to alleviate massive reduction in the work force.

We are told that the closure of the underground mines will result in an increased life expectancy for mining in the Butte area. Yet, we are not informed of the life expectancy of the present operations. We are not told how the closure will affect that life expectancy. But, we are told the closure is in the best interests of Butte. Why won't the Anaconda Co. provide us with the facts?

ACM has not demonstrated good faith in their dealings with the people of Butte, the government of Montana or the Federal Government.

We have been working for the past several years in close cooperation and in good faith with the Anaconda Co. to provide manpower training programs to insure them an adequate and qualified work force for their underground mines.

We have been operating an underground mining training program utilizing the facilities of the Anaconda Co. This program, over the past few years, represents an investment by the State of Montana and the Federal Government through manpower appropriations of about $350,000.

As recently as June of this year, we renewed the contract for an additional $125,000.

They mentioned in June they had already decided to close down their mines.

Senator METCALF. Governor Judge, was that just a program for Anaconda miners or was this a program for overall miners in the district?

Governor JUDGE. As the next sentence indicates, the Anaconda Co. abruptly concluded this program which had trained 247 miners, 97 percent of whom were placed with the ACM.

Was it good faith for them to sign such a contract in June only to close the mines in November? We have had on-the-job training contracts with ACM. The original contract, signed in 1973, trained 66 miners for ACM at a cost of over $48,000 to the federally funded manpower program.

They renewed the contract on July 15, 1974, for an additional 48 trainees. This contract has been also cancelled abruptly.

In addition, we have assisted them by bringing in 40 miners from Canada. These men have been sent back to Canada with little or no notice.

I ask you, is this dealing in good faith with the people of Butte, Mont. State government and the Federal manpower program?

The agreements we made, and the contracts we signed, seem to have little meaning. Instead of allowing us to plan for this closure for 2 years, the time which they say they have had this under consideration, they have given us a 2-month ultimatum.

Had we known for the last 2 years, instead of training underground miners for a mine that would no longer exist, we would have tried to train those miners to meet other needs in the economy of Butte and Montana.

The Anaconda Co., in the past 100 years, has produced many millionaires in Los Angeles, New York, and Seattle, by exploiting a natural resource with most of the profit leaving Montana. More often than not, all Montana has received is the pain and suffering of human beings. The war of the copper kings ended years ago. It now appears that the war is a battle for the human rights of those who face the united front of corporate mining interests.

The human element of corporate decisions has not been considered by the Anaconda Co. The lack of consideration for the people of Butte is astonishing. The city is unique with a rare mining heritage. Mining-based ethnic communities continue in Butte and make it an unusual and interesting place to live. The roots the people of Butte have grown into are the richest on earth. The very threat of a job loss is forcing men—who need a paycheck to survive—to seek employment else-

where. They are now being uprooted and forced to leave not only Butte, but Montana.

The actions of the Anaconda Co. represent an example of the cost accounting school of social planning which does not consider the human factor in economic equations. The people being affected by the decisions of this corporation are bandied about with little consideration of where they live, or how they survive.

The answer to these problems, I do not know. I hope that you can come up with some solutions. At best, I hope that the Anaconda Co. will reconsider its decision and keep the underground mines open or several of them.

If they will not do that, I hope they will significantly delay the closure so that we can attempt to alleviate some of the problems brought about by this action. The last 2 years have been wasted in terms of helping the affected miners. I hope the next 2 years will not be also wasted.

This comes at a time when Montana is facing a recession in other industries: The forest interest in western Montana, as a result of high interest rates, and a fall in the housing industry and high prices in the cattle and beef industry, this comes at about the worst possible time for the State of Montana.

I would hope and plead that this corporation consider the human problems of their actions. It is time that the Anaconda Co. consider its responsibility to people as well as to the dollar. They have a moral commitment to these people. They have a commitment to a community that has made the Anaconda Co. what it is today, and have little to show for it.

Thank you.

Senator METCALF. Thank you very much, Governor Judge, for coming back and reporting to us on the impact of this on the State of Montana.

As I have told witnesses for the Anaconda Co., including their president, it is not our purpose here on this subcommittee to go into the internal financial operations of the company, but certainly today we feel a necessity to see how various Federal programs are working. One of those programs, of course, is unemployment compensation when those men are laid off. They are entitled to unemployment compensation which is administered under the law of the State of Montana.

Were you given any notice so the people in your State, in your State government, could make plans to handle this lay-off?

Governor JUDGE. No, sir. Our office was informed—I believe Mr. Sternhagen and Mr. McDonald dropped the letter off on Thursday morning, I believe that was November 1. Advertisements had already appeared in the newspaper. I believe you and Senator Mansfield were informed that Saturday night when we were in Butte. I was informed one day, apparently, before the letter had gone out——

Senator METCALF. What did you do about it? Did you make any emergency plans to try to meet this issue?

Governor JUDGE. I met with the members and the leadership of the unions and immediately after that, in Butte, with yourself and with Congressman-elect Baucus.

We wrote a letter to the Anaconda Co. requesting they delay the closure and received a subsequent letter back responding negatively to that request.

Senator METCALF. We were in Butte the day that announcement was made in the newspapers.

Governor JUDGE. The announcement was made in the newspapers on Monday. We were there on Saturday evening.

Senator METCALF. In the classified section, they had ads in the paper offering employment to these people from the 11 corporations you suggested. How did your administration cooperate in trying to get jobs for these people?

Govenor JUDGE. The employment security office in Butte, Mr. Fred Barrett, the director, interviewed, allowed the companies to use the offices to interview miners who would be interested in relocating in another area.

I believe they have talked to some 75 by the time we were in Butte. How many decided to move, I do not know, but the State is cooperating with the unions and with the out-of-State mining companies that are there to interview miners who are interested in relocating.

Senator METCALF. Now that you have been told there will be this layoff in the next 2 months, are you doing anything on job manpower training programs to try to keep these people employed?

Governor JUDGE. The problem, Senator, 2 months does not give us much time to retrain anybody in a new profession. As I said, had the State of Montana been notified of the possibility of the closure of the underground mines, instead of running a manpower school to train underground miners, that obviously would not have any employment, we could have run a school under our manpower program to find new jobs that these people could be adapted into the economy of Montana, and we would have tried to find positions for them.

I would say to the best of our ability, whatever we can possibly do under our manpower program, we will do in the State government.

If there is any way at all we can provide some training to keep these people in Montana, we will certainly do that, but time is a problem. It is too bad we did not know about this a year or so ahead of time.

Senator METCALF. I want to say the same problem confronts us at the congressional level. We returned to Congress and the supplemental appropriations bill was on the floor of the Senate the first day we were back. Perhaps we could have gotten some additional money for some cooperation with the State if we had known—we have provided money for other cooperative ventures at the request of President Ford. We were able to get a little additional money for the wood products industry, as you know. I hope the thinning program that is going to take place will be of value to the Government and we will get our money back; in a few years.

At the same time, we have taken care of some of that unemployment.

Governor JUDGE. Yes. Fifty men working under that.

Senator METCALF. Had we had some additional information, I am sure the Federal Government would have cooperated with the State, both with matching assistance and suggestions for other programs, and we will continue to cooperate with the Governors in the months ahead.

Governor JUDGE. Thank you.

Senator METCALF. Thank you for coming back. Thank you for appearing before the committee.

Now, our next witness is Mr. James W. Murry, executive secretary of the Montana AFL-CIO, accompanied by Mr. Thomas P. Tracy, president of the Silver Bow Trades and Labor Council and Mr. Reginald Beavis, business agent, Local 1–A, United Steelworkers of America.

STATEMENT OF JAMES W. MURRY, EXECUTIVE SECRETARY, MONTANA STATE AFL-CIO; ACCOMPANIED BY THOMAS P. TRACY, PRESIDENT, SILVER BOW TRADES AND LABOR COUNCIL; AND REGINALD BEAVIS, BUSINESS AGENT, LOCAL 1–A, UNITED STEELWORKERS OF AMERICA

Senator METCALF. Mr. Murry, since you are chairman of this delegation—I am going to appoint you chairman anyway—tell us in what way you are going to proceed.

Mr. MURRY. Senator, I have my prepared testimony that has been given to the committee.

Senator METCALF. Has the Anaconda Co. had copies of your testimony?

Mr. MURRY. I do not know.

Senator METCALF. Will you please be sure the Anaconda Co. has a sufficient number of copies. Do you have prepared testimony?

Mr. TRACY. I do not have prepared testimony.

Mr. MURRY. Senator, Mr. Tracy and Mr. Beavis felt they might like to comment on some of the points I made and they are both very familiar with the underground operation in Butte and will respond to any questions the committee might have.

Mr. Chairman and members of the subcommittee, my name is Jim Murry, and I am the executive secretary of the Montana State AFL-CIO, which represents some 36,000 workers in our State.

With me today is Tom Tracy, president of the Silver Bow Trades and Labor Council of Butte, and Reggie Beavis, business agent of Local 1–A of the United Steelworkers, known also as the Butte Miners Union.

In a remarkable book written at the turn of the century, Harry C. Freeman wrote of Butte, and I quote:

> Situated in an almost inaccessible valley, shut in by an abrupt curve of the Rocky Mountains and off-running spurs and foothills, it most certainly would have been least sought in the pursuit of all the engagements of the human race but for that one industry which has made its fame worldwide as the greatest city of its kind on Earth, namely mining. Mineral wealth was there and in abundance. God seems even to have allowed the scale of equal distribution to go sadly out of horizontal in his endowment of that small area of hills that surround Butte proper . . . from which have been taken the riches of an empire and which are yet in the babyhood of their development.

Today, the city of Butte lies under the threat of economic destruction by the owners of the resource that make it what it is—a mining city.

The Anaconda Co., once a patronizing, almost parental factor in Butte, has now become the snappish parent ready to disinherit its child. Mr. Chairman, you know at first hand the relationship of Butte and the Anoconda Co., a relationship that has seen its days of turmoil, of disaster and its days of conflict. But there have been many more

days of high productivity by hard-working people who believed in the future of the mines and who staked their lives, what treasures they may have had, and the lives of their descendants on that belief.

Today the Anaconda Co. says that the underground mines will be closed and allowed to flood, that people will be discharged and forced to move to places where underground mines are more profitable, or to place themselves on the inadequate relief society offers in times like this. And, all in the name of profit.

Mr. Chairman, I could sit here for hours and rail against the callousness of this company, the utter cruelty of the Wall Street money machine that runs it, but that is not the central problem. The central problem is the disaster this portends for Butte, for Montana, and for our people.

The disaster of the closure of the underground mines, the idling of 1,200 to 1,500 workers, means the effective destruction of Butte as we know it. I need not go over the ripple effect of so massive a layoff, or the rules of thumb that every worker has three and one-half dependents who will be affected, and that for every worker laid off on the Butte hill, two and a half more will lose their jobs in service industries.

For the steelworkers in the mines the company's actions of attrition and layoff have already resulted in a net reduction of 40 percent since August. The operating engineers have been cut by about one-fifth. The boilermakers and the machinists report job reductions and members lost. And the collateral effect on the service trades has yet to be felt.

I am certain you realize that those miners who are hired by underground mining operations in other States will never return to Butte. Thus, the community will suffer a human loss that may be even greater than its economic loss. For the people of Butte are uniquely open and friendly. Roughhewn as the ore-bearing rocks that come from the mines, they have a rare, cooperative and good society there. Closing the mines, wreaking havoc with stores and businesses, forcing the cheap sale of residential and commercial property on the hill so that open pit mining can be expanded, all these can be considered logical consequences of the company's action.

I am going to digress for a minute. I would draw your attention to a publication put out by the Anaconda Co. and it is entitled "Anaconda, First in '74". This publication was published August 1974, Volume I, No. 1, published for Anaconda's Co. employees, 56 East Granite, Montana Mines Division, Butte, Mont. and in this publication I would point out this was published in August——

Senator METCALF. August 1974?

Mr. MURRY. August 1974.

Senator METCALF. Do you have a copy of that?

Mr. MURRY. Yes, I do. I will leave it for the committee when I finish.

In this publication, Mr. Sandstrom interviewed at some length. I would like to go over a couple of the questions and his responses to you today.

One of the questions was this:

As compared to other mining companies for which you have conducted studies, what is your impression of the Butte mines?

And, his response was this:

The conditions in Butte are very special, to say the least, mainly because underground mining has been in progress for almost 100 years. The main portion of the area we are now studying is penetrated with gob and tailing making it difficult to develop mining system.

On my early assignments we were working on more virgin ore bodies; in other words, starting from scratch. The very impressive thing about the Butte area is the potential for continued underground mining and the good stock of experienced mining people.

There was another question that was asked.

Question:

Will the Kelley be able to hoist all of the ore in the face of increased productivity?

And, Mr. Sandstrom's response was as follows, and I quote.

The Kelley shaft is only a temporary hoisting solution that would allow us to expand the underground operation to say, for example, seven to eight thousand tons per day during the next 5-year period. For the long range picture when we talk of 40,000 to 50,000 tons per day, we must establish a new major hoisting center. Where this new hoisting center will be located, it is too early to say.

There was another question, keeping in mind this was in August of 1974.

If introduced, what effect will mechanized mining have on miners presently employed?

Answer:

We do not expect the vein mining to terminate entirely, but there is a definite advantage to going to the major bulk mining system. The present vein miners are very valuable indeed. In the event there is a shortage of stopes for them to work, they will be retained in the bulk and mechanized mining methods. The stope miners are a skillful breed and we will prefer to keep them in the mechanized stopes.

Now, during Mr. Sandstrom's testimony, he said the company concluded, or perhaps he concluded, perhaps in June the deep mining was no longer feasible, but in August about 2 months later, he talks about expanding that mining operation. From what I understand, it is about 2,000 tons per day. That would have been in August. I don't know where it is now. Probably in that vicinity, but expanding that within the next 5 years to 7,000 to 8,000 tons per day and, to me, it seems like a direct conflict in the statements on the part of Mr. Sandstrom.

Senator METCALF. What was the source of that brochure? What was the title of it?

Mr. MURRY. This is a publication published by the Anaconda Co. It is August 1974, Volume I, No. 1 published for Anaconda Co. employees by the Employee Relations Department, 56 East Granite, Montana Mines Division, Butte, Mont. The title of the publication, as I see it, is "Anaconda First in '74."

Senator METCALF. Somebody back there—Anaconda should respond to that.

Mr. STEINMETZ. We would very much like to have Mr. Sandstrom respond to that.

Senator METCALF. I would like to have him respond to it now. He told me in June he had recommended the end of the strip mining pro-

cedure and now Mr. Murry tells me in August they told the employees they were going to continue and that strip mining was a valuable asset.

Mr. SANDSTROM. Senator, Mr. Murry, the reason I elaborated so much about the Kelley Block in my statement was around February——

Senator METCALF. 1974?

Mr. SANDSTROM (continuing). 1974, when we started to receive the results our analysis looked very promising indeed, and we were very hopeful in bringing this Kelley Block into our expansion for bulk program—I think we had that hope all the way into May or June—and, incidentally, this interview which came out in August was carried out in May of 1974. That interview was from May of 1974.

Now, at the very end of June, this year, due to the change in prices of copper and due to the negotiations, economic analysis of this particular block that carried my enthusiasm as expressed in this article. It was at that time, beginning in July, I brought to the attention of the Anaconda Co. that in the interests of the future of copper supplies and also because of negative economics of this background that Mr. Murry referred to, I recommended the things I stated earlier; that we should close down the vein mining and also definitely concentrate on the very intent strip mining program.

Senator METCALF. Did you make these statements in August?

Mr. SANDSTROM. No, in May.

Mr. PLACE. He made them in May. The article was published in August.

Senator METCALF. You mean there is a lag in your publication from May until August.

Mr. MONNINGER. This is the first of a company house organ. It hasn't even been named yet. As a matter of fact, if you read through it, you will find a little contest going on, as far as name is concerned.

Senator METCALF. We can even deliver the mail faster than that. This is one of the things with which we are concerned. It is pretty hard for the people of Butte, or your Congressional delegation to know what you are talking about when you put something out and it is not circulated until 4 months later and in the meantime you change your position.

You say we value the stoke miner. We are going to have continuing operation. You said that in May and then in June this recommendation came in and you did not change it on your date of publication in August and it seems to me the employees who relied upon this information that you were supplying in this still unnamed brochure, were being deceived. You had already made another decision.

Mr. SANDSTROM. Senator, I did not see the position at that time.

Senator METCALF. You made the recommendation. You were the one being interviewed back in May.

Mr. SANNDSTROM. That is correct.

Mr. PLACE. That is correct, but in the time of August, we had not made the basic decision, Senator, to close those mines. Those were not really made until October.

Senator METCALF. I see.

Mr. Murry, since we have had an interlude here, the Majority Leader just came in. I believe he has a statement. I would like to recognize him, if he will come forward.

Senator Mansfield, we only have one microphone. Could you take the microphone right there at the end.

Senator Mansfield, we are delighted to have you here to make this personal appearance before the committee.

STATEMENT OF HON. MIKE MANSFIELD, A U.S. SENATOR FROM THE STATE OF MONTANA

Senator MANSFIELD. Thank you, Mr. Chairman. I wanted to appear before the committee earlier this morning, but I had to chair an Appropriations Subcommittee on Military Construction and then meet with some people, so I am delighted to have this opportunity to say this afternoon what I would have said this morning.

Mr. Chairman, early in November I was privileged to spend some time in my State of Montana, and one of the most dominant topics of discussion was the plans of Anaconda in making substantial reductions in its work force at Butte.

These rumors soon became fact, and apparently over the next several months there will be numerous layoffs, amounting to anywhere from 700 to 1,000 employees.

This comes at a time when the city of Butte is just beginning to experience some success in its economic recovery program. As members of this subcommittee know, Butte, historically, has been a one-industry town and each time there has been any significant change in Anaconda's operations, it has had a very direct and immediate effect on the local economy.

The Butte situation develops at a time when there is serious economic dislocation in the lumber industry, one of the major economic resources we have in the western part of Montana. These are decisions made by private industry. Congress, or any other Federal agency, is not in a position to dictate decisions. We do, however, believe that we should have some answers to questions which give cause for great concern at this time.

I wish to compliment my colleague from Montana, Senator Metcalf, for scheduling this hearing to determine the impact of the announced closure of the underground copper mines in Butte by Anaconda, and to determine "if the shift is based on particular circumstances of Anaconda, and the particular mineral deposits involved, or if it is indicative of general trends in the copper mining industry."

As my colleagues know, I have been concerned for some time about a shift from deep mining techniques in coal to open pit or surface mining, and the many social and environmental problems associated therewith. I would hope that we are not facing the same situation in the hard rock mining industry. I believe the Anaconda officials might be able to give us some new insight into this possibility.

I do not believe that I or any other Member of Congress should dictate to Anaconda. But as a representative of the workers and families directly affected, I hope that these changes and reduced employment are not being dictated solely by monetary considerations. Anaconda has been a very important part of Montana's past and present and we want to see it continue in the future. I do not, however, like to envision it as solely an extractive industry which contributes little to the general welfare of Montana.

I think perhaps that one of the best things that could come from this hearing would be some clear indication from Anaconda officials as to where they are going in the area of copper mining and associated development.

What plans do they have for Butte, Anaconda, and Great Falls in the next 20 and 50 years? This kind of information is vital to the reasonable planning effort at the local level. If cities like Butte are to have a stable future, they are going to have to have some idea of what its major industrial and economic force is planning.

In the instance of Butte, there is a local planning effort designed to provide for the organized relocation of "the hill" to the flats. The original business district of Butte, as many of us know, is very close to the perimeters of the Berkeley pit.

As the pit expands, the lifetime of downtown Butte becomes more precarious. The major instrument in this dislocation has, in my opinion, a major responsibility to assist in any relocation or redevelopment plan. Also, specific projections for the future will make the work of the local planners that much easier.

In conclusion, Mr. Chairman, I believe that our society has progressed to the point that we can no longer tolerate the stop-and-go approach to economic development. The people of Montana and the Nation will no longer accept the unregulated scarring of the earth, shacktowns, and sporadic employment.

It is time for all interested parties to work together for the orderly planning and development of our resources. I know that the efforts of the subcommittee will contribute to that effort.

As the chairman knows, on our behalf, I met with the President on Wednesady, November 6, to discuss with him, among other matters, the disastrous economic situation which confronted Montana in several areas. Specifically, we discussed decreased beef prices plaguing the livestock growers, layoffs in the timber industry and layoffs and shutdowns in mining at Butte. At the time, the President indicated that he would take the matter up with the Secretary of Labor, Mr. Brennan.

In conclusion, Mr. Chairman, I ask to have included in the text of this hearing transcript a letter of November 6, 1974, I addressed to the president of Anaconda, Mr. John Place, and his reply of November 12 and a news release issued by Anaconda in Butte on November 12 this year.

Senator METCALF. Both of those letters will be incorporated in the record at the appropriate place.

[The letters and news release referred to above follow:]

NOVEMBER 6, 1974.

Mr. JOHN B. M. PLACE,
President, The Anaconda Co.,
25 Broadway, New York, N.Y.

DEAR MR. PLACE: When Senator Metcalf and I arrived in Butte late Saturday, November 2nd, we were informed by many of the proposed changes and expected layoffs. This was the first we knew and later learned that the letter sent to my office was received in Washington, D.C. on Monday of this week.

After the press conference held Monday in Butte, there are many questions and rumors which I feel the Company should clarify.

Will the men be given more than one week's notice on layoffs?

Is there any severance pay for them?

If all but 200 underground men are laid off by January 1st, will there be any jobs for them in the drilling operation or open pits?

Of the 500 to be transferred, will they be transferred to jobs in Montana—are they underground or salary people who will be transferred?

Is it true that the Tucson operation will be phased out and, if so, will any or how many be transferred to Butte?

Is there any truth to the rumor that you plan to start operations on the property in Lincoln? If so, when and what will it mean in the way of employment?

Is there any truth that Anaconda and Phelps Dodge are planning an operation in Mexico? What is the status of the Company's operation in Utah?

Many are concerned that if the mines in Butte are flooded, they might, in fact, not be reopened at any future time. What are the Company's plans to maintain these mines so that this natural resource can be made available in the future for our country.

Senator Metcalf and I are very concerned that this announcement could not have been made known sooner so that better plans could have been made to try to maintain these jobs in Butte. We are very concerned that this proposal could mean the total loss of approximately 1500 jobs in the Butte area only. We feel sure that, eventually, this will have an impact on Anaconda, and Great Falls as well, unless you can give us some assurances to the contrary. We recognize that the Company has had many problems and must operate at a profit. We do not, however, understand *why the Company does not show some responsibility to Butte which is dependent on the Company for the major share of employment.*

It is difficult for us to justify assistance to the Company on your operations in places like Chile, and now Mexico, and elsewhere when we feel Montana has not been given the stability it needs and the assurances it must have. After all, it was Butte which gave the Company its start and it is to Butte and Anaconda that the Company has a special obligation.

What is the Company going to do for those who are being thrown out of work and given such short shrift?

Sincerely,

MIKE MANSFIELD,
U.S. Senator.

THE ANACONDA CO.,
New York, N.Y., November 12, 1974.

Hon. MIKE MANSFIELD,
U.S. Senate, Senate Office Building, Washington, D.C.

DEAR SENATOR MANSFIELD: Supplementing my acknowledgment of your letter of November 6, and Mr. Mecham's memorandum to you of that same date, I am sorry the information hand delivered to your office on Thursday, October 31, did not come to your attention before your arrival in Butte. It certainly was our intention that you and Senator Metcalf be directly informed as soon as our decision was made.

To understand the timing of our decision to close down the underground operations at Butte, you should know that we have been engaged in a detailed and careful study of the underground situation, with the assistance of retained experts, over the past two years. One of our objectives was to determine the most economical long range program for developing the extensive underground deposits in the face of mounting costs. The present operations, which are conventional cut and fill stoping of scattered small veins, are no longer viable. The tonnage and grade of ore available for mining by those methods has been steadily declining over many years and the costs to maintain access to the numerous working places, let alone the labor, supplies and other requirements of productive operations, have escalated dramatically.

As the study proceeded, it became evident that the effect of our current underground mining program would jeopardize our ability to conduct a larger, more efficient bulk mining operation that hopefully represents the future of underground mining in Butte. Consequently, by mid-September it became clear that existing operations would have to be curtailed. It was hoped at that time that a part of our underground efforts could be continued by conducting near-surface mining in the vicinity of the Kelley Mine shaft. These decisions were revealed in a notice to employees issued on September 17, and in a subsequent press release issued on September 19.

Further study revealed that economic and operating problems related to the proposed operations near the Kelley Mine shaft made that near surface project

unfeasible. Additionally the high copper prices that prevailed during the first eight months declined in September and October. Consequently, in late October it was decided that underground mining would have to be discontinued entirely. This decision was promptly made known to the employees and public officials on October 31, and was released to the public at a press conference on November 4.

As explained by Mr. Mecham's memorandum, this curtailment will be carried out in an orderly way over approximately four months. Every effort has and will be made to minimize the effect on the company workforce. Last August, as soon as the underground study indicated that some curtailment on underground mining might be necessary, a moratorium on hiring of underground miners was imposed. Beginning in September, when the initial curtailment decision was made, other companies were encouraged to recruit underground miners in Butte. I am advised that eleven companies have been advertising, nine companies have actually been hiring and that, to date, some sixty miners have accepted employment with other companies. A number of miners recently recruited from Canada because of the shortage of qualified underground miners in Butte will be released to return to Canada. Within the company, a number of the Butte underground miners will be re-assigned to the open pit, crusher and concentrator operations, replacing lower seniority workers. Several of the miners will be offered the opportunity to relocate to our other three underground mines in Utah and New Mexico.

We do not expect any curtailment of operations at the smelter or Arbiter plant at Anaconda, nor at the refinery at Great Falls, since the ore tonnage lost from underground will be offset by increased tonnages of lower grade ore from the pits in Butte and from the output of other company mines.

You are concerned that the company has somehow failed in its "responsibility to Butte" and in giving Montana "the stability it needs." We believe that the company's performance has been both positive and responsible. For example, in Butte we have, in recent years, opened and developed the Berkeley Pit and the East Continental Pit, constructed and expanded the Weed Concentrator, and expanded our dump leaching and precipitation operations. We expect, with the cooperation of community and state officials, to develop the South Continental and East Berkeley open pits which, together with the present Berkeley and East Continental operations will provide steady mining operations for 15 to 20 more years. We will proceed with an extensive underground geological development and drilling program over the next two years. The program, employing 150 to 200 workers, is a part of the underground study, and is an effort to delineate a large volume of lower grade ores which may enable us to extend the Butte operations for an indefinite period in the future, to be phased in as the pits near exhaustion. From the foregoing, it is clear that Butte should continue to play a major role in the company's copper mining operation.

Elsewhere in Montana we have completed the new flue program at the Anaconda smelter, expended $34 million on Phase I of our smelter pollution control program, embarked on Phase II of that program (estimated at $33 million), constructed the revolutionary new Arbiter Hydrometallurgical plant at Anaconda (approximately $40 million), reopened the Anaconda concentrator, and are now expanding the Great Falls refinery (estimated at $9 million).

Therefore, we are proud of our record in Butte and Montana.

In response to your other questions, I would advise you as follows:

Personnel affected by the curtailment are given seven days notice. Short term workers (under two years) receive Montana State unemployment benefits so long as they are unemployed. If longer term workers are affected they will receive the severance benefits provided by the union contracts.

Curtailments are made by seniority in accordance with the union contracts. Many of the underground miners will be relocated in the open pit and concentrator operations, replacing lower seniority workers.

We are not phasing out our Tucson offices. Under our present organization the Montana Mining Division headquartered in Butte is a separate division from our General Mining Division with headquarters in Tucson.

We have no present plans to start up operations at Lincoln. We are continuing our evaluation of our Heddleston properties near Lincoln, and any decision to proceed will be dependent on the outcome of these investigations.

In Mexico we recently announced the formation of Cobre de Sonora, a joint venture mining company in which Anaconda will hold 26.25% and Phelps Dodge 3.75%. Our contribution is our interest in mining concessions where we discovered important mineral reserves. Financing of the planned operation will be by the new Mexican company and not by the individual shareholders.

In Utah, we announced in September the development of the Carr Fork underground mine. This will involve an expenditure of in excess of $135 million over a five year period to develop an operation that will produce 56,000 tons a year of copper in concentrates. It is our present plan to process the mine production at Anaconda and Great Falls. The Carr Fork deposit is a fully developed continuous high grade replacement deposit in limestone that is presently susceptible to mining by modern, large scale bulk mining methods.

In response to your concern about the maintenance of the underground mines, it is our judgment that our plan will not endanger the future long-term underground operations we envision. The resource will continue to be available through a new concept of large scale mining.

For your further information, I am enclosing a copy of my letter in response to a joint letter from Senator Metcalf, Governor Judge and Congressman Baucus. If I can be of further assistance in explaining the actions we have taken, please get in touch with me.

Respectfully,

JOHN B. M. PLACE.

[News Release]

THE ANACONDA CO.,
Washington, D.C., November 12, 1974.

The Anaconda Company announced Monday that 106 day's pay employees, who were officially notified of a reduction in force scheduled for last week, will be laid off this Friday.

F. M. Monninger, President of the Montana Mining Division, said the Company delayed making the reduction to allow time for training employees transferred to other jobs and in the interest of safety.

Monninger said the layoff affects only people who were hired since last February.

Further layoffs as may be required in the announced phaseout of present underground mining operations could affect as many as 540 additional hourly and salaried jobs in the next four months, Monninger added.

The Company has imposed a freeze on new hiring in both Butte and Anaconda in order to absorb as many people as possible from the underground operations.

Senator METCALF. Thank you so much for coming, and your contribution to this hearing, Senator Mansfield. We did have in the record about your meeting with President Ford, and the two letters you suggested and the questions you have propounded in those two letters, so that is the valuable part of the hearing, and of course, the whole history of these events.

Do you have any questions? Congressman Baucus is our new Congressman-elect. I think this is his first hearing and he has been privileged to sit with us today.

Senator MANSFIELD. He had better get used to it. Thank you, Mr. Chairman.

Senator METCALF. Thank you very much for yielding, Mr. Murry, and the previous ruling still prevails. Any comments the Anaconda people wish to make on this letter or any response on Senator Mansfield's testimony will also be incorporated in the record.

Please continue, Mr. Murry.

Mr. MURRY. Prior to Senator Mansfield's coming in, we were discussing publication of the Anaconda Co.

Mr. Chairman, I would like to point out to the committee this is the kind of information that workers in Butte, Mont., had to go on in planning their futures.

Every worker on that hill, I understand, received this publication and I don't care when the interview was, they received this publica-

tion in the month of August. To them, it looked like there was no threat and no danger of losing their jobs.

In addition, we heard the Governor of the State of Montana testify to the fact in June a contract was signed for an additional $125,000 for training of additional underground miners.

All of these things led the workers, led their union to believe there was going to be no shutdown of those mines.

Now, Mr. Chairman, the Montana AFL–CIO does not have the staff that Anaconda does, but we are subject to interviews many times and when we put out publications, we always read those publications over to make sure it is timely and not misleading to the people who read those interviews.

I think anybody who has a publication, it seems to me that it would just be good business sense to do that.

Senator METCALF. May I interrupt just for my own information.

You have had a substantial change in union activities from underground mining to operating engineers and machinists and so forth. What kind of unions will be used in this massive underground operation? What kind of skills will they have? Will they be operating engineers?

Mr. TRACY. Senator Metcalf, to respond to that, I would have to say the normal practices of the jurisdiction established on the Butte Hill, historically, should be followed. I would hope they would be.

I see no other reason why the miners would need a production unit in the crafts, the maintenance.

Senator METCALF. Does anybody know what unions are operating in this parallel, in this system in Utah?

Mr. TRACY. I cannot respond accurately.

Senator METCALF. The point I was bringing up, one long historic union, International Mine Mill and Smelter Workers, it has a tremendous history and it will probably be wiped out and another union take its place.

Certainly, I don't want to get involved in a jurisdictional struggle. I just want to know what happens when you go into some other type of operation. I assume there are going to be unions, Mr. Place. I think the new relationship in recent years between the Anaconda Copper Co. and the union has been such, has been one of cooperation.

Mr. TRACY. The only parallel we could possibly draw at this time would be the Berkeley Pit where the company went into the surface mining where the techniques were much different than underground and the projection people, where the haulage truck drivers were the operating engineers, the biggest part of the employees.

Senator METCALF. I suppose that is something you people will work out.

Mr. BEAVIS. Senator Metcalf, in regard to your question, the company already has upgraded this type of operation on the Butte Hill. It has been referred to as the load, haul and dump project. All of the production work, the steelworkers have the jurisdiction and in the event far-range plans become a reality, we would still continue jurisdiction on the production.

Senator METCALF. Thank you very much.

Mr. MURRY. Mr. Chairman, before I go on with my testimony, I would like to ask Mr. Tracy to go over some of the conditions surround-

ing the opening of the Continental Pit and the understanding the unions had in that regard, if we could, please.

Senator METCALF. Yes, Mr. Tracy.

Mr. TRACY. Senator Metcalf, another example of changes in directions were the opening of the East Continental Pit and I am sure you are familiar with the Columbia Gardens and that nice area of land that was known as the Columbia Gardens, very cherished to the people of Butte and their families.

There was no objection by the labor movement at this time for the company to go into this area and we are not implying they were not within their rights, but it was, as I said, a very cherished piece of land to the people of Butte.

Senator METCALF. When were those negotiations?

Mr. TRACY. July 1, 1974.

Mr. MURRY. Mr. Chairman, I would like to remind you and Congressman-elect Baucus of the meeting we had on November 7 at which time one of the union representatives said, in effect, what Mr. Tracy has said today; that perhaps the unions should have opposed the opening of the Continental Pit, because of the land-scarring effects it had and the damage to the environment. They chose not to do that.

They felt—at least it was tacitly agreed—that, if anything, it would stabilize the underground operation in Butte, Mont. The publication and signing of training agreements for money to train underground miners, the meetings that covered the opening of the Continental Pit, all led the workers to believe their jobs were not in danger in Butte.

I would like you to consider another of the often-overlooked victims of cutbacks so far-reaching as this one, and I am referring to the family.

No young person approaching work age can look forward to a job in Butte, Mont., from the day the mines are closed on into the foreseeable future.

As the reductions continue on the hill, in the stores and restaurants, there will be no place for young people to find entry jobs, and they will have to leave the city and leave their families. Thus, this closure will creep into every home in Butte and touch every hearth.

And what has Montana, what have these workers, what has Butte done to deserve a cup of hemlock from the company? Cooperated. Our labor movement in Montana, for example, bent over backwards to bargain a competitive contract with the Anaconda Co., so that they would not suffer in labor costs in comparison with other major copper producers.

In the nonferrous metals industry, only the Anaconda Co. was able to bargain a contract without a strike last year. That was done deliberately to help keep the underground operation going. Curiously, at no time during bargaining did the company indicate the slightest intention to discontinue its deep mining.

In fact, the first indication organized labor had of the extent and duration of the layoffs came from the Montana State Employment Securing Division, and the division today says it hasn't been fully informed about the proposed closings.

Similarly, State and local government have been willing partners for years in assisting the Anaconda Co., at times over the strong objection of the labor movement.

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And, this is the thanks we get.

But, there is a graver problem yet. What to do with an entire community of people who will no longer be allowed to work? There is a rumor, and I hasten to emphasize that it is merely rumor, that the company intends to automate their pits with a conveyor system, thus eliminating more jobs.

Soon Butte will be reduced from a city of workers to a city top-heavy with supervisors and executives.

Even if that does not come to pass, there is no doubt about the company's intention to expand open pit mining, which they say is more profitable, even if more naturally destructive. There is a vein of copper, called the Syndicate Vein, which runs beyond the perimeter of the huge Berkely pit the company now operates. That vein, unfortunately, runs directly through the north residential areas and part of the commercial district of Butte.

At present, costs of acquiring the property overlying the vein would be high, probably even too high for a company which registered a 706 percent profit in the last quarter. In a ruined Butte economy, the land costs will depress rapidly, thus allowing a massive savings in acquisition costs. Then will come the bulldozers and the mining machines. And the trucks. And no one will be around to see it.

That is a scenario as inevitable as night following day, Mr. Chairman. When it happens, it will mean that Butte will move into the category of a played-out mining camp, camps once described by Freeman as follows: "If the same elements had controlled the development of Butte that have shaped the destinies of other equally promising mining camps, its end would, no doubt, have been as inglorious. Denuded, as it seemed, of all the wealth that nature had hidden beneath its surface and rendered unattractive as a source of further treasure, it seems nothing short of marvelous that the camp was not abandoned for at least a long cycle of years, perchance forever, unmarked save by the telltale ruins of its early exploitation." Unquote.

We will, unless something is done, see Butte denuded, left unattractive, perchance forever.

What then is the remedy? There is copper in the underground mines, copper that the Nation desperately needs. Yet the mines, on a day some 4 months hence, will be allowed to flood to the 3,800 foot level. There are new copper leads that will be abandoned while the United States continues to undevelop its natural resources. We must ask how is this possible?

Can profit be enough to allow anyone, even this corporation, to hold back a metal on which productivity in many industries, not to mention its use in national defense, depends?

In these times when the President of the United States calls for increased productivity, can it be that his corporate friends with their desire for profit and higher copper prices haven't heard the call?

The company motto is, "from the mine to the consumer" and since little Anaconda Co. copper is sold on the open market, but instead is sold as copper products such as pipe and tubing, will the shortage of copper drive the price of their products up as a result of underproduction because of the Butte shutdowns, thus adding to inflation?

As a final question, doesn't all of that justify and necessitate action on the Federal level to maintain the operation of the mines?

Our Montana employment service has reported that mines in New Mexico, Arizona, Utah, and Idaho apparently have 1,000 job openings for Butte miners. It is inconceivable to us that underground mining can be so profitable to operators in those States, and unprofitable enough in Montana to warrant the great, tragic human cost that will be imposed on Butte.

The Anaconda Co. doesn't need a Federal subsidy or Federal aid. Not with the profits it has been reporting for the last six quarters. It needs a heart.

It is our firm belief that what we have here is the well-planned, corporate rape of a very special community. It cannot be permitted.

Not all the testimony in the world that corporate executives must act in the interests of stockholders changes the coldness and cruelty of this decision.

Not one word of it reverses the sad tide of destruction about to sweep over that city.

None of it alleviates one human problem involved in leaving Butte, leaving Montana, and trying to strike up a new life elsewhere.

None of it diminishes the cost to the State, both in benefits to be paid the unemployed, or revenue lost.

Mr. Chairman and members of the committee, we of Montana labor are powerless to stop the closings. I know it is the traditional posture of Congress not to meddle in corporate decisions because of something called free enterprise.

But, here we have a vital material soon to be covered by tons of water, a city about to become an economic disaster area of the first order, and we have thousands of people facing the awesome prospect of unemployment or relocation. If one company, in one swoop, can cause all that, then it may be time for a little less freedom in free enterprise.

Mr. Chairman, I don't know what precedents there are for Federal intervention, but perhaps you will agree with me that the situation here is serious enough to set a precedent on. Serious enough in terms of its damage to the city of Butte, the State of Montana, and to thousands of people who are powerless against the greed of the company.

For all of the working men and women of Butte, and of our fair State, I pray you do. For we have nowhere else to look for solutions.

Senator METCALF. Thank you very much, Mr. Murry, for your testimony on behalf of the AFL–CIO of Montana.

As I understand it, Mr. Tracy has some comments to make.

Mr. TRACY. Senator Metcalf, I think the comments are adequate. I think that was covered in response to Mr. Sandstrom.

Senator METCALF. Thank you. Do you have any comments, Mr. Beavis?

Mr. BEAVIS. Just one, Mr. Chairman. Mr. Chairman, on November 12, 1974, there was a letter submitted to yourself and the Honorable Thomas L. Judge, Governor of the State of Montana, the Honorable Max Baucus, Representative-elect to the U.S. House of Representatives and this was submitted on behalf of John Place, the president of the Anaconda Co.

Going through this at some later date when the record is read and discussed, there may be, if we do not correct it now, an indication that

the labor movement of Montana contributed to the demise of underground mining operations.

We feel this is not so and the privilege of that must rest with Anaconda officials. To make myself clear, I will read the first full sentence of that letter. It reads, "All efforts to increase productivity per man shift have been frustrated by either antiquated work practices protected by union contracts or the basic physical characteristics of the mining problem."

We have been engaged in negotiations since 1956 with the Anaconda Co., and as far as productivity is concerned, they were minimum. Anaconda Co. has told us on repeated occasions if they had the problems with the other people that they had with the steelworkers, they would be minimum and they would be in good shape.

We have attempted to have a stable community. We have cooperated with the company in all respects. Recently, we had a job reclassification program where we combined jobs. We allowed them to combine jobs. We also let them introduce new mining methods, new machinery and as a result of the new machinery, we also entered into an agreement with them that once they get into production with this type of thing, we will sit down with them as a task force and overhaul some of the problems arising regarding the incentive system now in effect.

So we say, once again, they can have that privilege and we want no part of it whatsoever. I wish the record would show that.

Senator METCALF. Mr. Murry, do you have anything further?

Mr. MURRY. Just in conclusion, Mr. Chairman, I would like to offer this publication.

Senator METCALF. Thank you. I wish you would make that available to the committee. The brochure will be incorporated in the record and it may not be incorporated in its entirety unless it is your desire and the desire of the Anaconda Co.

The staff will decide that.

[The article "The Path of Change" from Anaconda Co.'s publication follows:]

THE PATH OF CHANGE

MONTANA MINING DIVISION PLANS AHEAD FOR BUTTE'S UNDERGROUND FUTURE

Perry Sandstrom is a name many people concerned wtih underground mining on the Butte Hill have heard in recent months. He came to Butte in 1973 to conduct an intensive study of underground mining that hopefully will provide answers for a long and successful period of mining.

For years it has been recognized that if we all are to benefit from the great mineralized zones still remaining in Butte, it will be necessary to improve our underground methods to the most modern standards. Accordingly, the company called upon top experts in the field of underground mining to aid in the study of Butte's mining systems, and Perry Sandstrom was the man picked to direct it.

A native of Sweden, Perry resided in Montreal, Canada. He received his education at the Higher College of Technology in Skelleftea, Sweden where he concentrated his efforts in the field of mining engineering.

Since graduation he has become an internationally known expert in mechanized mining methods and bulk mining systems. He has conducted mining studies for a number of companies in Canada, including Craigmont Mines, International Nickel, Cominco and Falconbridge.

Also working on the study are Claude Huber, project engineer; Bob Solari, Bob Barnes and Ted Williams; Nigel Taylor, consultant from the firm of Urwick Currie & Partners of Toronto, and Georgene Pericich, secretary. Geologists and

others from the Montana Mining Division staff also are assigned to assist as required.

The following interview was conducted recently to enlighten our employees as to the nature of the Special Underground Study:

Question. What area of the Butte operations is your study concerned with?

Answer. We are concerned with the entire future of the underground operations in Butte. The initial objectives of the study were specified in three priorities. First, to improve the present vein mining system in order to improve costs and efficiencies of the system. Secondly, to prepare recommendations on mining for the next five-year period, hopefully involving mechanized mining systems. Thirdly, to prepare a long-range master plan indicating how the entire underground ore reserve shall be mined during decades to come.

Question. Why does the underground operations on the Butte Hill need such a study in the first place?

Answer. While open pit mining has provided most of the production in recent years, it is obvious that the long-range future relies on the tremendous underground ore reserves in the Butte area. To mine these reserves in the way they are presently being mined, which is by conventional vein mining, would not be economical. Furthermore, in order to insure that we can produce at least the same amount of copper out of the Butte area as we are producing now, we must look at a huge underground operation, allowing mining of grades of 1% and lower rather than the selective grade of about 4% presently, and handling tonnages in the range of 40 to 50 thousand tons per day. In other words, the Butte underground could become one of the major underground operations in the world. That, in turn, means it must become one of the most modern in the world.

Question. How long do you anticipate your study to last?

Answer. Originally, we agreed upon one year for the study. However, due to unpredicted problems in defining major geological blocks required for the study to achieve this high production level, it will now last approximately two years.

Question. When did your study begin?

Answer. It began in October, 1973.

Question. What, at present, are the major problem areas existing in the Butte mines?

Answer. There are some that result from little improvement in methods for many years, while others are due to the geological conditions. For example, we are mining very deep where heat generation is high, making ventilation a major problem.

Question. What are the major goals of your study?

Answer. As I have mentioned before, our immediate goal is to see that the present vein mining operations become more efficient and more profitable. This will be accomplished by mechanizing the stope activities and improving the logistics—particularly the tramming functions. Our second goal is to establish, as soon as possible, a test area for bulk mining, allowing continuous mining operations using mechanized equipment. This will mean less fatigue for the operators and create a good working environment. This bulk mining test area will indicate the future success of the long-range high tonnage operation.

Question. As compared to other mining companies, for which you have conducted studies, what is your impression of the Butte mines?

Answer. The conditions in Butte are very special, to say the least, mainly because underground mining has been in progress for almost 100 years. The main portion of the area we are now studying is penetrated by mined-out veins filled with gob or tailing making it difficult to develop efficient mining systems. In my earlier assignments we were working with more virgin ore bodies, in other words, starting from scratch. The very impressive thing about the Butte area is the potential for continued underground mining and the good stock of experienced mining people.

Question. How does one go about carrying on a study such as yours?

Answer. First, we determine the geological blocks, then we proceed with a preliminary mine layout, and then we do preliminary cost simulations. If these cost simulations prove to be positive, we proceed with the drilling of the major ore blocks. If the results of these drillings show workable ore deposits, we are ready to proceed into the detailed mining engineering stage from which will come the base for the final recommendations to management.

Question. What does the future of underground mining look like for Butte?

Answer. I am very positive indeed about the future of underground mining in the Butte area. I can really see the sun at the horizon now and I am very hope-

ful. I know for sure that we can improve the working conditions tremendously and at the same time make the operations profitable. For the long-range plans, I am also enthusiastic; however, this has to be subject to exploration drilling to better define targets for future high tonnage mining.

Question. If we are able to increase our underground productivity, through mechanized mining, will this result in the reopening of some of the inactive mines in the Butte area?

Answer. There may be other shafts reopened in the event the company begins to mine zinc again. However, if you are only looking at the copper, our strategy during the next decade will be to concentrate all hoisting activities at the Kelley Shaft and operate the mines as if they were one big mine.

Question. Will the Kelley be able to hoist all the ore in the face of increased productivity?

Answer. The Kelley Shaft is only a temporary hoisting solution that will allow us to expand the underground operation to say, for example, 7 to 8 thousand tons per day during the next five-year period. For the long-range picture, when we talk of 40 to 50 thousand tons per day, we must establish a new major hoisting center. Where this new hoisting center will be located it is too early to say.

Question. If introduced, what effect will mechanized mining have on the miners presently employed?

Answer. We do not expect the vein mining to terminate entirely, but there is a definite advantage to going to the major bulk mining system. The present vein miners are very valuable indeed. In the event that there is a shortge of stopes for them to work, they will be retrained in the bulk or mechanized mining methods. The stope miners are a skillful breed and we will prefer to keep them in the mechanized stopes.

Question. Would you please define mechanized mining?

Answer. Mechanized mining is a system of good long and short range planning that allows continuous use of mechanized equipment, like mobile drill jumbos, and diesel operated front-end loaders; in other words, equipment which will take away most of the fatgue from the operators. The miner in a mechanized system will no longer be required to be the super strong man he has been in the past. What is synonymous to the mechanized mining is a considerable improvement in productvity, which in turn will allow mining of lower value reserves, and substantially increase the life of the mining community.

Question. Getting back to your study, can you tell us a little about your findings to date?

Answer. Regarding the present vein mining, we are very hopeful that we can mechanize this operation. We have developed a new stope mining system in the area which we have seen in operation in a few mines in Canada and we are presently developing and setting up working stopes, using the new system, in the Mountain Can and Steward areas. We have, since February, been carrying out extensive work study projects in order to improve the underground logistics so that we can handle substantially higher tonnages from each stope once the mechanized vein mining commences. We expect to see the practical and economical results from this improvement in the later part of this year. In regard to our intermediate long-range plans, we already have good indications that a major bulk mining system can be established in the High Ore Split country and also the Kelley Shaft area. This system will be a major panel cut-and-fill system using the latest developments in mechanized drill jumbos and diesel powered L.H.D. loaders. We have very good hopes of designing or establishing similar bulk systems on the access between the Belmont and the Leonard, for example, in the Rarus and Minnie Healy mineralized zones. In other words, I feel very encouraged about the underground and future for the next two decades to come. However, here again we have geological exploration work to do before we can look into the real long-range plans.

Question. How important do you feel the underground activity is to our total production?

Answer. We anticipate the pit operation will continue for at least another 15 to 20 years. At this time we must be ready to phase in a major underground mining program. This fact puts top priority and importance on the underground operations. It will take quite a few years to develop and lay out a new underground operation that will be able to handle the expected copper production from the Butte mines. The best way to answer the question is to say that the Butte underground operation is of top importance for the future of the entire community.

Question. Frank M. Monninger feels we have the best contract miners in the business working right here on the Butte Hill. Have you observed our miners?

Answer. I certainly agree with Frank. I am quite impressed with the skill of the miners, particularly the stope miners. I am happy with what I have seen in regard to the mining personnel in the Butte area. These people will make it easier for us to go into the new mining system. We will, however, have to set up a top-notch training system to familiarize these personnel with the workings of the new mining system. The basic mining stock in Butte is very impressive indeed, and this stock will help us in the expansion of underground operations and in the introduction of the new modern systems of mining.

Question. What do you think of the trackless mining project (the L.H.D. Mine) being carried on in the Berkeley Pit?

Answer. I was very pleased to find out before I came here that this project was already underway. The project will serve as a very important pilot operation for what we are going to do in the future. In other words, when we start deep level underground mechanized mining, this will be nothing really new in Butte because of the L.H.D. mining that has been going on in the area. The procedures and organization have already been set up in this trackless Load, Haul, Dump operation. These people have already begun to talk about this new type of mining coming into the area, so mechanized mining will not come as anything new to them when our operation is in full swing.

Question. Mr. Monninger, in a speech given before the Butte Rotary Club on November 29, 1973, said, "We must become progressive in our concepts and gear our operations to a high level of sophistication and productivity." What are some ways our company can increase its productivity?

Answer. The first way is definitely by adopting a modern mechanized mining philosophy allowing four long-range planning and sound capital investment in underground development and equipment. The most important thing in this philosophy is long-range planning. We have to look years ahead of ourselves. The shorter we look into the future, the less chance we have to apply a highly mechanized mining system. Planning is really the number one issue. Besides planning and introducing a mechanized system, we have to turn to more sophisticated management techniques; for example, labor and supervisory training, advanced preventive maintenance systems, and an improved labor information system.

Representative-elect BAUCUS. Can you tell me what notice employees of the Anaconda Company, particularly the deep mines, have received? That is hypothetical. If I had been working as a miner for several years, how much notice would I receive and how much notice—

Mr. MURRY. I think Mr. Beavis might be in a better position to answer that. We were talking about when the union received the first notice, they took seriously the possibility of a layoff. That first notice came sometime in September, but that is because there were a number of plans, I understand, being offered by the company, and they were talking about several plans.

They did not realize there was any kind of a layoff, cutback in the forces at all.

Representative-elect BAUCUS. Can you tell me what terms of days or weeks notice—What kind of notice would I receive flatly, if I were going to be laid off?

Mr. BEAVIS. Also, in the letter I believe from Mr. Place, they say a man will receive at least 7 days advance notice prior to termination.

Representative-elect BAUCUS. Seven days, not more actual definite notice?

Mr. BEAVIS. No.

Representative-elect BAUCUS. Thank you.

Mr. TRACY. Mr. Chairman, I would like to relate to the Congressman-elect on the men that were laid off last week, they did receive

7 days notice, but I think part of that was due to the delay, the effective date was postponed for 1 week.

Representative-elect BAUCUS. Would I receive 1 month's notice, 1 month from such and such a date I would be laid off. Would I receive that?

Mr. TRACY. No.

Representative-elect BAUCUS. Seven days would be the maximum period.

Mr. MURRY. May I respond to that, Mr. Chairman?

Senator METCALF. Anybody who knows the answer.

Mr. MURRY. On one hand, we are talking about contract provisions here that would probably have to do with the closure of a part of the operation on the hill at one time or the other and the company has the responsibility that has been cited by Mr. Beavis, but when you have the closure of an operation that is going to affect maybe a thousand men, then the responsibility of a company is much greater. You are not talking about responsibility cited in a contract for 7 days. It seems to us you are talking about a responsibility to notify the workers, the community, the Government at the local, State, or national level, of these changes.

That responsibility on the part of the company was completely ignored. It was completely ignored. Right up to that point in September, these people were absolutely certain they had acted in good faith and they could expect nothing but continued employment. Perhaps, as I testified, too, from that publication that the underground operations would be expanded.

There would be more jobs. There would be more of jobs.

Representative-elect BAUCUS. I couldn't agree more. I am just trying to establish for the record the notice in terms of time anyway was very short and not the kind of notice we are talking about and I agree with you very much.

Senator METCALF. I don't believe I have any more questions. I have some more questions of the Anaconda Co., but they are going to be submitted in writing.

For example, Mr. Place, I did not understand whether you included some of the other minerals in your cost analysis. I understand from time to time you get some gold, some silver. Were you just talking about the price of copper?

Mr. PLACE. That was full absorption.

Senator METCALF. Well, anyway, give me a complete breakdown, complete figures so the record will be responsive to questions such as that please.

Mr. PLACE. We will include that information.

Senator METCALF. Mr. Morgan has submitted his statement, but I will hold it in reserve until we call you back, Mr. Morgan, and that will be sometime after the Thanksgiving holiday, as we can fit it in our very crowded schedule. I am pleased you came up here and held yourself in readiness to participate in this hearing. I am grateful to the members of the Anaconda Co. for their complete cooperation and to come down and bring important members of your staff from the New York corporate offices and from your Butte operation. I am grateful to

you, Mr. Murry, and to members of your organization for coming back and helping us understand this problem and I am glad we have had the assurance from the Anaconda Co. that we are not going to lose these resources as a result of the flooding of the mines and the abandonment of the present underground operation.

This is of great concern to the Members of Congress because of the scarcity of other minerals and the situation we have had with the petroleum industry and I am particularly grateful to the Governor of Montana to come back here and tell us his experience.

Unless there are other comments at this time, we have finished to 5 minutes of 3 instead of 3 o'clock. If your plane connections and so forth will permit, I think all of you will be invited to say goodby to Senator Bible who has been a long-time friend of the mining industry of the West and also the labor people have had a friend in Senator Bible.

Anything else to come before the committee? We will stand in recess subject to call of the Chair.

[Whereupon, at 2:55 p.m., the hearing was adjourned, subject to the call of the Chair.]

APPENDIXES

Appendix I

Additional Material Submitted for the Record

Statement Of
Dr. John D. Morgan, Jr.
Associate Director--Mineral and Materials Supply/Demand Analysis
Bureau of Mines, Department of the Interior
before the
Subcommittee on Minerals, Materials, and Fuels
Committee on Interior and Insular Affairs
U.S. Senate

November 25, 1974

This statement is in response to a request by the Chairman for an evaluation of the health of the domestic copper industry. The copper industry is an aggregate of many producing, consuming, and marketing units, each with an individual and changing health status not easily quantified. Therefore a diagnosis of the industry must be both subjective and qualified with respect to both the portion of the industry examined and the period of time considered.

For purposes of this evaluation it seems appropriate to first provide a brief background of the industry with information on supply and demand, industry structure, technology, and operating parameters. Where statistics are used as a reflection of events, a time frame has been selected to establish perspective and trends. While this discussion focuses on the domestic copper industry, international events are also discussed because copper is an internationally traded commodity and hence foreign happenings impact on the domestic industry.

BACKGROUND

Supply-Demand Relationships

During the 1964 to 1973 decade world mine production of copper increased 53 percent. While U.S. output registered a 38 percent increase during the same period the upward trend dipped sharply in 1967 and 1968 reflecting the effects of a long strike in those years. The strike aggravated an already tight supply situation that had begun in 1964 and had resulted in increased metal imports and significant emergency releases from the Government stockpile. Domestic demand also increased with industrial consumption of refined copper increasing 33 percent during the decade.

During 1973 consumption of refined copper was at a record high of 2.4 million tons. A shortage of copper developed in the first quarter and became a critical supply problem for some users. Salient factors causing the imbalance included: A surge in world demand; disruptions of production in Chile, Canada, and elsewhere; some curtailments in domestic output to meet air quality standards; transport problems in Canada and Zambia; and U.S. price controls coupled with a rapid escalation of world prices.

World demand continued strong in the first quarter of 1974 drawing down inventories and forcing prices up to a record high $1.50 per pound on the London Metal Exchange (LME) in April. However, by mid-1974 there was an apparent weakness in the copper markets and even strikes at most domestic producers during July and August only slowed the

decline of the LME prices. These were an average 66 cents per pound in September and 63 cents in October. As a consequence of the 1974 strikes and also a reflection of the general economy, domestic copper mine production and copper consumption will be reduced from the high levels of 1973. An additional component of supply in 1974 resulted from the sale or commitment of all 252,000 tons of refined copper remaining in the national stockpile. These commitments were made during the months of February through May.

Figure 1 shows the U.S. supplies and uses of copper. It indicates that in 1973 the U.S. was 93 percent self-sufficient in copper. This compares with only 75 percent self-sufficiency during the 1950-55 period. The 1973 total supply for consumption was 72 percent from U.S. mines, 21 percent from old scrap, and 7 percent from net imports.

A more detailed presentation of the domestic supply-demand relationships for 1964-73 are shown in table 1.

Industry Pattern and Production

The United States has been the world's leading copper-producing country since 1883, except for 1934 when economic conditions adversely affected domestic production. In 1973, the next five principal copper-producing countries were: Canada, Chile, Zambia, the U.S.S.R., and Zaire.

Principal copper-producing States in 1973 were Arizona, with 54 percent of the total U.S. production, Utah (15 percent), New Mexico (12 percent), Montana (8 percent), Nevada (5 percent), and Michigan (4 percent). These six States accounted for 98 percent of total production.

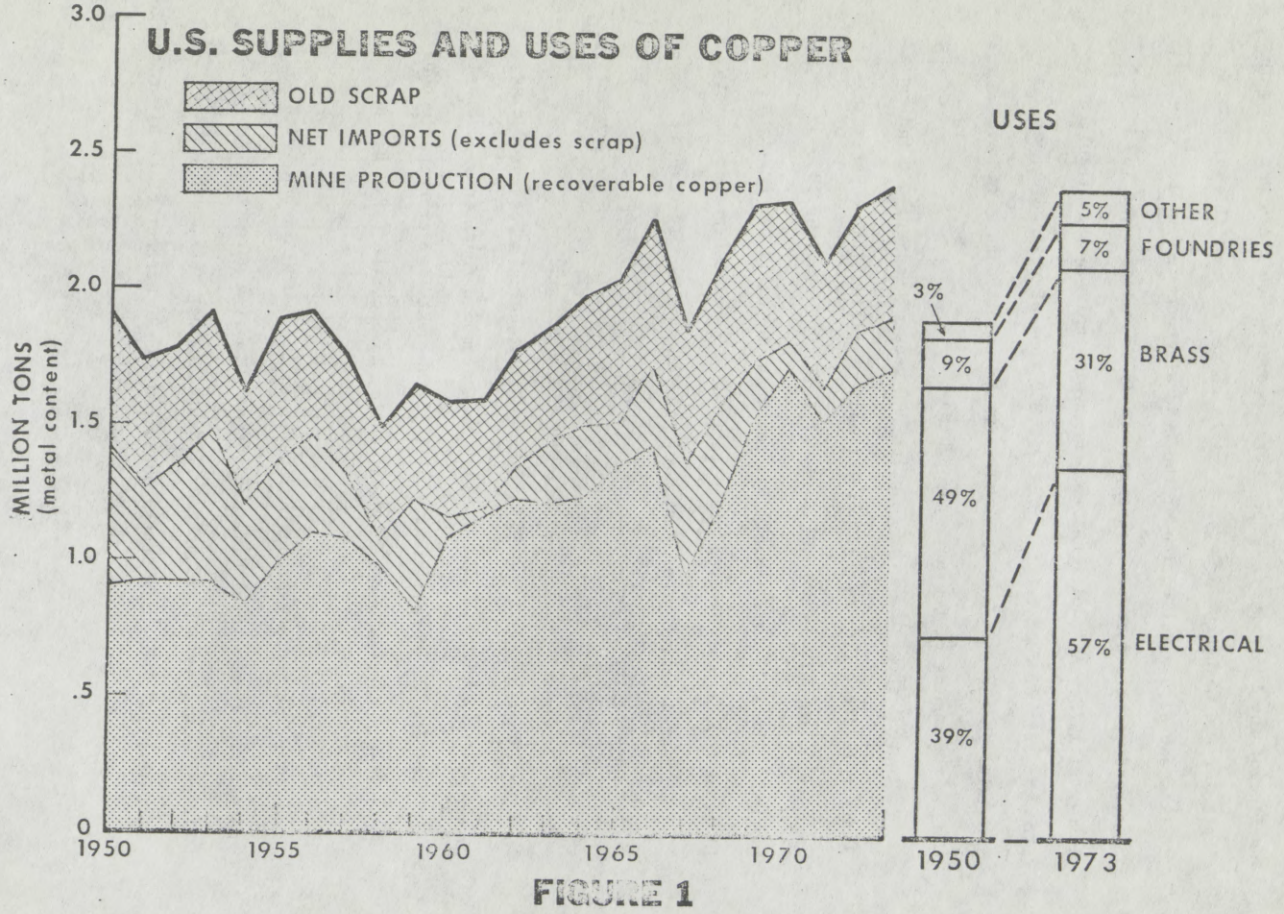
U.S. SUPPLIES AND USES OF COPPER
OLD SCRAP
NET IMPORTS (excludes scrap)
MINE PRODUCTION (recoverable copper)
MILLION TONS (metal content)
3.0
2.5
2.0
1.5
1.0
.5
0
1950
1955
1960
1965
1970
USES
3%
9%
49%
39%
5%
7%
31%
57%
OTHER
FOUNDRIES
BRASS
ELECTRICAL
1950
1973

FIGURE 1

44-527 O - 75 - 6

Table 1. - Copper supply-demand relationships, 1964-1973
(Thousand short tons)

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973 p/
World production - primary										
Mine production:										
United States	1,247	1,352	1,429	954	1,205	1,545	1,720	1,522	1,665	1,718
Rest of World	3,865	3,967	4,056	4,270	4,436	4,679	4,918	5,131	5,649	6,118
Total	5,112	5,319	5,485	5,224	5,641	6,224	6,638	6,653	7,314	7,836
Components of U.S. supply (primary and old scrap)										
Refined production:										
Domestic mines	1,259	1,336	1,353	847	1,161	1,469	1,521	1,411	1,680	1,698
Old scrap	186	214	242	190	231	284	278	208	212	241
Imports of ore, blister, etc	396	376	358	286	276	274	244	181	193	170
Government stockpile releases	27	120	400	149	---	---	---	---	---	---
Imports of refined	140	137	164	331	400	131	132	164	192	202
Old scrap (unrefined)	288	299	293	293	290	291	226	237	246	201
Industry stocks, Jan. 1	527	467	498	602	507	563	541	645	586	517
Total U.S. supply	2,823	2,949	3,308	2,698	2,865	3,012	2,942	2,846	3,109	3,029
Distribution of U.S. supply:										
Industry stocks, Dec. 31	467	498	602	507	563	541	645	586	517	456
Exports (refined)	316	325	273	159	241	200	221	188	183	189
Industrial demand	2,040	2,126	2,433	2,032	2,061	2,271	2,076	2,072	2,409	2,384
U.S. demand pattern:										
Electrical	941	1,028	1,178	1,113	1,046	1,193	1,101	1,113	1,252	1,445
Construction	420	415	410	277	316	341	328	351	432	336
Machinery	312	305	316	208	239	254	251	243	300	240
Transportation	222	227	226	145	193	198	173	192	227	187
Ordnance	43	45	182	188	164	172	119	69	78	57
Other	102	106	121	101	103	113	104	104	120	119
U.S. primary demand (industrial demand less old scrap)	1,566	1,613	1,898	1,549	1,540	1,696	1,572	1,627	1,951	1,942

p/ Preliminary.

Virtually all copper ore is treated at concentrators near the mines. Concentrates were processed at 15 smelters--seven in Arizona and one each in Utah, Michigan, Montana, Nevada, New Mexico, Tennessee, Texas, and Washington.

About 47 percent of the domestic electrolytic refining capacity is accounted for by six refineries on the Atlantic Coast, one in New York, three in New Jersey, and two in Maryland. The remaining 53 percent is accounted for by Arizona with two plants, and by Missouri, Montana, Texas, Utah, and Washington with one each. One Michigan plant produces Lake copper and refineries in New York, New Jersey, New Mexico, and Texas produce fire-refined copper.

Several of the leading copper-producing companies are completely integrated and have mining, smelting, refining, fabricating facilities, and marketing organizations. Other large producers mine and process through the smelting or refining stage and other companies mine and process their ore and ship the concentrate to custom plants for smelting and refining.

Figure 2 depicts the corporate structure and capacities for domestic primary smelter and refinery facilities and the feed source for each plant.

Many large domestic copper producers, through subsidiaries or stock holdings, operate, control, or have significant investments in foreign copper-producing properties in Canada, Mexico, Peru, the Republic of South Africa, and Zambia. In addition to copper, some

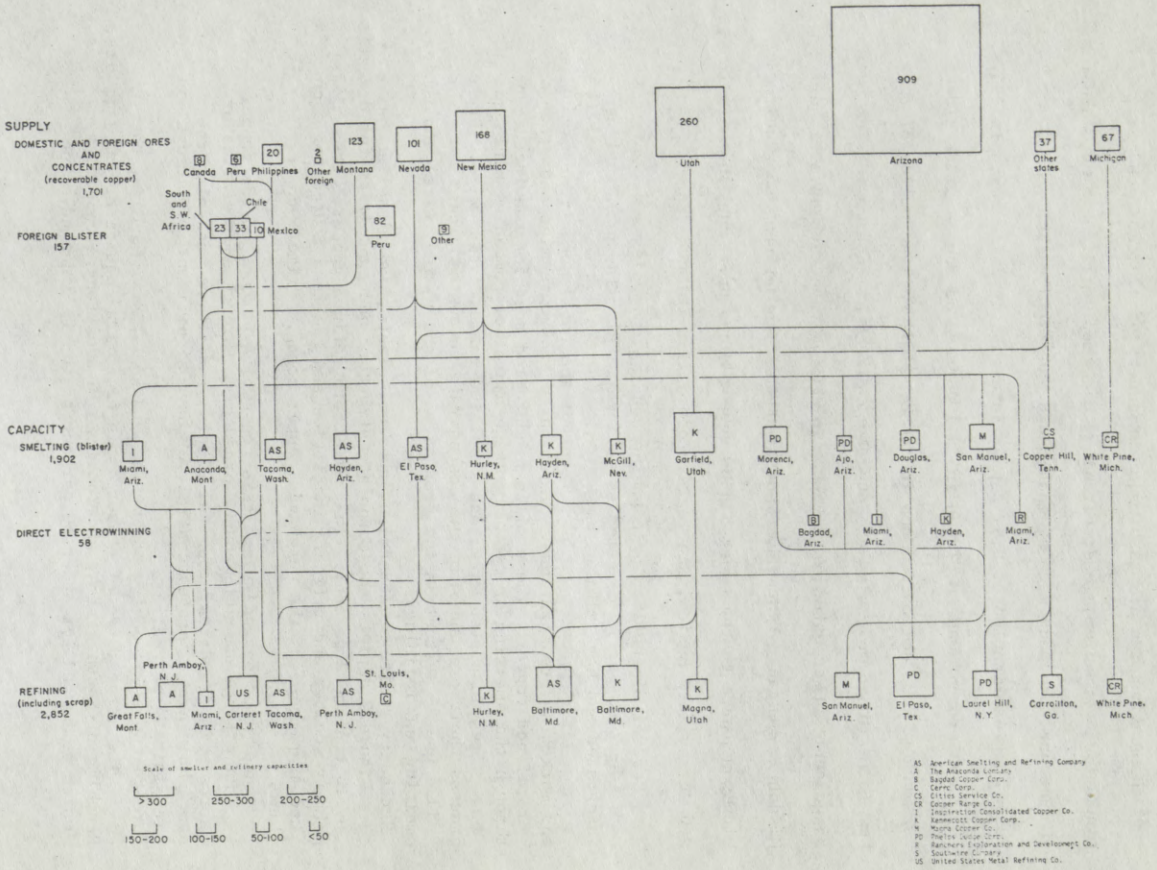

FIGURE 2. - Primary smelter and refinery capacities, and their feed sources in the United States in 1972 (Thousand short tons, copper)

of these companies are also major producers of aluminum, cadmium, chromium, germanium, lead, titanium, uranium, vanadium, zinc, asbestos, fluorspar, precious metals, and liquid and solid fuels.

Nationalization of U.S. copper interests in Chile began in 1967 and the process was completed in 1971 during the regime of President Allende. Nationalization continued to be the Chilean policy of the military junta following the overthrow of the Allende regime in September 1973. Most of the other producing countries have either taken steps toward, or have indicated their intentions, to acquire a large share in the ownership of copper mines operating in their land.

Consumption Pattern

Most copper is consumed as refined metal. The principal user--wire mills--accounts for 68 percent of the total domestic consumption of refined copper. These mills produce rod used for manufacture of bare wire, insulated wire, and insulated communication wire. Brass mills use 30 percent in the production of sheet, rod, wire, and tubing. Secondary smelters, foundries, chemical plants, and miscellaneous users consume 2 percent. In addition to refined copper, brass mills use 42 percent of the purchased copper scrap. Primary copper producers and secondary smelters consume 54 percent of the copper scrap with foundries, chemical plants, and others consuming the remaining 4 percent.

The largest use of copper is in electrical equipment and supplies, which accounted for about 60 percent of the 1973 demand. The

manufacture of electric motors, power generators, motor-generator sets, fans, blowers, industrial controls, and related apparatus requires the use of copper for the best electrical performance.

The noncorrosive properties of copper and its alloys result in many uses in the construction industries. Construction materials such as roofing, plumbing, and brass and bronze for decorative and utilitarian items for public buildings and private homes required approximately 14 percent of the total copper consumed in the U.S. in 1973.

Copper finds widespread usage in the production of nonelectrical industrial machinery, household and commercial air conditioning, farm machinery, and as components in sea water desalination distillation plants, and in pollution control equipment. Other important uses of copper include: Applications by the automobile industry, in railroad transportation, airplane manufacture, ordnance, and in marine applications.

Byproducts and Coproducts

About 98 percent of the domestic mine production of copper comes from ores mined primarily for their copper content, with the remainder being recovered from complex or mixed base metal ores. In addition to copper, significant quantities of byproducts and coproducts such as gold, silver, molybdenum, nickel, platinum, selenium, tellurium, palladium, arsenic, rhenium, iron, lead, zinc, and sulfur are recovered.

Lead, molybdenum, iron, and zinc minerals are separated from copper minerals by selective flotation. Gold, silver, nickel, platinum, palladium, selenium, and tellurium are recovered from anode sludges

at electrolytic copper refineries. Arsenic and sulfur are extracted during copper smelting, and rhenium is obtained in the processing of molybdenum concentrates recovered as a coproduct in the treatment of some copper ores.

Economic Factors

Prices of copper have an important bearing on both the producer and consumer of copper. Figure 3 portrays the trends and relationships between the domestic producer price and the price on the LME from 1954 through October 1974. The figure shows that the LME price was approximately the same as the domestic price prior to 1964. After that date the LME was generally substantially above and more volatile than the domestic producer price. Also it can be seen that 1974 has been a particularly hectic period in copper prices. The domestic producer price in terms of 1973 constant dollars has shown only a slight upward trend from 1954-73.

Costs of producing copper are variable, largely dependent upon location and physical characteristics of the ore deposits. For a large open pit copper operation the distribution of direct operating cost components, in terms of percentages of the price of copper, are estimated to be 25 percent for mining, 15 percent for ore beneficiation, and 25 percent for freight, smelting, and refining. The remaining 35 percent would be required for items such as discovery, development, taxes, marketing, and general overhead including profit. Copper production is considered to be a capital-cost-intensive industry requiring at least $4,000 per ton of new annual capacity for facilities from mining through refining.

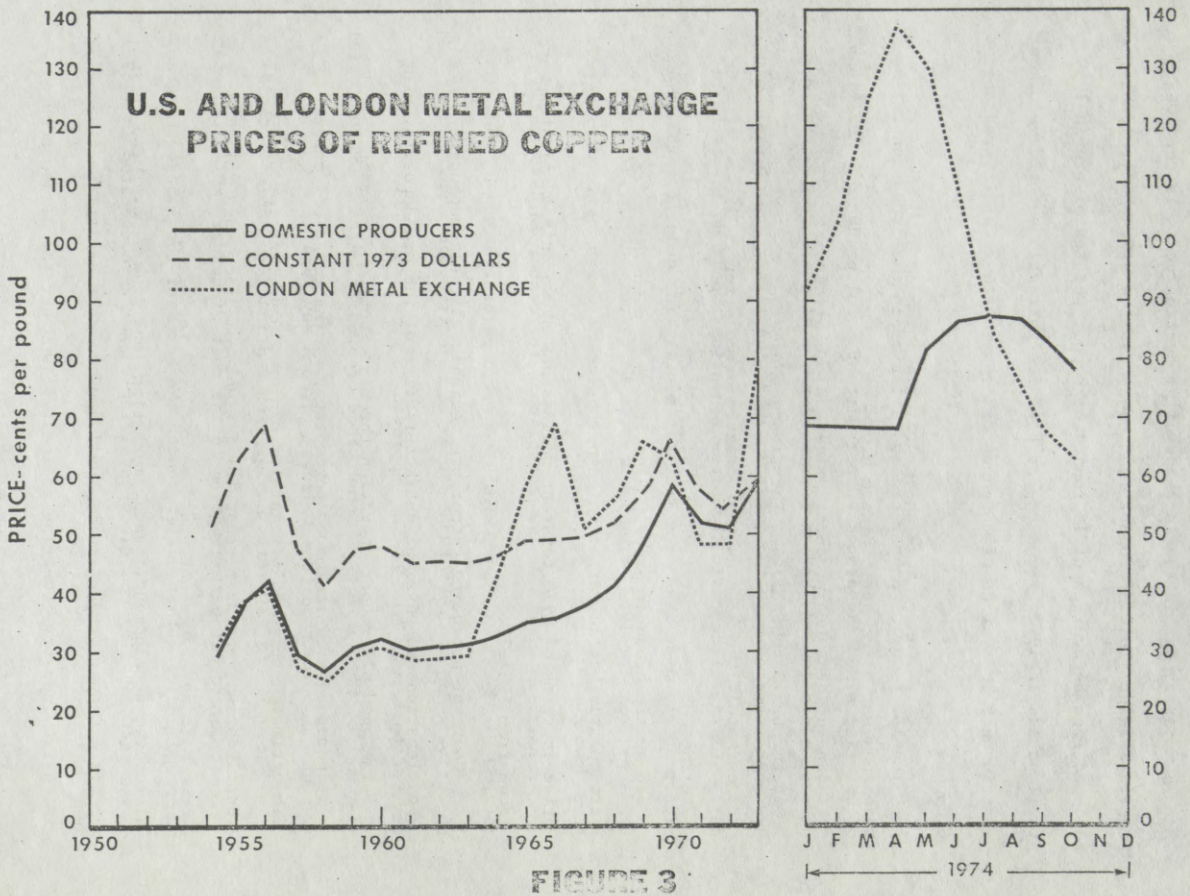
U.S. AND LONDON METAL EXCHANGE
PRICES OF REFINED COPPER
DOMESTIC PRODUCERS
CONSTANT 1973 DOLLARS
LONDON METAL EXCHANGE
PRICE- cents per pound
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1950
1955
1960
1965
1970
J F M A M J J A S O N D
1974

FIGURE 3

A major factor in the increase of production costs is the long term declining yield of copper from ores. In the U.S. the yield has dropped from an average of 18 pounds of copper per ton of ore in 1950 to 11 pounds in 1973. Some copper deposits currently under development contain only an average of 8 pounds of copper with a cutoff grade of 4 pounds.

The low tenor of copper ore is reflected in the large quantities of material mined and processed per unit of metal produced. Additionally, surface mines in 1973 had an increased ratio of overburden waste to ore when compared with the ratio in 1958, the first year of available data. Of significance to the present hearings would be the trend of mine production derived from open pit mines. The quantity, calculated at 71 percent for 1958, trended upwards to 84 percent in 1970, and then down to 78 percent for 1973.

A national stockpile was established for copper in 1946 and at the end of 1972 contained 258,659 tons, 33 percent of the 775,000-ton objective. In March 1973 the stockpile objective for copper was reduced to zero. P.L. 93-214, approved December 28, 1973, authorized disposal of the surplus. As indicated previously, all of this material was sold or committed from February through May 1974.

The Office of Minerals Exploration continues to offer up to 50-percent Government participation in the cost of copper exploration for approved projects that qualify under the terms of the amended program. Three participating contracts involving copper were executed in 1969. None has been signed since.

Copper is vulnerable to substitution for many uses such as aluminum for electrical transmission, steel for shell casings, and plastics for plumbing. Copper remains the preferred material for electric motors, generators, industrial controls, and automobile radiators although its use in the latter is threatened periodically by aluminum.

Technology

Most copper ores currently processed are sulfides. During milling they are subjected to crushing, fine grinding, and concentration by flotation. Oxide ores, not amenable to flotation, are leached with dilute sulfuric acid to take the copper into solution. The copper is then recovered by chemical precipitation on scrap iron (cementation) or by a direct electrowinning process.

Smelting copper concentrates and precipitates is generally accomplished by melting the charge with fluxes in a reverberatory furnace. In the reverberatory furnace the lighter impurities combine and float to the top as a slag to be skimmed off and discarded, while the copper, iron, sulfur, and any contained precious metals form a product known as matte which collects and is drawn off the lower part of the furnace. The molten matte is transferred to a converter where blowing air through the matte burns off the sulfur, oxidizes the iron for removal in a slag, and yields a 98 to 99 percent "blister" copper product.

The blister copper may be upgraded to fire refined copper by melting in an anode furnace and removing the principal impurities, in a reducing atmosphere. However, most of the blister copper is cast into

copper anodes for electrolytic refining. Refined copper is generally cast into wire bars, ingots, or other shapes and sent to fabricating mills for conversion to sheet, strip, tube, rod, wire, or other semimanufactured products.

In the process of copper production substantial quantities of solid wastes are generated in the form of waste stripping at the mine, tailings at the concentrator, and slag at the smelter. In addition, quantities of sulfur compounds and particulate matter escape to the atmosphere in the smelting process. In recent years new environmental standards governing emission of sulfur to the atmosphere has resulted in greater control of sulfur emissions through increased production of sulfuric acid and has also stimulated research for other solutions such as production of elemental sulfur or "throw-away" sulfur compounds from the effluent gases.

Operating Factors

Operating supplies consumed in mining are principally explosives, fuel or energy for operating equipment, and spare parts for maintenance of equipment. In milling, steel consumed for grinding the ore and electrical energy and reagents for flotation are the principal items. In smelting-refining the principal supply items are fluxes for the smelting charge and energy for electrolytic refining.

Concern over emission of sulfur compounds to the atmosphere during smelting is probably the most pressing problem facing the copper industry. It has already resulted in curtailment of production

at some smelters owing to enforcement of new air pollution regulations, and delay in construction of new smelter facilities pending a resolution of uncertainties surrounding new pollution standards and the proper technology to meet the anticipated requirements.

Transportation occupies an important role in the copper industry. Owing to the low copper content, production economics dictate that the ore concentrating plant be located relatively near the mine with transport by truck, rail, or conveyor. Since the concentrates only average 25 percent copper most smelters are located to minimize transportation of concentrates. Location of refineries is determined largely by evaluating transportation facilities, availability of labor, and nearness to copper markets.

Owing to the low copper content of the ore and overburden that must be removed at open pit mines the copper industry generates large quantities of mine waste, mill tailings, and smelter slag resulting in disposal problems.

OUTLOOK

A study of the various demand factors has resulted in a Bureau of Mines forecast that domestic copper demand will increase at an average annual growth rate of 3.5 percent to the end of the century. New mine projects and expansion plans through 1980 appear to be in approximate balance with the forecast consumption increases and, along with available scrap, should maintain the present high degree of self-sufficiency. A comparison of anticipated world demand and productive capacities indicates a supply surplus for the next few years. However, it is likely that demand will overtake production after several years resulting in an improved market situation from the producers point of view.

Uncertainties surrounding air quality standards at smelters can be expected to be the major bottleneck in production and could create a major problem if some older facilities were forced into early closure. New technology and large capital investments will be required to either modify existing pyrometallurgical practices or to adopt new hydrometallurgical processes as a solution to the problem if a viable copper industry is to be maintained. In this connection it is noted that an electric furnace replacing the conventional reverberatory has recently been placed in operation, and a completely new smelter using a flash smelting process is under construction, both firsts for this country. Also direct electrowinning plants using hydrometallurgical processes are expected to provide about 10 percent of capacity for processing copper ores and concentrates in several years, an impressive increase from the initial operation in 1967.

The domestic copper industry also faces potentially critical land-use conflicts. Unless opposing views on surface restoration standards, waste disposal water supply, and ground water pollution uses are reconciled without excessive increases in operating costs the competitive position of the United States copper producer could be adversely affected.

Despite the existing and potential problems facing the domestic copper industry, it is assumed that the development of new sources will be as energetically pursued as in the past, and there appears to be no insurmountable production difficulty in maintaining a high degree of self-sufficiency through at least the remainder of this century. In fact the domestic resource base for copper is adequate to supply 100 percent of our primary copper requirements if world conditions required it.

This brief overview of the recent developments and outlook of the domestic copper industry can be supplemented by reference to several publications. A recent review of copper resources is contained in the U.S. Geological Survey Professional Paper 820 (pages 163-190). The Bureau of Mines issues many reports related to copper and a packet of the more pertinent ones has been submitted to the committee for their use. These are: Preprint chapters from the latest Minerals Yearbook for the commodity copper and for the countries of Chile, Canada, Zambia, Zaire, and Peru, some of the major foreign producers of copper; copies of the latest annual and monthly Mineral Industry Surveys of copper; Information Circular 8598, An Economic Appraisal of the Supply of Copper From Primary Domestic Sources; and Information Circular 8622, Recovery of Secondary Copper and Zinc in the United States. These publications also contain references to both Bureau of Mines and other publications related to the copper industry.

RESOURCES

Some findings and conjectures from recent research into resource development and use

Many years ago a distinguished Frenchman, Marshal Lyautey, asked his gardener to plant a tree, and the gardener said, "Well, this won't flower for a hundred years." And the Marshal said, "In that case, plant it this afternoon."

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Assessing the Materials Threat

Adapted and excerpted from a statement by Hans H. Landsberg, Director of the RFF Energy and Minerals Program, before the Subcommittee on Foreign Economic Policy of the House Committee on Foreign Affairs, May 15, 1974.

A MAJOR CONCERN following the oil crisis precipitated by the OPEC cartel has been that other exporters might take similar action to raise the prices of nonfuel minerals. This concern has been given some substance by the recent decision of Jamaica to increase its take from bauxite exports, and some less pointed moves of other Caribbean bauxite exporters. Nonetheless, I think that there is little likelihood that materials exporters can emulate the success to date of the OPEC countries (though one should not discount the possibility altogether). There are several reasons for this view:

1. There is more geographic and political diversity among producers and exporters of nonfuel minerals than in the petroleum market. At the present time, significant amounts of major commodities are located in traditionally friendly, or at least not unfriendly countries such as Canada, Australia, and Latin America. The unifying political and perhaps cultural catalyst present in the Arab world is not as easy to find in countries producing most other materials. It is not that groupings of politically or otherwise heterogeneous nations are unimaginable, but that they would find it harder to agree on and persist in openly aggressive actions.

2. Although it is sometimes implied otherwise, the potential confrontation in materials is not between developed and developing countries. For instance, the developed, free market countries hold more than half the world's reserves of lead, zinc, chromium, molybdenum, titanium, and potash. The centrally planned economies predominate in tungsten, vanadium, and land-based magnesium (which is also readily available from seawater).

3. Financial staying power differs widely among these countries, but is generally far inferior to that of the important oil exporters. Dependence upon a continuing flow of foreign exchange earnings, for both import procurement and budget support, is important and would militate against risking production or export interruptions. So would the role of mining activities in providing local employment.

In this respect it is worth noting, for example, that Chile and Zambia derive about 80 percent of their foreign exchange earnings from copper, Zaire about 50 percent, and Peru about 30 percent. Such differences, coupled with widely varying prospects for capacity expansion in these countries suggest that attitudes toward aggressive supply and price actions on materials would differ.

4. Many of the supplier countries are heavily involved with the importing countries in a diversified trade pattern, pointing to the potential for negotiation rather than unilateral action. Moreover, in the broad context of both environmental and foreign assistance policies it is quite feasible, and an example of a positive approach, to think of broad long-term changes in the pattern of trade and division of labor that would, as volume expands, transfer a growing share of processing to the raw materials suppliers. While at first glance one might expect this to increase the future bargaining power of the raw materials countries, I am inclined to believe that steps toward their industrialization would meet long-standing aspirations on their part, help diffuse the chances and severity of confrontation between haves and have-nots, and provide for increased interchangeability of imported supplies as compared with ores.

5. The success of an operation patterned on that of the OPEC countries depends on control of a large share of output and on specific elasticity characteristics. These are (1) that the price elasticity of demand, and especially the cross elasticity, remain low, i.e., that price increases would not call forth substantial declines in demand or substantial shifts to consumption of a near substitute; and (2) that the price elasticity of supply for the same material produced in the rest of the world remain low. Since one of the immediate responses to materials price increases or supply shortages is substitution, cross elasticity may be so high it would preclude successful manipulation of the market.

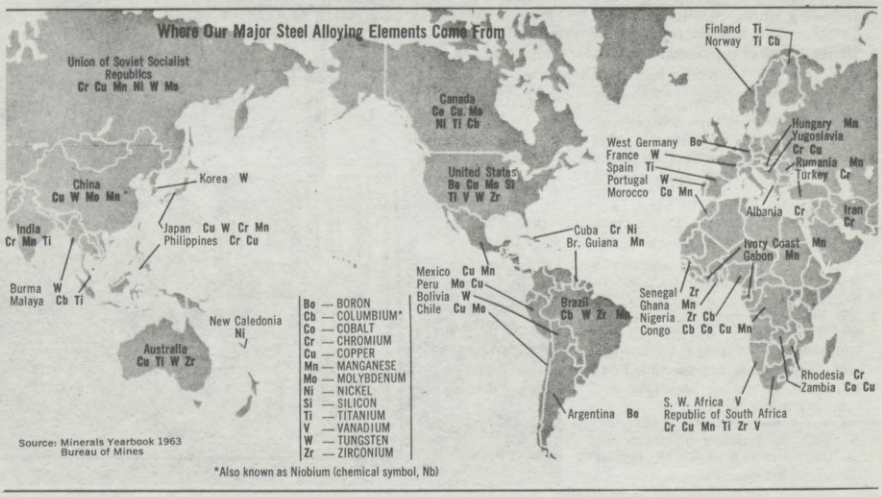
6. In the long run, the sharp downturn in economic activity and growth predicted for OECD countries by the World Bank (from 6.6 percent in 1973 down to 1 or 2 percent in 1974) will also mean low growth rates for developing countries. Moreover, there are sharp signs that the price of materials may have crested. Thus, producers may be more interested in consolidating present gains rather than working to increase future prices.

Despite the poor odds for its success, suppose an OPEC-type action does take place. What then?

Administratively, the handling of any sudden shortages would be much easier than in the case of oil, since by and large the consumers are a moderate number of processors and converters and not, as in the case of oil, tens of millions of end-users that heat homes or drive automobiles. By the same token, most materials purchases are more readily postponable, and allocations to high-priority areas and uses more easily designed and carried out.

For the short run, a well-thought-out allocation scheme of the sort practiced in wartime, supplemented by utilizing stockpiles, is the most immediate response. Subsidized recycling activities, accompanied by adjustment of product specifications downward would come next. Wide dissemination of information on feasible substitutions would be another activity. In addition, where warranted by the impact of supply and price manipulation, political and economic pressure on the countries involved always remains an ultimate weapon.

The long-term response to materials shortages is somewhat more complicated. Revisions of design to eliminate scarce or costly materials may be possible in many cases. For instance, Chrysler has recently redesigned its automobile ignition sys-



tem to use electronic ignition, thus eliminating the need for critical and expensive alloying materials.

In situations where this is not possible, the development of a standby technology that would be ready to utilize substitute materials has been proposed. While such an approach may become necessary, its implementation poses problems of financing, degree of development, and choice of the developers.

The cost of setting up a pilot plant is not inconsiderable and even if the plant is operative, it does not necessarily mean that a commercial-sized plant will be successful. Knowing how to derive aluminum from domestic clays is a far cry from having proved it in a commercial-sized plant, and having done the latter is a far cry from having sufficient capacity ready to go into operation on short notice.

The decision to install "standby capacity" rather than rely on "standby technology" alone would be a momentous one, to be evaluated in terms of the credibility and likely impact of the threat.

IT IS IMPORTANT to recognize that the effects of price increases in materials would be considerably less disruptive than the increases in oil prices because the value of ores is heavily diluted in the end product. For example, bauxite at the price prevailing until recently of $9 to $15 a ton is less than 10 percent of the total cost of an aluminum ingot (over $600/ton), even considering that it takes 4 tons of bauxite to produce 1 ton of aluminum. The cost is further diluted in the end product. Thus, even sharp increases in the price of bauxite tend to be dissipated. By comparison, a barrel of oil refinery products will typically be less than double the value of a barrel of crude. To give another example, in 1972 a 25-HP motor sold for about $170. The 18 pounds of copper it contained were worth $9, or a little over 5 percent of the cost of the motor. At $1.30 per pound of copper, the cost of the motor would rise less than 10 percent. While these are simplified examples, they suffice to make the point regarding impact.

Closely related is the difference in effect on balance of payments. In 1972, out of a total U.S. import bill of $56 billion, so-called crude materials accounted for $3.9 billion, or 7 percent (down, incidentally, from 18 percent in 1960). Of this, "ores and metal scrap" totaled $1 billion. If we add nonferrous metals in their intermediate form, the import bill is increased by another $1.8 billion, but even that does not make it an imposing amount. According to the Second Annual Report of the Secretary of the Interior Under the Mining and Minerals Policy Act, 1972 gross imports of raw and processed minerals broke down roughly as follows (in million dollars): nickel—$300; copper—$300; bauxite—$200; alumina—$200; aluminum—$300; iron ore—$400. Trade statistics reveal the composition by country of origin: of the $1 billion of "ores and scrap," Canada shipped $400 million; various Latin American countries $200 million; Far Eastern countries $40 million; with the balance scattered. Canada predominated equally among the shippers of nonferrous metal, supplying nearly half of U.S. imports, followed by Western Europe with not quite 25 percent (much probably processed from imported ores). The balance-of-payments impact would thus be minor compared to petroleum, even if there were concerted action among the diverse suppliers to raise prices. To illustrate the contrast, the value of annual world bauxite output has in recent years run at about $350 million; that is the equivalent of perhaps two weeks' oil production in Saudi Arabia at pre-embargo prices.

TO SUM UP, therefore, assessing the odds on the threat posed by materials exporters and its impact if enacted, is the first order of business. In addition, there is a need for a more thorough, material-by-material analysis of the situation and preparation of contingency plans, including the evaluation of need for technology, capacity, and governmental instrumentalities designed to stay abreast of developments. At the same time, it would be tragic if legitimate concern were to launch us rapidly in the direction of self-sufficiency, across the board and at all costs, to the detriment of the advantages that all who share in it can draw from increased foreign trade.

WILL HUMANITY'S LEASE EXPIRE?

Excerpted from chapter one of Sterling Brubaker's forthcoming RFF study "In Command of Tomorrow," which will be published by, and available from, The Johns Hopkins University Press.

UNTIL RECENTLY there has been no general concern about the long-term capacity of the physical world to meet our expanding wants. Now that such concern is both necessary and widespread, all of us are subjected to conflicting and often inconsistent advice on the direction to take. Mankind has no long-term strategy to guide short-term policy. It is easy to accept the idea that current policy should be consistent with a longer-term view, but this is difficult to achieve in the absence of agreement on what the longer-term options look like or which of them we wish to choose. In modern societies with representative governments, consistency between long-term objectives and short-term actions is hard to attain in any case, for governments must be responsive to short-term demands that often are in conflict with longer-term goals. Nonetheless, clearer public understanding of long-term options favors a climate in which greater reconciliation between current policy and long-term goals is possible. With that in mind let us examine future modes of occupancy.

All civilized men are miners. Primitive hunters and gatherers were not; they depended upon and were limited by the current output of natural systems. But from the time man first domesticated goats and made bronze, he has been mining the earth's soil and rock, dispersing our materials, and degrading the environment.

However, we are not exclusively miners. We still make use of current biological output. In the case of agriculture, we have modified natural systems so as to increase greatly the earth's yield, apparently on a sustainable basis. This use, however, is not infinitely expandable; the supply of agricultural land is finite and limits to the efficiency of photosynthesis may be expected. Thus, while agriculture offers partial escape from the adverse effects of the mine, it uses exhaustible resources, meets only a limited range of needs, creates environmental problems, and is itself subject to capacity limitations.

Air and water are also complex resources which render direct amenity services to each of us and assimilate our wastes. While they are renewable in most respects, they are not so in all respects, since they can be permanently damaged.

All of these limits are aggravated by an increased scale of human activity. Because of growth in both numbers and per capita consumption the draft on resources and burden on the environment are increasing at a startling rate. The relentless logic of Malthus that, given fixed supplies of land, we could not expand food production fast enough to keep pace with population growth has not yet been verified. Still, it is impressive to observe how rapidly exponential growth threatens to exhaust finite stocks of conventional nonrenewable resources or available land, and most of us have become aware of the onerous burden of pollution that endless growth implies. These consequences loom even if technological advances extend the availability of conventional resources and the capacity to abate pollution.

While growth shortens the time to exhaustion of finite resource stocks, permanent human occupancy of the earth cannot in any case be based on the use of conventional exhaustible resources. However successful we are in finding deposits or in recovering materials from lower-grade sources, eventually we use up our supplies.

CAN THE DILEMMA posed by depletion be avoided? Essentially two paths are open to man in order to secure permanent occupancy. One is to aspire to a modest but sustainable place in the natural system by changing to a technology that is nondepleting in character. Man once held such a sustainable place when his numbers were few, wants purely biological, and technology nil. Regaining such a balance would mean reliance upon current energy flows from the sun and on the biological cycling of materials. It would not rely on the continuing net acquisition of exhaustible materials.

We might hope to manipulate the natural system through sophisticated biological methods and more efficient capture of the energy flow from, for example, sun, wind, and tides, so as to maintain numbers and a high standard of living. The more restrained our expectations with respect to population size and living standards, the more promising the outlook for this mode. Even so, it is difficult to see how this system could avoid degradation over time.

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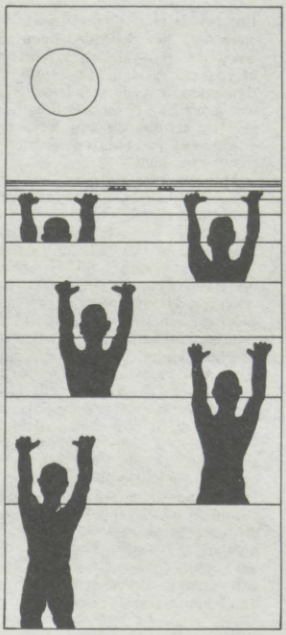
Many uses of materials are inherently dissipative, and it is hard to imagine that we could divert a current energy flow large enough to permit us to recapture that which is dispersed. As dispersion proceeded we would lose access to our initial stock of exhaustible materials, including metals. The loss of metals, hence machinery and transport, would limit our capacity to capture and utilize current energy flow. Regression in population and income would appear inevitable. Advocates of this mode might view such a result with equanimity, contending that it is still consistent with human happiness and the health of the planet. Indeed, on a sufficiently reduced scale, this mode is viable.

THE OTHER path would be a calculated effort to escape the constraints of resource exhaustion through new technologies. It differs from previous constraint-releasing advances in that it would not simply rely on enlarging the conventional supply of exhaustibles, but rather would seek to replace them with inexhaustible resources. The difference is between a temporary reprieve and a permanent solution. The second path means finding an inexhaustible source of energy as a prerequisite to other technology that would make use of more common materials. Given ample energy, we might make a direct attack on entropy, using common rock and sea water as resources, or perhaps we could reach for the alchemists' dream of elemental transmutation.

Even this approach would not be without limits on growth—dissipation of heat from the earth's atmosphere and physical space still pose limits. (Presumably we could learn to synthesize nutrients chemically, so photosynthesis and the supply of agricultural land need not limit us.) Of course, an encounter with the heat limit also could be greatly postponed by more attention to efficiency and less use of heat-using technological processes. The important point is that, while we might face limits to the magnitude of activity at any time, we could hope to escape the time limit implied by exhaustion. And, if this mode is combined with population restraint, it carries the potential for a higher standard of living for both developed and less developed countries. By contrast, when measured by current values, the first path implies a lower standard of living. Although each path admits of many variants, the strategies suited for each path are antithetical in important respects. An interim strategy could preserve the option to choose between the two modes, but that decision cannot be indefinitely deferred.

There is no assurance that the second mode can be achieved. Is it not more risky than the first? The answer is probably negative, for if



the second path proves impassable, this does not preclude reversion to the first, although, depending on population size at the time of transition, great suffering and a dramatic reduction in numbers would be likely.

There is some risk in postponing the decision. The constraint-releasing option is perishable—we must seize it soon or forever lose it. Timing is very important. Since time is required to perfect constraint-releasing technology (if indeed it is successful), exhaustible resources should be viewed as buffer stocks to be drawn on while the desired technology is perfected. If we continue to consume exhaustible materials without advancing to a technology able to transform or transmute plentiful materials, then we may no longer have in stock the energy or the quantities of concentrated elements needed to secure the transition. If we tarry too long or move too far down the first path, abandoning much of our technology as we go, then we forfeit the option for the second path—in effect we choose path one for our heirs, if not for ourselves.

Mankind is largely unaware of the need for choice. Instead, we mill about, increasing our appropriation of the stock for current consumption but not turning in a definitive way toward constraint-releasing technology of a sort that allows permanent occupancy. Is there still time to effect the transition before encountering resource constraints? Many doomsayers who think not are in fact expressing a preference for a romanticized version of path one. To the extent that they are also technological Luddites, there is a self-fulfilling element to their prophecy.

BUT IF PATH two is selected, a prudent first step would be to seek a more efficient transformation of the natural capital represented by resource stocks into the constraint-releasing technology of the future. A consumer society that uses stocks only to increase immediate gratification is inimical to the second strategy. An antitechnological bias that denies resources for the development of new technology also frustrates the second path. On the other hand, measures to conserve exhaustible resources through more efficient use, recycling, or substitution of renewables are consistent with the second strategy. Policies that restrain our rate of use of exhaustible resources, extending the time period over which the stock is used, allow a longer time for transition to occur. However, such conservationist measures need to be combined with a technical strategy if they are to contribute to the success of the second option. Thus, the conservationist, preservationist, and environmentalist biases present in much of the current discussion can be reconciled with the second strategy, but the antitechnological biases cannot.

While conservation policies permit deferral of the choice between the two paths, ultimately a choice must be made. Our society already is a heavy user of exhaustible resources and there is danger of overstaying that mode. If we opt for the second path, we must do so while resource stocks allow time, energy, and materials for possible success. Also, we must have continuity with past technical achievements. We may be able to get there from here, but not if we wander too far away from the technological sophistication already attained. We must remember that we can always fall back on the first course, provided no cataclysmic damage has been done to the ecosystem in the process. Hence the manner in which we proceed is also of great importance to man.

In sum, long-term human occupancy of the earth on the present basis is not viable. The alternatives are either path two to escape resource exhaustion while retaining income aspirations or path one, based on current flows, with population and income being trimmed as necessary. In either case there are limits (though quite different ones) to the scale of human activity at any time, but no necessary limits to its endurance.

Forest Policy For The Future

Excerpted and amended from Joseph L. Fisher's paper, "A Search for Consensus," in a recent RFF Working Paper, Forest Policy for the Future. *The matrix is from Marion Clawson's paper, "Conflicts, Strategies, and Possibilities for Consensus in Forest Land Use and Management," in the same volume. Marion Clawson is also the editor of the volume, which is available from The Johns Hopkins University Press.*

A SEARCH FOR CONSENSUS on future forest policies would seem to be worthwhile. By consensus I mean not perfect agreement on figures or statements, but rather a shared understanding of what the issues are, the pros and cons of the solutions proposed, and the directions in which to go. With this kind of consensus the chances of reaching workable solutions—frequently they will be compromises—will be greatly increased.

There are a number of issues on which such a consensus would be helpful. One of the most difficult of these is how much forest land should be allocated for timber production and how much should be kept as wilderness. Marion Clawson's matrix shows these two uses to be completely incompatible. Furthermore, it shows preservation of wilderness to be incompatible with recreational opportunities. Both of these incompatibilities, especially the latter, require a purist concept of wilderness.

My view is that wilderness does provide opportunity for certain kinds of recreation, including backpacking, limited trail riding, nature study and photography, fishing, and even hunting for food supply. The problem is how to limit these activities so that the essential wild characteristics are preserved. The day of the absolutely trackless, unpenetrated wilderness is over. Like all other land, wilderness henceforth must be planned and managed.

In the so-called quasi-wilderness, predominantly in the East and South, carefully prescribed cutting of timber may be considered, for example, as a means toward more rapid establishment of the kind of forest thought to represent sustainable wilderness or toward reestablishment of beaver and other indigenous animals.

Wilderness preservationists justifiably fear that anything more than minimum recreational use of wilderness, and any tree cutting at all, will open the door to heavy instrusion and destroy the fragile ecosystems that are an important esthetic component of the wilderness experience. Much of the difficulty is due to a lack of confidence and trust between the antagonists. This antagonism goes back to the Hetch Hetchy controversy in California and earlier. It will not be dispelled easily. Each side has tended to portray the other as villainous, as de-

Table 1.

Degree of Compatability among Various Forest Uses

Primary use	*Maintain attractive environment*	*Provide recreation opportunity*	*Wilderness*	*Wildlife*	*Natural watershed*	*General Conservation*	*Wood production and harvest*
Maintain attractive environment		Moderately compatible; may limit intensity of use	Not inimical to wilderness but does not insure	Compatible to most wildilfe, less so to a few	Fully compatible	Fully compatible	Limited compatibility; often affects amount of harvest
Provide recreation opportunity	Moderately compatible unless use intensity excessive		Incompatible; would destroy wilderness character	Incompatible for some kinds; others can tolerate	Moderately compatible; depends on intensity of recreation use	Moderately compatible; incompatible if use too heavy	Limited compatibility depends on harvest timing and intensity; roads provide access
Wilderness	Fully compatible	Completely incompatible, can't tolerate heavy use		Highly compatible to much wildlife, less so to others	Fully compatible	Fully compatible	Completely incompatible, precludes all harvest
Wildlife	Generally compatible	Limited compatibility; use intensity must be limited	Mostly compatible though some wildlife require vegetative manipulation		Generally fully compatible	Generally fully compatible	Generally limits volume or conditions of harvest
Natural watershed	Fully compatible	Moderate compatibility; may require limitation on intensity	Not inimical to wilderness but does not insure	Generally compatible		Fully compatible	Moderate compatibility; restricts harvest methods but does not prevent timber harvest
General conservation	Fully compatible	Moderately compatible; if use not excessive	Not inimical to wilderness but does not insure	Generally compatible	Fully compatible		Compatible but requires modifications in methods of timber harvest
Wood production and harvest	Compatible if harvest methods strictly controlled	Moderately compatible	Completely incompatible; would destroy wilderness	Compatible if harvest methods fully controlled	Compatible if harvest methods fully controlled	Compatible if harvest methods fully controlled	

stroyers of important values. Breaking out of this frustrating and paralyzing situation will require compromise and understanding.

I think that in dealing with the issue of wilderness versus timber production and outdoor recreation, we are slowly moving in the right direction. Wilderness and semi-wilderness areas are being legislatively recognized, and should be designated according to suitable criteria and then managed so as to maintain desired standards. Kinds and degrees of use must be specified. No use in the strict sense is either unrealistic or a misnomer. Ideally, wilderness areas should be graded across a spectrum according to natural characteristics and intensity of use for approved purposes. The spread would extend from the Brooks Range in northern Alaska to a once or twice cutover Appalachian forest.

We are all nominally for conservation and environmental protection. The question is how much conservation and environmental protection; when, where, and at what cost? Personally I want lots of it and I believe Americans want lots of it. As a matter of insurance against future risks, we in this country can afford a lot. If the people of the United States can put 5.8 percent, and rising, of their own wages and salaries into old age security, with this matched by government contribution, surely they should also be willing to put half that or so into old age security for their land, water, and air—the planetary resources on which they depend utterly.

The actual funds to do this could be channeled through private or governmental programs, or both. The basic point is that the job has to be done one way or the other. My preference is for the private route, where possible, by large use of emission charges and user fees. I see much merit in pricing privately sold products and services so as to include fully the costs of protecting the environment. When this can't sensibly be done, then regulations, penalties, and taxes are available for doing the job the bureaucratic way.

At present, neither private nor public forests are being conserved and protected on a truly long-range basis, with enough flexibility built into policies to permit response to new knowledge on conservation methods and public preferences. It should be possible to find consensus not only on long-term conservation but also on the scale of funding required to reach agreed-on objectives. The costs of an adequate program of environmental improvement do not appear to be unbearable. Two to 2½ percent annually of the gross national product ($24 to $30 billion a year this year), about twice what is now being spent, would enable progress to be made.

It is all too easy for professional foresters, industry leaders, and environmentalists to become so caught up in their own work that they forget, except in a general way, that the other people in the country see the forests and forest policy from a different perspective. If it is to reflect a national consensus, forest policy in the future must also take into account the need for reasonably priced housing, cheap and attractive paper products, the effect of changes on local economic structures, and a variety of similar concerns that reflect the interests of the general population.

PETRODOLLARS AND THE WORLD MARKET

Excerpted from a preface, by Hans Landsberg, Director of RFF's Energy and Minerals Program, to a forthcoming RFF publication by Donald Wells.

PERHAPS it is just as well that the research community does not concern itself with thinking up all the potential questions to which answers may someday be needed. Some rule of relevance and timeliness does seem to order the agenda. But at times events move so rapidly that scholars are left far behind, unable to come up with good answers to burning questions. Conjecture, speculation, and the imaginative drawing of analogies then take the place of careful research.

The Arab oil embargo and the drastic increases in price associated with it are such events. They have caught the scholarly community with its cupboard bare, or at best only spottily occupied. Among the many questions still to be answered is the degree to which the rapid and large accumulation of oil revenues will affect monetary and eventually economic stability the world over. While new jargon has quickly emerged and one talks glibly about "petrodollars" and of "recycling" the swollen treasuries of the oil-exporting countries, the knowledge on which the discussion rests is pretty thin.

An important aspect of the debate is the capacity of the Arab nations to absorb the revenues through expanding consumption by their citizens as well as their investment in productive facilities. "Absorptive capacity" is a concept long employed among students of foreign aid and development economics generally. It relates to the degree to which a country can, in an orderly manner, utilize an inflow of funds. In the case of some of the Middle Eastern oil-producing countries, the expected rise in the volume

of such funds is so steep that neither the existing literature nor the country's own experience is of much help in establishing a firm base on which to build forecasts. Even after domestic absorption, there will still be a substantial amount of cash available for use outside the exporter countries. The volume of this cash will be a critical factor in judging prospects for world economic stability.

Donald Wells has wisely chosen Saudi Arabia as the key country in this picture, given the contrast between the vast potential for expanding oil production and the modest economic stage of development. In developing his thesis that Saudi Arabia's absorptive capacity is greater than the casual observer would suspect, Wells leans heavily on an analysis of past budget appropriations and expenditure records and on evidence of unmet needs of the country's population. I use the term "needs" advisedly, since in the absence of matching income these needs have not attained the dimensions of "demands." This, however, is the transformation that Wells expects in the future, largely through government intervention via enlarged imports of consumer goods, social services, housing, and—last but not least—military hardware. In the investment area, agricultural infrastructure and oil-related industry rank high as potential outlets.

The net result of this absorption is a large but not overwhelming volume of funds seeking employment abroad. However, since one of the major factors contributing to a lower surplus is a large military buildup, it is hard to know whether or not to characterize the outlook as salutary. But that is not Wells's task. What he has done is make available a substantial volume of data and supplied ways of drawing conclusions from them. It will be up to the reader to judge their relevance as well as their usefulness for further analysis.

AN EXCHANGE OF VIEWS

August 27, 1974

Editor:

The address by Allen Kneese (excerpted in June, 1974, "Resources") was an excellent conceptual and historical assessment of the phenomena that induce serious pollution problems. Basically his argument is that "common property resources," primarily water and air, are left unpriced (and "unowned") so that there is every inducement to utilize these resources in detrimental, as well as, harmless ways. Other institutional inducements, such as depletion allowances and direct subsidies encourage the use of large amounts of materials. Unpriced water and air induces material waste although private production and distribution costs induce efficient use of product materials prior to disposal. I agree that some degree of coalition and cooperation is required to reduce pollution (and waste) levels. I also agree that a persistent source of the pollution and waste problem is the system of incentives promoted by tax and subsidy plans at all levels of government.

I disagree with Kneese when he goes on to say that pollution is a result of market failure and that federal laws taxing effluents and effluent-creating inputs should be enacted to somehow remove or equalize incentives for pollution and waste treatment. This proposal is like wielding an axe on the head of another axe rather than its handle. An alternative proposal readily follows from his insightful analysis.

First it must be recognized that increased pollution and waste is not an example of market failure. The inducements to exploit greater quantities of resources and to "freely" dump wastes and residuals into the air, land, and water come from government policy intervention into the market system. It is unlawful to own most waterways and airways and thus there is no private incentive to keep them clean. As owners and controllers of property, governments have been most lax. Yet governments are quick to enact laws and propose policies regarding the activity of the private sector. Most of these policies lead to "special interest" legislation. The proliferation of special interest laws and regulations has served to abrogate the efficiency of market allocation of privately owned resources. Whatever the original intent of these laws the effect has been to close markets, increase prices, increase pollution and waste, and reduce output and labor employment. To characterize present environmental (and economic) problems as market failures is to pervert the notion of the operation of free markets unencumbered by plans and restrictions.

Second, in his policy proposal Kneese determines the appropriate level of coalition to handle pollution problems. He calls for taxation at, presumably, both state and national levels. By and large the impact of pollution from stationary sources is confined to localities such as urban or extended urban areas. Since areas differ in air and water quality it is not unexpected that urban policy makers would devise different tax policies than state or national governments.

Third, Kneese points out that "common property resources" are only imperfectly reduced to and defined as private property parcels. This, of course, is supposition and denies the important function of a market which is to rearrange and adjust ownership patterns (once some initial allocation is determined) in order to gain in private welfare. That some owners of land, air, and water would allow greater amounts of pollution and waste on their property is a likely result of market allocation. Yet pollution would cost in the private market and its harmful effects would be fully compensated. What would result is a new set of prices on pollutors, pollutants, and resources which would improve efficiency in waste disposal. Furthermore, the size of decision units (ownership) would emerge from efficient market processes in a similar way that economies of scale are discovered and exploited.

The proposal I would make would be to open up government held or controlled property—air, land, and water—to private ownership claims and private control and to remove existing tax and subsidy incentives already on the law books. Only then will the market system function at its best resulting in, I suspect, greater output, less pollution, lower prices, and greater general welfare than the present situation even with the imposition of Kneese's new taxes. Market failure is generally what people posit as the source of many adverse events having large externalities. Externalities, however, can be priced away (internalized) at various levels of coalition. A free market, unlike the existing U.S. market system, induces coalition and cooperation to improve the private (and social) welfare. The freeing of markets and the extension of markets to new areas is the key policy to be proposed. It is the force of government, which is incompatible with free enterprise, that has failed in the pollution case and will continue to fail as long as government policy makers impede the functioning of the market.

Sincerely,
William K. MacReynolds
Research Associate
Center for Environmental
Quality Management
Cornell University,
Ithaca, New York 14850

September 5, 1974

Dear Mr. MacReynolds:

I am pleased that you found part of my address to the Canadian Royal Society meeting insightful. I fear, however, we must continue to disagree on the policy implications of my analysis of the sources of pollution problems. I do not feel that private ownership of the air and water resources would produce desirable results.

Imagine private ownership of the New York—New Jersey Metropolitan air-shed. To avoid the continuing existence of large scale externalities ownership would have to be in a single unit. Let us say that ownership implied the privilege of charging a fee for residuals discharge (and on breathing?). Since from what we know about the probable response of dischargers to such a fee, very high fees or very low fees would yield the most revenue, so the monopolist, being a revenue maximizer, would almost certainly set the price at an inappropriate level.

One could claim, of course, that breathers of the air would band together to bribe the owner to set the fee higher (if he has set it too low) but then we encounter the well known problem of the "transactions costs" involved in setting up a market.

I do not think the problem of establishing a positive and creative environmental policy can be met so easily as you suggest.

Sincerely,
Allen V. Kneese
Department of Economics
University of New Mexico,
Albuquerque, N.M. 87131

IN MEMORIAM

RFF announces the publication of the selected works of Orris C. Herfindahl, 1918-1972.

RESOURCE ECONOMICS
Selected Works of
Orris C. Herfindahl
edited by David B. Brooks

Orris Herfindahl was among the first modern economists to go beyond a descriptive survey of natural resources and to view mineral resources as economic goods. Using traditional (neoclassic) theoretical and empirical economic analysis, he threw new light on resource supply and demand relationships.

Best known for his work in minerals supply and completion in the minerals industry, Herfindahl advanced the now widely accepted view that ore deposits are better treated as capital than as "land." In his later work, Herfindahl addressed the larger issue of the quality of the environment. From 1957 until his death, Herfindahl was a senior research associate with Resources for the Future.

David Brooks, a colleague of Herfindahl's, has compiled a convenient text of balanced and representative samplings of Herfindahl's writings on the nature and scope of source economics, natural resource supply and conservation, the economics of the minerals industry, the supply of natural resource information, and the quality of the natural environment. The editor provides an introduction which sets the thematic framework and a full bibliography of Herfindahl's work.

New RFF Books

The following titles may be ordered from The Johns Hopkins University Press, Baltimore, Maryland 21218.

West African Marine Fisheries: Alternatives for Management. James A. Crutchfield and Rowena Lawson. RFF Program of International Studies of Fishery Arrangements Paper 3. 64 pp. Summer 1974. Paper, $3.00.

Organizational Arrangements to Facilitate Global Management of Fisheries. Edward Miles. RFF Program of International Studies of Fishery Arrangements Paper 4. 23 pp. Summer 1974. Paper, $1.00.

Fisheries of the Indian Ocean: Issues of International Management and Law of the Sea. Arlon R. Tussing and Robin Ann Hiebert, with Jon G. Sutinen. RFF Program of International Studies of Fishery Arrangements Paper 5. 55 pp. Summer 1974. Paper, $3.00.

Tuna: Status, Trends, and Alternative Management Arrangements. Saul Saila and Virgil Norton. RFF Program of International Studies of Fishery Arrangements Paper 6. 59 pp. Summer 1974. Paper, $3.00.

Resource Economics: Selected Works of Orris C. Herfindahl. David B. Brooks, ed. 339 pp. September 1974. Cloth, $16.00.

Minerals and Men: An Exploration of the World of Minerals, revised and enlarged edition. James F. McDivitt and Gerald Manners, 192 pp. October 1974. Cloth, $7.50.

Technical Change, Relative Prices, and Environmental Resource Evaluation. V. Kerry Smith. 116 pp. September 1974. Cloth, $8.00.

Interbasin Water Transfers: A Case Study in Mexico, Ronald G. Cummings. 144 pp. October 1974. Cloth, $7.00.

Waterfowl and Wetlands: Toward Bioeconomic Analysis. Judd Hammack and Gardner Mallard Brown, Jr. 103 pp. September 1974. Cloth, $7.00.

Working Papers

Energy and the Social Sciences—An Examination of Research Needs. Hans H. Landsberg *et al.* RFF. October 1974. $7.50.

Forest Policy for the Future: Conflict, Compromise, Consensus. Marion Clawson, ed. 360 pp. Summer 1974. Paper, $5.00.

Note

Out of print issues of *Resources* are now available in microform from Xerox University Microfilms, 300 North Zeeb Road, Ann Arbor, Michigan 48106. For further information, please write to that address.

RFF Reprint Series

The following reprints of staff material have been added to the RFF Reprint Series. Single copies are available free on request to Resources for the Future. Additional copies are priced as listed.

114. *A Linear Programming Model of Residuals Management for Integrated Iron and Steel Production.* Clifford S. Russell and William J. Vaughan. From *Journal of Environmental Economics and Management.* July 1974. More than one copy 25 cents each.

115. *Disparate Fisheries: Problems for the Law of the Sea Conference and Beyond.* Francis T. Christy, Jr. From *Ocean Development and International Law Journal.* Summer 1974. More than one copy 25 cents each.

116. *Limiting the Demand for Energy: Possible? Probable?* Joel Darmstadter. From *Environmental Affairs.* July 1974. More than one copy 25 cents each.

THE LIBRARY OF CONGRESS,
CONGRESSIONAL RESEARCH SERVICE,
Washington, D.C., November 20, 1974.

To: Senate Interior and Affairs Committee Attention: Mike Harvey
From: Allen F. Agnew, Senior Specialist A.F.A./D.A.T. Environmental Policy Division
Subject: Copper Prices, Anaconda Shutdown at Butte

This is in response to your request of November 12 for information on the copper price situation and on the shutdown of underground mining at Butte by the Anaconda Company during the next four months.

The answer would appear to be economics, as the following discussion shows.

1. The copper price on the London Metals Exchange has plunged since its high of $1.52/lb. on April 1, to about $0.60/lb. in late September—a level that was maintained through the end of October. Bleak forecasts for the industrialized economics of the world certainly "are not fostering demand for copper," said E/MJ Markets in its October 1974 issue. Statistics suggest a continuing oversupply and downward pressure on prices. A November 19 Reuter's news release from Paris said that the four CIPEC countries (the world's main copper exporters) will cut copper exports by 10 percent on December 1, in a bid to boost declining world copper prices.

Anaconda, Amax reached accord with their unions in late June, but the other U.S. copper producers—Kennecott, Phelps Dodge, Magma, Asarco, Inspiration, and Cities' Service were struck on July 14. Kennecott settled on July 22, with basic wages less than Anaconda's, and the rest of the industry followed Kennecott. The attached calendar of events as reported in E/MJ Markets is significant.

2. Underground mining at Butte has become more expensive in the last few years. Only two and a half years ago, an article in Mining Congress Journal for April, 1972, discussed favorably the merits of open pit vs. underground mining in Butte. Martin K. Hannifan, Vice President for Operations of The Anaconda Company, wrote that "the future of mining in Butte indicates a combination of underground and open pit mining for a long time to come." (P. 120.)

Hannifan continued that vein mining is competitive with pit mining in Butte despite the great depth (3000–5000 feet), the high rock temperature (as much as 130 degrees F), and relatively weak wall conditions. He went on to say, however, that to remain viable, more tons per man shift of previous average grade of ore must be produced, or the price of metal must keep pace with wage and other cost increases. "Mining by underground methods may be feasible," Hannifan said, "in the better grade zones adjacent to and below possible pit resources." Hannifan's supporting statement and table of data are attached.

"In the Butte situation . . . methods which disturb the surface will have to wait. Mechanized cut-and-fill or longhole shrinkage and fill need to be tested in these areas. The nearby Kelly shaft has unused hoisting capacity for such a venture." Government support of research in underground mining methods is urgently needed, Hannifan concluded.

The Metals Sourcebook for March 11, 1974, reported that Anaconda was investigating the use of highly mechanized mining methods to revamp and expand its existing underground mines at Butte. The company presently (March 1974) hoists 2000 tons of ore per day at three vein mines—Leonard, Stewart, and Mount Con; in 1972 their output totaled 20,833 tons. On the other hand, the Berkeley open pit produced 104,934 tons and, in late 1973, Anaconda launched a full-scale feasibility study on methods to improve the steeply escalating haulage costs in the open-pit operation.

The May 1974 issue of E/MJ reported that Anaconda is "continuing an aggressive program of development at its North American properties." One of them, the Continental-East open pit at Butte, has started up at 24,000 tons per year of copper. Production has been resumed at the Cariton mine in New Brunswick (75% Anaconda) at 6,000 tons per year, the Victoria open pit in Nevada is slated

for 1975 startup at 9000 tons per year, and exploratory drilling for a potential large underground copper mine is continuing at Carr Fork, Utah. In the October 1974 issue of E/MJ the Carr Fork deposit was announced as a sure thing, with Anaconda planning to spend $135 million to develop a new underground copper mine and mill there, with construction to begin immediately; a permanent work force of about 800 will be recruited from surrounding areas, according to the news item.

Also, the March 1974 E/MJ noted that construction of the first Arbiter-process hydrometallurgical plant for copper extraction was slated for completion at Anaconda, Montana (where Butte-mined ores are processed), in 1974. Concentrates from the new Carr Fork mine and mill will be shipped to the company's processing facilities in Montana.

ATTACHMENT I.—COPPER PRICE SITUATION, 1974 CALENDAR

Jan. 1974—Major U.S. copper producers quickly moved up to 68 cents/lb. for cathode copper.

Feb. 1974—The GSA stockpile offering on Feb. 5 of 50,000 tons of copper came as no surprise to the copper market, so the major price factors were currency jitters and energy worries.

April 1974—Copper prices remained strong in March, due to strong demand for copper and strong showings by gold and silver, caused by an easing of the energy problems in the U.K. and the U.S. In the U.S., GSA's awards of 59,488 tons of stockpile copper were expected to bring 97–98 cents/lb; such high prices are objected to by U.S. copper producers, which are limited to a 68 cents/lb cathode quotation. In Japan, copper producers raised prices in March to $1.30/lb.

May 1974—LME copper prices hit a record $1.51/lb on April 1 but slipped back to $1.36–$1.41/lb later in the month. GSA's final price for the 59,488 tons of stockpile copper was 99.2 cents/lb. It is expected that U.S. producer copper—held at a 68 cents/lb ceiling for cathode—will move to 80 cents/lb when price authority expires on April 30. CIPEC members (Chile, Peru, Zaire, and Zambia) are expected to consider 75–90 cents/lb floor price when they meet on May 5–6.

June 1974—U.S. copper producers raised cathode quotes to 80 cents/lb on May 1. Copper markets, however, dipped in May, with the LME going below $1.25/lb.

July 1974—Domestic copper producers increased cathode quotes to 85 cents/lb during the first week of June. Copper markets, however, dipped sharply in June, with the LME dropping to $1.04/lb. CIPEC was meeting on June 24, but there was little expectation that the four charter members would agree on a minimum copper price.

Aug. 1974—Copper strikes dominated the market in July. The big question remains: After the strike, will U.S. producers attempt to raise prices once again, this time to offset the cost of lost production and higher labor rates?

Sept. 1974—The five-week U.S. copper strike did not halt the downward trend in world markets—a must, before U.S. producers can push through another price hike. On August 20, London and New York markets were 44 cents/lb below July 15 levels. The reasons? (1) Even though 100,000 tons of production was lost, customers had built sufficient inventories in May and June; (2) copper production outside the U.S. remained substantially greater than consumption, especially in Japan; and (3) summer vacation shutdowns and the generally sluggish world economies put no pressure on.

Oct. 1974—Downward pressure on copper prices intensified in early September, leading to increased speculation that a price cut by U.S. producers was inevitable. Thus the 6 cents/lb price cut on September 14 brought U.S. cathode quote down to 79 cents/lb—the first time since July 1972 that U.S. producers had been forced to drop prices. This 6 cents/lb drop more than wiped out the 5 cents/lb increase that was posted in early June of 1974, supposedly to cover in advance the cost of the new three-year labor contracts that were subsequently negotiated during the mid-July through mid-August U.S. copper strike.

ATTACHMENT II.—OPEN PIT VS. UNDERGROUND MINING AT BUTTE

One of Hannifan's tables showed the following decrease in underground mining since 1940 (Hannifan's, 1972, Table 2) :

PERCENT OF COPPER PRODUCED

	1940	1955	1961	1970	1975 [1]
Underground stoping	97.7	54.2	31.5	14.4	13.5
Underground block cave	0	34.8	16.0	0	0
Open pit	0	8.2	48.8	71.4	59.1
Leaching	2.3	2.8	3.7	14.2	27.4
Total	100.0	100.0	100.0	100.0	100.0

[1] Estimated.

Another of his tables shows the relative cost and productivity of the three types of mining (Hannifan, 1972, Table 4).

	Vein stoping	Block caving	Open pit
Years production	1880 to present	1952–62	1955 to present.
Tons to the mill (million)	197.2 at 4 percent	32.3 at 0.99 percent	160 at 0.75 percent.
Maximum daily production	13,000 at 4.8 percent	15,000 at 1 percent	56,000 at 0.75 percent
Average cutoff grade (percent)	2.5–3.0	.6	0.4.
Tons per man-shift, 1970	3.3	20	208.
Ratio mining cost per ton, 1970	9.10	1.42	1.00.
Ratio, mng and mlg cost per lb 1970	.98	.93	1.00.
Leach copper credit, 1970 (million)	3.3		31.8.
Percent of Butte copper produced, 1970 (percent)	15.7	0	84.3.

Hannifan noted that Butte ore reserves are substantial, as shown in the following table (Hannifan, 1972, Table 6) :

Type of deposit	Million tons	Cutoff grade (percent)	Average grade (percent)
Available copper vein structures	12	2.0	4.3
Presently planned pit (1,990 ft deep)	250	.4	.71
Probably open pit (2,550 ft deep)	580	.4	.7
Potential open pit (3,900 ft deep)	1,600	.4	.7
Zones for possible underground mining	220	.7	.9

THE LIBRARY OF CONGRESS,
CONGRESSIONAL RESEARCH SERVICE,
Washington, D.C., November 28, 1974.

To: Senate Minerals, Materials and Fuels Subcommittee
Attention: Mike Harvey
From: Allen F. Agnew, Senior Specialist Environmental Policy Division
Subject: Anaconda Shutdown of Butte Underground Mines

I was interested in the material presented at the Subcommittee hearing called by the Chairman on November 25, and thought you might like to have my reaction as a follow-up to my memo to you of November 12.

Although I was unable to attend in the morning and thus missed out on the questioning of the Anaconda Company witnesses, my assistant, Duane Thompson, sat in for me and obtained copies of the statement of Messrs. Place, Sandstrom and Miller, as well as the one by Congressman-elect Baucus.

In the afternoon I did attend, and thus heard Governor Judge's testimony and the testimony of the labor group, as well as the questioning of the latter which brought the Anaconda Company people back into it.

As a result of perusing the three written statements of the Anaconda Company people and hearing their responses to the questions, I wish to make the following points:

Regarding Mr. Place's Statement

1. He says (p. 2–3) that the Leonard mine was not reopened in 1968 after the prolonged strike of 1967. On the other hand, *Metals Sourcebook* for March 11, 1974, reported (p. 3) that Anaconda "presently hoists 2,000 tpd at the Leonard, Stewart, and Mount Con underground vein mines. Combined output in 1972 from these mines was 20,833 tons of copper." This discrepancy is surprising.

2. He says (p. 9) that, "over the years, the marginal nature of the underground operations has been explained many times to the public." True, but Hannifan's 1972 paper (p. 120, quoted in my November 12 memo to you) says that "the future of mining in Butte . . . indicates a combination of underground and open pit mining for a long time to come." That may have been an overly optimistic conclusion by Hannifan, for he also said (p. 121, also quoted in my November 12 memo) that, although "vein mining . . . is competitive with pit mining in Butte . . ., to remain viable . . . more tons per man shift [must be mined] . . ., or the price of metal must keep pace with wage and other cost increases."

Thus Mr. Place's statement (p. 11) that "the suspension of vein mining was foreseen by a large segment of the community" does seem to require clarification.

3. Mr. Place said (p. 13) that "the bulk of the mineral deposit [at Butte] has a projected grade of 0.5 to 0.6 percent. This would not be economically mineable." On the other hand, Hannifan's 1972 report (Table 5, which I presented in a modified form in my November 12 memo in Attachment II, p. 2) said that the average grade of the zones for possible underground mining was 0.9%. His Table 6 and his discussion on p. 121 showed that, at that grade, 19 tons per man shift would be economic.

4. Mr. Place said (p. 14) that "this low-grade deposit beneath the Butte Hill has been calculated at between 500 million to one billion tons." On the other hand, Hannifan's 1972 report (Table 5, which is the same one referred to in my comment No. 3, above) said that there was 250 million tons down to 1990 feet depth, 580 down to 2550, and 1600 down to 3900." Again, Mr. Place should document the source for his 500–1,000 million tons.

5. It is possible that all the economic answers are contained in Mr. Place's Appendix B, page 1, under the category "extraordinary items," which was graphically evident on the succeeding page of his Appendix B. However, it would seem that Mr. Place should document these extraordinary items, as one would do by a footnote in an annual report.

REGARDING MR. SANDSTROM'S STATEMENT

1. In the illustration entitled "Projections on Future Open Pit and Underground Copper Production" (p. 10), he shows underground tonnages mined as beginning in about three or four years at a level of some 25 million pounds (12,500 tons) and continuing at a somewhat increasing level until year ten or later, at a level of perhaps 50 million (25,000 tons). The latter is approximately the level of copper production from underground mines at Butte since 1967.

I assume that the gap in underground mine production at Butte between year zero and year 3 or 4 is based on Mr. Place's (p. 15) two-year program of underground drilling and geologic study to better define the deposit, and on Sandstrom's expectation that underground mining will resume thereafter. A verification by Mr. Sandstrom or Mr. Place of my assumptions would be helpful.

IN GENERAL

Understanding the Company's concern for a viable total mining enterprise at Butte, I can appreciate their wanting to back off from an unproductive underground operation at Butte while they explore for richer ore that could be mined by underground methods. Thus, although the short-range impact of the shutdown would be severe in a community like Butte, where so much of the economy depends on Anaconda's mining operations, the long-range health of mining there is even more important.

It is interesting to note that the 1972 analyses of Hannifan (Anaconda) and Professor Eugene P. Pfleider of the University of Minnesota have been completely turned around by Mr. Sandstrom and his colleagues in 1974.

[Time magazine, Dec. 2, 1974]

CARTELS—IMITATING OPEC

Inspired by the heady success of the Organization of the Petroleum Exporting Countries in pumping up the price of oil, four countries that account for 70% of the world's copper exports last week adopted some of OPEC's tactics. Zambia, Zaire, Chile and Peru, members of a cartel called the Intergovernmental Council of Copper Exporting Countries (CIPEC) announced plans to reduce shipments of the metal by 10%. Said Fernández Maldonado, Peru's Minister of Energy and Mines: "The Arabs have shown us the way."

The move was prompted by sagging copper prices, down from $3,200 a ton earlier this year to less than $1,400. Demand has decreased with the worldwide recession and cutbacks in manufacturing. If CIPEC succeeds in raising prices, many industries will be affected. Copper is an important ingredient in cars, planes and trains as well as in plumbing materials, pots and pans, and even intrauterine devices. The U.S. and the Soviet Union, the two largest copper producers, both mine nearly enough for their own needs. Europe and Japan, however, rely heavily on CIPEC copper.

Metal traders were skeptical that CIPEC could drive up prices. They questioned the effectiveness of a cutback in shipments without a resduction in production. Almost in response, the Chilean government announced that it would close down the Exotica Mine for six months; the mine, one of Chile's largest, last year produced about 32,000 tons, or only 4% of Chile's copper exports. That should certainly not be enough to kick up prices—unless more member countries also close their mines.

Producers of other materials, too, are now banding together to try to lift prices. Countries that possess iron ore (including Venezuela and Brazil) and seven bauxite producers (Guinea, Guyanna, Jamaica, Sierra Leone, Surinam, Australia and Yugoslavia) are talking about forming cartels. Coffee-producing nations hope to control prices by reducing exports from the Central American republics. Oil-rich Venezuela promises to make up their short-term losses in revenues with subsidies from a special investment fund.

For now, it is highly doubtful that the incipient cartels will inflate world prices. The likely members have few close religious, ethnic, cultural or geographical ties, compared with the Middle East nations that make up the core of OPEC. And even OPEC had to wait and struggle for a dozen years after its founding in 1960 before conditions were right for raising prices. Still, the development of the other cartels gives the rest of the world another potentially inflationary force to worry about.

Appendix II

Additional Questions Submitted by Senator Metcalf to Anaconda Co., and Their Responses

DECEMBER 12, 1974.

Mr. JOHN B. M. PLACE,
President, The Anaconda Co.,
New York, N.Y.

DEAR MR. PLACE: As I indicated in the Subcommittee hearings on 25 November, I have some additional questions which I would like The Anaconda Company to answer. They are set out in Enclosure I of this letter. I would appreciate the Company's responses as soon as possible.

Thank you very much for your cooperation.

Very truly yours,

LEE METCALF,
Chairman, Subcommittee on Minerals, Materials and Fuels.

Enclosure.

QUESTIONS FOR ANACONDA

(*a*) What is the average assay value per ton of ore for the underground production (including all recoverable metals)?

(*b*) Under existing contracts, what is the current shift labor rate and associated fringes in underground mining?

(*c*) What is the productivity (tons/man-shift) of those miners in the underground cut-and-fill operations?

(*d*) What is the labor cost as a percentage of direct operating cost (per ton) in underground mining?

(*e*) What percentage of the total mining cost is the "direct operating cost" per ton of ore received in the underground operation?

(*f*) On a per year basis, what capital expenditures have been made in improving underground haulage, stoping, hoisting and general materials handling in the last 5 years?

(*g*) Please provide the monthly cost data associated with the underground mines at Butte over the past 12 months.

(*h*) Would Anaconda be receptive to offers of leasing current underground mining areas to responsible mining contractors? If not, why not?

(*i*) What are the company plans for the extension of the Berkeley Pit further west from its present boundary?

(*j*) Please supply the estimated time frame for reaching the "hopeful" underground bulk mining production at Butte. Please include the breakdown of time needed for exploration, feasibility studies, construction and development period in a phased schedule to reach the production level.

(*k*) In the event that the feasibility study for underground bulk mining proves negative, how much ore (tonnage) reserves would be lost; and could the company recover the ore in the minable vein system by underground methods, after abandonment and flooding to the 3900 level of the Kelley?

(*l*) Should all types of underground mining prove negative in the three exploration blocks, will the Anaconda consider mining these blocks by the open pit method? Would this necessitate expanding the Berkeley Pit into or closer to the downtown Butte area?

(*m*) Will the proposed 1975 geological budget for Butte (Miller testimony) of $3.11 million be funded and used to explore the Kelley, Steward-Belmont and Raves-Minnie Healy blocks for underground mining potential?

(*n*) Large underground bulk mining techniques normally result in surface subsidence. Would mining of the type suggested in the three exploration blocks result in surface subsidence in the downtown Butte area? If so, do you plan to purchase the area of surface disruption?

(*o*) In Mr. Place's testimony (Appendix A, page 2) tonnages, grades and mining costs are given for vein mining at Butte. The following information can be calculated from this information.

44-527 O - 75 - 8

Year	Mining cost per ton of ore	Grade	Mining cost per pound of copper (cents)
1971	$20.93	3.77	28
1972	24.29	3.73	33
1973	27.89	3.39	41
1974 (9 mo)	24.57	2.92	42

The average annual domestic selling price for copper during this period was as follows:

Average annual copper price (domestic)

	Cents per pound
1971	51.43
1972	50.62
1973	58.86
1974 (9 months)	70.38

In the first 9 months of 1974 the production costs per lb. of copper increased an average 1¢/lb. over 1973 costs while the price of copper increased almost 12¢/lb. over the 1973 price. In view of this relationship: (1) Why are the underground operations at Butte still unprofitable? (2) What are the direct costs associated with milling, smelting and refining of this underground ore?

(*p*) In Mr. Sandstrom's testimony (page 3) he states that "the initial investigation of the present underground mining practices revealed extremely high costs, ranging around $40.00 per ton." This cost figure does not correspond to the mining cost figures presented by Mr. Place in Appendix A of his testimony. Please explain this difference.

ANACONDA

President

January 10, 1975

The Honorable Lee Metcalf
Chairman, Subcommittee on
Minerals, Materials and Fuels
United States Senate
Washington, D. C. 20510

Dear Senator Metcalf:

In reply to your letter of December 11, I am pleased to enclose answers to the questions that you posed. We trust that the answers are responsive and appreciate the opportunity to furnish you this additional information.

Sincerely,

John B. M. Place

Enclosure

The Anaconda Company 25 Broadway New York, New York 10004 212/422-6300

ANACONDA

Answers to Questions Posed by Senator Lee Metcalf
In his Letter of December 11, 1974 to The Anaconda Company

(a) Question: What is the average assay value per ton of ore for the underground production (including all recoverable metals)?

Answer: Underground production average assay values for the first eleven months of 1974 were as follows:

Copper	Silver	Gold
2.406% (48.12 lbs./ton)	1.015 oz./ton	0.0046 oz./ton

(b) Question: Under existing contracts, what is the current shift labor rate and associated fringes in underground mining?

Answer: July Through November 1974 Average

Wages	$54.59
Fringes	18.01
	$72.60 per man-shift

(c) Question: What is the productivity (tons/man-shift) of those miners in the underground cut-and-fill operations?

Answer: The productivity of miners in underground cut-and-fill operations averaged 12.47 tons/man-shift for the first eleven months of 1974. This productivity was for contract miners in cut-and-fill stopes only. Total underground vein mine productivity, including all mine production and all mine shifts, was 3.58 tons/man-shift.

(d) Question: What is the labor cost as a percentage of direct operating cost (per ton) in underground mining?

Answer: January Through November 1974

Labor	48.43%
Fringes	15.28
	63.61%

(e) Question: What percentage of the total mining cost is the "direct operating cost" per ton of ore received in the underground operation?

Answer: January Through November 1974

79.58%

(f) Question: On a per year basis, what capital expenditures have been made in improving underground haulage, stoping, hoisting and general materials handling in the last 5 years?

Answer: See Exhibit "F" attached.

(g) Question: Please provide the monthly cost data associated with the underground mines at Butte over the past 12 months.

Answer: Monthly cost data underground mines, Dec. 1973 - Nov. 1974:

	1973	1974					
	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
Total thru Refining	71.9¢	70.1¢	72.4¢	73.6¢	74.0¢	86.2¢	100.6¢
Less Precious Metal Credits	6.6	9.1	8.0	8.7	7.7	3.9	8.5
Total Net Cost Per Pound, refined copper cathode	65.3¢	61.0¢	64.4¢	64.9¢	66.3¢	82.3¢	92.1¢

	1974					12 Mos.
	July	Aug.	Sept.	Oct.	Nov.	Total
Total thru Refining	96.7¢	127.1¢	104.1¢	105.2¢	138.9¢	88.8¢
Less Precious Metal Credits	7.6	8.8	7.9	9.6	13.4	8.1
Total Net Cost, per pound refined copper cathode	89.1¢	118.3¢	96.2¢	95.6¢	125.5¢	80.7¢

The "total net cost" is approximately the same as "cost per pound of copper produced" set forth in Exhibit "A" to Mr. Place's testimony at the November 25 hearing. Since the hearing, cost data have been refined.

(h) Question: Would Anaconda be receptive to offers of leasing current underground mining areas to responsible mining contractors? If not, why not?

Answer: No. The same problems would exist under a leasing arrangement as exist now--primarily, high development and operational costs. In fact, it would probably cost much more for a lessee to operate the mines than it would cost the Company.

It would also be difficult to segregate the separate operation of the underground mines by a lessee from the continued operation of the open pit mines by the Company, since both operations are closely related and inseparable in some operational respects.

A lease arrangement would be complicated by the numerous and complicated legal problems that would have to be discussed and resolved. A good example would be responsibility for possible subsidence and/or blasting damage which may result from lease mining operations.

The proposed future method of bulk mining the underground could be seriously prejudiced by a lease operation unless the Company controlled the underground mining methods and areas to be used by the lessee.

(i) Question: What are the company plans for the extension of the Berkeley Pit further west from its present boundary?

Answer: Anaconda has no present plans for extending the west rim of the Berkeley Pit further to the west.

(j) Question: Please supply the estimated time frame for reaching the "hopeful" underground bulk mining production at Butte. Please include the breakdown of time needed for exploration, feasibility studies, construction and development period in a phased schedule to reach the production level.

Answer: The estimated time to reach the underground bulk mining production stage is indicated on the enclosed Preliminary Schedule for Preproduction Activities (Exhibit J); which also show the specific times for different phases, such as exploration, feasibility study, construction and development. It must be emphasized that this is only a preliminary schedule and definite times can not be stated before the results from the exploration program and the feasibility study are known. As any underground bulk mining in the future must be coordinated with the pit plans, the earliest possible production date for underground would be 1985 for the uppermost portion, here called Berkeley underground.

Assuming that the ore from the Berkeley underground will be trammed to the existing Kelley Shaft and hoisted there, a maximum of four years would be required to develop this main ore block. Ore production, in any event, cannot commence before substantial exhaustion of Berkeley open pit ore.

The Berkeley underground will serve as a production overlap between the pit phase-out and the main underground bulk production area in the Dome. The Dome will require the construction of main surface installations, shafts and major underground development to be brought into production around 1990 and from there escalate its production to compensate for the drop in pit production.

(k) Question: In the event that the feasibility study for underground bulk mining proves negative, how much ore (tonnage) reserves would be lost, and could the company recover the ore in the minable vein system by underground methods, after abandonment and flooding to the 3900 level of the Kelley.

Answer: In order to clearly answer this question, it is necessary to explain the intended meaning of "ore" and "mineral deposit." Technically, an ore is a metal bearing mineral, or aggregate of such minerals, mixed with barren matter, called "gangue," and capable of being mined at a profit. By contrast, where the element of profit is uncertain or impossible, the term "mineral deposit" may be used instead of "ore deposit."*

In answer to part one of the above question, in the event that the feasibility study for underground mining proves negative, an extrapolated tonnage of 500 million to one billion tons would be "lost," or it would be necessary to postpone mining the "mineral reserve" until such time that mining technology and/or economic conditions improved to a point where the mineral deposit could be considered an ore reserve capable of providing a reasonable profit and return on investment.

In answer to part two of the above question, the Company could recover the ore in a minable vein system by underground methods after abandonment and flooding to the 3900 level of the Kelley, provided economic conditions were such that a reasonable profit and return on investment would be assured. Flooding does not preclude pumping out and rehabilitating the existing workings and resuming production.

*Peele's "Mining Engineers Handbook," Third Edition, Volume 1, Pages 2-18, Article 13.

(l) Question: Should all types of underground mining prove negative in the three exploration blocks, will the Anaconda consider mining these blocks by the open pit method? Would this necessitate expanding the Berkeley Pit into or closer to the downtown Butte area?

Answer: Should the feasibility study for the Rarus-Minnie Healy block above the Kelley 2000 prove negative by underground bulk mining techniques, this particular mineral zone could conceivably be mined by open pit techniques; however, if bulk underground mining proves uneconomical, it is unlikely this area could be economically mined by open pit method mainly because of high stripping ratios and long haul distances. Mining of the indicated area would probably require some expansion of the Berkeley Pit closer to the downtown Butte area. However, the distance would not be significant. The two remaining potential blocks are too deep to be considered for open pit techniques under present conditions.

(m) Question: Will the proposed 1975 geological budget for Butte (Miller testimony) of $3.11 million be funded and used to explore the Kelley, Steward-Belmont and Rarus-Minnie Healy blocks for underground mining potential?

Answer: The proposed 1975 geological budget for Butte of $3.11 million (1974 dollars) will be funded. Of this amount, $1.39 million will be spent on surface development drilling projects other than underground exploration development, and $1.72 million will be used to explore the Steward-Belmont, Rarus-Minnie Healy, and Leonard blocks for underground mining potential. It will not be used in the Kelley block, which has been partially explored and is too close to the Kelley shaft to consider bulk mining for many years.

(n) Question: Large underground bulk mining techniques normally result in surface subsidence. Would mining of the type suggested in the three exploration blocks result in surface subsidence in the downtown Butte area? If so, do you plan to purchase the area of surface disruption?

Answer: Mining of the type suggested for the three exploration blocks would result in surface subsidence. If this type of mining is to be utilized in the future, surface areas that would be affected would, of necessity, have to be made available prior to commencement of such mining operations. Surface rights to areas that would be disturbed would have to be acquired and the cost would become an incremental cost of the project. To that extent such costs will have a bearing on whether the project is feasible.

(o) Question: In Mr. Place's testimony (Appendix A, page 2) tonnages, grades and mining costs are given for vein mining at Butte. The following information can be calculated from this information.

Year	Mining Cost Per Ton of Ore	Grade	Mining Cost Per Pound of Copper
1971	$20.93	3.77	28¢
1972	24.29	3.73	33¢
1973	27.89	3.39	41¢
1974 (9 Mos.)	24.57	2.92	42¢

The average annual domestic selling price for copper during this period was as follows:

Year	Average Annual Copper Price (¢/lb.) (Domestic)
1971	51.43¢
1972	50.62¢
1973	58.86¢
1974 (9 Mos.)	70.38¢

In the first 9 months of 1974, the production costs per pound of copper increased an average 1¢/lb. over 1973 costs while the price of copper increased almost 12¢/lb. over the 1973 price. In view of this relationship:

1) Why are the underground operations at Butte still unprofitable?

2) What are the direct costs associated with milling, smelting and refining of this underground ore?

Answer: First, the mining cost per pound of copper cannot be precisely calculated by dividing the mining cost per ton of ore by the pounds of contained copper determined from the grade. The reason is that all of the copper is not recovered (recoveries from Butte Underground ores range from 86% to 88%, on the average). Also, tons of copper in Exhibit "A" were "wet tons" with an approximate moisture content of 4% to 6%. Unfortunately, a copying error showed the 1974 grade as 2.92, when the correct grade was 2.42.

In determining profitability the other costs associated with copper production must be added to the mining cost.

The actual on site costs during the four year period were:

Year	Mining Cost Per Pound Refined Copper	Concentrating	Smelting	Refining	Total On-Site Costs
1971	31.5¢	3.0¢	7.6¢	2.3¢	44.4¢
1972	37.0¢	1.8¢	8.1¢	2.7¢	49.6¢
1973	47.0¢	2.1¢	9.8¢	3.7¢	62.6¢
1974 (9 Mos.)	59.2¢	3.4¢	7.5¢	5.2¢	75.3¢

(The 1974 cost of mining per pound of copper is 12.2¢ above the 1973 cost and not the 1¢ per pound stated in Question "o.")

In addition to the on-site costs other direct and indirect costs must be added to determine the total cost per pound of copper produced as set forth in Appendix A to Mr. Place's statement. These costs include selling, transportation, interest and administrative.

Accordingly, as indicated by Appendix A to Mr. Place's statement, the cost per pound of the copper exceeded the selling price in 1972, 1973 and 1974.

(p) Question: In Mr. Sandstrom's testimony (page 3) he states that "the initial investigation of the present underground mining practices revealed extremely high costs, ranging around $40.00 per ton." This cost figure does not correspond to the mining cost figures presented by Mr. Place in Appendix A of his testimony. Please explain this difference.

Answer: Prior to July, 1974, two types of underground ore were shipped to the Concentrator (regular ore and lower grade development ore). These products were kept separate in the mines and mixed together in the surface ore bins. Ton costs were based on regular ore only. In order to eliminate the extra costs involved in keeping the two types of ore separated underground and to obtain a more uniform concentrator feed grade, a decision was made effective July 1, 1974, to mix regular ore and develop-

ment ore underground and to base mining ton costs on the combined product. This had the effect of substantially lowering the mining cost/ton since July 1, 1974, because of the larger denominator.

All of the ton costs listed in Mr. Place's testimony (Appendix A, page 2 of 2) were adjusted to the new system of calculating ton costs. Mr. Sandstrom's testimony was correct since his $40.00/ton figure referred to "regular ore" only and not the combination of development and regular ore.

THE ANACONDA COMPANY
MONTANA MINING DIVISION
Accounting Department - Butte, Montana

EXHIBIT "F"

STATEMENT OF EXPENDITURES FOR UNDERGROUND MINES - 1970 TO 1974

Capitalized Expenditures	C.O. No.	1970	1971	1972	1973	1974	Total
SIEWARD:							
Atlas Copco Cavo 310E Loader	5197					20,500.00	20,500.00
Atlas Copco Cavo 310E Loader (3)	5246					91,872.14	91,872.14
Total		$	$	$	$	$112,372.14	$ 112,372.14
LEONARD:							
Atlas Copco Cavo 310E Loader	5196					20,009.00	20,009.00
Atlas Copco Cavo Loader 310E (2)	5215					42,399.20	42,399.20
Total		$	$	$	$	$ 62,408.20	$ 62,408.20
LHD:							
Equipment - LHD	5192						
(1) Atlas Copco Cavo 310E Loader					17,745.00		17,745.00
(2) Eimco 963 Loaders					17,829.27		17,829.27
(2) Eimco 915B L.H.D. Units					128,291.35		128,291.35
(1) Jumbo Minibore					52,211.60		52,211.60
(1) Fan Drill					57,789.62		57,789.62
(2) Eimco 912 L.H.D. Units					74,421.00		74,421.00
(2) Shotcrete Machines					9,152.50		9,152.50
Equipment - LHD	5200						
(3) Eimco 915B LHD Units						201,418.33	201,418.33
(1) I.R. Drill Jumbo						67,332.31	67,332.31
(1) Eimco 912C LHD Unit						38,413.00	38,413.00
(2) Eimco 911 LHD Unit						54,497.78	54,497.78
Total		$	$	$	$357,440.34	$361,661.42	$ 719,101.76
TOTAL CAPITAL EXPENDITURES		$	$	$	$357,440.34	$536,441.76	$ 893,882.10

THE ANACONDA COMPANY
MONTANA MINING DIVISION
Accounting Department - Butte, Montana

STATEMENT OF EXPENDITURES FOR UNDERGROUND MINES - 1970 TO 1974

Extraordinary Installations Expenditures	C.O.No.	1970	1971	1972	1973	1974	Total
STEWARD:							
Trolley & M.G. Set 4600' Level		$ 7,477.30	$ 342.42	$	$	$	$ 7,819.72
Substation 4400-4559		3,511.74					3,511.74
Substation 4160' LW		2,497.62					2,497.62
Substation 4500'		5,807.30					5,807.30
24 Additional Coils 4414 Plant		6,632.55					6,632.55
3 Unit Air Conditioning Plant			11,751.88	12,283.14	26,511.84	2,589.67	53,136.53
Substation East of M Fault			7,860.26				7,860.26
Substation 3455 Vein			8,061.99				8,061.99
Replace Motor Surface Cooling Tower				10,902.82		(8,685.00)	2,217.82
Automatic Drill Jumbo				18,777.39			18,777.39
Supply and Return Line for Cooling Plant				32,411.74	7,593.77	18,159.65	58,165.16
Install 565 Fan on 4500'					7,344.72		7,344.72
Purchase 350 HP Compensator					4,214.00		4,214.00
Spare M.G. Set for U.G. Hoist					248.96	13,284.13	13,533.09
Spare Motor for U.G. Hoist						13,304.90	13,304.90
Spare Amplidyne M.G. Set for U.G. Hoist						3,701.00	3,701.00
Additional Cooling Tower						118,363.09	118,363.09
Total		$25,926.51	$28,016.55	$74,375.09	$ 45,913.29	$160,717.44	$ 334,948.88
LEONARD:							
Purchase Spare M.G. for U.G. Hoist					248.96	13,284.12	13,533.08
Purchase Spare Motor U.G. Hoist						13,304.90	13,304.90
Spare Amplidyne M.G. Set						3,701.00	3,701.00
Total		$	$	$	$ 248.96	$ 30,290.02	$ 30,538.98
KELLEY:							
10" Pump Column		9,629.94					9,629.94
#565 Fan 3800'		7,677.70	2,962.34				10,640.04
Joy Fan & 300 HP Motor 2000'				1,811.57			1,811.57
Total		$17,307.64	$ 2,962.34	$ 1,811.57	$	$	$ 22,081.55
TOTAL EXTRAORDINARY INSTALLATION EXPENSE		$43,234.15	$30,978.89	$76,186.66	$ 46,162.25	$191,007.46	$ 387,569.41
GRAND TOTAL		$43,234.15	$30,978.89	$76,186.66	$403,602.59	$727,449.22	1,281,451.51

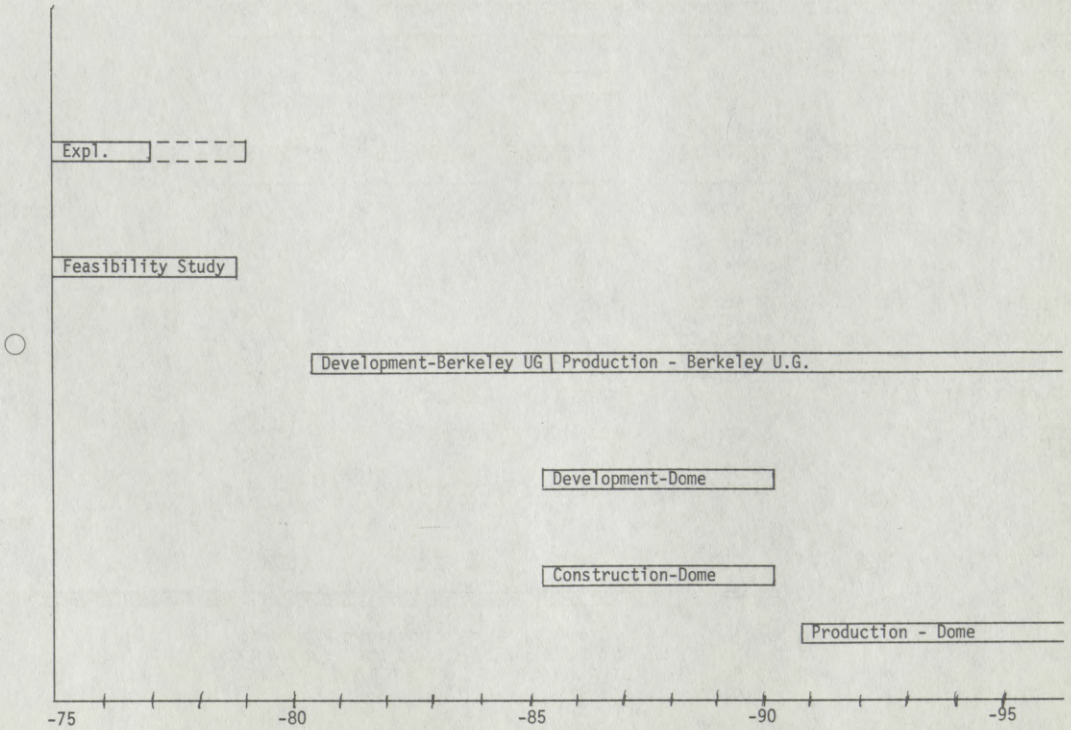
THE ANACONDA COMPANY
MONTANA MINING DIVISION
Accounting Department - Butte, Montana

STATEMENT OF EXPENDITURES CHARGED TO DEFERRED DEVELOPMENT AFFECTING UNDERGROUND MINES

	1970	1971	1972	1973	1974	Total
Amounts Charged To Berkeley Development						
Leonard Mine Reactivation:						
Equipment Requirement	$ -	$ 44,292.31	$288,958.03	$124,320.72	$	$ 457,571.06
Relocate Central Pump Pipelines	196,553.83					196,553.83
Relocate Slime Lines	16,529.95	58,634.47	153,717.04	263.92	341.48	229,486.86
Relocate Pumping Plant	51,752.44					51,752.44
Move Modoc Fans	-	75,089.57	15,518.37			90,607.94
Dismantle Leonard Surface Plant	-	-	35,834.42	155,174.31	12,160.18	203,168.91
Leonard Mine - Install Underground Hoist	-	-	104,536.75	272,284.41	11,110.88	387,932.04
Replace Leonard Fresh Air Inlet	-	-	-	228,953.68	9,863.88	238,817.56
Reroute Kelley Water Lines	-	-	-	110.91	-	110.91
Reroute Neverseeat Exhaust 1308'	-	-	-	41,776.15	28,692.54	70,468.69
Leonard-Kelley Air Course					63,231.26	63,231.26
Surface Vent Fans					25,848.00	25,848.00
Colorado Shaft Exhaust Connection on 3400'					102,381.08	102,381.08
Power & Telephone - Leonard-Kelley					15,892.98	15,892.98
Total	$264,836.22	$178,016.35	$598,564.61	$822,884.10	$269,522.28	$2,133,823.56
Leonard Mine Charges:						
Leonard Mine Reactivation		$320,904.19	$562,824.17		$	$ 883,728.36
Haulageway 4200' & Related Facilities					285,743.21	285,743.21
Total		$320,904.19	$562,824.17		$ 285,743.21	$1,169,471.57
TOTAL DEFERRED DEVELOPMENT	$264,836.22	$498,920.54	$1,161,388.78	$822,884.10	$ 555,265.49	$3,303,295.13

Exhibit J

PRELIMINARY SCHEDULE OF PRE-PRODUCTION ACTIVITIES



P.O.S.
Dec. '74