

REPORT on the
ANTELOPE MINING DISTRICT
PERSHING COUNTY, NEVADA

for

SUPERIOR MINES, INC.
650 East Plumb Lane
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by

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RESUME

Education:

Master of Science, Metallurgical Engineering; Mackay
School of Mines, University of Nevada, Reno, Nevada;

Engineer of Mines, Mining Engineering; Colorado School
of Mines, Golden, Colorado; January 1961

Professional:

1974- Consultant Engineer, Reno, Nevada: from
1967 Engaged in various facets of the minerals industry
ranging from geochemical exploration projects to
plant design and construction. Conducting property
evaluations, exploration programs and economic
feasibility studies in Nevada, California, Utah,
Arizona, Idaho and Colorado. Commodities included
Mercury, gold, silver, copper, uranium, lead, zinc
and sulfur. Work was conducted for both individual
entrepreneurs and large mining companies.

1966-General Superintendent Bretz Mine, Malheur County,
Oregon; In charge of 300 ton per day mercury open
pit mine and flotation plant.

1965-Self-Employed Reno, Nevada; With a partner conducted
exploration and mine evaluation in Nevada and Idaho.

1963-Employed $\frac{1}{2}$ time by the Nevada Mining Analytical
Laboratory a division of the Nevada Bureau of Mines
while attending graduate school. Work included
testing of Nevada metallic and nonmetallic ores
for susceptibility to metallurgical treatment and
the design of flowsheets for those ores.

Edward P. Jucevic, E.M. (Resume)

1962-Self-Employed Ely, Nevada; With a partner operated a small mine in Eastern Nevada. Conducted many exploration programs on several properties. Performed contract engineering for various private individuals and companies.

1960-Mines Engineer and Chief Engineer; Sabre-Pinon Corporation (now United Nuclear), Grants, New Mexico; All engineering facets associated with two underground uranium mines producing about 30,000 tons of ore per month.

PREVIOUS: Summer experience as a miner in Idaho, Colorado, and California.

Presently: In the employ of the University of Arizona.

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SUMMARY

At the request of Superior Mines, Inc., an investigation of the Antelope Mining District, Pershing County, Nevada, was conducted in order to evaluate the area. The area of the mines is gently mountainous and semi-arid. It has a history of production beginning in 1906 and extending to the 1940's. During this time, two mills were built to handle the oxidized ore, which milled fairly well. However, the sulfide ore was not amenable to these gravity mills and very little sulfide ore was mined. The mines were allowed to fill with water to the top of the sulfide zone. All production from the area has been fairly high grade, averaging about:

GOLD	Au	0.12 oz/t
SILVER	Ag	27.9 oz/t
LEAD	Pb	15% per ton
ZINC	Zn	6% per ton
COPPER	Cu	1.2% per ton

An estimated total production of the area is about 80,000 tons.

The mines are situated along two parallel shear zones, striking about N 45. W, the longest being over 12,000 feet long. The wallrocks are Triassic or Jurassic dark slates and shales with occasional sandstone or quartzite interbeds. The oreshoots are located within this shear zone in veins that usually average about four to five feet wide and usually split into a hanging wall vein and a foot wall vein separated by from two to twenty feet of waste. Where these veins part and recombine, the ore is wider, occasionally up to 18 feet wide. In the Antelope mine, the ore has been shown to be continuous for over 500 feet of vertical depth. In the Superior Mine, all indications are that the sulfide ore between the 200 foot level and 300 foot level is still almost all in place

SUMMARY (cont)

The Iron Mask Mine on the second shear zone is characterized by higher grade ore in smaller ore bodies. Production from this zone was probably fairly small.

Due to the high grade nature of the ore, the depth to which the ore shoots will probably go, the very strong nature and long length of the shear zone that contains the veins, and the prospects for a continued raise in the price of silver, this area presents a very attractive exploration opportunity.

It is recommended that all mining rights to the entire area, not already in the possession of Superior Mines, be secured and further exploration work extending the shear zone capabilities be commenced.

Edward P. Jucevic, E.M.

INTRODUCTION

At the request of the officers of Superior Mines, Inc., an investigation of the Superior Mine, Iron Mask Mine, Noble Mine, Antelope Mine and the Smith Canyon property was conducted. All non-producing silver-lead properties located in the Antelope Mining District, Pershing County, Nevada.

The purpose of this investigation was to evaluate the property, determine if further exploration was warranted, and if so, to suggest a program of exploration.

At the present time Superior Mines, Inc. has acquired mining right to all the properties discussed in this report, with the exception of the Antelope Mine which is the property of the Golden Sceptre Mining Company. All of the other ground is privately owned, and I am informed that this will be acquired under lease and option.

The Superior Mine, Antelope Mine, and Noble Mine are all located on the same shear zone trending about N 45.W. They are developed with numerous shafts and adits. The Iron Mask Mine and Smith Canyon property are located on a zone parallel about 1500 ft. N.E. of the Superior shear zone. These also are developed by numerous shafts and drifts.

The geography, geology and history of the specific area and the surrounding region, the past and possible future mining methods, and the availability of water, power, labor and transportation were all examined and evaluated before any conclusions were drawn.

The information used in writing this report was obtained from 20 days spent on the properties, from publications by the Nevada and Federal Bureau of Mines, materials supplied by various companies and papers and reports in the possession of the Superior Mines, Inc. staff and advisors.

September, 1974 and October, 1974 was the time spent on the property. The author was accompanied on the trip by either Mr. Stuart, Mr. William Davis or Mr. Watson, all of whom were very helpful in pointing out features of the property and acting as guides.

Previous work on the area is very sparse, excepting the very recent opening and discovery work performed by Mr. Davis. Jones (1931) has some general geology for the area about three miles N.W., referred to as the Scossa District. Lawrence (1963) refers briefly to some of the mines in the district. An old engineering report by Hanselman (1941), though not complete, was very useful.

The author wishes to express his gratitude to Mr. P. Van Löben Sels of the Southern Pacific Company for providing the use of their topographic and geologic maps of the area. Mr. Edgar Noble of Imlay, Nevada was also very helpful in providing first hand information about the property. The American Smelting and Refining Company, International Smelting and Refining Co., and the United States Smelting, Mining and Refining Co. all cooperated in supplying any information they had on past production. Unfortunately, most of their old records have been destroyed, but some useful information was obtained and did aid greatly in my determinations.

GEOGRAPHY

The mines investigated in the report are located in the Antelope Mining District, in the Antelope Mountains, Pershing County, Nevada. More specifically they are situated in Sec. 25, 26, & 36, T. 33N, R. 30E and in Sec. 30, 31 & 32, T. 33N, R. 31E., M.D.M. about 110 air miles N.E. of Reno, Nevada (See Fig. 1)

The area is accessible by automobile, although some of the roads on the property require pickup or four wheel drive vehicles for easy travel. The mines can be reached from Lovelock, Nevada by 54.2 miles on the Sulfur road or 38.5 miles of Interstate 80, a divided highway, 18 miles of graded county road and about 4 miles of dirt road. On other than days immediately following heavy snows, the property is accessible the year round.

Topography in the region is characterized by gentle canyon walls and moderately steep peaks. Elevations range from 5500 to 6800 feet. with relief averaging about 600 ft. per half mile.

The climate of the region is typically arid. Some snow is encountered during winter months, but most snows do not remain on the ground long. During a regular mining operation not more than one or two working days per year would be lost due to snow conditions. Winters are moderately cold, but the summers are never really hot for long periods.

Vegetation consists of typical Nevada sagebrush on the lower elevations and pinon pine on the upper elevations and on the northern slopes.

HISTORY

Unfortunately a precise history of this area, including accurate tonnage figures, is not possible to obtain. From the limited amount of published information available, from talking to old-timers in the area and from the little production information the smelters were able to furnish, a general picture can, nevertheless, be constructed.

It is not known when the area was first prospected, but Lincoln (1923), states that the Nevada Superior Mining Company began shipping ore from the Superior Mine in 1906. In 1910, 72 tons of ore were shipped netting about \$49.00 per ton. At today's metal prices this would be about \$127.00 per ton. In 1911, Lincoln reports that construction was begun on a seventy five ton gravity concentration mill for the Superior Mine. Development work at that time consisted of a 330' shaft and about 4500' of workings. Mr. Noble of Imlay, Nevada, (Personal Communication) states that the mill worked well on the oxide ore but was ineffectual on the sulfides due to excess pyrites. Pyrite is heavy and difficult to separate from galena, the ore mineral, in a gravity concentration mill. According to Lincoln, the mill operated until 1913. No production information is available. Sometime around this date, Mr. Noble, as a boy, reports being underground in the Superior Mine with Mr. Tomkin Sr., who was then Superintendent. A steam line ruptured, almost scalding Mr. Noble and Mr. Tomkin. The boilers were turned off and the shaft was allowed to flood to the drain tunnel. The reason for this probably was not the rupturing of the steam line but the refractory nature of the sulfide ore.

Mr. Noble reports that the ore was wide and continuous on the three hundred foot level and very high grade. Noble reports that only about 50 or 60 tons of ore were mined from the three hundred foot level before the shaft flooded and the shaft has never been dewatered. If Mr. Noble is to be believed there would exist excellent ore throughout this adit.

In 1915, according to Lincoln, the Antelope Springs Mining Co. built a 25 ton per day mill at the Antelope mine. It must have been fairly successful because it was enlarged to 50 ton per day in 1917. No records are available on the early production from the Antelope.

In about 1917 or 1918, Mr Noble reported that he shipped about 50 tons of ore from the Noble Mine, netting \$99.60 per ton. This ore was reportedly high in silver and contained almost 40% lead.

Mr. Noble further reports that sometime during the twenties two Italians mined the ore between the 100 and 200 foot levels of the Superior Mine. The evidence indicates that a substantial amount of material was removed between these two levels. A large amount of the floor on the 100 foot level sounds hollow. On the 200 foot level stoping is evident for 200 feet on either side of the shaft. These stopes have been filled with wallrock, probably from hanging wall raises. They appear fairly narrow, two or three feet wide, but this could be due to squeezing of the fill.

Sometime during the 1930s' Mr. Tomkin Jr. son of the Mr. Tomkin who ran the Superior Mine during its development era, drove a drift on the Iron Mask property. He encountered two pods of very high grade ore that, according to Mr. Noble, netted \$14,000.00 for about 100 tons. At today's prices that would amount to over \$1,000.00 per ton.

It has not been possible to obtain any production records for the time previous to the 1930s'. The smelters periodically destroy old records to make room for new ones. U.S. Smelting & Refining Co. was not able to supply any information on production. American Smelting & Refining Co. was able to show one shipment in 1947, and International Smelting & Refining Co. was able to show about 1,000 tons of production during the 1930s'.

Between 1935 and 1938, the International Smelting & Refining Co. shows more than 600 tons of ore shipped from the Superior Mine by E.J. Baker. It is possible that this ore might have come from the stopes between the 100 foot and the 200 foot level of the Superior Mine shaft. This ore averaged about 27 oz. Silver, 15% Lead and 2.5% Zinc.

International also shows about 300 tons of ore shipped to them, during the 1937 thru 1939 period, from the Antelope Mine. There were ten shipments averaging about 30 tons each. A mining engineer's report by Hansleman (1941), in the hands of Mr. William Davis, shows about 30 analysis of shipments from the Antelope during the 1930s', ten of which were confirmed by International. If we project the average of 30 tons per shipment as indicated by International to the 30 shipments indicated by Hanselman we have about 900 tons of ore shipped during this period. The map by Rogers (1941) drawn from a report by Parrington M. McCree shows the No. 1 ore shoot in the Antelope Mine averaging about 150 feet long and being continuous for at least 500 feet in depth, with no indication of diminishing. The map shows the ore shoot completely removed. Hansleman (1941) reports the ore to average about 4 feet thick. This would indicate about 25,000 tons of ore removed. The No. 2 ore shoot would probably have contained as much ore, indicating that the Antelope probably produced about 50,000 tons total.

The only other production from this area was reported by American Smelting & Refining Co. in 1947, Mr. Jess T. Simmons shipped 42 tons of ore, probably from the upper levels of the Superior shaft, that analyzed 33.7 oz. Silver, 5.2% Lead and 5.2% Zinc with 0.2% Copper.

It is not possible to say with much accuracy exactly what the production of this area was to date. However a guess might be in the range of 80,000 tons.

GENERAL GEOLOGY OF THE AREA/ ANTELOPE MINING DISTRICT

Most of the district is underlain by dark colored slates and soft mica shists, which have a general strike of N 40.E and dip 40 to 60 degrees to the Northwest. Interbedded with the slates and shists are sandstone and limestone strata. In general, the sandstones are indurated, and verge on quartzites in some areas. There is a question as to whether these beds are upper Triassic or Lower Jurassic. No intrusives were noted in the area studies, but Jones (1931) reports small quartzdiorite dikes in the Scossa Mining District three miles Northwest of the Superior area. Spruck (1938) shows a large granodiorite intrusive six miles to the Northeast and intrusive rhyolites four miles East at Majuba Hill.

The only structures evident in the area are the two shear zones related to the ore deposits (See Fig. 2). These zones trend about N 45.W and cut the slates and shists at almost right angles. The more Southerly shear zone, hereafter referred to as the Superior shear, appears to be the strongest and has undoubtedly produced the most ore. Its strike is N 45.W and its dip is generally almost vertical. This zone can definitely be traced over 12,000 feet on the surface. The second shear zone, hereafter referred to as the Iron Mask Shear, is located about 1500 feet Northeast of the first and parallels it in strike. The dip of the Iron Mask shear, however, is about 40.to 60. to the Southwest, toward the Superior Zone, indicating a possible intersection at somewhat less than 2000 feet. The Iron Mask shear is not nearly as strong as the Superior, but may be as long, possibly extending into Smith Canyon. There is some question as to whether the Smith Canyon area is a continuation of the Iron Mask shear or an offset of the Superior shear.

The veins are true fissure veins that probably filled voids in the shear zone and replaced some of the crushed wallrock. At various intervals the main vein splits, forming two veins separated by a few feet of wall rock in places, but sometimes separated by up to twenty feet. Where the veins split and rejoin together, the ore is often wider than fifteen feet.

SPECIFIC GEOLOGY

The geology of the mines on the Superior shear zone will be discussed first and the mines on the Iron Mask zone second.

Superior shear zone mines.

The mines along the Superior shear zone from Northwest to Southeast are the Noble, the Superior, the Antelope and the Queen. The mines will not be discussed in that order, however, but in order of their importance as follows:

THE SUPERIOR MINE
THE ANTELOPE MINE
THE NOBLE MINE
THE QUEEN MINE

THE SUPERIOR MINE: The Superior Mine on the West side of the mountain (See Fig.1) is developed by a 330 foot shaft with levels at 100 ft., 200 ft. and 300 ft. depths and a drain tunnel from the Superior shaft, 2500 feet west to the valley edge. There is evidence of caving in the shaft at the water level and probably some caving below. The shaft has probably been lagged over at the drainage tunnel level. The 100 foot and 200 foot levels are accessible, though badly caved in part. Parts of the drain tunnel are accessible, though most of it is not. About 400 feet up the hill from the Superior shaft is an adit that contains about 400 feet of workings, following directly toward the Antelope. Reports of old-timers say this adit is much deeper.

The vein is a fissure vein in the Superior shear zone. The shear zone at the Superior shaft strikes N 50.W and dips about 70 degrees to the N.E. AT THE SURFACE. This dip may be due to rock creep near the surface since the vein steepens to almost vertical dip between the 100 foot and 200 foot levels.

On the 100 foot level of the Superior, drifting has exposed the shear zone for about 300 feet on either side of the shaft. Cross cuts show the shear zone to be at least 265 feet wide. A few raises have been driven but there is evidence of only small amounts of ore having been removed. No ore remains on this level, however, in many places the floor sounds hollow, indicating the possibility of stoping from below.

The 200 foot level also extends for several hundred feet on either side of the shaft. To the southeast, stoping is evident for at least 200 feet of the drift. The stopes have all been filled with waste rock and most of the timbers have rotted giving way to much caving. The stopes here appear to average only about two feet wide, but this may be due to squeezing of the stope fill. Hansleman (1941) reports that at that time the ore was three to four feet wide on the 200 foot level. It is probably that just such ore as this is what is evidently removed. It is probable that the 600 tons shipped by E.J. Baker in the late 1930s', which average about 23 oz. Silver, 15% Lead and 2.5% Zinc, came from this level. Northwest of the shaft stoping and caving is also evidenced. There is at the Easterly end of the 200 foot level, an ore face exceeding 18 feet in width exposed, however much rehabilitation is necessary here.

The author was not able to gain access to the drain tunnel from the shaft, due to deep water. Hansleman (1941) reports that the tunnel is in and out of the vein and exposed ore bodies for many hundreds of feet. He further states that considerable ore of carbonate form was encountered toward the west end of the tunnel.

The reports by Hansleman contains a fair discussion of the 300 foot level. He states; "The three hundred foot level, I am told is run on the vein both ways from the main shaft for 300 feet Northwest and 250 feet Southeast, exposing several fine shoots of ore. The estimated tonnage exposed from this development is reputed to be 70,000 tons, and is very high grade ore."

Mr. Hansleman's informer in the above statement was Mr. Tomkin Sr. who was father of the Mr. Tomkin Jr., the son of the mine superintendant and who worked in the mine as a boy.

Mr. Hansleman further states that "I am told that in the bottom of the Superior shaft the vein is from 10 to 18 feet wide, and 3 to 4 feet of ore occurs on both walls." All indications are that the ore between the 200 foot level and 300 foot level is still in place.

The fact that there was little ore on the 100 foot level, fairly good ore on the 200 foot level and a very excellent tonnage of ore on the 300 foot level, tends to indicate that this is the top of the ore shoot and that the ore can be expected to continue with depth and probably increase in width and length.

Mr. Noble (1973) stated that the ore on the 300 foot level was all sulfide, being in the main pyrite. The mineralization on the upper levels indicates that the ore probably contained a large amount of pyrite before it was oxidized. Based on all available information, the vein in the sulfide zone will probably be made up of quartz and pyrite gangue and argentiferous galena, sphalerite and chalcopyrite ore minerals. Some silver values may be in the form of tetrahedrite since Lawrence (1963) p.156) reports finding this mineral in the ores of the area.

The average of all the ore we have been able to find that has been shipped from the Superior Mine is about:

Gold	Au	0.12 oz/Ton
Silver	Ag	27.7 oz/Ton
Lead	Pb	15.0% Per Ton
Zinc	Zn	2.5% Per Ton
Copper	Cu	0.35% Per Ton

This shows ratios of silver to lead of about 2 to 1; silver to zinc of about 10 to 1 and lead to zinc of 6 to 1.

THE ANTELOPE MINE: The author was not able to make an on the spot investigation of the Antelope Mine due to a lack of time and the refusal of a Mr. Johnson, representing the Golden Sceptre Mining Company who refused permission to energetically pursue the exploration. However, the report of Hansleman, the map of Rogers, and the information supplied by the smelters give sufficient information for evaluation.

The Antelope Mine is developed through four adits at various elevations on the hill. The No. 1 adit is on the vein, while the No. 2, No. 3 and No. 4 were driven to cross cut the vein. There are also numerous raises and winzes connecting the various levels. When Hansleman was in the area in 1941, many of the drifts along the vein were caved and Mr. William Davis, advisor to Superior Mines tells me that except for the work he did several years ago, most of the drifting along the vein is caved and unworkable.

The Antelope Mine is located in the N.W. $\frac{1}{4}$ of Sec. 31, immediately southeast and adjacent to the Superior Mine. The mine is on the Superior shear zone and the vein strikes N 50.W. Two ore shoots were encountered in the drifting along the vein. One of the ore shoots rakes at 52. following the dip of the bedding and possibly following one of the sandstone beds. The other is almost vertical. Both are continuous for the 500 vertical feet they have been explored and both improve with depth.

The raking shoot begins only about 1.5 feet to 2.0 feet wide on the surface, but increases to double this amount with depth. Its length also increases from about 100 feet to several hundreds of feet in length. The vertical ore shoot is fairly consistent in length with depth but is reported to widen. It will average about 100 feet long. Although Rogers shows only one of the shoots having a split into the hanging wall vein and foot wall vein, Hansleman contends that both do. This is consistent with the split Hansleman refers to in the Superior ore shoot, at the bottom of the shaft. Where the veins split and recombine, the ore is usually from 10 to 18 feet wide.

Indications are that most of the ore mined in the mine oxidized in part. The No. 4 level was probably just about at the top of the sulfide zone. Reports of ores shipped indicate two general types; high zinc and low zinc ore. They average about the following analyses:

High Zinc Ore;

Au	0.01 oz/T		
Ag	18.0 oz/T	Silver to lead	3 to 1
Pb	6.0%	Silver to zinc	1 to 1
Zn	17.0%	Lead to zinc	1 to 3
Cu	1.9%		

Low Zinc Ore:

Au	.01 oz/T	Silver to lead	2 to 1
Ag	22.0 oz/T	Silver to zinc	4 to 1
Pb	12%	Lead to zinc	2 to 1
zn	6%		
Cu	2%		

The ore shoots as they extend below the No. 4 level are excellent exploration targets and should produce a large amount of very excellent ore.

THE NOBLE MINE: The Noble Mine lies on the Northwestern end of the Superior shear zone in the N.W. $\frac{1}{4}$ of Sec. 26. The author has never been on the ground but the map by Spurr (1958) and information obtained personally from Mr. Noble indicate that the mine is developed by two shafts, numerous adits and test pits. The only production information obtained was that reported by Mr. Noble. He states that in 1917-1918 he shipped 50 tons of ore that, at that time, netted about \$100.00 per ton. At today's metal prices, the same ore would bring approximately \$1,200.00 per ton. The area between the Superior Mine and Noble Mine holds excellent promise for new mineral production and located as it is within the valley it would lend itself to a potentially profitable open pit operation.

THE QUEEN MINE: The Queen Mine lies about 1500 feet in a southwesterly direction from the end of the Antelope property and 1500 feet southeast of the main adit workings, (See Fig. 1) on the same shear zone and vein structure. Just recently a large bulldozer cut was put in at this property covering the old shaft and tunnels. The shear zone and veins are, however, exposed by this work. The veins strike about N 50,E and dip almost vertically. The shear zone is not nearly as strong here as it is in the Antelope and Superior areas and probably dies off southeast of the mine. Hansleman reports that the vein at the bottom of the shaft was four to five feet wide, but the ore only averaged from 8 to 18 inches wide. The Queen mine should not be an area of immediate interest. However if a major part of the Superior zone becomes productive, the Queen Mine would warrant further exploration.

IRON MASK SHEAR ZONE MINES

The Iron Mask Shear Zone lies parallel to and about 1500 feet North of the Superior shear zone. The mines from Northwest to Southeast are the Iron Mask and the Smith Canyon properties. The Tomkin Mine is not included here.

THE IRON MASK MINE: The Iron Mask Mine is located in the center of the E $\frac{1}{2}$ of Sec. 25 T33N, R30E. and in the center of Sec.30 T33N, R31E about 1500 feet Northeast of the Superior shaft. The mine is developed by an incline shaft reported to be 280 feet deep, and numerous drifts and adits. The shaft has been lagged over at about 80 feet and about 10 to 20 tons of waste has caved on this lagged area. All of the adits are caved at their portals, but it would take little work to reopen them.

Surface mapping at the Iron Mask indicates the presence at least two Northwest trending veins. The most Northerly vein is exposed in the small shaft at the portal of the Tomkin tunnel, on the 35 foot level of the Iron Mask shaft and in an adit down the hill from the Iron Mask shaft. It has a strike of N 55.W and dips about 60 degrees to the Southwest. The more southerly vein is about 300 foot south of the Iron Mask shaft and has a strike of about 45 degrees N and dips about 60 degrees to the southwest. In the vicinity of the Tomkin tunnel, it is probably only 200 feet south of the North vein. There are a number of North-South veins extending between the two main veins and the intersections of these two systems were locals for ore shoots. The ore from this mine is of very good grade. A sample taken by the author from the North vein in the vicinity of a North-South vein on a 35 foot level of the shaft showed 14 inches that assayed:

Au	.129 oz/T	Silver to lead	2 to 1
Ag	58.55 oz/T	Silver to zinc	10 to 1
Pb	27.2 %	Lead to zinc	5 to 1
Zn	6.9 %		
Cu	.04%		

The International Smelter shows 28 tons of this grade ore shipped in 1938-1939. Mr. Noble reports that Mr. Tomkin Jr. shipped two cars of ore (approximately 100 Ton) from the Tomkin tunnel in the Thirties netting \$14,000.00. This ore was contained in a North-South vein just below where it flattened in dip. The ore bodies on this property, although higher grade than those of the Superior and Antelope, are much smaller.

SMITH CANYON PROPERTY: The Smith Canyon Property is located in the E $\frac{1}{2}$ of Sec. 32 (See Fig. 1) East of the Antelope and Queen Mines. It is developed by many adits driven into the hill. No evidence of production was found, although the amount of workings indicate some production. It is not evident at this time whether the Smith Canyon area shears are part of the Iron Mask shear or an offset of the Superior shear. There are two parallel quartz veins, striking N 40.W, around which most of the development has centered.

Lead-silver mineralization is evident in spots and some siderite gangue was noted in association with the quartz vein. This area should not be considered for any immediate exploration, but would be very valuable once the other areas are explored.

MISCELLANEOUS

In the past all mining has been by open stoping methods. The stopes were sometimes filled, probably from waste development rock or hanging wall raises. This method, though not inexpensive would probably be used in future mining.

At the present time, there are no facilities of any appreciable value on the properties. Neither is there any timber that would be useful for mining. There is a small amount of water running out of the drain tunnel of the Superior Mine and a small amount running from the No. 4 tunnel of the Antelope.

There would probably be sufficient water from these sources, for mining, but the nearest water in sufficient quantities for milling would be either three miles west of the Superior shaft in the valley, or nine miles east of the Antelope Mine in the Humboldt River valley. The nearest power would very likely be Imlay, 20 miles to the east, or Sulfur, about 20 miles to the north. The Southern Pacific Railroad is available at Imlay and the Western Pacific is available at Sulfur. Interstate 80 also passes through Imlay. Labor is available in Lovelock and Winnemucca, each of which is about 55 miles from the mine site. Housing and trailer space is available in Imlay.

CONCLUSIONS

This area is, in the author's opinion, one of the best Silver-Lead exploration possibilities in the State of Nevada today. The potential for developing a successful mining operation is very good and with competent engineering would make not only an excellent mine but one of the richest and profitable properties in the United States today.

The Superior shear zone offers the better possibility for large production of ore and it is felt that this area should receive the major exploration effort.

These conclusions are based on the following:

1. The main shear zone is $4\frac{1}{2}$ to 5 miles long, very strong and continuous. It has been well explored for only a small percentage of its length.
2. The known ore shoots are at least 500 feet in vertical length. Minerologically, there is no reason to believe that these ore shoots will not go to good depths.
3. The ores are of excellent grade, averaging for the entire district better than 28 oz Silver per ton, 15% in lead, 6% Zinc and 1.2% Copper.

4. The prospects for continued increases in the price of Silver, the main economic metal in the district are very excellent. Prominent members of the United States Mining Industry have forecast that Silver will eventually reach \$5.00 per ounce.

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RECOMMENDATIONS

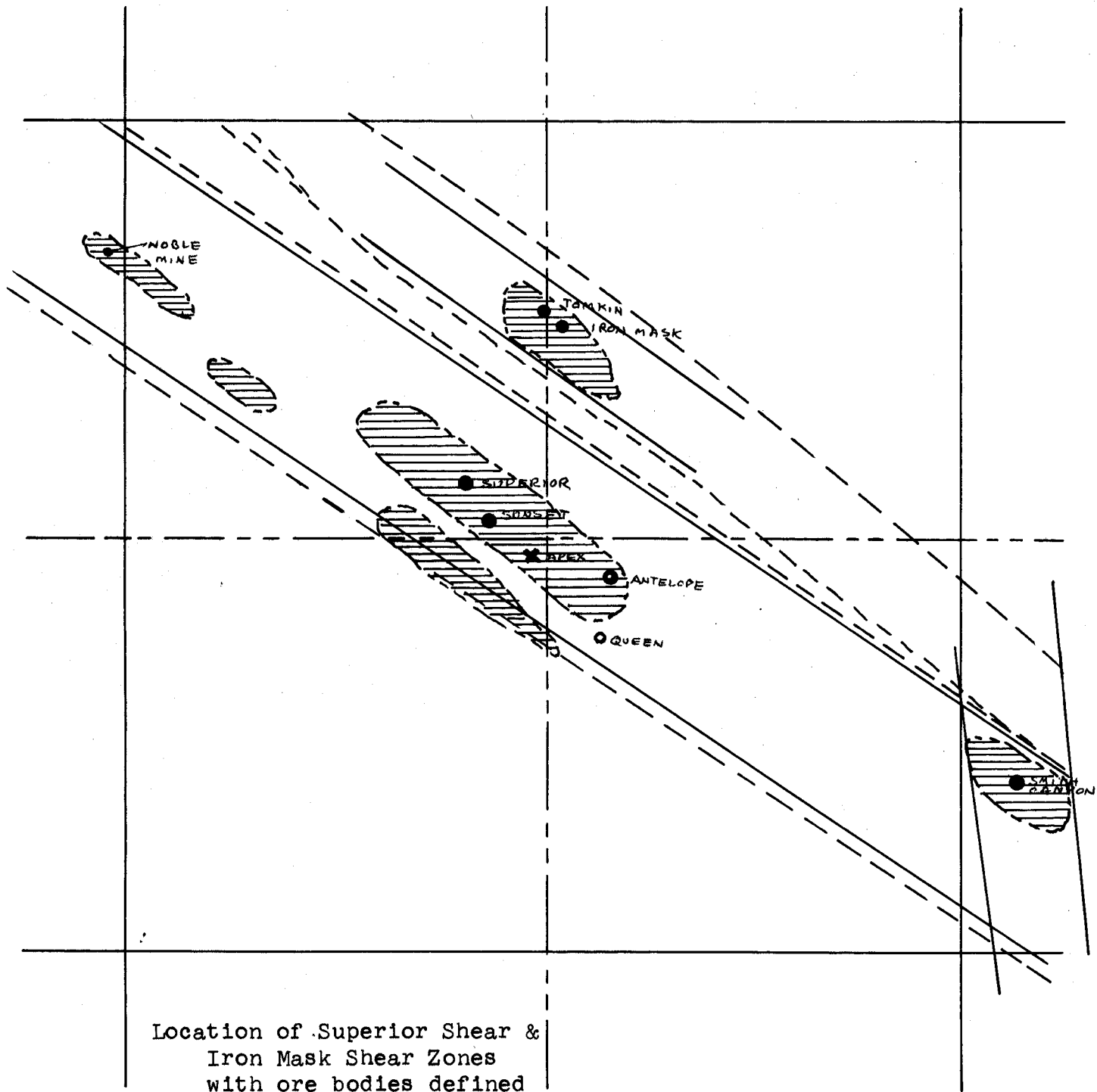
It is recommended that the following procedures be followed in exploring the property. They represent the most efficient and economical method of proceeding and would give the property its best chance for success. They would also prepare the property for exploration assistance from the Federal Government, under the Office of Mineral Exploration. The Federal Government is willing to assist with up to 75% of the cost of exploration of Silver properties of merit. This money is loaned, interest free, and is paid back as a royalty of 5% of gross smelter returns. I believe this property would easily qualify. The recommendations are listed in the order of their importance.

1. Acquire mining rights to all of Superior and Iron Mask Shear zones through lease, option and outright purchase.
2. Proceed with exploration of the Superior shear as follows:
 - a) Begin to dewater and retimber the Superior shaft to the 300 foot level. Open this level to its extremes.
 - b) Begin a topographic and geologic survey of the shear zone from one end to the other on a scale of 1" to 100' augmenting and verifying the North American report.
 - c) Map all underground workings that are accessible.
 - d) Conduct a geophysical survey of the entire zone self-potential methods. This method is easy, inexpensive, and probably the best method of finding additional ore.
 - e) Conduct a geochemical survey over the zone to confirm geophysical work done by North American Exploration
 - f) On the basis of the results of the above, layout an extensive drilling and drifting program to qualify for Federal Assistance for the exploration program.

3. Proceed with the exploration of the Iron Mask shear zone in the following manner:
- a) Clean out the shaft to gain access to lower workings.
 - b) Clean out all other workings so that access is provided to each of the valuable adits.
 - c) Map very thoroughly on a scale of 1" to 40', the surface and underground workings, including all geology.
 - d) Proceed with drifting or drilling along the lines suggested by the results of the geologic investigation.

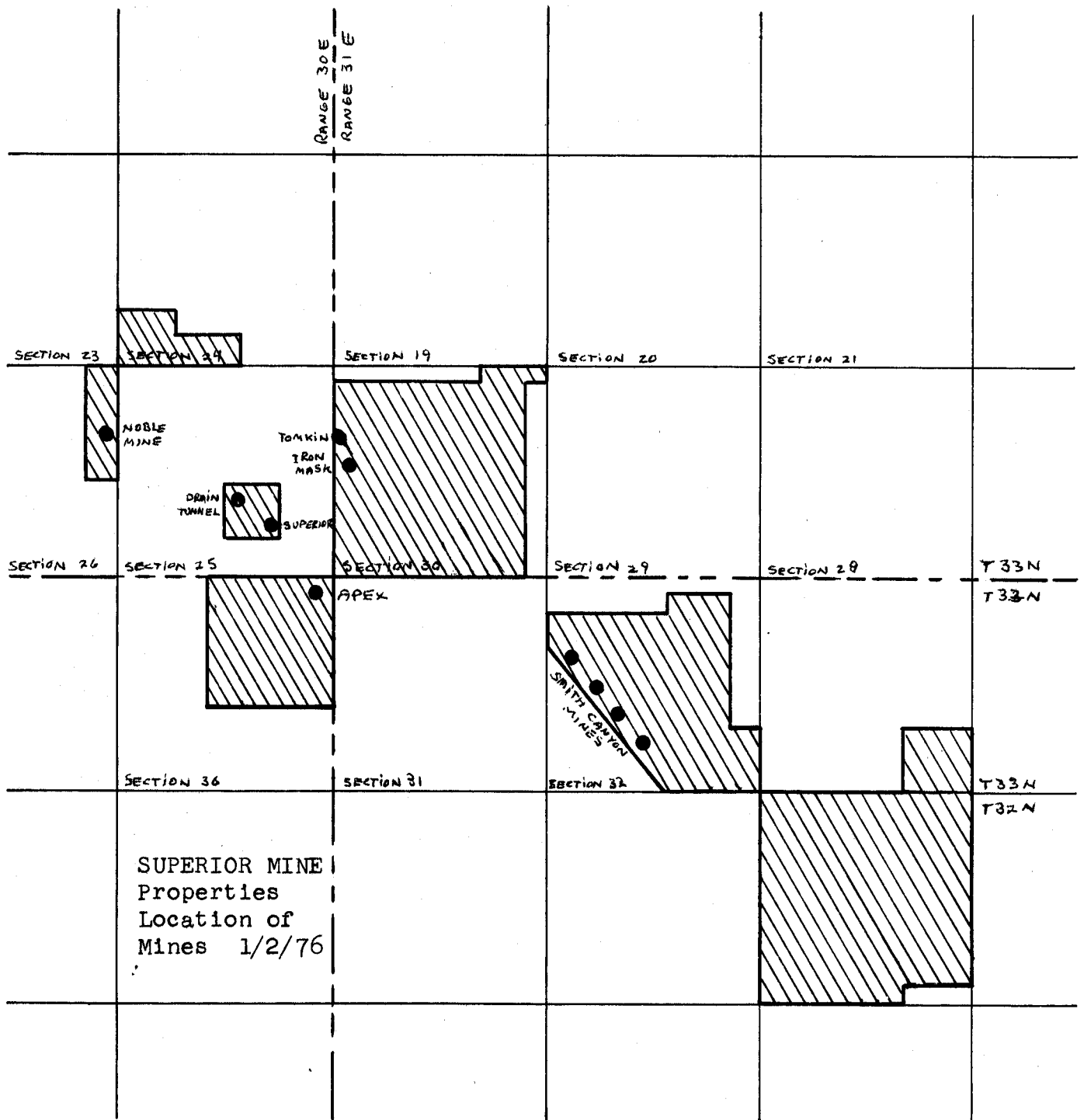
The initial exploration suggested for the Superior Shear Zone and the Iron Mask Shear Zone could be accomplished at a reasonable expense. However, the extensive exploration of the Superior Shear Zone would mandate a large expenditure. Hence the recommendation of obtaining financial assistance from the Federal Government through the Office of Mineral Exploration.

Edward P. Jucevic. E.M.

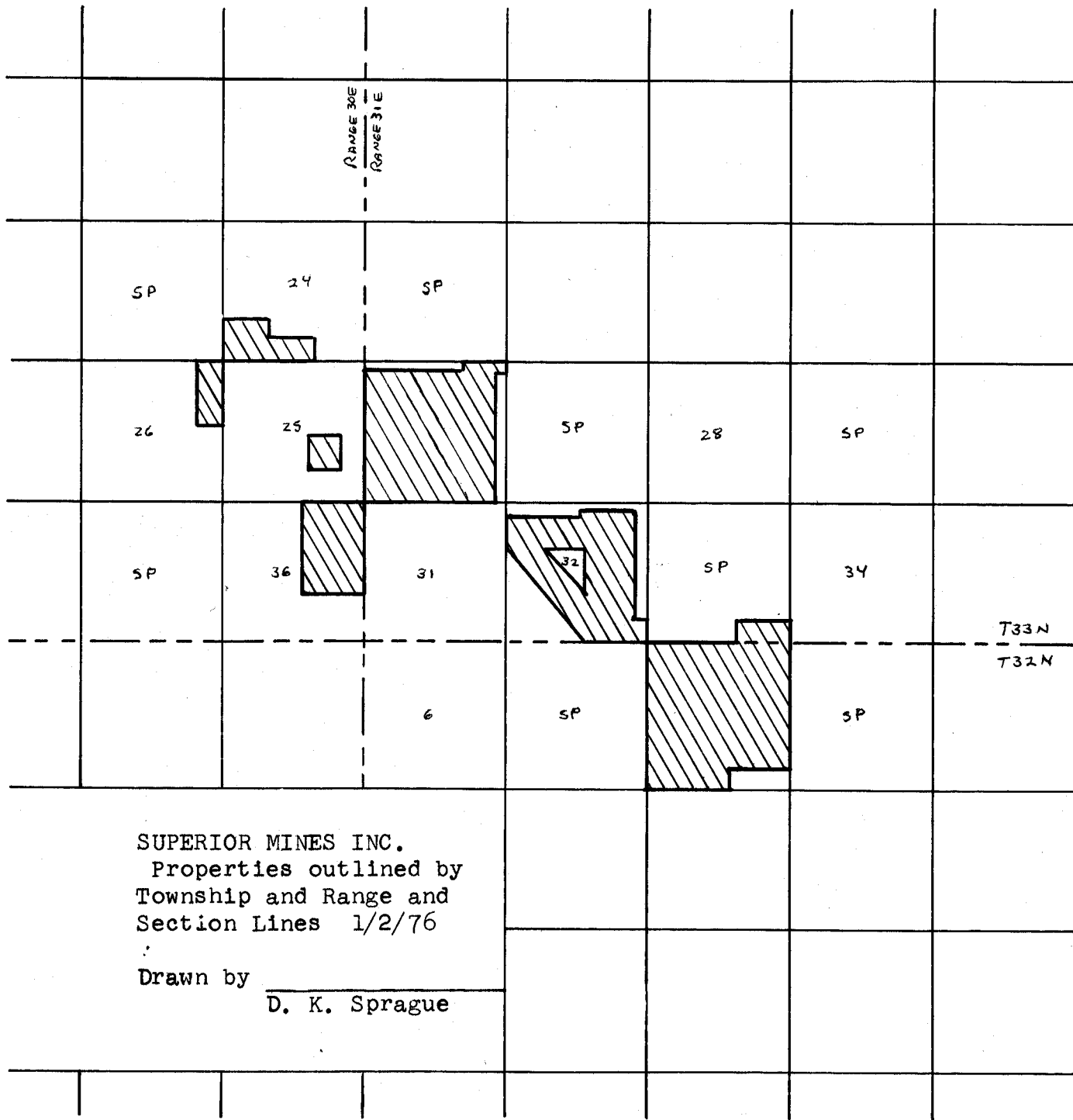


Location of Superior Shear &
 Iron Mask Shear Zones
 with ore bodies defined

(Fig. 1)



(Fig. 2)



SUPERIOR MINES INC.
 Properties outlined by
 Township and Range and
 Section Lines 1/2/76

Drawn by

D. K. Sprague

Copy of letter recieved from Lester C.Greenwood/ District Geologist
with North American Exploration, Inc. 125 Melarkey St. Winnemucca.

Sept. 14, 1972

Great Western Silver and Lead Mines Inc.
131 East Sixth Street
Winnemucca, Nevada

Dear Mr. Davis

As you have requested, we have prepared a report on the Antelope Mining District, Pershing County, Nevada, and present it herewith.

In as much as we have been acting as consultants to you from time to time on the property, for more than a year, we are quite familiar with the property.

In my opinion, this property has excellent potential for development of one or more high grade Silver/Lead mines. I know of no other property of this type in Nevada which offers more factors favoring a successful result of further exploration. Some of the favorable factors found in this study are outlined here:

1. The discovery that multiple parallel mineral bearing zones are not only present, but appear to be common throughout the district, and that they are close enough to be considered as mineable units, thus allowing more efficient mining methods to be used.
2. The discovery that vein material having a grade of from \$100 to \$200 per ton, and possibly some with a grade of several hundreds of dollars per ton, is available at or near the surface and thus could be recovered by inexpensive open pit methods.
3. The length of the Superior shear zone is over Five miles much of it unexplored. With a structure of this length, ore shoots may be expected to reach a depth of many hundreds of feet.
4. Reports of ore shipped, our own findings included signify ore values from \$100 to \$400 per ton average from near surface ore tables. Profitable by open pit.

Yours truly, L.C.G.

MINING REPORT

For

SUPERIOR MINES, INC.

by

J. STANLEY HODGSON, E.M.

Prepared by: RESOURCES DIVISION
2130 Dickerson Road
Reno, Nevada 89502
(702) 322-2268

J. Stanley Hodgson, E.M.

RESUME

J. STANLEY HODGSON
MINING ENGINEER

Graduated from Queen's University in 1952 with Bachelor of Science, B.Sc. degree.

Superintendent for Falconbridge Nickel Mines between 1952 and 1954

Managed several Uranium and exploration companies from 1954 to 1964. Secured several S.E.C. and O.S.C. clearances during this period for multi-million dollar loans.

Owner, American Research Corp., contract mining, consultant for numerous private clients in Western U. S. between 1965 and 1968.

Mining Consultant for American International Mining and Milling, Inc., Continental Mining and Milling, Corp., General Investment Corp., Arrowhead Silica Corp., Pastime Enterprises, Mining Development Services, Great Basin Land and Mining Co. and others between 1968 to 1975.

Presently employed as Chief Mining Engineer for Superior Mines, Inc. of California and Nevada. Engaged in several development programs in Flourspar, Barite and Limestone and exploration programs throughout Nevada, Idaho, California, Montana, Utah and Arizona.

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Property of the RESOURCES DIVISION
SUPERIOR MINES, INC.
650 East Plumb Lane
Reno, Nevada 89502

Authorized Signature

PROPERTY

The property consists of 93 Lode mining claims located in Sections 24, 25, 26, and 36, Township 33 North, Range 31 East and Section 4, Township 32 North, Range 31 East and Section 30, Township 33 North Range 30 East, Mount Diablo Base & Meridian, approximately 22 miles Northwesterly from Imlay, Nevada and 110 air miles Northeast of Reno, Nevada.

Access is by gravel roads from Imlay, 22 miles or from Lovelock 54.6 miles. The roads to the property as well as most roads on the property can be travelled by car at all times during the year excepting immediately following snow or storms. However, the last 4 miles of road to reach the property and all roads on the claims themselves must be improved and additional roads built to facilitate conducting an aggressive development program at the mines.

The topography of the property consists of some moderate hills and gentle valleys, with relief averaging about 600 ft. per half mile, at an elevation of between 5500 to 6800 feet.

The climate is somewhat arid with some snow encountered at the higher elevations in the winters, which are moderately cold. Summers are relatively dry and cool.

Vegetation is sparse, consisting of grass and sagebrush at the lower elevations and pinon pines at the higher.

Water is available from 3 to 4 springs on or adjacent to the property and should be adequate for the anticipated mining operation. Management has decided that milling operations should not be anticipated at the site, therefore drilling of wells or any further development of water is unnecessary at this time.

Electricity is not available on the property, but could be provided by diesel-electric generators or by extending the power lines from Imlay or Rye Patch, between 10 and 20 miles.

HISTORICAL

The first ore discovery on the Superior shear zone was made in 1904 by a prospector named Breckenridge. The first shipment of ore was made from the property in 1906 (Lincoln). A shaft was sunk 100 feet, a drift run 200 feet southeast and 100 feet Northwest and all high grade removed almost to the surface.

In 1910, 72 tons of ore from the Superior Mine was shipped, which is reliably reported to have netted the Nevada Superior Mining Company, about \$40.00 per ton.

In 1911 construction was begun on a 75 ton per day gravity concentration mill, which worked well on the oxide ores. The shaft was then deepened to the 200 foot level, where the character of the ore changed from oxides to sulfides, which could not be processed with the available milling facility.

The ore was drifted on at the 200 foot level. but no stoping was done, Rather, the shaft was sunk to the 300 foot level to more accurately determine the grade, character and tonnages of ore that could be mined, they remained sulfides.

Substantial flows of water were encountered at the 300 foot level, so a sump was dug and a steam pump installed. No pumps at that time could pump against a 300 foot head dependably, so at the 245 foot level a new drainage tunnel was driven almost 2500 feet to connect with the valley just Northwest of the shaft.

Drifts were driven 250 feet southeast and 300 feet Northwest. Mr. Tomkin, superintendent of the Superior Mine at this time, and a Mr. Edgar Noble still living in Imlay, Nevada, with a mining man by the name of Burton, all reported very high grade ore on this level, where the vein was over 19 feet wide. They all estimated the ore reserves to be some 50,000 tons, almost all of which is still in place.

Approximately 50 or 60 tons of ore from the 300 foot level were run through the mill, but results were very unsatisfactory. Construction was begun on a flotation mill to process the sulfide ores, but it was never completed.

During this period, Mr. Tomkin and Mr. Noble were underground when the steam line to the water pump on the 300 foot level ruptured and nearly scalded them. The boilers were turned off and the men removed, the mine was allowed to flood to the drain tunnel. It was never pumped again, some say a dispute over the operation and safety.

The financiers in New York were hesitating about the providing of additional money necessary to complete the construction of the mill utilizing relatively unfamiliar and unproven concentration procedures (flotation), so the story is told. Instead, the same people spent their money in the development of the Antelope Mine, just discovered at that time, which adjoined to the southeast of the Superior. This mine was developed by 2 long adits and several short ones above the elevation of the collar of the Superior shaft. They produced over \$500,000 in silver-lead ore before it went into litigation.

Small tonnages of ore have been mined from the Superior at the 100 and 200 foot levels since that time, principally about 600 tons shipped by Mr. E. J. Baker in 1935 to the International Smelting & Refining Company at Salt Lake City, Utah. This ore is reported to have averaged 23 oz. Silver, 15% Lead and 2.5% Zinc.

In 1917-1918, Mr. Noble shipped about 50 tons of ore from the Noble Mine and netted \$99.50 per ton, mainly in silver and lead (40%) content.

Sometime in the 1930s' Mr. Tomkin Jr. drove an adit on one of the Iron Mask veins and mined about 100 tons of high grade ore from which he netted \$14,000.00.

In 1940 Mr. C. M. Hanselman, mining engineer, examined the property and sent a sample of ore to the U. S. Smelting and Refining Co. and was told that they could not secure a good recovery of the Silver, Copper, Lead and Zinc, probably due to not being equipped to handle the combination with efficiency. Litigation again tied up the property for the ensuing years until Mr. William L. Davis claimed the land in late 1959, while a partner with Mr. Johnson and working on the Antelope Mine. In 1964 the still unworked property was once more reclaimed by William L. Davis who set about to thoroughly and professionally explore the property.

Several competent engineers were hired to evaluate the property, Clarence Doyle, Geologist, James Watson, Engineer, a Mr. Poliakoff, Engineer and an associate of Clarence Pease of Sacramento and the North American Exploration Co. and the eminent Engineer, Geologist, Lester C. Greenwood of Winnemucca.

Mr. Edward P. Jucevic, mining and metallurgical engineer, and North American Exploration Co. have both done and eagerly recommended considerable work on the properties within very recent years, costing the owners possibly as much as \$250,000 during the past 5 years. Considerable time and money is evidenced on the property. The results of this work prove that a substantial mining operation is feasible on the Superior Mines Properties.

The average grade of ore mined in the area is reported by Edward P. Jucevic to be:

GOLD	Au	0.12	oz/Ton
Silver	Ag	27.9	oz/Ton
Lead	Pb	15 %	Per ton
Zinc	Zn	6 %	Per ton
Copper	Cu	1.2%	Per ton

As recently as two weeks before this writing, the author has taken samples from the several properties that registered considerable higher in Gold and Silver.

GEOLOGY

The area containing the Superior Mines properties is underlain by dark slates and soft schists, generally striking about N 40.E and dipping 45 to 60 degrees N.W. Sandstones, quartzites and impure limestone are interbedded with these schists and slates. Intrusive granodiorites and rhyolites have been noted east and northeast of the properties.

The 2 main structures present on the Superior property are large parallel shear zones striking about N45.W cutting the schists and slates almost at right angles. The Superior or southerly shear, is the strongest, it dips almost vertically and has been traced for nearly 3 miles along strike. The Iron Mask shear, 1500 feet to the east, dips between 45 and 60 degrees S.W., and should intersect the Superior shear zone at less than 2000 feet vertical distance.

The ore veins are true fissure veins that filled voids in the shear and replaced some of the crushed, brecciated and cross fractured wall rock. The veins split in places, and forming 2 veins separated by a few feet up to 20 feet of wallrock, often partially replaced with ore minerals.

Where cross faulting intersects these split veins, ore shoots up to 15 to 20 feet wide and as much as 200 feet long and certainly much more than 500 feet deep, occur. These conditions are responsible for most of the presently known ore reserves on the property.

The fact that the Superior and Iron Mask shear zones are continuous for several miles and cut the regional slate and schist country rocks is most significant and together with the fact that the ore structures are contained in true fissure veins, certainly guarantees that the ore will persist to substantial depths, probably in excess of 2,000 feet.

ORE DEPOSITS

SUPERIOR SHEAR ZONE:

The ore shoots and lenses in the Superior shear zone vary in width from as little as 1 foot in parts of the Noble mine and Antelope Mine (not part of the property), to more than 18 feet in the area of the Superior shaft. The average width in the areas where the Superior ore reserves are contained appears to be between 6 and 8 feet, and definitely widens significantly with depth.

There are more than 500 feet of total proven length of ore in this area and more than 500 feet of certain depth, of which less than one third has been mined by previous operators. Thus, approximately 100,000 tons of ore should be available for mining from the Superior shaft area, primarily from the existing workings and extensions thereof.

The Noble Mine ore zones are much narrower, but appear equally persistent along strike and to depth, so probably between 15,000 and 25,000 tons of ore could be mined from this area. An additional 500 feet of depth continuity would increase the available reserves to between 350,000 and 500,000 tons of proven ore in the Superior shear zone.

IRON MASK SHEAR ZONE:

The ore contained in the Iron Mask shear zone varies in width from as little as 1 foot to as much as 5 or 6 feet, and probably averages 3 feet in width in the better sections that would be mined first.

At least 2 parallel veins and branches thereof have been proven to have a combined total length in excess of 1000 feet, of which probably half would be mined in the near future to an average depth of 200 feet.

Assuming an average width of 3 feet, the ore reserves contained in the Iron Mask veins would be in excess of 25,000 tons having an average grade of more than \$200.00 per ton.

The ore widths and grade both increase with depth in the Iron Mask deposits and geological conditions almost do guarantee the persistence of the ore for 1,000 feet down dip, so the actual assured ore should exceed 100,000 tons.

Smelter receipts for most of the ore shipped from the Superior and Iron Mask Mines, as well as others in the area, have been lost or destroyed, primarily because most of the actual mining was done prior to the 1940s' when records were not kept in sparse development areas as has been the case in recent years. However, sufficient receipts have been located from U. S. Smelting & Refining Co. International Smelting & Refining Co. and American Smelting and Refining Co. to substantiate the ore grade figures provided by the various individuals involved in mining some of the ore that was removed and sold from these mines.

Apparently the ore removed from between the 100 and 200 foot levels of the Superior Mine averaged 23 oz Silver, 15% Lead and 2.5% Zinc, which our recent work tends to substantiate. The best calculations that we can make concerning tonnages of ore mined from the Superior, Iron Mask, Noble and adjoining mines is in the range of 75,000 tons, worth possibly between \$200.00 and \$300.00 per ton at the current prices.

CONCLUSIONS

Sufficient work has been done in the past 70 years both on surface and to depths of more than 300 feet to prove that it is feasible to mine ore at a profit from all of the old mines contained on the property.

Only limited tonnages of ore ever have been mined, not in excess of 80,000 tons, which in no significant way depleted the ore potential of these mines.

The ore remaining to be mined certainly exceeds the 125,000 tons by all accounts and could be as much as the 5,000,000 tons mentioned in the North American Exploration reports, and the average grade appears to be in the \$150.00 to \$250.00 range at present prices.

Stated factually and simply, all past development of the Superior Mines in question has merely proven their great lateral and vertical extent of the ore contained on these properties and established an approximate grade and potential overall tonnage of ore that probably can be mined in the future, without diminishing to any measurable extent the ore reserves themselves.

I am completely satisfied that substantially in excess of 125,000 tons of ore containing at least \$150.00 per ton in Silver, Lead, Gold, Zinc and Copper can be mined by the rehabilitating and extending laterally the old mine workings. Probably 5 times this amount of ore could be mined by deepening these workings another 500 feet.

On this basis, the net proceeds from ore to be mined from EXISTING workings and extensions thereof would exceed \$7,500,000.00 and probably the net proceeds from mining the 500 foot depth extension beneath these workings should exceed \$30,000,000.00.

Mr. William L. Davis, the previous operator of the various mines on the properties, has taken samples and secured assays from practically every occurrence of ore existing on each of the mines, including ore stockpiles at the main Superior shaft and the newer cuts made recently.

He stated that between 12,500 and 15,000 tons of ore in the 3 principle stockpiles contained an average of .02 oz. Au, 15 oz. Ag, 25% Pb, 6% Zn, and 7.5% Cu. based on 39 samples he took.. The Superior mines engineering division has not had the opportunity to sample to this extent on the 3 stockpiles to verify these assays.

It is our opinion that the stockpiles have a very definite aggregate value of some \$750,000.00 in Silver, Lead, Zinc with some Copper. The area where we found Gold in small quantities would be an underground operation and although values to 2.8 oz. per ton, this type of operation would not be compatible with a Silver-Lead development.

Mr. Davis also stated that he has secured assays as high as 23% Copper from the East Copper Zone adjoining the Majuba Hill Mine and 6.8 oz. of gold from a grab sample taken about half a mile North of the Iron Mask mine, in the same vicinity where we have panned Gold but not taken any representative samples for assaying.

The results of this work prove that a substantial mining operation is feasible on the Superior Mine Properties. As recently as two weeks before this report was begun, two engineers from Los Angeles took out samples that were run in Salt Lake City by a Dr. Anderson, that assayed in excess of \$1,600.00 per ton from the surface around the Iron Mask.

The amounts mentioned above are merely from the existing workings and do not reflect any further work on the outcroppings, cuts, exploration shafts or unmined areas.

RECOMMENDATIONS

Some or all of the mines on the property should be placed into production, either to produce direct shipping ore or to feed a mill to be built on the property, depending strictly on policy decisions to be made by Superior Mines.

Initial production can most profitably come from parts of the Iron Mask section of the property where ore grading up to nearly \$1,000.00 per ton can be mined in tonnages of between 10 and 25 tons per day after rehabilitation and a development cost of between \$50,000.00 and \$75,000.00. This ore can be selectively mined and an average grade of approximately \$300.00 per ton maintained for at least 10,000 tons.

Before the end of 1976, an integrated operation from mining to refinery is planned to be in operation at a rate of approximately 200 tons per day with an average millhead somewhat less than \$200.00 per ton.

An accompanying feasibility study examines in some detail the production options once initial production is achieved.

Respectfully submitted;

J. Stanley Hodgson
Mining Engineer

MINES DEVELOPMENT PROGRAM

for the

ANTELOPE DISTRICT PROPERTIES

of the

SUPERIOR MINES, INCORPORATED

Prepared by: RESOURCES DIVISION
2130 Dickerson Rd.
Reno, Nevada. 89502
(702) 322-2268

Signed _____ Dated _____

ESSENTIAL DEVELOPMENT

Substantial tonnages of relatively high grade SILVER-LEAD ore, with lesser amounts of GOLD, Zinc and Copper, have been established to be contained in the SUPERIOR, IRON MASK, NOBLE and SUNRISE mines comprising part of the property. By all of the accounts the average dollar value of the ore present at prices quoted 12/1/75 varies from about \$180.00 to well in excess of \$300.00 per ton depending upon the mine in question. The minimum total quantity exceeds 125,000 tons available essentially from existing workings to be rehabilitated and extended laterally as described herein.

The minimum total quantity of ore that should be blocked out and indicated by complete and total development program outlined herein should exceed 500,000 tons having an average grade in the range of \$150.00 to \$250.00 per ton if the results of previous work is representative of the results to be achieved in the future.

Adequate camp facilities and other surface facilities, including roads, must be provided and improved to facilitate carrying out the program outlined herein.

The initial work should be concentrated in the IRON MASK section of the property, since the greatest return can be realized from the expenditure of the least amount of money and time here.

As soon as shipments of ore are made from this section, portions of the profits derived therefrom can be utilized to begin the rehabilitation of other sections of the property as outlined, provided that production is not only continued, but expanded from the IRON MASK SECTION.

IRON MASK SOUTH ADITS

The two adits comprising the IRON MASK South Adits are approximately 100 yards south of the IRON MASK shaft, and are situated on the IRON MASK West Vein about 40 feet apart vertically.

Both adits have caved at their portals and at several places for the first 200 feet. Considerable rehabilitation is necessary to open either adit for the first 200 feet.

Because of the high grade ore available in this vein, these adits should be opened and the bottom one driven for approximately 500 feet Northwesterly on the vein, which should block out in excess of 10,000 tons of good ore.

COSTS of this work will be as follows:

Drilling & Blasting	\$ 1,500.00
Removing Rock with Loader	2,000.00
Timber for Portals and caved section	2,500.00
Installation	1,000.00
500 Ft. of adit Contract	<u>40,000.00</u>
TOTAL COSTS IRON MASK SOUTH ADIT	\$47,000.00

IRON MASK SHAFT

The shaft originally was sunk 288 feet on ore and subsequently bulkheaded at approximately 80 feet to enable removal of the South shaft pillar above this level, which was solid ore.

To rehabilitate the shaft so that it can be used to mine the highest grade ore known to occur on the property, substantial work must be done, as follows:

IRON MASK SHAFT 2

Rebuild Headframe	\$ 3,000.00
Install hoist	9,000.00
Repair shaft collar	2,500.00
Blast & remove rock on Bulkhead	3,000.00
Timber & backfill shaft pillar	3,500.00
Properly timber shaft with separate manway	4,500.00
Drive 1,000 feet of drift to prove and develop ore evident for mining	<u>75,000.00</u>
 TOTAL COSTS OF SHAFT REHABILITATION	 \$100,000.00

IRON MASK SOUTHEAST ADIT

This adit has caved at the portal due to lack of proper timbering and most important, must be reopened and retimbered. Extending the adit approximately 100 feet in a Southwesterly direction will intersect one of the IRON MASK veins that outcrop on surface at a depth of more than 50 feet. The width of this vein on surface appears to be between 3 to 5 feet and it should be at least this wide where intersected. Drifting on this vein for 500 feet should produce about 1,200 tons of ore and block out another 10,000 tons.

COSTS of reopening and extending this addit follows:

Muck out caved rock	\$ 1,000.00
Timber for portal	1,500.00
Installation	500.00
600 feet of adit complete Contracted	<u>45,000.00</u>
 TOTAL COST of Southeast Adit	 \$48,000.00

IRON MASK EAST ADIT

This adit was collared about 200 feet east of the IRON MASK shaft at an elevation about 50 feet below the shaft collar and driven for an unknown distance on a narrow vein of exceptionally high grade silver that appears to intersect the shaft vein.

This adit should be opened up, retimbered and joined to the shaft in order to provide alternate access and some storage for mining on the lower levels of the IRON MASK shaft vein.

COSTS of this work will be as follows:

Reopening the portal	\$ 1,500.00
Timbering Portal	1,500.00
Enlarging adit and joining shaft	<u>22,000.00</u>
TOTAL COST of East Adit	\$25,000.00

SUNSET ADIT

The Sunset adit was driven nearly 1,000 feet Southeast on the SUPERIOR veins starting about 500 feet Southeast of the SUPERIOR shaft at an elevation about 50 feet above the collar of the shaft. This adit is caved at the portal and at various places throughout its length. Some visible ore of relatively low grades are evident in greater strength as it progresses toward the Antelope Mine in what seems an attempt to intersect the longer adit of the Antelope.

COSTS of rehabilitation will be as follows:

Retimbering Portal	\$ 3,000.00
Laying track and pipe	10,000.00
Mucking out caved sections	7,000.00
Retimbering length of caved sections	<u>15,000.00</u>
TOTAL COSTS of Sunset Adit	\$35,000.00

SUPERIOR DRAINAGE ADIT

The drainage adit was driven nearly 2,500 feet to intersect the SUPERIOR shaft at the 245 foot level, and thereby facilitate removal of mine water from the shaft sump below the bottom or 300 foot level in the mine.

This adit was not driven on ore for its length, but it did intersect good ore in several places. Two extensions of this adit, one to the Southeast for 1,500 feet on ore of the SUPERIOR veins and the other a crosscut about 1,200 feet to the Northeast and drifts about 800 feet on the IRON MASK ore, should prove and open up for mining in excess of 100,000 ton of ore grading in excess of \$200.00 per ton at present prices.

COSTS will be as follows:

Rehabilitating present Drainage Adit	\$ 75,000.00
Laying track and pipe for entire length	20,000.00
Southeast 1,500 foot of drift	150,000.00
Northeast 1,200 foot of drift	100,000.00
Various adits to intersect veins	<u>250,000.00</u>
TOTAL COSTS of Drainage Adit	\$595,000.00

NOBLE MINE

Two shafts and an adit originally gave access to the ore in the NOBLE MINE, but none is in usable condition to mine any tonnages of ore. The shaft was only 85 feet deep, so should be deepened another 115 feet to open one new level.

COSTS will be as follows:

Collar shaft	\$ 2,500.00
Erect headframe	5,000.00
Install hoist	6,500.00
Retimber present shaft	2,500.00
Sink shaft additional 115 feet.	25,000.00
Drift 400 feet on 200 foot level	<u>36,000.00</u>
	\$77,500.00

ESSENTIAL DEVELOPMENT COSTS RESUME

IRON MASK SOUTH ADIT	\$47,000.00
IRON MASK SHAFT	\$100,000.00
IRON MASK SOUTHEAST ADIT	\$ 48,000.00
IRON MASK EAST ADIT	\$ 25,000.00
SUNSET ADIT	\$ 35,000.00
SUPERIOR DRAINAGE ADIT	\$595,000.00
NOBLE MINE	\$ 77,500.00
SUPERIOR MINE	-0-
TOMKIN MINE	-0-
TOTAL COSTS OF UNDERGROUND WORK	<u>\$927,500.00</u>
Contingencies	75,000.00

No work is contemplated on the Superior shaft or the Tomkin workings at this time. Further development work is needed.

FEASIBILITY STUDY
for
OPERATION OF THE MINING PROPERTIES
of the
SUPERIOR MINES, INCORPORATED
situated in the
ANTELOPE MINING DISTRICT
PERSHING COUNTY, NEVADA

Prepared by: RESOURCES DIVISION
2130 Dickerson Rd.
Reno, Nevada. 89502
(702) 322-2268

Signed _____ Dated _____

PROPERTIES AND ACCESS

The mining properties are situated in the Antelope Mining District in sections 25,26, and 36 of Township 33N, Range 30E and in Sections 30 and 32 of Township 33N, Range 31E and Section 4 of Township 32N, Range 31E, MDM, about 110 air miles Northeast of Reno, Nevada and 22 miles East of Imlay, Nevada.

The property has accessibility all year by car or truck from Imlay by traveling 22 miles Westerly on secondary county roads. Dirt roads on the property are adequate for present requirements, but should be improved prior to the beginning development of the properties as outlined herein.

Topography of the property is moderately steep hills and valleys, with relief averaging about 600 feet per half mile at an elevation between 5500 and 6800 feet.

The climate is somewhat arid, with some snow temporarily encountered in the winter at the higher elevations. Winters are moderately cold and the summers are not excessively hot.

Vegetation is sparse, consisting of sagebrush at the lower elevations and PINON pines at higher elevations. The water situation is unknown except for several springs that seem to emanate from areas within the property, these are however, not adequate to operate a mine. The flooding and seepage conditions in the Superior shaft seem to be of a continuous nature and it is possible that they could be developed into enough usable water for mining only.

Electricity must be brought in or operated from a widely spaced generating program, both problems preclude the placing of a mill at the property at this time.

The Antelope Mining District properties can be placed into profitable operation in one of several ways, depending upon the amount of money that can be spent before the entire operation becomes self-sustaining.

As little as \$75,000.00 or as much as \$3,000,000.00 can be spent profitably to develop these properties, depending upon the size and scope of operations to be conducted.

The options, costs, anticipated profitability and time involved are expressed as follows:

I. IRON MASK SOUTH ADITS

1. Move in costs (5 days)		\$10,000.00
2. Reopen both portals	(10 days)	2,500.00
3. Timber both portals complete	(10 DAYS)	3,000.00
4. Muck out caved sections and retimber both adits	(10 days)	1,500.00
5. Install track and pipe to the face of the bottom adit	(20 days)	5,000.00
6. Construct road to portals	(3 days)	1,000.00
7. Construct 100 Ton ore bin	(5 days)	3,500.00
8. Secure 300 cfm or larger air compressor, mucking machine and 3 cars, 2 Jackleg drills and miscellaneous equipment		50,000.00 12,000.00
9. Extend lower adit a distance of 500 feet at a per foot cost of \$80.00 and a profit of \$100.00 per foot for a profit of \$100,000.00		
10. Working capital required at this point		25,000.00

This work will require 75 days on a 1 shift basis.

11. Open "Cut & Fill" stopes and mine 10 tons of ore per day on 5 day basis per week at a profit of \$5,000.00 per week Gross.

The work to this point will require: 63 Days to setup
75 Days to extend adits
120 Days to Fill stopes
258 Days from Start.

The work to this point will produce: 1,000 Tons of ore.
at an average grade of \$200 per ton \$200,000.00

The Costs to this point will be: \$215,500.00
Further costs will be amortized against production at the
rate described in (11.) and covering the 120 day period.

12. Spend 75% of this profit or \$3,750 per week to drive a new adit approximately 500 feet to intersect the same ore vein nearly 200 feet down the dip of the ore. This will require 90 days on a 1 shift basis.
13. Drive both ways on ore for a total of 500 feet at a profit of \$20.00 per foot or \$10,000.00 during a 60 to 80 day period.
14. Mine up to 10,000 tons of ore at a rate of 20 tons per day and at a profit of approximately \$100 Net per ton over a period of between 1 and 2 years.

An initial investment of not more than \$75,000.00 should enable income to be secured from the sale of ore and the reinvestment of not more than \$75,000.00 at the rate of 75% of the earned income should earn a production profit of approximately \$1,000,000.00 within less than the 2 years.

This working program is dependant on the total expenditure of initial capital in the \$75,000.00 range with the actual ore areas already blocked and proven and is considered to be the MOST economical projection feasible for the area under consideration.

The work to this point would concern only the IRON MASK SOUTH ADITS and would not consider any further workings.

II. ENTIRE IRON MASK ZONE

1. Complete I(1) to I(14) and coincidental with I(11) to I(14) do the following:
- | | | |
|---|------|-------------|
| A. Rebuild the IRON MASK headframe | | \$ 3,000.00 |
| B. Install a mine hoist and compressor | (5) | 9,000.00 |
| C. Repair the shaft collar | (3) | 2,000.00 |
| D. Blast & remove rock from bulkhead | (5) | 3,000.00 |
| E. Timber & backfill mined shaft pillar | (10) | 3,500.00 |
| F. Properly timber shaft with manway | (10) | 4,500.00 |
| G. Begin limited mining of ore from bottom of shaft in new condition | (10) | 5,000.00 |
| H. Muck out caved rock from Iron Mask S.E. adit with new machines | (3) | 2,000.00 |
| I. Retimber portal of S.E. adit | (3) | 2,000.00 |
| J. Secure equipment & supplies needed | | 12,000.00 |
| K. Drive adit 200 feet to intersect and follow additional ore exposed | (30) | 19,000.00 |
| L. Reopen and timber Iron Mask east adit | (5) | 3,000.00 |
| M. Build 100 ton ore bin at Shaft | (5) | 3,500.00 |
| N. Build change house and service bin at Shaft with security room | (5) | 3,500.00 |
| O. Secure 4 ore cars and install skip in Shaft including cables and lines | (5) | 5,000.00 |
| P. Working capital required at this point. | | 30,000.00 |

This work will require 100 days on a 1 shift basis.

- Q. Begin drifting both ways from shaft in ore
R. Begin stoping and producing ore from shaft and the IRON MASK S.E. adit at total rate of 25 tons per day earning \$2,500.00 per day profit for 25 days.

Total Capital required including carryover from Least Cost Program would approximate \$175,000.00

ENTIRE IRON MASK ZONE (cont)

An initial investment of \$175,000.00 will enable the entire IRON MASK shear zone area to be opened up to a depth of 280 feet, from which can be produced a minimum of 25,000 tons of ore having an average grade of probably in excess of \$200.00 per ton, from which a Gross profit of approximately \$2,500,000.00 should be earned within a 2 year period.

Since 1,600 tons of this \$200.00 ore would return the invested capital, there is almost no risk of financial failure in the project by adhering to the development plans formulated herein.

This working program is dependant on the total expenditure of initial capital in the \$175,000.00 range with the actual ore areas already blocked but in several areas still unproven and due to this one facit it is felt that with the expenditure of funds of prime importance here, even though the returns projected are soundly thought out and felt to be secure, the decision regarding further development in the several areas covered by this study must be left to the Board of Directors.

It is the recommendation of the RESOURCE DIVISION that the development of the entire IRON MASK zone be undertaken as this division has NO reservations as to its success.

No considerations of Base Camp costs have been held within the considerations of the first nor the second study.

Due to the size of the operations contemplated on a 1 shift basis only, it is felt that commuting would be most desirable.

CO-ORDINATED DEVELOPMENT OF ENTIRE PROPERTIES

1.	Entire base camp with full complement	\$ 65,000.00
2.	Conduct II(A) to II(P) coincidental with the following	150,000.00
3.	Build shops and other surface facilities including sewage, roads and bridging	125,000.00
4.	Remainder of equipment and supplies	150,000.00
5.	Construct 200 Ton Per Day mill on site	500,000.00
6.	Rehabilitate present drainage tunnel	75,000.00
7.	Rehabilitate SUNSET tunnel	38,000.00
8.	Rehabilitate NOBLE mine workings	71,000.00
9.	Extend drainage adit 3,500 feet	280,000.00
10.	Complete development of IRON MASK drifts and adits	127,000.00

This work will require 350 days on a 2 shift basis.

11.	Miscellaneous equipment and supplies	\$110,000.00
12.	Miscellaneous Development work	150,000.00
13.	Contingencies, Force Majeure, Etc.	350,000.00
14.	Working capital requirements	900,000.00

TOTAL CAPITAL REQUIRED \$3,000,000.00

This working program is NOT dependant on the total expenditure of \$3,000,000.00 or even the \$2,000,000.00 that has been budgetted for this program. These figures are based on total outlay and do not reflect the input expected from the ore that will be recovered during the working life of the 350 day period required to open and rehabilitate the existing workings. It IS expected that such input should balance the outgo of funds within half this period and that by the end of the First year, the entire property should be producing ore at \$200.00 per ton at the rate of 200 ton per day with approximately \$150.00 per ton in Profits. All values are expressed based on the actual values of Assayed ore as found, at this time.

PROFITS AND POTENTIALS

ANALYSIS

The explored sections of the property probably contain between 350,000 and 500,000 tons of formidable ore having an average recoverable grade in excess of \$100.00 per ton to a depth of 1,000 feet.

The tonnages of ore presently available for mining from existing shafts, adits and drifts and lateral extensions thereof almost certainly is in the range of 125,000 to 150,000 tons containing an average of somewhere between \$100.00 and \$200.00 in recoverable metals. It has been authentically determined by actual assay that the average values of the entire area will exceed \$285.00 per ton.

Assuming the smallest tonnage of the poorest average grade, a net smelter return of 75% of the gross recoverable ore value, complete plant and development cost amortization against this income and mining and milling and other costs of \$35.00 per ton of ore, then \$7,500,000.00 of gross income would be generated at a total cost of approximately \$5,500,000.00 leaving an operating profit of approximately \$2,000,000.00.

Assuming the 500,000 tons of ore averaging \$200.00 per ton, smelter returns would be \$75,000,000.00 at a cost of \$19,500,000.00, or say twenty million, leaving a sound profit of \$55,000,000.00.

Realistically, based upon all presently known facts concerning the various ore deposits exposed on these properties, in excess of 250,000 tons of ore containing an average in excess of \$150.00 per ton in recoverable metal values should be available for mining. Thus in excess of \$28,000,000.00 income should be available at a cost of less than \$11,000,000 leaving a profit of more than \$17,000,000.00 before taxes.

ANALYSIS (cont)

The maximum capital investment required will be \$3,000,000.00 and the maximum capital exposure to loss will be \$2,000,000.00 estimated against the full and completed development and actual production stages.

Since 25,000 tons of ore, that is absolutely available and even exposed, will earn a profit for the operation, theoretically the loss potential is Zero and the presently realistic profit potential is at least FIVE to SEVEN times the maximum investment required.

It is the opinion that the SUPERIOR MINES properties are as reflected in the many engineering reports available through Sterling Mines, Great Western Silver and Lead Mines, North American Exploration, Edward Jucivec and Clarence Doyle and James Walker, some of the finest properties in the Western Hemisphere.

A detailed breakdown of this report is available at the RESOURCES DIVISION of S.M.I. at 2130 Dickerson Road, Reno, Nevada. 89502.

Copies of this and other reports are available only to authorized personnel or shareholders in S.M.I. They may not be reproduced, copied or altered in any way and are not to be considered authentic unless personally endorsed by an executive of SUPERIOR MINES, INC.

J. Stanley Hodgson
Vice-President
RESOURCES DIVISION
SUPERIOR MINES, INC.

(Authorized signature)