

Going on to item 8—and, again, if I may put the text in the record, and summarize it—this pertains to resolving resource conflicts and the place of minerals in true multiple land use. We are more and more concerned about air pollution, water pollution, and mined land restoration. We have got to learn how to retrieve our minerals from nature, and at the same time restore the land so that it can be used for other purposes.

And this is going to add a cost to the mining operation. And, hopefully, that cost will be recovered by the subsequent values of the land.

And then item 9, which is extremely important—again, if I may put the full text in the record and summarize—item 9 is conserving manpower. There is a great shortage of mining engineers and mineral engineers and an uncertain supply of skilled labor and operators. If you will look at an increase of 50 percent in our requirements for minerals, this could mean at least an increase of 50 percent of our requirements for mining engineers. Our preliminary appraisals indicate that these people are not forthcoming. And, in addition, there are impending shortages of workers at the mine face and in the mills and smelters.

Somehow or other we are going to have to find ways and means for producing and attracting these people, or find ways and means of producing minerals without them, I don't know which, but it is a tremendously important area.

And health and safety is a major part of it.

These, then, are the emerging issues which merit the most serious attention. While some of these subjects are beyond the immediate responsibility of the Bureau of Mines, none are outside the interest of this committee, and I am certain these vital matters will receive your serious consideration.

Acquiring the skills that will be essential to accomplish the technological advances prescribed here presents a major challenge. Professional capabilities in these areas are limited now and are likely to be wholly inadequate in the future if an effective means of developing the necessary talent and attracting it to these problems is not forthcoming. The outlook suggests a critical need to increase the number of engineers, economists and executives knowledgeable in the mineral field and a way to attract their skills to these issues.

In my opinion, the successful application of technology to meet the mineral demands of the future is the most recurring theme in the appraisals of the projected supply-demand relationships. Until now, the industry's ability to keep pace with growing demand through the application of new and improved technology is impressive, indeed.

However, we now see two trends emerging which will have far-reaching implications for the future of our minerals policy. As shown in the chart, the minerals industry added, in 1966, another \$1.3 billion of capital to the amount already invested in overseas ventures. Lately we have also been witnessing series of "marriages" within the minerals field. Several companies are diversifying and others are integrating their activities, both horizontally and vertically. The petroleum companies in particular are expanding into the total-energy-supply business as well as acquiring interests in nonfuel minerals. It is heartening