SPEECH DELIVERED BY J. C. KINNEAR, JR.
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My talk today will cover mining in White Pine County. It will be divided into three parts, a brief history of White Pine County's mining industry, a slide presentation of present mining operations, and finally I will give some insight into the cost of doing business as a miner.

Mining in White Pine County started in about 1865 in districts such as Hamilton, Cherry Creek and Osceola, but none of this was of major importance and total production in those early years probably did not exceed $20 million in value. The major industry of this area at that time was cattle raising. At the turn of the century, however, mining was to become especially active and from that time has been the major economic factor contributing to the growth of Ely and White Pine County.

Prior to the turn of the century, living conditions in White Pine County were geared to early day ranch economy. Ely was quite small--its population in 1890 being 207 and little increase took place until after 1900. Cherry Creek and a number of other towns in White Pine County were larger than Ely.

At that time, the general store was the banking center of the community and it was customary for people to settle their accounts once a year. While the store was the banking center, the saloons were the clearing house for information, employment, etc.

The celebration of Independence Day was considered one of the year's biggest events and every year a pavillion was erected in town and people came from far and wide. There was usually a big barbecue and money was contributed for prizes for the youngsters' games. Livery stables were necessities at the time and it cost $6 to rent a buggy and two horses for a day, a taxi to McGill was $5, or one horse and a smaller buggy could be rented for around $2.

As I said, a very typical ranch community of the time. The event destined to change all that occurred in 1900. At that time, two miners from California, Dave Bartley and Edwin F. Gray came to Ely and took options on two claims in the Robison Mining District that were regarded as possible gold and silver properties. On their property, these men found copper ore running 2% to 4%. About this same time, a company called the New York and Nevada Copper Company had been formed to develop the Copper Flat Group of mining claims which lay about a mile west of the Bartley-Gray prospect.

However, it was about 150 miles to the main line railway from Ely and most engineers thought that it was not feasible to mine such low grade ore when it had to be hauled such a distance.

In 1902, a man famous in Nevada mining and railway circles, Mark Requa, purchased the Bartley-Gray property for $150,000, and in 1903, he organized the White Pine Copper Company and continued development work, at the same time looking with interest on the Copper Flat prospect which was now being called the Boston and Nevada Copper Company.

In 1904, the Nevada Consolidated Copper Company was incorporated and the following year the property of the Boston and Nevada Copper Company and the White Pine Copper Company was transferred to the Nevada Consolidated Copper Company. The Vice President and General Manager of the new company was none other than the hard driving Requa.

The new company received the necessary finance to develop the properties from the banking firm of Hayden, Stone and Company. This development was to include the building of a railway from near Cobre on the Southern Pacific to the mines at a cost of $1,115,000. $975,000 was to be provided to equip the Ruth Mine and build a mill, power house, and smelter at McGill. The building of the Nevada Northern Railway was the first project undertaken and on September 29, 1906, the first train arrived in Ely, the county seat of White Pine County.

Just prior to the completion of the railway, William B. Thomson, one of the Nevada Consolidated Directors, and an associate of his, George E. Gunn, became interested in mining claims at Veteran (west of Kimberly) and also got an option on the ranch property of W. N. McGill below the present town of McGill. The ranch property included extensive water rights in Duck Creek Valley behind McGill. Thomson organized the Cumberland-Ely Copper Company. The Cumberland-Ely group wanted to effect a consolidation with the Nevada Consolidated Copper Company but Requa was opposed to it. Requa wanted to build a power plant and reduction works near Ely depending on Murray Creek for water, the present water source for Ely. Thomson favored building the reduction works at McGill using Duck Creek water and the McGill ranch water.

As matters stood, the Thomson group had the water and the money and Requa had the ore. Finally the two companies decided to become equal partners in the Nevada Northern Railway Company and in the Steptoe Valley Milling & Smelting Company, the corporation organized to erect and operate the smelter and concentrator at McGill.

The building of the concentrator, power house, and smelter proceeded to a point where the first regular treatment of ore in the mill occurred on May 15, 1908. Thus the period, 1902 to 1908, was one of mine development, railroad and plant construction, and ownership consolidations, all in preparation for 50 years of production to follow.

The Eureka Pit (east end of the present Liberty Pit) supplied the first mill ore. The Liberty Pit, just west of the Eureka Pit, was started in 1910, and as the years went by the two smaller pits were joined to make one large excavation now known as the Liberty Pit. In the last 50 years, the Liberty Pit has been developed to its present size of one mile long, 5/8 mile wide, and about 700 feet deep.

In August, 1910, the Nevada Consolidated Copper Company bought the assets of the Cumberland Ely Company which placed the mines, reduction plant, water supply and Nevada Northern Railway Company under one ownership.

To supplement the ore from the Liberty Pit, the Star Pointer Shaft, familiarly known as the Ruth Mine, came into production around 1915 and until its closing in 1949, produced 19 million tons of ore. This is the property discovered by Gray-Bartley.

In the years following 1910, Nevada Consolidated Copper Company

continued to expand without incident until July 9, 1922, when the concentrator, with the exception of the crushing plant, was destroyed by fire. This proved to be a blessing in disguise because in the rebuilding program, the latest equipment was installed and modern methods incorporated in the operation of the plant, which resulted in great efficiency and an improvement in the amount of copper recovered from the ore.

In 1933, Kennecott Copper Corporation, acquired the assets of Nevada Consolidated Copper Company by the issuance of stock and the old Nevada Consolidated Copper Company became known as the Nevada Consolidated Copper Corporation. In 1943, this latter corporation was dissolved and local operation became known as Nevada Mines Division of Kennecott Copper Corporation as it is known today.

In 1913, our neighbor, Consolidated Coppermines Corporation, was formed under similar circumstances. At the time it was formed, Con Copper was known as the Consolidated Copper Company, but in 1922, its designation was officially changed to Consolidated Coppermines Corporation.

Until 1949, Con Copper was basically an underground mining outfit using the block caving method of removing ore. Their underground mines have included the Richards, Alpha, Emma, and the Morris. 27 million tons of ore were taken out of the Emma and Morris alone.

In 1949, the underground operations were shut down and in 1951 they converted to their present open pit method of mining.

The two companies together make up almost the entire metals production of Eastern Nevada. There were and still are some small shipments of ore made by private individuals, but the amount is unfortunately insignificant.

As an insight into changing mine conditions and resulting economics, it is interesting to note that the copper recovery per ton of ore treated in White Pine County at the beginning of operations was about 70 pounds per ton. From 1908 to 1918, it was 32 pounds per ton. From 1928 to 1938, it was 25 pounds per ton, from 1938 to 1948, it was 20 pounds per ton, and from 1948 to 1957, it was 19 pounds per ton, with the average from 1956 being 16 pounds per ton (now just half of 1908 to 1918 average).

During the same period of time (1908 to 1958) it is interesting to note that Kennecott and Coppermines have produced a little over 4 billion pounds of copper as well as nearly 2 million ounces of gold and almost 7 million ounces of silver. To give you some idea of how much 4 billion pounds of copper actually is, let's assume it was made into a sheet 1/3 of an inch thick and 30 feet wide...it would then cover a standard 4-lane highway from Ely to Reno, then a 2-lane highway loop from Reno to Las Vegas to Elko, then back to Reno...a distance of approximately 1,600 miles.

That brings me to the second section of my talk. The following slides are scenes from the mining operations being carried on today in White Pine County and my comments on the various slides will give you some idea as to the costs of development and the cost of equipment that is in use.

SLIDE 1 This first slide gives us a birds-eye view of the major mining operations in White Pine County. This view encompasses an area of approximately 60 square miles. We are looking almost due east.

In the immediate foreground is Kennecott's newest open pit operation..The Veteran Pit.

Adjacent to that is the new Tripp Pit, belonging to our neighbors, Consolidated Coppermines Corporation. Following in almost a direct line is Kennecott's huge, internationally famous Liberty Pit.

The Town of New Ruth is clearly indicated, and the city of Ely is located in the distant background, approximately 7 miles away from the mines.

SLIDE 2 In this view, our camera has swung around to a point where we are looking to the west. Dominating the foreground is the huge keystone waste dump, containing approximately 90 million tons of the 225 million tons of waste which has been removed from the Liberty Pit. Other less impressive dumps can be seen sprawling out from the rims of all the pits. We point out these waste dumps to call your attention to the fact that currently 3 tons of waste must be moved to extract 1 ton of ore, and remember each ton of ore contains an average of only 16 pounds of copper.

SLIDE 3 With this general introduction to the total mining area, lets move down into the huge Liberty Pit. This pit has been in continuous operation since 1908. At the present time, it is 1 mile long, 5/8 mile wide and has an average depth of over 700 feet. To date, Kennecott has removed over 133 million tons of ore and, as already mentioned, over 225 million tons of waste. A portion of this pit is owned by Consolidated Coppermines Corporation, and their ore is also mined by Kennecott on a contract basis.

SLIDE 4 Traditionally, the Liberty Pit has been a rail haulage operation. Miles of track must be laid, repaired and shifted in the working areas. Here we see 3 1500-HP diesel electric locomotives moving ore cars up the various levels on their 11-mile trip to the assembly yards on the rim of the pit. With all of these conditions we have mentioned it should be evident that as the size and depth of the pit increases, the cost of handling such huge volumes of ore and waste increases proportionately.

SLIDE 5 Although current mining practices still consist of loading directly into rail cars, as shown here, we have been able to achieve much greater operational mobility as well as reduced handling costs by initiating truck haulage from certain areas of the pit to central rail points within the pit itself.

SLIDE 6 Here we see 3 of our fleet of 24 huge 35-ton capacity haulage units. The electric shovel in the background, which

scoops up 10 tons of earth with each bite, is one of 8 such shovels available to our operation. This picture clearly illustrates the old saying that you have to spend money to save money. The equipment in this picture alone represents a new investment of over $500,000.

SLIDE 7 Here we see the loaded trucks dumping into rail cars from an improvised tipple deep in the bottom of the pit. An idea of the size of these haulage units can be gained by noting the size of the tipple man standing by the wheel of the unit that is dumping.

SLIDE 8 Our newest and biggest attack on high costs is aimed at the long costly railroad haul from the bottom of the pit to the surface.

SLIDE 9 This attack is in the form of a huge incline skip system, similar to those used in underground operations. We plan a skip installation at a capital investment of over $1½ million. The length of the incline is 1,766 feet and there is a lift of 545 feet.

SLIDE 10 As pointed out earlier, Kennecott's newest open pit operation is the Veteran Pit. Here we see a current picture of our Veteran Pit. As you will note, the Veteran Pit is entirely a truck haulage operation.

SLIDE 11 35-ton trucks and giant electric shovels maintain a steady flow of ore and waste out of this pit.

SLIDE 12 The Veteran Pit is expected to produce approximately 16 million tons of ore averaging about 16 pounds of copper to the ton, but in order to do this, it will be necessary to move approximately 65 million tons of waste. When this pit is completed, it will be second in size only to the huge Liberty Pit.

SLIDE 13 When the ore from the Veteran arrives at the loading ramp, it is transferred into 30 or 50 car ore trains for the trip to the reduction plant.

SLIDE 14 Kennecott is also removing ore from an underground orebody known as the Minnesota Hi. Approximately 2,500 tons of ore per day comes up to the collar of the old Star Pointer Shaft which, as I mentioned was first sunk in 1915. The Minnesota Hi originally contained 1¼ million tons of ore which we have been removing by the "block caving" method.

SLIDE 15 That simply means going down underneath an orebody and then letting it fall by controlled cave-in into waiting ore cars. The cars then transfer the ore to skips which bring the ore to the surface for transfer to the reduction plant. In developing this relatively small orebody it was necessary to spend nearly $1½ million before any ore was produced.

SLIDE 16 This is a view of the Deep Ruth Shaft site. This shaft was started in 1951 in order to recover an orebody of 25 million

tons. To date we have spent about $16 million to develop this mine.

SLIDE 17 This isometric drawing of the total development work in the Minnesota Hi gives you an example of where all the money went. In the past 2½ years, enough timber has gone into the Minnesota Hi project to build a community of over 700 two bedroom homes--each one having 900 square feet of floor space. By comparison, enough timber will be required in the Deep Ruth project to build a city of 10,000 homes.

SLIDE 18 Con Copper's primary operation at the present time is the Tripp Pit seen in this slide. Like Kennecott's Liberty Pit, The Tripp also started out as two separate pits...the Morris and Brooks but these were combined in 1955. Employing a total of 325 men, Con Copper's present production calls for 7,000 tons of ore a day from the Tripp Pit, plus 2,000 tons of ore that is mined by Kennecott for Coppermines account from adjoining ground in the Liberty and Veteran Pits. The ore from these various mining ventures is then taken to the Kennecott mill and smelter located at McGill where it is processed to blister copper and then sent back east for further refining and fabrication into salable copper products.

SLIDE 19 Here we see one of the ore trains heading down the canyon from the mines on its 23-mile trip to McGill.

SLIDE 20 The town of McGill is located 13 miles north of Ely and 23 miles northeast of Ruth. This slide gives us an idea of the reduction plant layout. In the upper right is the crusher and the mill where the ore is concentrated and sent to the smelter which we see in the left foreground. The general offices are in the right foreground and the residential area spreads off to the right toward Ely. Barely visible up on the hillside are the ore cars from the mine ready for dumping at the huge rotary dumper.

SLIDE 21 Here at the car dumper we see the first step in the crushing and milling process. 6 clamps, one of which can be seen here, move down on each side of the car to fasten it securely to the tracks. Then the entire dumper revolves, emptying ore into a huge jaw crusher. The size of the boulders being dumped into the jaw crusher can be judged by the one shown in the picture. After going through the jaw crusher the ore is moved by conveyors to a cone crusher and finally a roll crusher.

SLIDE 22 As the broken ore flows from the roll crusher it is a quarter of an inch or smaller. Quite a difference from the huge boulders that were dumped in the jaw crusher a short time ago, but we must make it even smaller. This is done in the ball mills shown here. Inside the rotating mill, steel balls roll and bounce to grind the ore to a powdery state. Grinding is followed by flotation to separate the copper mineral particles from the waste rock.

SLIDE 23 The final step in the milling process is to remove the water from the mineral particles which is done by the drum filter shown here. The finished product of the mill is a copper concentrate which averages about 20% copper. The mill processes a total of about 21,000 tons of ore per day, including 9,000 tons for Consolidated Coppermines Corporation. This 21,000 tons of ore is processed down to about 650 tons of concentrate which is sent to the smelter.

SLIDE 24 This exterior view of a portion of the smelter shows the concentrate storage bins and the location of the conveyors that carry the concentrate to the furnace.

SLIDE 25 The first step in the smelting process is to melt the concentrate. This is done in a huge reverberatory furnace...the interior of which is 30 feet wide and 130 feet long. Temperatures get as high as 2800° in the smelting zone of the furnace, and the daily consumption of coal is between 150 and 200 tons. As the concentrates melt in the furnace the non-value elements float to the top of the molten mass and are drawn off through a tap hole in the side of the furnace and discarded. This process is called skimming.

SLIDE 26 The copper, iron and sulphur elements in the molten mass, which we call copper matte, sink to the bottom of the furnace and are withdrawn through a tap-hole low in the sidewall of the furnace.

SLIDE 27 The molten metal runs down a sand trough into a giant 13-ton capacity ladle which is picked up by a huge overhead crane and taken to the converters.

SLIDE 28 A converter is a large horizontal steel cylinder lined with magnesite brick.

SLIDE 29 As the molten matte, which is now about 25% copper is poured into the converters, the final converting process begins. It takes about 20 hours to convert a charge of about 18 ladles of matte to blister copper.

SLIDE 30 As soon as the converter finishes the charge, which is now around 60 tons of blister copper, it is poured into ladles once again and transferred by crane to a holding furnace.

SLIDE 31 Here the blister copper is poured from the holding furnace into moulds. The moulds on the casting machine are on an endless conveyor belt which discharges the cast copper bars into water for cooling.

SLIDE 32 The bars are removed from the water by another conveyor and hand-trucked to a storage area to await shipment. Each bar will weigh approximately 400 pounds and our daily production averages about 150 tons of blister copper.

SLIDE 33 Here we see the copper bars being loaded into box cars for shipment to an electrolytic refinery on the East Coast.

SLIDE 34 As you perhaps know we do not have a main line railroad

passing through our area. The common carrier shown here is a subsidiary of Kennecott and transports our finished product to a main line junction and returns with operating supplies and equipment. It is known as the Nevada Northern Railway.

For at least the last 20 or 30 years, the minerals industry has realized that the easily won metals are gone--they actually started fading from the scene shortly after the turn of the century. No longer can a mineral or metal discovery be anticipated through searching for outcrops, with development begun at the grass roots. No longer can handling of high grade ore be anticipated because the high grade has run out.

Instead of a relatively uncomplicated mining procedure, wherein the principal problem was to meet the payroll and maintain an adequate reserve of ore, the mining operator today faces the prospects of lower and lower grade ore and the introduction of mass production methods to combat increasing costs of labor, materials, and transportation. Also generally taxes.

It was not too long ago that a mine could be developed for an investment of something like $5000 per worker. That day is gone. In its place we see such developments as the San Manuel Copper Corporation in Arizona where an expenditure of well over $100 million was required before any metal was produced; or the Lavendar Pit, also in Arizona, where expenditures of more than $125 million were required before the first ore was treated. If you include the cost of exploration, development, plant and equipment, the cost of creating one new job at these two projects was approximately $50,000 per employee. As a result of investments like that, your mining enterprise today is naturally a "permanent citizen" as compared to mining at the start of this century when exhaustion of easily accessible high grade ore set the stage for the ghost town. These "permanent citizens" have proved over the years they are a definite asset to a community or state in which they are located.

This is pointed up by the fact that economists have developed figures on a national basis which show that for every man on the job in a basic industry, it takes 4 more men in service industries to keep him there. Applying this to Kennecott's and Coppermines' operations in Nevada, the two Companies can be credited with creating, in round figures, 8,800 other jobs. Add to this the 2,200 Kennecott and Coppermines employes and we have 11,000 jobs.

The total impact of 11,000 jobs, the purchases of supplies and services, and dividends on stock to shareholders in Nevada obviously is beyond accurate determination. The effects are spread over the entire economy; manufacturing...wholesale and retail trades...construction... professional services...and savings in the form of bank deposits, insurance and so forth. One can see that these huge sums do provide a tremendous amount of capital for our expanding Nevada industry.

As an example of Kennecott's and Coppermines' contribution of capital to this State since our inception; in property tax alone, we have paid more than $10 million. Our Net Proceeds of Mines Tax for that period has equalled $5½ million and our Sales and Use Tax over the last 2 years has amounted to nearly $200,000.

Other money which could be considered as having almost exclusive use within our State is payrolls. Through 1956, the two Companies have paid out nearly a quarter of a billion dollars in payrolls. Payroll figures for just the calendar year 1956 indicate that over $10 million was paid to our employes.

As you may all know, the selling price of copper has recently dropped by progressive stages from a high of 46¢ a pound to the present price of 27¢.

Unfortunately in the face of this down trending copper market, Kennecott and Coppermines are required to treat lower and lower grade ore recovered only at a higher stripping ratio or waste to ore ratio.

Regarding stripping ratios, we now have to move 3 tons of waste and 1 ton of ore to recover 16 pounds of copper that sells for 27¢...when we can sell it...and in the future, we are going to have to handle an even greater quantity of waste to recover 1 ton of ore that won't even give us 16 pounds of copper.

With underground mine operations we face an even more difficult cost problem.

It is obvious that Kennecott must tighten its belt and further improve its efficiency if it is going to remain competitive. I would like to outline some of the steps being taken by Kennecott to stay in business.

We have discovered that it is imperative to establish complete cost and performance standards on all phases of our operations if we are to be successful in combating rising costs, industry competition, and the substitution of other materials. In the past we have been reluctant to reveal costs to anyone below the level of Assistant General Manager or Superintendent. Today, we are appreciating the fact that it is the front line Foreman who is directly affecting most of the costs by the manner in which he uses the labor, materials and equipment for which he is responsible. Therefore, we are developing the necessary cost and performance controls and reports which will inform each level of Management, including the line Foreman, exactly how the actual costs and performance compare with engineered standards established for the work.

Another line of our attack has come from the estimate that one-half of the annual gain in productivity comes from better organization and one-half from better technology. If this is true, the time and effort spent in improving management communication through a more effective organizational structure, is obviously an area of critical importance. We now have an improved organization structure which permits a clear definition of functional lines of responsibility, eliminates overlapping of duties and authority, avoids surplus and ineffective levels of supervision, establishes optimum spans of control, and provides an engineered balance between the labor force and the work requirements in all levels of responsibility.

The increasing complexity, scope and cost of mining operations require more formal justification and control over expenditures, particularly with reference to capital expenditures. Typical of the capital expenditures currently underway, or recently completed by Kennecott and Coppermines include $2½ million for a 20,000 K.W. generator, turbo-

boiler and auxiliary equipment...$275,000 for new rotary drilling equipment...$1½ million for truck haulage units...$200,000 for one new 6-yard shovel...and in the immediate future, Kennecott and Coppermines expect to expend well over $2 million for skip systems in the Tripp and Liberty Pits. These expenditures are a must if we are to maintain our high standards of efficiency and meet our competition, which, incidentally, continues in ever greater intensity as new orebodies and competitive materials, such as aluminum come into the picture.

There is another aspect of the copper mining industry calling for large expenditures. That is the gradual obsolescence of plants and equipment as the result of improved technology and changing availabilities and costs of power, fuels, water and labor.

As I have earlier mentioned, today copper is selling for 27¢ or less per pound, which is 19¢ a pound lower than it was when our current labor contracts were signed. Yet, the annual wage increases and other benefits our employes will receive under the contract continue. Likewise, the cost of supplies is continually going up and up.

A glance at these charts will explain more graphically the disproportionate rise between costs and the selling price of our product. These are costs that must be anticipated and must be taken into consideration if the industry is to remain competitive.

I mentioned previously that we must make huge investments in equipment to handle our low grade ore profitably. These investments are not static...they are a continuing thing, and as you gentlemen realize, they can only be financed out of profits after taxes. Plants, equipment and processes must be kept up to date if the industry is to continue in business.

It is realized that taxes are a very large part of the expense of doing business and certainly this State and Nation could not exist without the Government services they provide. But I believe that in view of what has taken place in our industry that if the Company is going to continue to operate, compete successfully, and provide the maximum economic activity for the people of this State, it is imperative that a great deal of care and study be given any future tax increases.

Certainly, the amount of taxes obtained from a natural resource industry assists in the economy of an area, but the real benefits come from payrolls, supply purchases, and other economic influence the operation creates in the State. Consequently, the more widespread natural resource utilization becomes, the greater is the State's prosperity.

If State and local taxes from industry are at a level too high to allow expansion of existing industries or too high to attract new business, then it may clearly be seen that the power to tax is the power to destroy. To operate, industry must have a healthy business climate which is made up of realistic but not prohibitive taxation.

One state that is fearful its business climate may not be all it would like it to be in the way of retaining present industry and attracting new business is California. During its last Legislative Session, the Senate and the Assembly adopted unanimously a resolution setting forth factors inherent in a good business climate and calling for insistent

attention to them by legislature and state agencies.

Of particular interest was that part of the resolution which states, and I quote, "Now, therefore, be it resolved by the Assembly of the State of California and the Senate concurring, that this Legislature henceforth shall examine all proposed legislation relating to business climate of the State, and shall determine whether such legislation may have further discriminating or deterring effect upon the investment of capital and the creation of needed payrolls in California."

You might also be interested in five sections in the resolution which defined a good business climate. They are:

"1. Fair and equitable treatment in general legislation and administrative regulation for all segments of California's economy.

"2. A framework of Government, the support of which adds no greater cost to doing business than the cost of Government imposed by other States of similar industrialization and favorable climate.

"3. Equitable tax policies and restriction of the cost of Government to reasonable levels.

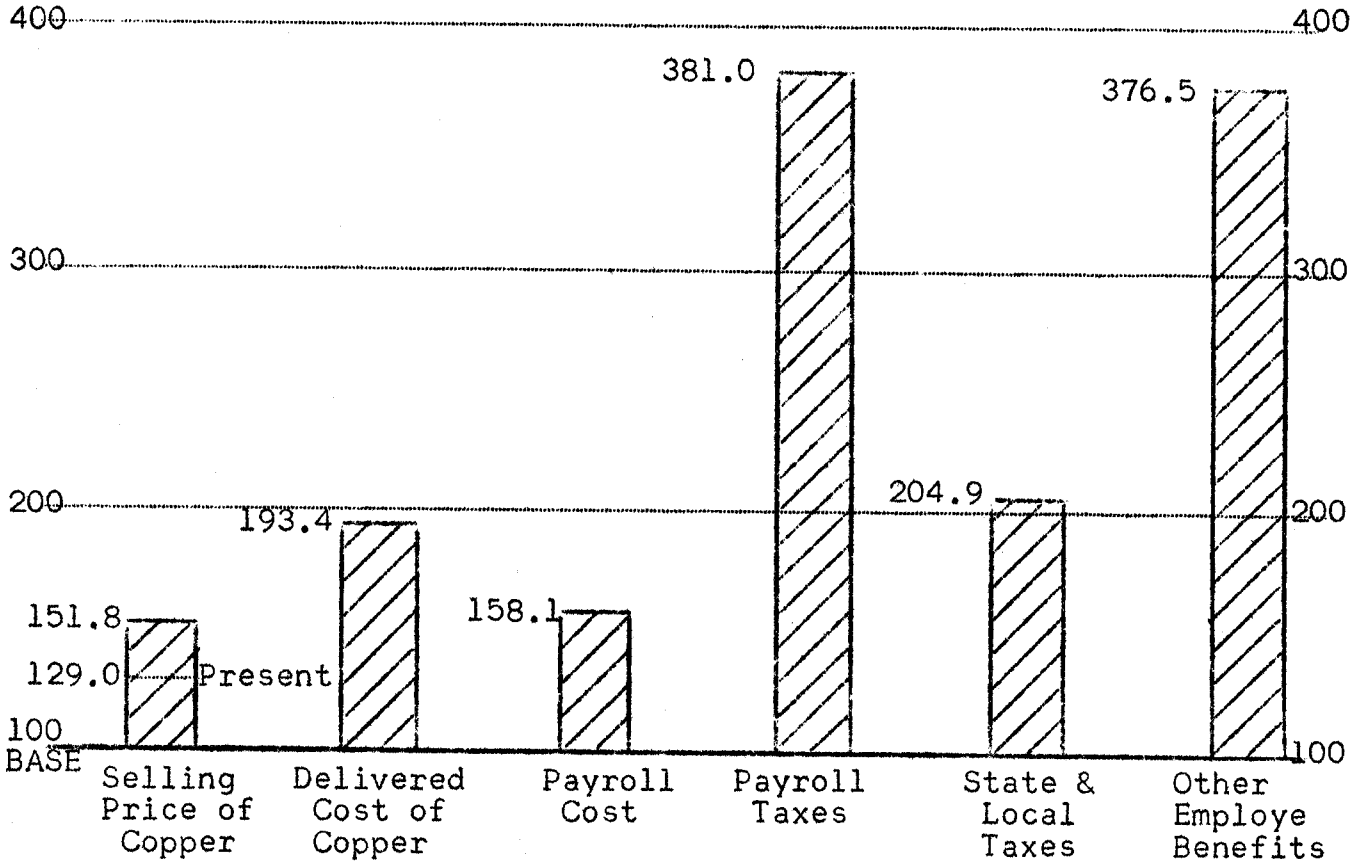
"4. Fair treatment for all in legislation and administration of labor management relations affairs.

"5. Fostering in the public interest, an economic atmosphere which will enable California agriculture and industry to compete for out-of-state markets, remembering that wide marketing of California products brings wealth into the State, thereby raising the standard of living of all our people."

Contrast this attitude to that existing in Michigan where State Officials have been served notice by several large companies that the business climate is now such that expansion or development of these companies has come to a halt, and that expansion contemplated will be done in other states where a reasonable return on investment can be expected.

May I say that if Nevada could live up to resolutions similar to those provided by California, the State not only will retain all its present industrial concerns, but is certain to attract more. The end result being a justly deserved economic growth and greater prosperity for every County in our State. And I can assure you that Kennecott Copper Corporation and Consolidated Coppermines Corporation will be proud to have played their part in that growth.

KENNECOTT COPPER CORPORATION
NEVADA MINES DIVISION



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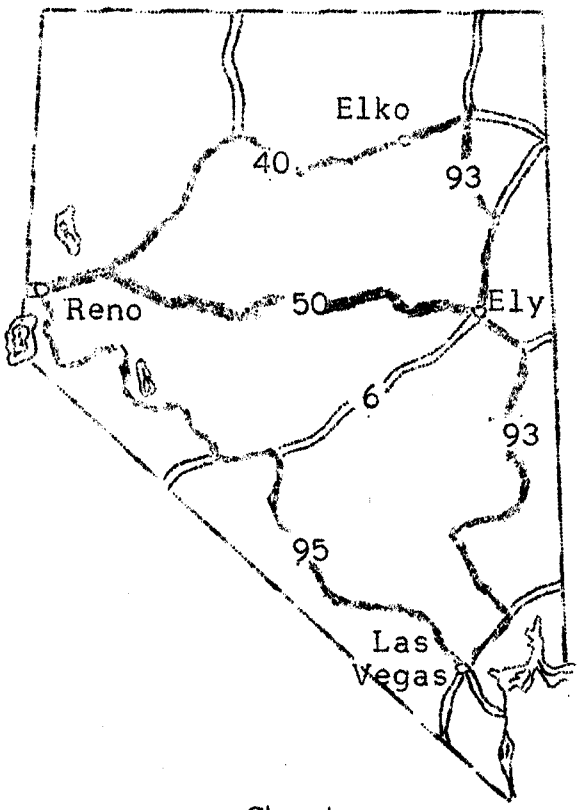

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