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# **VENUS MINE FEASIBILITY REPORT**

**MACDONALD CONSULTANTS LTD.  
ACRES WESTERN LIMITED**

**OCTOBER 1968**

November 8, 1968.

Mr. J. M. O'Brien,  
President,  
Venus Mines Ltd. (N.P.L.),  
890 West Pender Street,  
Vancouver, B.C.

Dear Mr. O'Brien:

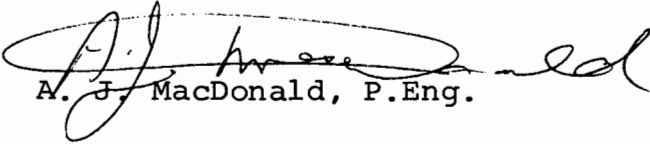
We have pleasure in enclosing our Feasibility Report on your Venus property.

The study shows that your presently identified ore reserves will allow the mill to operate for about five years at the projected annual rate of 105,000 tons per year. Expenditure of a further three and a half million dollars will be required to bring the mine to production.

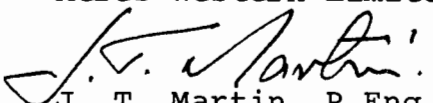
This expenditure is justified by a projected annual gross operating profit of over two million dollars. We have provided supporting descriptions, estimates and drawings in the report and have defined the separate responsibilities accepted by us. If amplification of any of this material is required we will be pleased to provide it.

Yours very truly,

MacDonald Consultants Ltd.

  
A. J. MacDonald, P.Eng.

Acres Western Limited.

  
J. T. Martin, P.Eng.

VENUS MINES LTD. (N.P.L.)

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## 1. INTRODUCTION

The Venus vein was discovered by J. M. Pooly and J. Stewart in 1901. Developments between 1904 and 1908 led to the construction of a 100 ton per day mill which operated for almost a year. Early records, while incomplete, indicate that several thousand tons of ore containing gold and silver, which at present day values would have been worth about \$140 per ton, were produced from the vein.

During the intervening years several attempts to mine the property were made and a number of favourable investigations led to enthusiastic but unsuccessful attempts to reorganize for production.

In 1966 Venus Mines Ltd. (N.P.L.) acquired the property and commenced a program of underground development including exploratory drilling, drifting, cross-cutting and raising. The program is under the direction of MacDonald Consultants Ltd. Sufficient encouraging data was assembled from this program that by June 1968 MacDonald Consultants Ltd. and Acres Western Limited were commissioned jointly to undertake a study of the feasibility of bringing the Venus Mine into production.

It was agreed that MacDonald would be responsible for consideration of all mining and exploration aspects including determination of ore reserves, and grades and mining techniques, capacities and costs. Acres' responsibilities for the mill include interpretation of metallurgical laboratory testing, determination of the milling and recovery processes and the design of all surface facilities except those needed for mining. Acres have also designed the permanent mine access road and are presently supervising its construction.

Lakefield Research of Canada Limited have conducted all metallurgical laboratory testing.

## 2. SUMMARY AND CONCLUSIONS

During a development period of two and a half years, investigations have been sufficiently completed to indicate ore reserves in the Venus vein of:

Proven	65,470
Probable	59,375
Inferred	<u>425,955</u>
TOTAL	<u>550,800</u> tons

These reserves have average grade for mill feed purposes of:

Gold	0.39 oz/ton
Silver	11.55 oz/ton
Lead	2.58 %
Zinc	1.67 %
Cadmium	0.09 %

A detailed estimate indicates that the cost of bringing the mine into operation from its present state of development will be \$3,511,000.

Metallurgical testing indicates that this grade and type of ore can be processed to produce concentrates having a net smelter value of \$35.93 per ton of ore processed. This figure is based on the following metal prices in Canadian dollars.

Gold	\$37.60/oz.
Silver	2.15/oz.
Lead	0.13/lb.
Zinc	0.135/lb.
Cadmium	2.65/lb.

A variation of \$0.10 in the price of silver would effect a \$1.09 increase or decrease in the net smelter return per ton of ore. Similarly, \$1.00 variation in the price of gold would alter the net smelter return per ton of ore by \$0.27.

The ore reserves of 550,800 tons will allow continuous operation at the annual rate of 105,000 tons for approximately five years. Based on the projected grades and recoveries and assumed metal prices, the annual gross income of the mine will be \$3,772,650 or \$35.93 per ton of ore.

Annual operating costs, including continuing development costs, are projected to be \$1,732,500 or \$16.50 per ton of ore. A gross annual operating profit of \$2,040,150 or \$19.43 per ton of ore is therefore available for the repayment and servicing of debt, the payment of taxes, and the support of the shareholders' equity.

In summary:

	<u>\$ / Year</u>	<u>\$/Ton Ore</u>
Gross Revenue	\$ 3,772,650	\$ 35.93
Operating Costs	<u>1,732,500</u>	<u>16.50</u>
Gross Operating Profit	<u>\$ 2,040,150</u>	<u>\$ 19.43</u>

It is apparent that a gross operating profit of this magnitude justifies an additional capital expenditure of \$3,500,000 to bring the property into production.

### 3. GENERAL DESCRIPTION

#### 3.1 Location and Access

The Venus Mine is located in the Yukon Territory about 1½ miles north of the British Columbia border and about 50 miles south of Whitehorse, Yukon Territory, as shown on Plate 1. The existing mine portals, at El. 2600 and El. 2700 on the eastern slope of Montana Mountain, overlook the Windy Arm Reach of Tagish Lake which is at an average level of approximately El. 2152.

An all-weather gravel road is presently under construction to connect the mine and mill site with Carcross and the territorial road system. This road will be approximately 16 miles in length with a width of 24 feet.

The metal concentrates produced at the mill will be trucked over this access road to Carcross for shipment via the White Pass and Yukon Railway to Skagway, Alaska, an ice-free port on the Pacific Ocean about 47 miles south of Carcross. Mine and mill supplies will be shipped via Skagway on the reverse route. An existing rail siding immediately south of Carcross along the Bennett Lake shore line will serve for trans-shipment to and from the mine.

Transport of construction materials and equipment to the site could be via the Alaska Highway or the coastal freight and passenger service provided by the White Pass and Yukon Railway between Skagway and Vancouver. Whitehorse is served by regularly scheduled flights from Vancouver by the Canadian Pacific Airlines.

#### 3.2 Accommodation

The total operating staff of this mine as detailed in the Estimate of Operating Costs is 66 people. Accommodation for 19 has already been provided at the mine in the form of two bunkhouses which it is proposed to transfer to Carcross. An existing house trailer will also be available for the mine manager and tentative arrangements have been made to procure five additional trailers.

Several houses are available in Carcross at the present time and it is believed that further building can be encouraged by providing serviced building lots for employees. In summary, the operating staff is expected to be accommodated as follows:

Existing house trailer	1
Existing Carcross bunkhouses	16
Existing mine bunkhouses relocated in Carcross	19
Existing houses in Carcross	4
Trailers to be purchased	5
Serviced subdivision lots	<u>21</u>
 TOTAL	 <u><u>66</u></u>

### 3.3 Climate

The Venus Mine area, situated in the lee of the Coast Mountains, is characterized by a cool short summer and relatively low precipitation.

Total annual precipitation is approximately 11 inches, spread more or less uniformly throughout the year. Average snowfall is about 48 inches.

Average extreme daily temperatures vary between about -40°F in winter to about 75°F in summer, with absolute extremes varying between -60°F to 90°F. Mean monthly temperatures vary between about 4°F in January to about 55°F in July.

This area is on the southern verge of the permafrost zone where sporadic permafrost conditions can be expected, although no permafrost has been encountered in the mining operations to date. Prevailing winds are from the south.

## 4. GEOLOGY AND ORE RESERVES

### 4.1 Regional Geology

The mineralized area of Montana Mountain on Windy Arm is situated a few miles north-east of the granite batholith of the Coast Range Intrusion. Flanking this granite, in the Tagish and Bennett Lakes area, are limestone, quartzites, schists, etc. of the Lewes River Group. Near the mouth of Windy Arm a thick belt of bedded crystalline limestones of the Taku Group, striking north-west, occurs and can be traced south-easterly into British Columbia. The limestones are cusseeded southwards along Windy Arm by a belt of sediments of the Tagish series consisting of coarsely bedded, dark argillaceous rocks with occasional bands of amygdaloidal basalt. In the south portion of Windy Arm the Tagish series is replaced by igneous rocks that are mainly andesite flows of porphyritic character, known as the Tutshi series. These porphories outcrop along for the shore for about five miles before being succeeded by a series of clastic rocks.

### 4.2 Historical Geology

Montana Mountain is situated close to the western edge of a belt of sediments of the Tagish series. The geosynclinal basin in which these sediments were deposited is known as the Whitehorse Trough. Sedimentation commenced in late Palaeozoic time and continued into lower or middle Cretaceous.

The Triassic sedimentation in deep water was followed by periodic uplift of the western edge of the trough from which redeposition and some ejections formed the sediments and flows of the Lewes River group. During the lower Jurassic, renewed uplift restricted the lateral development of the trough. At the same time a fault block that is now exposed across the mouth of Windy Arm began to be elevated in the middle of the trough. In the middle Jurassic to middle Cretaceous, the basin became progressively shallower, uplift cut off connection with the sea, and marine deposition ceased.

Towards the end of the Cretaceous, volcanic sources on the west side of the trough were reactivated with ejection of the thick series of volcanics of the Tutshi series of porphyritic andesites and breccias.

The disturbances culminated in the intrusion of the granodiorite bodies of the Coast Range batholith to the west of the trough. The late stage liquors from this intrusion seeping up and through the fissures of the overlying Tutshi series to the east, resulted in the deposition of the mineralized veins on Montana Mountain.

#### 4.3 Economic Geology

The silver-gold mineralization of Montana Mountain is confined mainly to the Tutshi group and occasionally occurs in the adjacent granodiorite bodies. The veins on the Venus Group all occur within the andesite flows of the Tutshi Group. The Venus Vein is traceable for the length of some 5,000 feet across the property and is the structure which Venus Mines Ltd. is currently developing. Fourteen other veins, some of which have produced ore for shipment, are known to exist on the property. Several of these veins definitely warrant future work.

The veins are all very similar in character and are mineralized quartz veins in true fault fissures.

The Venus Vein occurs in a fissure of compound nature consisting of two or more parallel fractures, extending over a thickness of several inches up to eight feet. In most places a thickness of 3.0 feet is average where the vein is exposed by underground workings. The intervening vein material consists of crushed wall rock which has largely been replaced by silica carbonates, chlorite and sericite. Bleaching and pyritization of the andesite wall rocks extends several feet beyond the limits of the vein fissures. The vein has undergone repeated reopening, as is shown by the well developed comb structure in the quartz gangue, and the banded nature of the sulphide deposition. The ore minerals are irregularly distributed within the veins and consist of galena, pyrite, arsenopyrite and sphalerite as the most abundant sulphides, with minor tetrahedrite and chalcopyrite in a quartz gangue.

In places, the sulphide bands consist almost entirely of galena with which most of the silver deposition is associated, and sphalerite, which contains a very high percentage of cadmium. The gold is distributed throughout the vein and appears with galena when blebs of the sulphide are disseminated through the gangue.

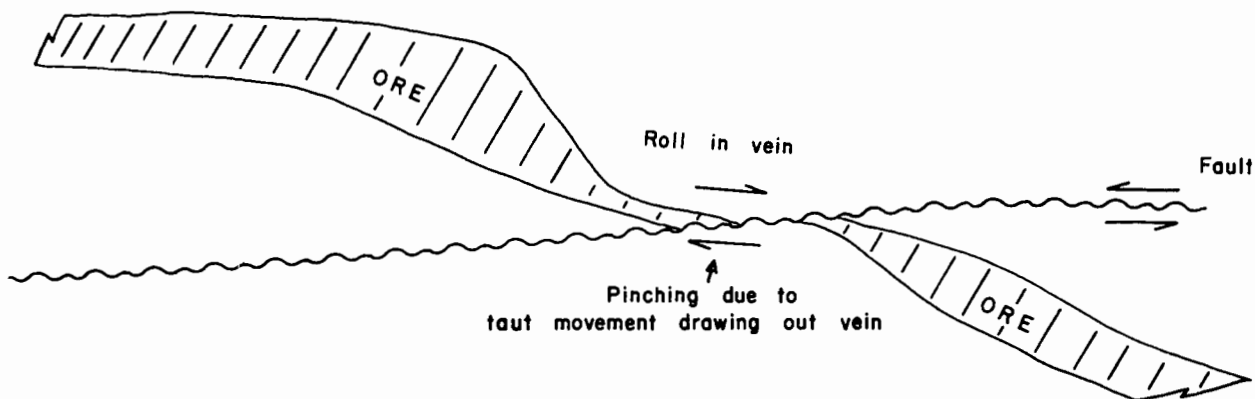
The vein strikes about N 10° E and dips to the west into the mountain from nearly flat to approaching 60° in local areas. The dip of the vein as observed in the underground workings averages between 20° - 30°.

Faulting on the vein is generally of two separate types:

- a. Small faults which are both normal and reverse and cut the vein almost at right angles to the vein strike. These faults tend to offset the vein very little either horizontally or vertically.
- b. Large faults that are almost parallel to the vein strike and which cause the repeated large rolling effect along the vein strike. These faults are both post-mineralization and pre-mineralization.

As a result of this faulting, the vein tends to roll both along strike and dip, with associated pinching and swelling. Concentration of ore values appears to be closely tied in to this faulting and ore control for future mining will largely depend on the interpretation of the faulting structure.

Typically the ore is concentrated in swells associated with the main faulting.



#### 4.4 Sampling Procedure

1. Chip samples are taken across the vein and adjacent wall rock at approximately six foot intervals after washing of walls and vein.
2. Sample lengths are chalked on wall, breaking samples with mineralization.
3. Samples are averaged for each section by converting assays to assay feet.
4. Low values outside four feet in total width are neglected.
5. Samples are plotted on 20 scale drawings and apparent value over \$15.00 in gold and silver is considered ore.
6. Ore zones are indicated on 20 scale assay plans.
7. Tonnages are calculated using a factor of 10 cubic feet per ton.

For the purposes of metallurgical testing and ore reserve evaluation, bulk samples were also taken. A mechanical chipper was used to cut channels 6 inches deep at five foot intervals in each ore zone. All channels were cut to a minimum length of four feet, the minimum mining width, and in many cases to widths of four to five feet.

In all, some 37 samples, weighing approximately 100 pounds each, were used to make up a composite bulk sample which is considered to be typical of the quality of ore to be produced. Its grade is as follows:

Lead	Zinc	Cadmium	Gold	Silver
2.58%	1.67%	0.093%	0.39oz.	11.55oz.

#### 4.5 Ore Reserves

##### Definitions:

Proven Ore - Ore outlined by multiple workings extended to a maximum of 50 feet

beyond any working where no cut off is indicated by sampling, or 50 feet up dip and 50 feet down dip of an ore zone indicated by one drift only.

Probable

- Ore - 1. Fifty feet up dip and fifty down dip from proven ore where no cut off is indicated by sampling.
2. Where strike length exceeds 175 feet, one level (175 feet) up dip and  $\frac{1}{2}$  level (90 feet) down dip.

Inferred  
Ore -

The dip length of the vein from the 2600 level to surface is 1,000 feet and the strike length from the end of the 2700 west drift to the end of the old Venus Mine workings is 3,000 feet. The strike length of the 2700 level drifts is 2,150 feet with 654 feet or 30% in ore, at an average width of 4.5 feet.

The geological indication is that the vein structure continues to the south, north and down dip. Ore is inferred for only 200 feet beyond the existing workings. Thus, the inferred ore in this area at 30% ore density is 425,955 tons.

Ore Reserve Summary:

Proven Ore Reserves	65,470 tons
Probable Ore Reserves	59,375 tons
Inferred Ore Reserve	<u>425,955 tons</u>
	550,800 tons

Allowance has not been made in the ore reserve calculations for potential ore tonnage beyond 200 feet along the Venus vein from the existing workings or to tonnage possibilities from the other known veins on the property.

For the purpose of evaluating ore reserves, grades determined by bulk sampling techniques are used as follows:

0.39 oz. Au, 11.55 oz. Ag, 2.58% Pb, 1.67% Zn, .093% Cd.

Table I gives calculated ore grades from routine sampling, which agree closely with the bulk sample grades.

TABLE I  
PROVEN AND PROBABLE ORE RESERVES OCTOBER 1968 - CALCULATED GRADES

<u>Location</u>	<u>Strike Length</u>	<u>Width</u>	<u>Gold</u>	<u>Silver</u>	<u>Lead</u>	<u>Zinc</u>	<u>Proven Tons</u>	<u>Probable Tons</u>
27-2A W Dr Sta 512 + 24'	23'	4.0	.53	3.65	1.14	.91	925	925
27-2A W Dr Sta 509 + 21'	42'	4.0	.58	2.52	.78	.26	1,680	1,680
27-2A W Dr-27-2A N Dr	310'	4.7	.41	11.44	2.56	.61	22,130	33,140
27-2A N Dr Sta 2713	138'	4.2	.27	11.7	4.24	3.03	6,000	6,000
27-2A N Dr Sta 2729 + 75'	15'	4.0	.49	5.3	1.30	-	300	300
27-2A N Dr Sta 2738	57'	4.2	.23	7.4	1.34	.95	2,380	2,380
27-2A N Dr Sta 2742-26 ND	106'	4.5	.44	10.07	2.08	1.58	18,770	4,715
27-2A N Dr Sta 2745	34'	4.8	.64	2.21	.38	Tr	1,630	1,630
27-2A N Dr Sta 2749	23'	4.5	.32	6.07	1.60	.73	1,035	1,035
27-2A N Dr Sta 2750	29'	4.1	.14	10.1	.22	.70	1,180	1,180
East Sta 2749 (DD & Geology)	94'	4.2	.30	2.67	.66	.67	-	3,950
2600 South x Cut	58'	4.2	.26	2.9	.26	.09	2,440	2,440
Dump							17,000	
Weighted Average			.39	9.80	2.24	1.14	65,470	59,375

## 5. MINING

### 5.1 Present Status

The mine is being developed through two adits, on the 2600 and 2700 foot levels, and two additional levels are being established from these adits. These workings, complete to September 30, 1968, are shown on Plate 4.

A crew of 15 - 19 men is employed and 600 feet per month of raises and drifts are being driven.

The equipment on site is:

- 1 - 19-man trailer camp, consisting of office, bunkhouse, kitchen, dry.
- 1 - 350 KVA diesel generator plant and a 100 KVA standby plant (leased).
- 2 - 600 cfm electric powered stationary compressors.
- 2 - 1½ ton battery locomotives complete with chargers and two batteries each.
- 2 - LM36 Mucking Machines.
- 2 - 10 HP air slusher hoists and scrapers.
- 8 - 40 cubic foot rocker dump mine cars.
- 1 - 33 cubic foot rocker dump mine car.
- 2 - Timber cars.
- 7 - Air leg rock drills.
- 2 - Stoper rock drills.
- 1 - 3/4 ton pick-up truck 4 x 4.
- 1 - Panel truck 4 x 4.
- 1 - Grader.

On order for the current development program is:

- 1 - 1½ ton battery locomotive with two batteries.
- 1 - 3 ton battery locomotive with one battery.
- 6 - 40 cubic foot rocker dump mine cars.
- 2 - Tugger hoists for raise service.
- 1 - House trailer for erection in Carcross.

## 5.2 Current Development Program

The current development program schedule is shown on Plate 5. At present ore density this program will provide a total of 174,600 tons of proven ore by September 30, 1969 and will provide 12 stoping areas with raises for stoping on four levels.

All major equipment for this program is now on order.

## 5.3 Production Mining

### 1. Mining Rate

The mill is planned at 300 tons per day operating seven days per week. At this rate the presently inferred ore will last four to five years.

The mine is planned to operate on a 5-day week basis. To provide seven days mill feed the daily mine production will be  $300 \times \frac{7}{5} = 420$  tons per day.

### 2. Level Development Required to Maintain Ore Reserves

On the 2700 level 30% of the drift length is in ore. Assuming this is average for the mine, then the tons of ore developed per foot of level drift =  $\frac{.3 \times 175 \times 4.5}{10} = 23.6$  tons

At a production of 420 tons per day this requires  
 $\frac{420}{23.6} = 17.8$  or 18' of development per day.

This will produce an average of  $.3 \times \frac{7 \times 8}{10} \times 18 = 30.2 =$   
30 tons development ore per day.

### 3. Stoping and Haulage

The stoping plan is illustrated on Plate 6. Initially one raise in an ore zone will be driven level to open the stope and additional raises will be driven when slushing distances become too great, or ground conditions indicate additional openings desirable. Pillars at the drifts will be left intact to end of the stoping, and then recovered. Random pillars, not less than 5 feet diameter, will be left in waste areas and where roof support is required. Additional roof control will be provided by rock bolting and stulling where required.

#### Stope Development Raises

Footage Required - The stope raise development required to maintain production is an advance per mine day of 9 feet.

### 5.4 Probable Ore Grade to Mill

The grade of ore mined and trucked to mill is predicted, from bulk sampling, to be:

0.39 oz. Au, 11.55 oz. Ag, 2.58% Pb, 1.67% Zn, .093% Cd.

## 6. METALLURGY

### 6.1 Summary

Fifty-one laboratory tests have been conducted by Lakefield Research of Canada Limited on a two ton bulk sample of Venus ores. These tests indicate that differential flotation is the most suitable method of separating and concentrating the galena, sphalerite, mixed iron sulphides and precious metals present. Based on projected mill feed of the same grade as the composite bulk sample, the metallurgical results given in Table 2 can be expected.

### 6.2 Tests

The results and conclusions derived from the Lakefield tests may be summarized as follows:

1. The galena, sphalerite and iron sulphides present in this ore can be effectively concentrated by differential flotation.
2. Gravity separation and bulk flotation produce bulk sulphide concentrates of similar grades and recoveries. However, differential flotation is considered more suitable because it can more effectively separate the sulphide constituents of this ore.
3. A high proportion of the silver and gold is recoverable in a lead flotation concentrate.

It is evident from these test results that the concentrator should be designed to produce:

- (a) A lead concentrate with a high recovery of lead and precious metals. This is important because lead concentrate smelters pay for a higher proportion of precious metal than zinc smelters.

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TABLE 2  
EXPECTED METALLURGICAL RESULTS

	<u>Wt.%</u>	<u>Assay</u>					<u>% Distribution</u>					
		<u>% Pb</u>	<u>% Zn</u>	<u>% Cd</u>	<u>% As</u>	<u>Au oz/T</u>	<u>Ag oz/T</u>	<u>Pb</u>	<u>Zn</u>	<u>Cd</u>	<u>Au</u>	<u>Ag</u>
Lead Concentrate	3.38	63.94	3.91	.27	3.10	6.83	298.93	83.77	7.92	9.93	59.25	87.48
Zinc Concentrate	2.63	1.32	50.75	2.59	3.60	0.49	10.93	1.35	79.94	73.40	3.38	2.49
Pyrite Concentrate	23.71	.39	.32	.03	25.20	0.46	2.64	3.62	4.65	8.39	28.55	5.44
Flotations Tailing	70.28	.41	.17	.01	1.50	0.048	.75	11.26	7.49	8.28	8.82	4.59
Mill Heads	100	2.58	1.67	.093	7.20	0.39	11.55	100	100	100	100	100

- (b) A high grade zinc concentrate containing the bulk of the zinc and cadmium and a minimum of precious metals.
- (c) A pyrite-arsenopyrite concentrate containing as much of remaining gold and silver as possible for subsequent cyanidation.
- (d) A flotation tailing containing the minimum amounts of lead, zinc, cadmium, gold, and silver.

### 6.3 Flowsheet

The Flowsheet is presented as Plate 8. Major sections of the recovery process are:

1. Crushing Plant - Two-stage crushing will be employed to reduce minus 16 inch run-of-mine-ore to minus 3/4 inch mill feed. The coarse ore bin provides 250 tons live storage capacity. The fine ore will be stored in a 30 foot diameter x 50 foot bin having 900 tons live storage capacity.
2. Grinding - Both primary and regrind mills will be employed. An 8 foot diameter x 8 foot ball mill will be used for primary grinding. A 3 foot diameter x 8 foot ball mill will be used to regrind the lead rougher concentrate.
3. Flotation - Lead, zinc and iron flotation circuits have been provided for the selective flotation of the respective sulphide minerals. The lead rougher concentrate will be regrind to facilitate the production of a high grade of final concentrate consistent with good recovery.
4. Cyanidation - Three 12 foot diameter x 12 foot agitators will provide 36 hours of leaching time for the pyrite concentrate. A counter-current filtration washing system, rather than a counter-current thickening system, will be used in order to reduce building area requirements. A standard precipitation system will be employed to produce a gold-silver precipitate for marketing.

#### 6.4 Physical Data

The specific gravity of the mill heads and major products are shown in the following table:

<u>Material</u>	<u>Specific Gravity</u>
Mill Heads	3.2
Lead Cleaner Concentrate	6.5
Zinc Cleaner Concentrate	4.0
Pyrite Concentrate	5.0
Flotation Tailing	2.8

The average Bond Work Index of Venus ore as determined by three grindability tests is 11.8. A 75% minus 200 mesh primary grind was found to provide the maximum metal recoveries and the ball mill has been selected to provide this reduction. The energy requirement operating on a 99% minus 3/4 inch new feed is 11.7 kiltowatt-hours per short ton of mill heads.

A lead regrind mill will be installed. Grindability tests show its probable power requirement to be 9.3 kiltowatt-hours per short ton of lead rougher concentrate.

#### 6.5 Flotation

Differential flotation, with provision for regrinding the lead rougher concentrate, will be used to effectively separate and concentrate the galena, sphalerite, mixed iron sulphide and precious metals present in the Venus ore.

The recommended retention times, reagent addition points and quantities, and pH conditions are outlined in Table 3.

The expected grade-recovery relationships for lead and zinc concentrates shown in Tables 4 and 5 have been used in establishing the optimum concentrate grades and net smelter returns.

#### 6.6 Cyanidation

Preliminary cyanidation tests conducted on unroasted pyrite rougher concentrate indicate that approximately 33% of the

gold and 50% of the silver content in this material is recoverable. The reagent consumption approximates 1.1 lb. NaCN and 2.6 lb. CA(OH)<sub>2</sub> per ton of pyrite concentrate. Regrinding of the pyrite concentrate was investigated but does not appreciably improve the recovery of precious metals.

One roasting test was carried out and resulted in a 66% gold and a 5% silver recovery. Unless future additional tests show that precious metal recovery can be improved significantly by more closely controlling the roasting conditions, it appears that roasting cannot be economically justified.

The income derived from cyanidation of one ton of pyrite rougher concentrate is summarized as follows:

Gold value @ 33% Recovery, .39 oz/ton, \$37.60/oz Au	=	\$ 4.85
Silver value @ 50% Recovery, 2.7 oz/ton, \$2.15/oz Ag	=	<u>\$ 2.90</u>
Sub Total		\$ 7.75
Less Freight and Smelting Charges @ 10%!	=	<u>\$ .78</u>
Sub Total		\$ 6.97
Less approximate reagent and operating costs @ 1.0 lb. NaCN and 2.6 lb. CA(OH) <sub>2</sub> /ton pyrite concentrate		<u>\$ .59</u>
Operating Profit/Ton Concentrate		<u>\$ 6.38</u>
Operating Profit per year @ 70 tons/day. 350 x 70 x \$6.38	=	<u>\$156,000/year</u>

The estimated capital cost of a complete cyanidation leaching, washing and precipitation system is in the range of \$130,000. The resultant short payback period justifies this precious metals recovery system.

Further roasting and cyanidation investigations are planned as it appears possible that the recoveries noted can be improved.

## 6.7 Concentrate Dewatering and Handling

The lead, zinc and pyrite concentrate thickeners have been sized on the basis of 5, 5 and 4 sq.ft./ton solids/24 hours, respectively. The lead and zinc concentrate filters were selected to dewater the concentrates operating one shift per day. These equipment loadings are based on bench scale thickening and filtration tests.

The installation of drying equipment does not presently appear warranted because of the small tonnage of concentrates produced and high fuel costs in the area.

TABLE 3  
RECOMMENDED FLOTATION OPERATING CONDITIONS

<u>Operation</u>	<u>Reagents Added in Pounds Per Ton Mill Heads</u>							<u>Retention Time</u>	<u>pH</u>
	<u>Ca(OH)<sub>2</sub></u>	<u>ZnSO<sub>4</sub></u>	<u>Z-11</u>	<u>MIBC</u>	<u>CuSO<sub>4</sub></u>	<u>R-211</u>	<u>H<sub>2</sub>SO<sub>4</sub></u>	<u>(Minutes)</u>	
Grinding	3.0	2.0						30	
Lead Roughing			.02	.02				)	
			.01					)	13
			.02					)	10.4
Lead Re grind	.20	.2	.01				.01		30
Lead Cleaning									
First Stage									9
Second Stage	.02	.10	.005	.002					10
Conditioning	3.0				.20				20
Zinc Roughing				.02		.03		)	
				.01		.02		)	6
Zinc Cleaning									
First Stage	.10					.005			8
Second Stage	.08			.005					5
Conditioning							4.0		10
Pyrite Flotation			.03	.01				)	
			.03	.01				)	12
			.03	.01				)	
TOTAL FLOTATION REAGENT USAGE	6.40	2.3	.125	.087	.20	.055	4.0	.01	

TABLE 4  
GRADE-RECOVERY RELATIONSHIP FOR LEAD CONCENTRATE

<u>Concentrate Grade</u>	<u>Wt.% Mill Heads</u>	<u>Assay</u>						<u>% Distribution</u>					
		<u>% Pb</u>	<u>% Zn</u>	<u>% Cd</u>	<u>% As</u>	<u>Au oz/T</u>	<u>Ag oz/T</u>	<u>Pb</u>	<u>Zn</u>	<u>Cd</u>	<u>As</u>	<u>Au</u>	<u>Ag</u>
33% Pb	6.60	33.12	6.81	0.30	5.40	4.54	155.66	84.80	22.60	24.00	5.20	73.70	89.00
45% Pb	4.82	44.89	6.47	0.30	5.02	5.17	199.38	83.80	18.16	19.79	3.53	67.56	88.50
59% Pb	3.59	59.46	5.35	0.30	3.49	6.65	261.47	82.90	11.17	12.21	1.82	64.39	87.34
65% Pb	3.23	65.18	5.14	0.30	3.08	7.30	284.70	81.70	9.69	11.60	1.45	63.81	85.83

VENUS MINES LTD. (N.P.L.)

TABLE 5  
GRADE-RECOVERY RELATIONSHIP FOR ZINC CONCENTRATE

<u>Concentrate Grade</u>	<u>Wt.% Mill Heads</u>	<u>Assay</u>						<u>% Distribution</u>					
		<u>% Pb</u>	<u>% Zn</u>	<u>% Cd</u>	<u>% As</u>	<u>Au oz/T</u>	<u>Ag oz/T</u>	<u>Pb</u>	<u>Zn</u>	<u>Cd</u>	<u>As</u>	<u>Au</u>	<u>Ag</u>
30% Zinc	4.19	1.25	29.33	1.30	14.35	0.39	7.16	2.07	73.60	68.00	9.03	4.51	2.87
40% Zinc	2.98	1.49	40.82	1.40	7.86	0.32	8.51	1.77	72.80	66.50	3.51	2.63	2.42
50% Zinc	2.41	1.56	50.10	2.30	3.54	0.28	8.67	1.49	72.10	65.00	1.28	1.87	1.99

## 7. MILL AND MINE SURFACE FACILITIES

### 7.1 Mill Arrangement

The general arrangement is shown on Plate 7. The site is located 2.2 miles north-east of the mine and is about 400 feet from Tagish Lake. The mill structures will be approximately 120 feet above lake level. Mill tailings will be deposited in a natural draw to the south.

Several alternative mill and tailings disposal sites were examined and rejected before final selection of the proposed site. It was not practical to locate the mill immediately adjacent to Venus Mine because of the steep rugged terrain which slopes approximately  $37^{\circ}$  from the horizontal, and the complete absence of natural ledges or terraces at this location. Construction costs to provide space for the relatively large concentrator building, access to the various plant areas, and storage facilities would be excessive. The nearest possible tailings disposal site is a mile distant. Despite the additional costs of loading and hauling the ore by truck, it was more economical to locate the mill at a topographically suitable site.

The chosen mill site, some 300 by 400 feet, slopes gently away from the foot of Montana Mountain. At the south-east corner a bedrock knoll rises 30 to 40 feet above general ground level. To the east, the ground surface drops off towards the lake. To the south-west, the ground surface slopes gently into a broad draw which opens out at the lake shore approximately 1800 feet south of the site. Surface examination of the site indicates that moderate depths of firm overburden can be expected.

The concentrator building is centered within the relatively level site which facilitates access and provides for inexpensive outside storage. This two-storey structural steel and metal clad building which is approximately 180' x 120' will house all concentrator equipment and general service facilities. The millrooms, machine shop, warehouse, concentrate handling and loading area, emergency diesel generator room, sampling and bucking rooms, and first aid and washrooms are all located on the ground floor. The operating floor provides for flotation, filtration, precipitation and leaching equipment, as well as the laboratory and office facilities.

Mill tailings will be pumped from the concentrator building to the tailings pond via a four-inch pipeline approximately 2000 feet in length.

The crushing plant, approximately 35 feet by 50 feet, is located adjacent to the bedrock knoll. An elevation difference facilitates material flow by gravity, and minimizes handling costs. The 50-foot high crushing plant structure will also be of structural steel with metal cladding. A 250 ton capacity storage bin is located at the input side of the crushing plant to provide for variations in mine and crushing plant production. Trucks hauling the ore from the mine via a spur road extending from the main access road will dump their loads directly into the bin.

An ore stockpile with a capacity of approximately 25,000 tons will be located immediately south of the spur road. This stockpile will allow for production of ore before mill startup and additional surge capacity during normal operations.

The crushed ore will be transferred by a 220-foot long, 18-inch conveyor to a storage bin located adjacent to the south-west corner of the concentrator building. The 50-foot high bin, with a live storage capacity of 900 tons, provides the necessary surge capacity for variation in production rates based on a five-day week for the crushing plant and continuous operation of the concentrator.

The pumphouse, which will provide mill, fire and domestic water, will be located at the lake shore directly below the concentrator building, approximately 350 feet distant and at an elevation difference of about 120 feet.

The electrical substation will be located at the north-west corner of the concentrator building to receive power supplied by the Yukon Electric Power Company.

Administration facilities will be centralized in a single-storey 24 x 40 foot building located near the entrance to the site.

Building outlines and details will be similar to those provided by manufacturers of standard prefabricated steel buildings. Internal floors and platforms will be steel framed and decked with timber.

## 7.2 Tailings Disposal

The annual volume of tailings will be about 1.7 million cubic feet. After five years of operation the settled tailings volume will be approximately 8.5 million cubic feet. This volume can be accommodated in the draw located to the south of the mill. The maximum depth of tailings will be approximately 50 feet with the top surface almost level with the access road.

Construction of a dam at the downstream end of the draw will impound a pond into which the piped tailings will be deposited. A small dam will be required to form the first-stage tailings pond. Thereafter, the tailings dam will be raised using the fine sand fraction of the tailings. The clear effluent will be skimmed from the pond surface by inverted syphon and piped to the lake. A small stream running down the draw will be diverted around the tailings pond.

The Government of Canada, Department of Fisheries, has expressed considerable interest in the method of tailings disposal proposed for this mill. The Bennett-Tagish Lakes system supports substantial numbers of salmon, trout, grayling and whitefish, and the Department requires that no deleterious substances enter these waters. Tests are presently underway on simulated effluent samples to determine their toxicity on fish.

It is proposed that all organic soil be stripped from under the tailings area and stockpiled. This material would be spread over the tailings deposit on completion of operations to allow re-seeding and to provide a protective covering to prevent continuous and objectionable wind erosion of the fine tailings.

## 7.3 Construction Materials

With the exception of dam fill, concrete aggregate and timber, all construction materials will have to be shipped to the site via Skagway or Edmonton.

Surveys for the access road indicate ample supplies of fill and surfacing gravel within short hauling distance of the

site. Concrete gravel and sand were located, and samples taken. Cylinders prepared from a trial mix indicate acceptable concrete strengths. With some selection and screening, more than enough concrete aggregate can be obtained economically within a short distance of the site. Fine sand is available from the lake shore.

Rough logs from the clearing of the road right-of-way will be available for cribbing, bridge, and rough bin construction. Rough and dressed spruce lumber can be obtained from a sawmill operating at Teslin, approximately 100 miles away by road.

Consideration has been given to the use of metal-clad timber structures frequently used for mill buildings in the past. Light steel structures, prefabricated and requiring only site erection, have recently proven to be more economical. In addition, steel structures have a significant salvage value and are more fire resistant. For these reasons, all mill buildings will be of metal-clad structural steel construction.

#### 7.4 Mill Water Supply

Tagish Lake is the source of water for the plant. The lakeside pumping station will be designed to ensure a reliable water supply for plant operation, fire protection and domestic requirements. The pumphouse will incorporate intake screens to the requirements of the Department of Fisheries as well as pumping units and control equipment.

The process water demand, including safety factor, is estimated to be 210 usgpm. The maximum total plant water demand is then:

Process	210 usgpm
Cooling	10 usgpm
Domestic Hot and Cold Water	20 usgpm
Washdown	<u>60 usgpm</u>
TOTAL	300 usgpm

A standby process water pump will be installed to provide an uninterrupted supply of water in the event of mechanical

problems or routine maintenance of the regular pump. A 4 inch main, protected against freezing and physical damage, will carry the water to the plant. Pressure regulation will be provided to ensure steady system pressure for all flow conditions.

A complete fire protection system will be provided, the capital cost of which is considered to be consistent with the reduction in fire insurance premiums over the plant life. Any shutdown of the plant due to fire within a three-year period of startup would shorten the effective tax concession period accordingly. The protection will include a sprinkler system for the main buildings, and yard hydrants for outside protection. Analysis of alternatives for fire protection led to the selection of a two-unit pumping system. This will include two turbine type pumps, one driven by electric motor and the other by gasoline engine, and a 10-inch main to the distribution piping.

#### 7.5 Mill Heating and Ventilation

The concentrator building complex will be heated throughout to provide adequate operating conditions. The winter temperature in the concentrator proper will be maintained at approximately 40°F. An independent unit heater system with oil firing will be installed.

The maximum heating fuel demand for the concentrator building is estimated at 1600 gallons of oil per week in the critical month. A 4000 gallon tank will be installed to provide a two-week fuel supply and have adequate volume to take the standard tank truck capacity of 2500 gallons.

The office building will be heated by a warm air system with underfloor supply ductwork. The crusher building and conveyor enclosures will not be heated, but electric heating will be provided for the control cabin in the crusher building.

The pumphouse water mains, and other piping will be electrically heated as required, to provide protection against freezing.

## 7.6 Dust Collection

Dust collection and disposal will be provided for the crusher building. The system will be designed to reduce free dust in the building to an acceptable level, and to meet the requirements of the Workmen's Compensation Board.

Space will be provided for installation of dust collecting equipment at the fine ore bin should it be required at some future date.

## 7.7 Mine Surface Facilities

Buildings at the Elevation 2600 portal will comprise two existing trailers for offices, first aid and lecture room; a compressor shed; and a structure housing the dry, the warehouse and the shop. These buildings will be heated by oil fired units fed from a fuel storage tank. The domestic water system will include a submersible pump at the Tagish Lake, a water main protected against freezing, a pressure tank and oil fired domestic water heater.

## 7.8 Electrical Power Supply and Distribution

Electrical power will be purchased from Yukon Electric Company Ltd., who will build a 25 KV, 3-phase line from Carcross and install step-down substations at both the mill site and mine, providing 440V, 3-phase power at both sites.

Mill power and mine power will be metered separately and costs have been calculated on this basis. Since there is a possibility of reducing power costs by purchasing all power (including that for the mine) at the mill site, and owning the line between the mill and the mine, further investigation during the detailed design stage will be carried out.

A main indoor switchboard will be installed at the corner of the concentrator building to take power from the transformer bank and feed the load centres in the mill, in the crusher building, at the pumphouse, and at the office.

A separate feeder will supply lighting in the mill and concentrator, with transformers stepping the voltage down to 110 - 220 volts at local lighting panels.

Capacitors are included in the installation for correction of power factor, in order to reduce the KVA demand on the utility and, hence, the cost of energy. The savings obtained provide an excellent return on the capital investment.

The emergency generator provided at the mill will provide power in case of a line outage for lighting, heating, and maintenance operations.

Electrical service at the mine will be similar to that at the mill. The main switchboard will be located in the compressor house with two feeders, one to the warehouse, shop, and office buildings area, and the second to the underground facilities. Because of the limited requirement for power inside the mine, only a 480 volt system is planned at this time. A small emergency generator will be installed.

8. CONSTRUCTION SCHEDULE

Table 6 presents a tentative construction schedule for the Venus Project. The tentative mill startup date, October 1, 1969, is determined primarily by the delivery date for the ball mills and other major equipment, assumed herein to be ordered no later than December 15, 1968. With a delivery time of approximately eight months the ball mills would be on site ready for installation by August 15, only 1-1/2 months prior to mill startup.

To achieve this date, the general civil contract would have to be awarded no later than early March of 1969 and mill construction would start no later than April 1, 1969. Work would start immediately on the concentrator building and the crushing plant, which are most critical on the construction schedule, with all ancillary structures constructed to best suit the contractor's schedule.

Award of an equipment installation contract could be deferred by up to 2-1/2 months following the initial contract award, with equipment installation commencing by June 15, 1969.

TABLE 6

TENTATIVE CONSTRUCTION SCHEDULE

	1968				1969									
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
Access Roads	—————						— — — —							
Underground Equipment & Services	—————→													
Civil Contract Award							▲				Mill Start-up →			
Equip. Install. Contract Award									▲					
Mine Surface Facilities										—————				
Crushing Plant & Conveyors								C	—————		E	—————		
Concentrator Plant								C	—————		E	—————		
Tailings Dam & Facilities										E	—————			
Water Supply & Fire Protection								C	—————			E	—————	
Electrical													—————	
Mobile Equipment					— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —
Administration Building									—————					
	C - Civil Construction							E - Equipment Installation						

9. ESTIMATE OF CAPITAL COST

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

SUMMARY

Underground Equipment and Services	\$ 82,000
Mine Surface Facilities	110,500
Crushing Plant and Conveyors	403,300
Concentrator Plant	1,076,200
Tailings Disposal	90,300
Water Supply and Fire Protection	126,300
Electrical Services	251,000
Mobile Equipment	184,500
Administration Building	23,900
Access Roads	120,000
Accommodation	<u>109,000</u>
Sub Total	\$2,577,000
Contingency	258,000
Engineering and Administration	226,000
Mine Preproduction and Development November 1968 to Production	450,000
TOTAL	<u><u>\$3,511,000</u></u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

UNDERGROUND EQUIPMENT AND SERVICES

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
1	Air leg rock drills	No.	5	\$1,600.00	\$ 8,000
2	Rock bolt stopers	No.	4	1,450.00	5,800
3	3 Drum 20 HP slushers	No.	4	8,000.00	32,000
4	2 Drum 20 HP slushers	No.	2	7,000.00	14,000
5	36 Inch Scrapers	No.	6	650.00	3,900
6	60 Cubic feet mine cars	No.	5	1,450.00	7,250
7	Dump ramps	No.	2	1,200.00	2,400
8	Battery and box for 3-ton locomotive	No.	1	4,450.00	4,450
9	Mine lamps and charging racks	sum	-	-	1,200
10	Ventilation equipment	sum	-	-	<u>3,000</u>
	TOTAL				<u><u>\$82,000</u></u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

MINE SURFACE FACILITIES

Civil Works

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
1	Site Preparation	sum		\$	\$1,000
2	Concrete Compressor Bases	cu.yd.	8	80.00	640
3	Electric Substation Bases	sum			1,000
4	Timber Buildings and Sills	sq.ft.	720	10.00	7,200
5	Steel Buildings and Sills	sq.ft.	2,000	12.00	24,000
6	Relocating and Rehabilitating				<u>2,000</u>
	Sub Total				\$35,840

Equipment

		<u>Shipping Weight</u>	<u>Cost</u>
7	Compressor Installation	13,800	\$30,600
8	Water Supply	7,050	15,550
9	Heating, Oil Tanks, etc.	2,400	2,310
10	Tools		9,800
11	Shelving, Racks, Cupboards		1,500
12	First Aid		5,000
13	Installation		6,400
14	Freight and Insurance		<u>3,500</u>
	Sub Total		\$74,600
	TOTAL		<u><u>\$110,500</u></u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

CRUSHING PLANT AND CONVEYORS

Civil Works

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
1	Excavation - rock	cu.yd.	1,340	\$ 10.00	\$ 13,400
2	Fill	cu.yd.	3,000	1.50	4,500
3	Cement	sack	900	3.00	2,700
4	Reinforcing Steel	ton	12	600.00	7,200
5	Concrete	cu.yd.	150	50.00	7,500
6	Formwork	sq.ft.	5,000	1.80	9,000
7	Coarse Ore Bin	sum			15,000
8	Cribbing	MBM	100	250.00	25,000
9	Building Steel	ton	17	1,000.00	17,000
10	Cladding and Insulation	sq.ft.	9,000	1.50	13,500
11	Truck Door	No.	1	1,800.00	1,800
12	Platform Steel	ton	7	1,000.00	7,000
13	Floor Decking	sq.ft.	2,000	2.70	5,400
14	Cabin	sum			<u>500</u>
	Sub Total				\$129,500

Conveyor Structures

15	Conveyor Table Steel	ton	9	\$1,200.00	\$ 10,800
16	Steel Structures	ton	50	1,000.00	50,000
17	Cladding	sq.ft.	11,300	1.50	17,000
18	Decking	sq.ft.	4,000	1.00	<u>4,000</u>
	Sub Total				\$ 81,800

ESTIMATE OF CAPITAL COST

CRUSHING PLANT AND CONVEYORS (Cont'd.)

Crushing Plant Equipment  
and Conveyors

<u>Item</u>	<u>Description</u>	<u>Shipping Weight</u>	<u>Cost</u>
19	36" x 192" Vibrating Feeder	7,000 lb.	\$ 8,500
20	20" x 36" Jaw Crusher	25,000	24,000
21	48" Core Crusher	48,000	42,000
22	4' x 12' Vibrating Screen	4,500	4,500
23	Electro Magnet Protector	3,500	3,000
24	7½ Ton Overhead Crane	8,000	7,900
25	Dust Collection System	9,500	12,500
26	Heating System	200	1,000
27	Fabricated Steelwork	24,800	9,900
28	Conveyors	54,260	38,000
29	Installation	-	27,600
30	Spare Parts	9,210	7,600
31	Freight	-	<u>5,500</u>
	Sub Total		\$192,000
	TOTAL		<u><u>\$403,300</u></u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

CONCENTRATOR PLANT

Civil Works

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
1	Excavation, soft	cu.yd.	6,000	\$ 1.50	\$ 9,000
2	Fill	cu.yd.	5,000	1.00	5,000
3	Cement	sack	5,000	3.00	15,000
4	Reinforcing	ton	63	600.00	37,800
5	Concrete	cu.yd.	830	50.00	41,500
6	Formwork	sq.ft.	6,400	2.00	12,800
7	Fine Ore Bin	sum	1	20,000.00	20,000
8	Building Steel	ton	110	900.00	99,000
9	Cladding and Insulation	sq.ft.	50,800	1.80	91,500
10	Truck Doors	No.	6	1,800.00	10,800
11	Floor Steel	ton	505	900.00	45,500
12	Floor Deck	sq.ft.	13,100	2.70	35,400
13	Internal Partitions	sq.ft.	11,000	1.00	<u>11,000</u>
	Sub Total				\$434,300

Equipment and Fabricated Items

		<u>Shipping Weight</u>	<u>Cost</u>
14	Feeders Conveyor and Weigh Scale	4,700 lb.	\$ 13,300
15	Primary Ball Mill Complete	175,500	77,400
16	12" Cyclones with Feed Pumps and Boxes	5,200	5,000
17	Regrind Ball Mill Complete	16,700	8,500
18	6" Cyclones with Feed Pumps and Boxes	1,500	2,700
19	Rougher Flotation Cells Complete	83,500	44,400
20	Cleaner Flotation Cells Complete	16,000	9,800
21	Concentrate Thickeners and Forks Complete	30,400	26,600

ESTIMATE OF CAPITAL COST

CONCENTRATOR PLANT (Cont'd.)

<u>Equipment and Fabricated Items</u>	<u>Shipping Weight</u>	<u>Cost</u>
22 Disc and Drum Filters and Auxiliaries	43,500 lb.	\$71,700
23 Conditioners and Tanks	7,200	5,000
24 Agitators and Tanks	16,800	16,400
25 Precipitation System	20,000	28,000
26 Reagent Feed System	21,570	25,900
27 SRL Centrifugal and Sump Pumps and Boxes	29,700	20,400
28 2-Ton Overhead Cranes	14,000	11,000
29 Compressors and Blowers	6,700	10,000
30 Automatic Wet Samplers	450	9,000
31 Concentrate Conveyor and Weigh Scale	4,100	5,500
32 Heating and Ventilating Equipment	15,000	19,100
33 Plumbing and Waste Disposal	7,900	4,900
34 Furniture and Fixtures	2,800	4,600
35 Hand Tools	100	500
36 Piping	155,600	62,200
37 Installation	-	78,000
38 Office and Assay Laboratory	-	25,000
39 Machine Shop Equipment Installed		34,000
40 Warehouse Equipment and Furnishings		3,000
41 Freight	<hr/>	<hr/> 20,000
Sub Total	678,920	\$641,900
 TOTAL		 <hr/> <hr/> \$1,076,200

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

TAILINGS DISPOSAL

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
1	Stripping and Diversion	sum			\$ 2,000
2	Excavation, trench	cu.yd.	4,000	\$ 4.00	16,000
3	Fill, impervious	cu.yd.	8,000	3.00	24,000
4	Fill, random	cu.yd.	21,000	1.50	31,500
5	Tailings Line and Cyclones	lin.ft.	2,000	6.50	13,000
6	Overflow Structure	sum			2,000
7	Effluent Line	lin.ft.	300	6.00	1,800
	TOTAL				<u>\$90,300</u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

WATER SUPPLY AND FIRE PROTECTION

<u>Item</u>	<u>Description</u>	<u>Shipping Weight</u>	<u>Cost</u>
1	Pumphouse	-	\$ 30,800
2	Fire Pumps	9,300	28,000
3	Controls	1,500	2,500
4	Pumphouse Heating	200	400
5	Piping, Valves, Pumps and Mains	46,800	26,200
6	Crusher and Concentrator Sprinklers	10,900	9,200
7	Outside Fire Protection	31,000	11,500
8	Installation	-	15,500
9	Freight	-	2,200
	TOTAL		<u>\$126,300</u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

ELECTRICAL SERVICES

MINE

<u>Item</u>	<u>Description</u>	<u>Cost</u>
1	Additional Compressor Motors	\$ 2,400
2	Installed cost of low voltage distribution system, controls and wiring @ \$50/HP for surface installation	1,250
3	Installed cost of Capacitors (Power Factor Correction)	3,647
4	Miscellaneous lighting and wiring on surface	2,000
5	Underground wiring (not including battery charger units)	8,000
6	Freight and insurance	<u>800</u>
	Sub Total	\$18,097

MILL

7	Electric Motors	\$23,500
8	Installed cost of control centres, controls and distribution system	
	- Small motors @ \$120/HP	120,000
	- Large motors @ \$ 30/HP	15,000
9	Lighting	9,000
10	Installed cost of Capacitors (Power Factor Correction)	6,400
11	Emergency diesel generator	5,000
12	Freight and insurance	<u>4,000</u>
	Sub Total	\$182,900

BOND - As guarantee of tenure in the form of a prepayment of cost of energy, required by Yukon Electric Co. Ltd. (Recoverable at the rate of 10% per annum) \$ 50,000

TOTAL \$251,000

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

MOBILE EQUIPMENT

<u>Item</u>	<u>Description of Vehicle</u>	<u>Quantity</u>	<u>Cost</u>
1	35-Ton Off-Highway Ore Dump Truck (used)	1	\$ 40,000
2	Front-End Loaders	2	60,000
3	20-Ton Off-Highway Con- centrate and Back-up Truck	1	36,000
4	3-Ton General Service Dump Truck	1	7,500
5	3/4-Ton, 4 x 4 Pick-up Truck	2	11,500
6	Fork Lift (6000# rating)	1	10,000
7	40 Passenger Bus	1	9,500
8	Ambulance	1	4,500
			<hr/>
	Sub Total		\$179,000
	Freight		5,500
	TOTAL		<u>\$184,500</u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

ADMINISTRATION BUILDING

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
1	Site Preparation	sum		\$	\$1,000
2	Concrete Foundations and Vault	sum			2,000
3	Prefabricated Steel Building	sq.ft.	960	9.00	9,000
4	Internal Partitions and Finishing	sum			4,000
5	Furnishings				3,000
6	Heating, Ventilat- ing and Plumbing	sum			4,900
	TOTAL				<u>\$23,900</u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

ACCESS ROADS

<u>Item</u>	<u>Description</u>	<u>Cost</u>
1	Permanent Mine Access Road, Initial Contract Price	\$ 232,150
2	Additional Length of Road, 5,000 feet	25,000
3	Changes in Line and Grade	10,000
4	Contingency for Quantity Variations	33,000
	Sub Total	<hr/> \$ 300,000
5	Federal Government - two-thirds cost sharing grant	\$ 200,000
	Sub Total Cost to Mine	\$ 100,000
6	Site Clearing, Yards and Roads	\$ 20,000
	TOTAL	<hr/> <hr/> \$ 120,000

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

ACCOMMODATION

<u>Item</u>	<u>Description</u>	<u>No. of Men</u>	<u>Cost</u>
1	Relocation existing mine bunkhouses to Carcross	19	\$ 2,500
2	Provide and set up house trailers on sub- division lots	5	75,000
3	Provide serviced sub- division lots for employee lease	21	31,500
	TOTAL	<u>45</u>	<u>\$109,000</u>

NOTE: This estimate covers only the cost of providing additional accommodation to that already in use.

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF CAPITAL COST

MINE PREPRODUCTION AND DEVELOPMENT COSTS  
NOVEMBER 1968 TO PRODUCTION

<u>Item</u>	<u>Description</u>	<u>Cost</u>
1	Equipment	\$ 86,000
2	Supervision	17,400
3	Drifting	93,800
4	Raising	57,500
5	Drilling	24,000
6	Services	48,000
7	Cookhouse	27,000
8	Camp Maintenance	12,000
9	Assaying	10,000
10	Engineering and Administration	74,300
	TOTAL	<u>\$450,000</u>

10. ESTIMATE OF OPERATING COST

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF OPERATING COSTS

SUMMARY

<u>Item</u>	<u>Description</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
1	Mining	\$ 725,000	\$ 6.90
2	Crushing Plant	39,000	.37
3	Concentrator	447,500	4.26
4	Transportation	70,000	.67
5	Services	122,000	1.16
6	Administration and Engineering	179,500	1.71
	Sub Total	<u>\$1,583,000</u>	<u>\$ 15.07</u>
	Contingency	<u>149,500</u>	<u>1.43</u>
	TOTAL	<u><u>\$1,732,500</u></u>	<u><u>\$ 16.50</u></u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF OPERATING COSTS

MINING

<u>Item</u>	<u>Description</u>	<u>Cost/Foot</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
<u>Drifting</u>				
1	Contract Labour	\$ 18.75		
2	Pipe	1.50		
3	Track	2.50		
4	Powder	2.10		
5	Drill Steel and Bits	1.00		
6	Drill Repairs	0.50		
7	Miscellaneous	1.00		
	Sub Total	\$ 27.35	\$ 126,200	\$ 1.200
<u>Raising</u>				
8	Contract Labour	\$ 16.25		
9	Pipe	0.50		
10	Powder	2.00		
11	Drill Steel and Bits	0.80		
12	Drill Repairs	0.40		
13	Miscellaneous	0.80		
	Sub Total	\$ 20.75	\$ 48,500	\$ 0.461

ESTIMATE OF OPERATING COSTS

MINING (Cont'd.)

<u>Item</u>	<u>Description</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
<u>Stoping</u>			
14	Drilling Labour )		
15	Drill Steel and Bits )		
16	Drill Repairs )		
17	Powder and Accessories )		
18	Slushing Labour )		
19	Slusher and Scraper Repairs )		
20	Slusher Cable )		
21	Rock Bolts, Chutes and Timber )		
	Sub Total	\$ 310,590	\$ 2.958
<u>Haulage</u>			
22	Labour		\$ 0.350
23	Car Repairs		0.050
24	Locomotive Repairs		0.020
	Sub Total	\$ 44,100	\$ 0.420
<u>Services</u>			
25	Supervision and Engineering	\$ 90,000	
26	Underground Services	65,800	
	Sub Total	\$ 154,800	\$ 1.474
<u>Electric Power</u>			
27	1,440,000 KWH @ Average Net Cost 2.83¢/KWH	\$ 40,800	\$ 0.390
	Sub Total	\$ 40,800	\$ 0.390
	TOTAL	\$ 725,000	\$ 6.903

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF OPERATING COSTS

CRUSHING PLANT

<u>Item</u>	<u>Description</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
<u>Supplies</u>			
1	Crusher Wearing Parts	\$ 5,770	\$ 0.055
2	Crusher Maintenance	2,100	0.020
3	Screen Maintenance	2,100	0.020
4	Conveyors	1,580	0.015
5	Dust Collection and Miscellaneous	3,150	0.030
	Sub Total	\$14,700	\$ 0.140
<u>Labour</u>			
6	1 Crusher Plant Operator	)	
7	1 Crusher Plant Helper	)	
	Sub Total	\$17,300	\$ 0.160
<u>Electrical Power</u>			
8	420,000 KWH @ Average Net Cost 1.68¢ per KWH	\$ 7,000	
	Sub Total	\$ 7,000	\$ 0.068
	TOTAL	<u>\$39,000</u>	<u>\$ 0.368</u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF OPERATING COSTS

CONCENTRATOR

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Price</u>	<u>Quantity</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
<u>Reagents</u>						
		<u>lb/ton</u>				
1	Lime	6.50 lb.	4.276	683,000	\$ 20,200	\$ 0.278
2	Zinc Sulphate	2.30 lb.	15.80	242,000	38,200	0.364
3	Z-11	.16 lb.	29.10	17,000	4,940	0.047
4	MIBC	.10 lb.	23.35	10,400	2,420	0.023
5	Copper Sulphate	.20 lb.	28.15	20,900	5,880	0.056
6	R-211	.05 lb.	42.85	5,200	2,210	0.021
7	Sulphuric Acid	4.00 lb.	4.25	419,000	17,810	0.170
8	Sodium Cyanide	.40 lb.	21.70	42,100	<u>9,140</u>	<u>0.087</u>
	Sub Total				\$109,800	\$ 1.046
<u>Other Supplies</u>						
9	Grinding Media	lb.	13.00	156,500	\$ 20,500	\$ 0.195
10	Liners	lb.	30.00	42,500	12,600	0.120
11	Pump Parts - 20% first cost	sum			4,760	0.045
12	Other Wearing Parts	sum			7,040	0.067
13	Lubricants	sum			800	0.001
14	Assay Supplies	sum			3,000	0.029
15	Miscellaneous	sum			<u>15,800</u>	<u>0.150</u>
	Sub Total				\$ 64,500	\$ 0.607

ESTIMATE OF OPERATING COSTS

CONCENTRATOR (Cont'd.)

<u>Item</u>	<u>Description</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
<u>Salaried Personnel</u>			
16	1 Mill Superintendent )		
17	1 Metallurgist Foreman )		
18	1 Assayer )	_____	_____
	Sub Total	\$ 44,000	\$ 0.420
<u>Labour</u>			
19	4 Grinding Bay Operators )		
20	4 Flotation Bay Operators )		
21	4 Leaching and Precipitation )		
	System Operators )		
22	1 Clean-up Labourer and )		
	Relief Operator )	_____	_____
	Sub Total	\$135,000	\$ 1.290
<u>Electrical Power</u>			
23	5,760,000 KWH @ Average )	\$ 94,200	\$ 0.896
	Net Cost 1.64¢/KWH )	_____	_____
	Sub Total	\$ 94,200	\$ 0.896
	TOTAL	<u>\$447,500</u>	<u>\$ 4.259</u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF OPERATING COSTS

TRANSPORTATION

<u>Item</u>	<u>Description</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
<u>Vehicles</u>			
1	1 35-Ton Ore Truck	\$ 16,300	\$ 0.155
2	1 Front End Loader (Ore Loading)	4,850	0.046
3	1 Front End Loader (General Service)	1,600	0.015
4	1 20-Ton Concentrate Truck	8,600	0.082
5	1 3-Ton Fork Lift	2,120	0.020
6	1 3-Ton General Service Truck	1,320	0.013
7	3 3/4-Ton 4 x 4 Pick-ups	2,800	0.027
8	1 40-Passenger Bus	13,300	0.127
9	1 Ambulance	<u>110</u>	<u>0.001</u>
	Sub Total	\$ 51,000	\$ 0.486
 <u>Truckers</u>			
10	1 Truck - Loader Operator	)	
11	1 Concentrator - General Service Truck Operator	)	
	Sub Total	\$ 19,000	\$ 0.181
	TOTAL	<u>\$ 70,000</u>	<u>\$ 0.667</u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF OPERATING COSTS

SERVICES

<u>Item</u>	<u>Description</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
<u>Maintenance Shop Supplies</u>			
1	Miscellaneous Materials	\$ 21,000	\$ 0.200
<u>Maintenance Shop Labour</u>			
2	1 Master Mechanic	)	)
3	1 Mechanic Machinist	)	)
4	1 Electrician	)	)
5	1 Welder	)	)
6	1 Helper	)	)
	Sub Total	\$ 54,300	\$ 0.518
<u>Surface Crew Supplies</u>			
7	Miscellaneous Materials	\$ 3,200	\$ 0.030
<u>Surface Crew Labour</u>			
8	3 Labourers	\$ 22,500	\$ 0.214
<u>Building and Road Maintenance</u>			
9	Supplies	\$ 10,500	\$ 0.100
<u>Heating</u>			
10	Fuel	\$ 10,500	\$ 0.100
	TOTAL	<u>\$122,000</u>	<u>\$ 1.162</u>

VENUS MINES LTD. (N.P.L.)

ESTIMATE OF OPERATING COSTS

ADMINISTRATION AND ENGINEERING

<u>Item</u>	<u>Description</u>	<u>Cost/Year</u>	<u>Cost/Ton Ore</u>
<u>Mine Administration</u>			
1	1 Accountant - Purchasing Agent )		
2	1 Payroll Clerk )		
3	1 Receptionist - Typist )		
		\$ 26,700	
4	Office and Camp Supplies	9,000	
5	Telephone and Telegraph	8,400	
6	Fire Insurance	<u>3,400</u>	
	Sub Total	\$ 47,500	\$ 0.452
 <u>Head Office Administration and Engineering</u>			
7	Salaries, Directors' Fees, Rents, Supplies and Communications	\$120,000	
8	Engineering and Consultation	<u>12,000</u>	
	Sub Total	\$132,000	\$ 1.258
	TOTAL	<u>\$179,500</u>	<u>\$ 1.710</u>

VENUS MINES LTD. (N.P.L.)

OPERATING STAFF

<u>MINE</u>	<u>Total</u>
<u>Salaried Personnel</u>	
Mine Superintendent	1
Shift Bosses	2
Geologist	1
Surveyor	1
Sampler	<u>1</u>
	6
<u>Labour</u>	
Tramming - main haulage: 1 shift, 5 days	2
- levels : 2 shifts, 5 days	2
Slusherman 2 shifts, 5 days	4
Drillers 2 shifts, 5 days	8
Raisemen 1 shift, 5 days	2
Drift Crew 2 shifts, 5 days	6
Underground Services 2 shifts, 5 days	2
Labourer 1 shift, 5 days	1
Blacksmith 1 shift, 5 days	1
Electro-Mechanic 1 shift, 5 days	<u>1</u>
	29
<u>CRUSHING PLANT</u>	
Crushing Plant Operator 1 shift, 5 days	1
Crushing Plant Helper 1 shift, 5 days	<u>1</u>
	2
<u>CONCENTRATOR</u>	
<u>Salaried Personnel</u>	
Mill Superintendent	1
Metallurgist - Foreman	1
Assayer	<u>1</u>
	3

OPERATING STAFF (Cont'd.)

		<u>Total</u>
<u>Labour</u>		
Grinding Bay Operator	3 shifts, 7 days	4
Flotation Bay Operator	3 shifts, 7 days	4
Leaching-Precipitation System Operator	3 shifts, 7 days	4
Clean-up Labour - Relief Operator	1 shift, 7 days	1
		<hr/> 13

TRANSPORTATION

Truck - Front End Loader Operator	1 shift, 5 days	1
Concentrator - General Service Truck Operator	1 shift, 5 days	1
		<hr/> 2

SERVICES

Master Mechanic Surface Foreman	1 shift, 5 days	1
Mechanic-Machinist	1 shift, 5 days	1
Electrician	1 shift, 5 days	1
Welder	1 shift, 5 days	1
Helper	1 shift, 5 days	1
Mill Area Labourer	1 shift, 5 days	1
General Labourers (road work and cleanup)	1 shift, 5 days	2
		<hr/> 8

ADMINISTRATION

Accountant - Purchasing Agent		1
Payroll Clerk - Warehouseman		1
Receptionist - Typist		1
		<hr/> 3

TOTAL		<hr/> <hr/> 66
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## 11. MARKETING OF CONCENTRATES

American, Canadian, European and Japanese smelters have been contacted regarding the marketing of the Venus concentrates, and provisional quotations have been received from several of these companies. The Cominco lead and zinc open smelter schedules provide the most favourable net smelter return, and for this reason have been used.

The estimated grade-recovery relationships for lead and zinc concentrates are presented in Tables 4 and 5 of Section 6. Net smelter returns have been calculated for each of the cleaner concentrate grades and are shown in Table 7. The net smelter return on the silver-gold precipitate has been assumed to be 94% of the contained gold and silver at market value.

The metal prices assumed in the smelter calculations are:

Gold	-	\$ 37.60/oz.
Silver	-	2.15/oz.
Lead	-	0.13/lb.
Zinc	-	0.135/lb.
Cadmium	-	2.65/lb.

If the concentrator were operated to produce 33% lead and 30% zinc rougher concentrates, the pyrite concentrate would contain an estimated .39 oz. gold and 2.7 oz. silver per ton. The net smelter return derived from this concentrate is calculated as follows:

Net smelter return per ton pyrite concentrate		\$ 6.97
Tons concentrate produced per day = (300)(.2371)		\$ .70
Net Smelter Returns/Ton Ore = <u>\$6.97 x 70</u> 300		<u>\$ 1.63/Ton Ore</u>

When the lead and zinc concentrates are upgraded in the flotation cleaner cells the gold and silver recoveries therein decrease. For market investigation purposes, the gold and

silver values stripped from these concentrates with progressive cleaning are considered to report in the pyrite concentrate. These additional pyrite smelter returns associated with these concentrate cleaning operations are also shown in Table 7.

Since the primary values in the Venus ore are derived from silver and gold, it is of interest to consider the effect on net smelter returns of fluctuations in the price of the metals. It can be said that, based on the recoveries noted above, and assuming no variation in the price of other recovered metals, a 10 cent fluctuation in the price of silver will alter the net smelter return by approximately \$1.00 per ton of ore. Similarly, \$1.00 variation in the price of gold changes the net smelter return per ton of ore by \$0.43.

It is evident from Table 7 that the total smelter returns derived from the lead concentrate do not vary appreciably with grade. This should permit considerable operational flexibility in the lead circuit. It is also apparent that the zinc circuit should be designed to produce a high grade concentrate.

From these investigations it can be concluded that the maximum income, at the stated metal prices, will be developed when the concentrator is operated at the following overall conditions:

	<u>Grade</u>	<u>Net Smelter Returns, Including Additional Values Recovered from Pyrite Concentrate</u>
Lead Concentrate	59% Pb	\$ 31.00
Zinc Concentrate	50% Zn	3.30
Gold Silver Precipitate		1.63
		<hr/>
TOTAL - Net Smelter Returns		\$ 35.93
		<hr/> <hr/>

VENUS MINES LTD. (N.P.L.)

TABLE 7  
NET SMELTER RETURNS

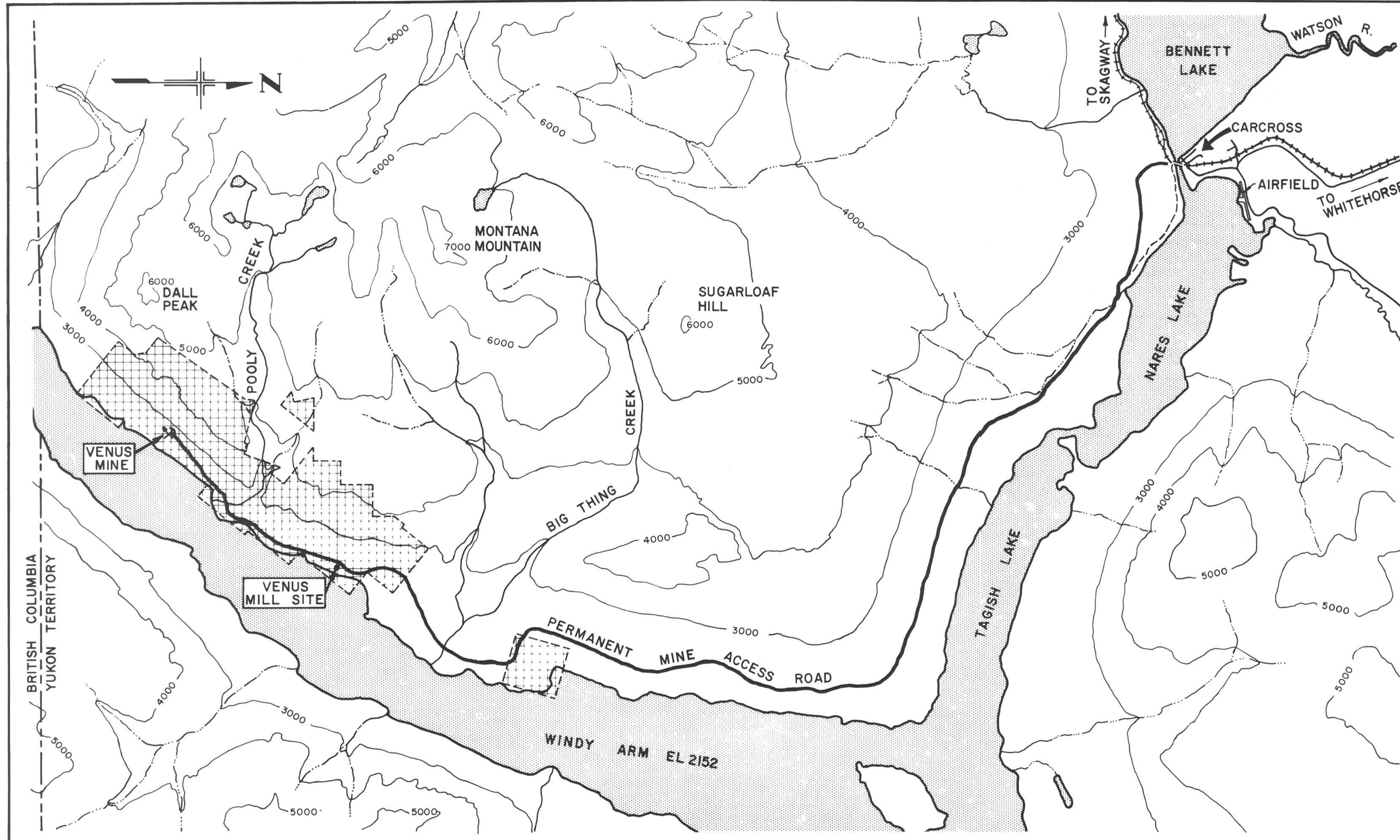
<u>Concen- trate</u>	<u>Grade %</u>	<u>Concen- trate Produc- tion (SDTPD)</u>	<u>Ratio of Concen- tration</u>	<u>Smelter Outrun \$/Dry Ton Ore</u>	<u>Transportation Carcross siding to smelter incl- uding cost of pallets \$/Dry Ton Conc.</u>	<u>Net Smelter Return</u>		<u>Additional Values Re- covered from Pyrite Concentrate \$/Ton Ore</u>	<u>Net Smelter Return Plus Addi- tional Valu- e \$/ Ton Ore</u>
						<u>\$/Dry Ton Conc.</u>	<u>\$/Dry Ton Ore</u>		
Lead	45%	14.448	20.764	670.39	39.85	630.54	30.37	0.34	30.71
	59%	10.791	27.800	884.37	39.85	844.52	30.38	0.62	31.00
	65%	9.701	30.924	968.10	39.85	928.25	30.02	0.82	30.84
Zinc	40%	8.935	33.575	106.49	37.64	68.85	2.05	0.14	2.19
	50%	7.210	41.608	166.05	37.64	128.41	3.08	0.22	3.30

12. PLATES

VENUS MINES LTD. (N.P.L.)

LIST OF PLATES

plate 1	Location Map
Plate 2	Regional Geology - Windy Arm Area
Plate 3	Location of Veins and Old Workings
Plate 4	Development Headings and Ore Zones
plate 5	Development Schedule - October 1968 to September 1969
plate 6	Typical Stope
plate 7	Mill Site Arrangement
plate 8	Flow Sheet
plate 9	Crushing Plant
plate 10	Concentrator Floor Plans
plate 11	Concentrator Sections
plate 12	Mine Surface Facilities
plate 13	Electrical Distribution System



**LEGEND**  
 VENUS CLAIMS

SCALE .5 0 .5 1 MILE

1:50,000 (1.25 INCHES TO 1 MILE APPROX)

**VENUS MINES LTD. (N.P.L.)**  
 ACRES WESTERN LIMITED

**LOCATION MAP**

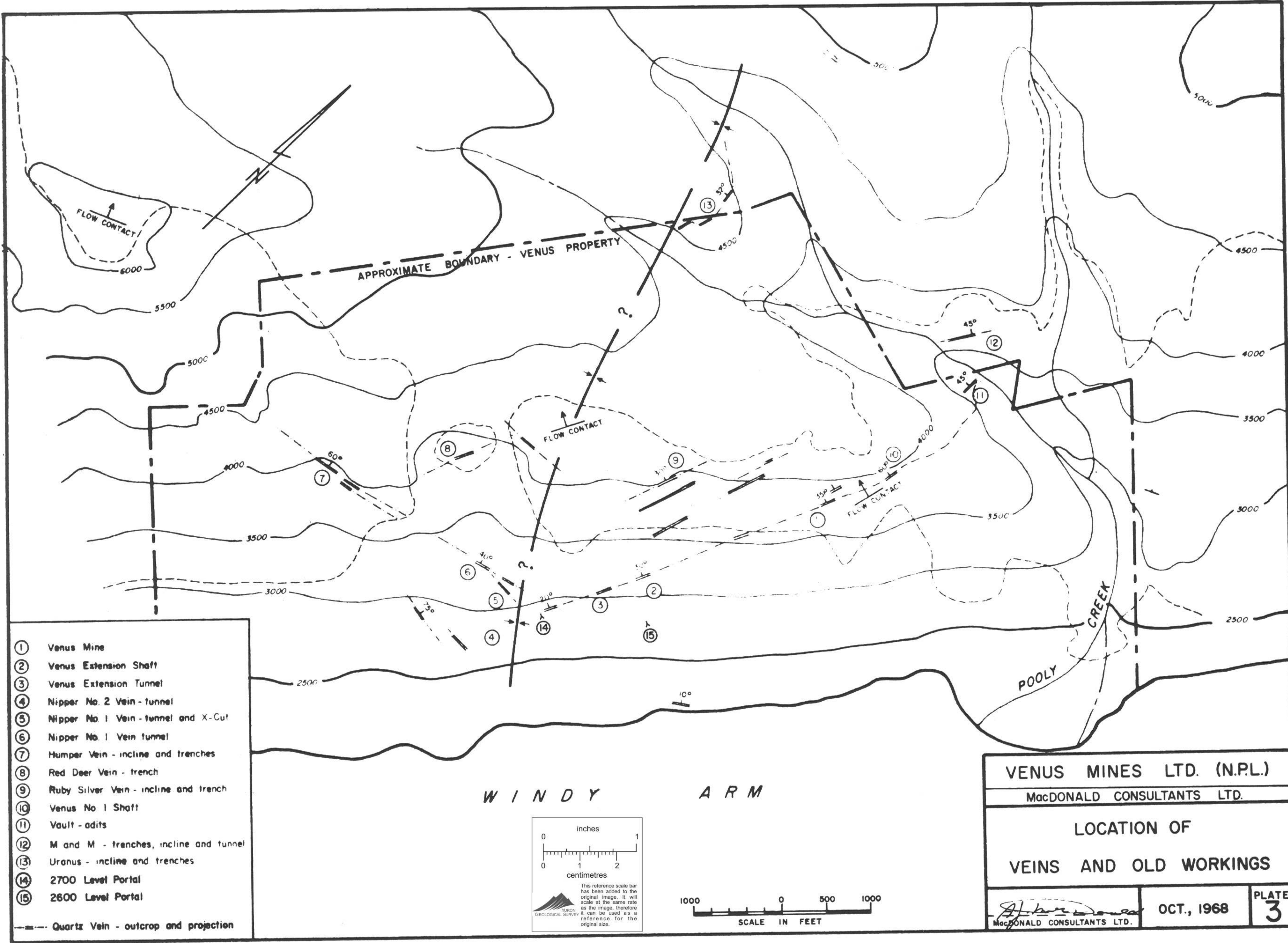
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*S.T. Norton*  
 ACRES WESTERN LIMITED

OCTOBER 1968

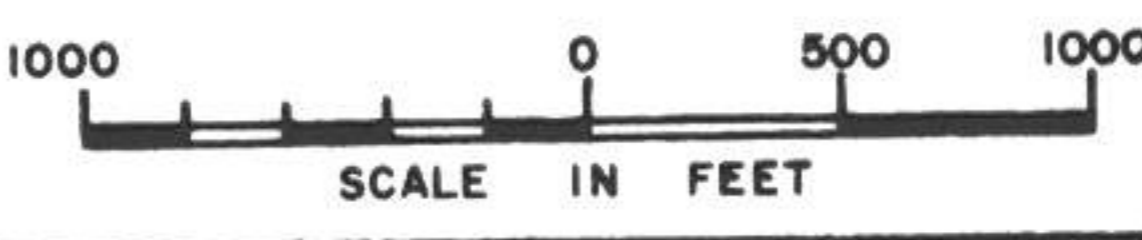
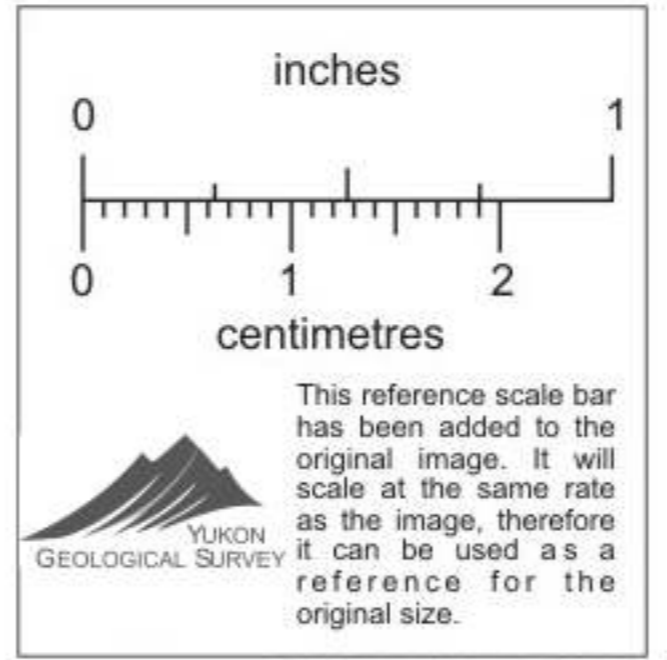
PLATE 1





- ① Venus Mine
  - ② Venus Extension Shaft
  - ③ Venus Extension Tunnel
  - ④ Nipper No. 2 Vein - tunnel
  - ⑤ Nipper No. 1 Vein - tunnel and X-Cut
  - ⑥ Nipper No. 1 Vein tunnel
  - ⑦ Humber Vein - incline and trenches
  - ⑧ Red Deer Vein - trench
  - ⑨ Ruby Silver Vein - incline and trench
  - ⑩ Venus No 1 Shaft
  - ⑪ Vault - adits
  - ⑫ M and M - trenches, incline and tunnel
  - ⑬ Uranus - incline and trenches
  - ⑭ 2700 Level Portal
  - ⑮ 2600 Level Portal
- Quartz Vein - outcrop and projection

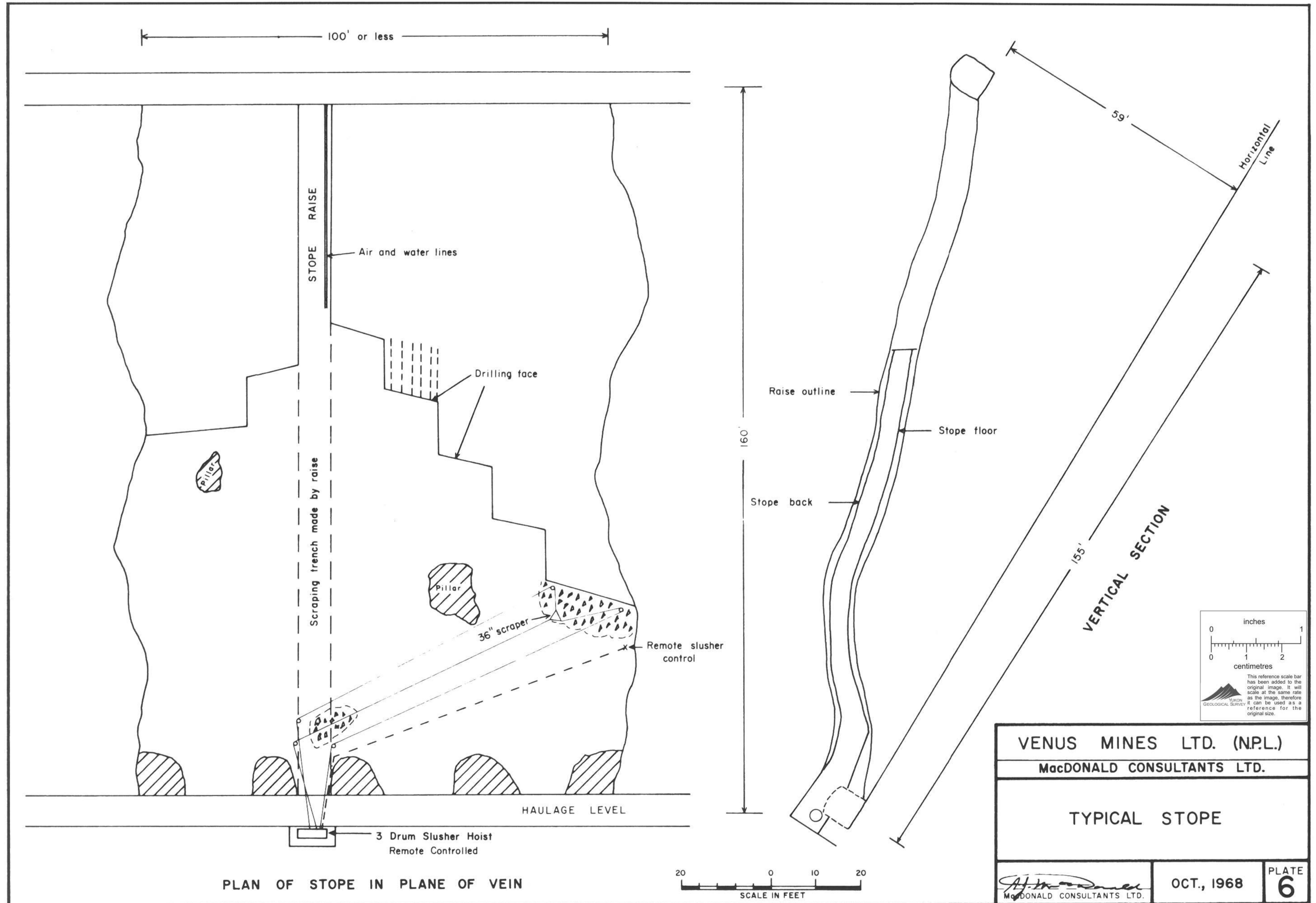
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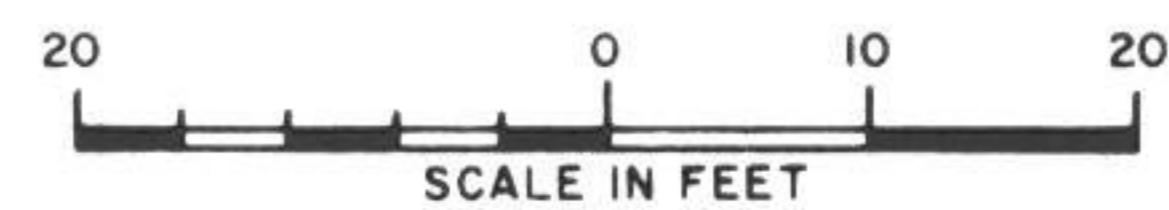
VENUS MINES LTD. (N.P.L.)	
MacDONALD CONSULTANTS LTD.	
LOCATION OF VEINS AND OLD WORKINGS	
 MacDONALD CONSULTANTS LTD.	OCT., 1968
PLATE <span style="font-size: 2em; font-weight: bold;">3</span>	



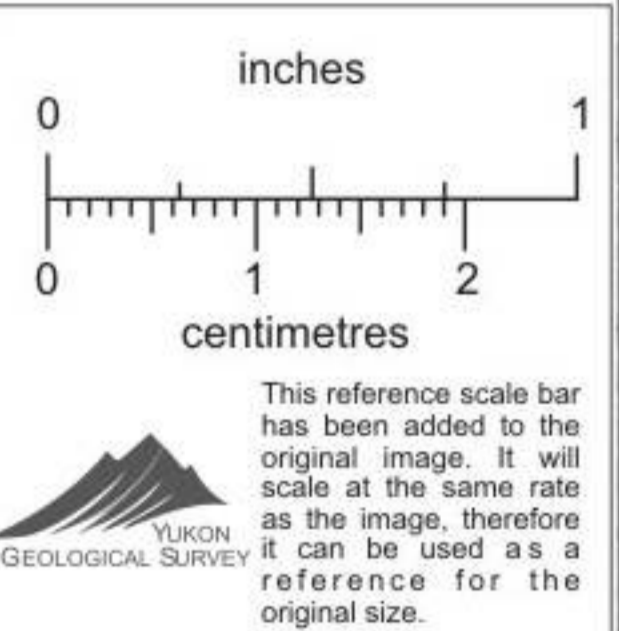





PLAN OF STOPE IN PLANE OF VEIN

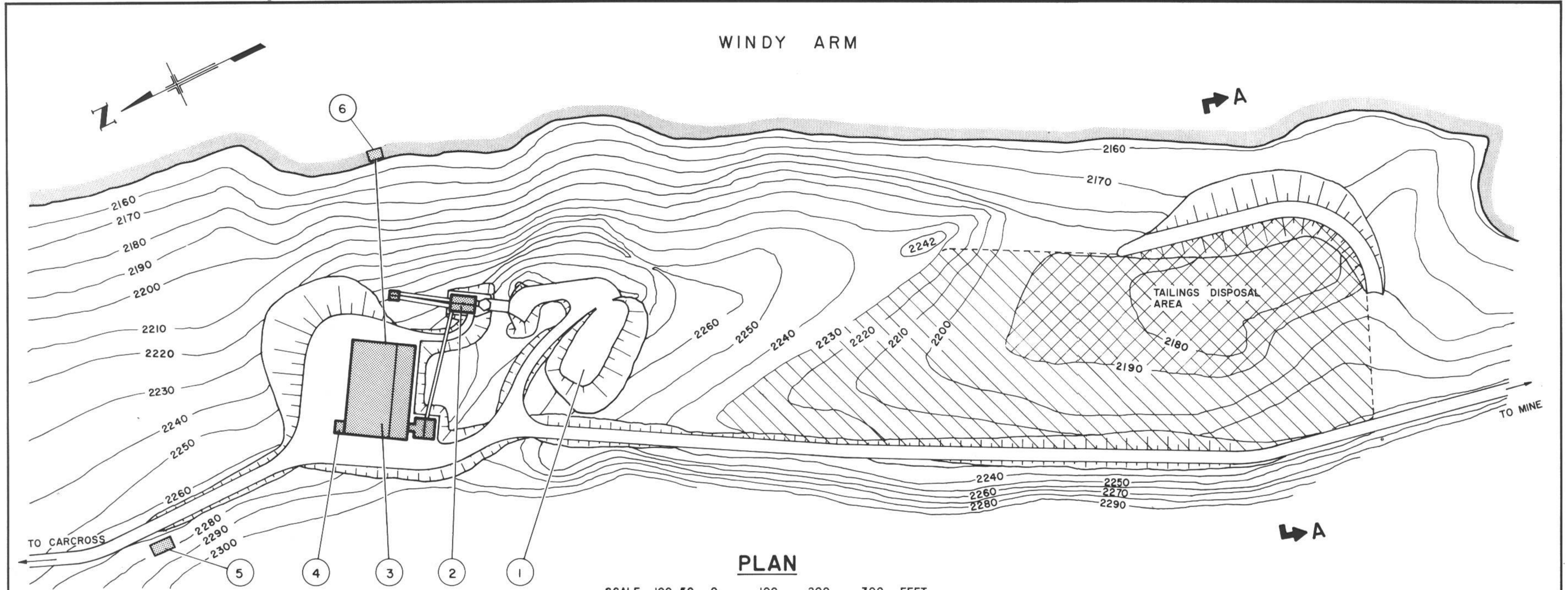


VERTICAL SECTION

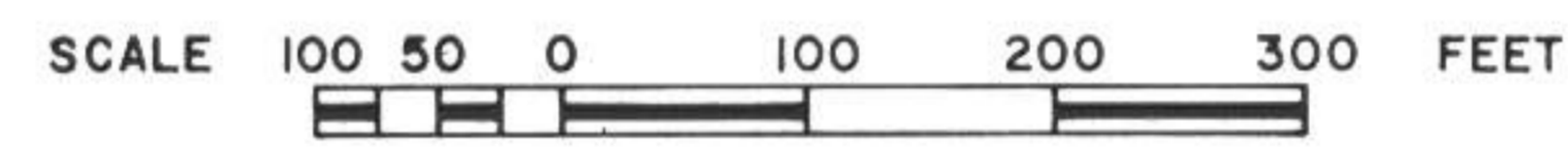


VENUS MINES LTD. (N.P.L.)	
MacDONALD CONSULTANTS LTD.	
TYPICAL STOPE	
 MacDONALD CONSULTANTS LTD.	OCT., 1968
PLATE <span style="font-size: 2em; font-weight: bold;">6</span>	

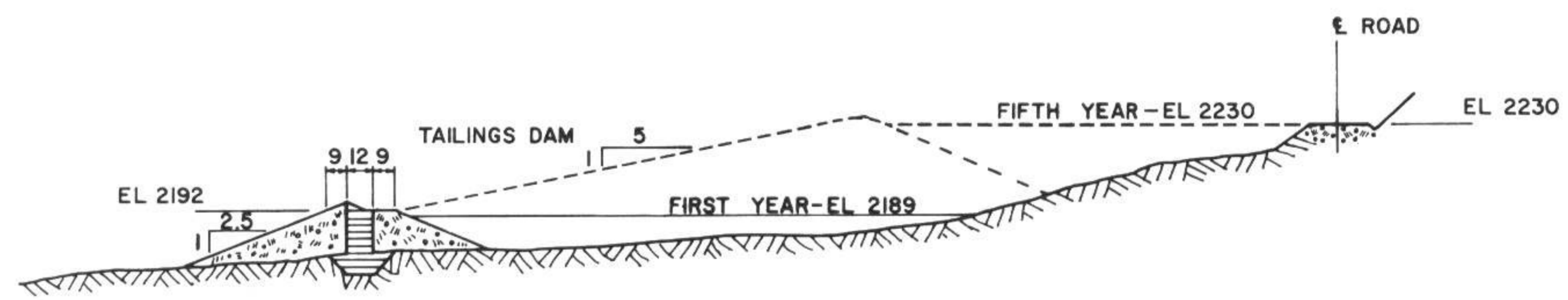
WINDY ARM



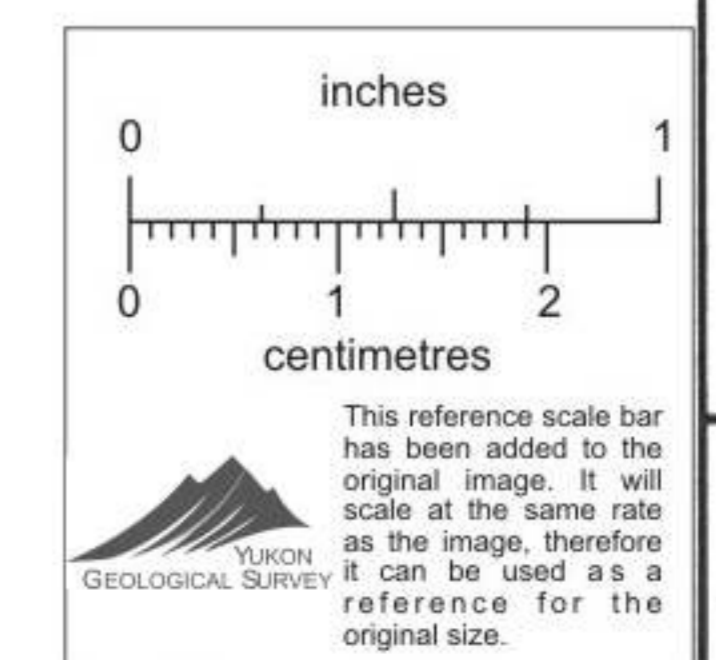
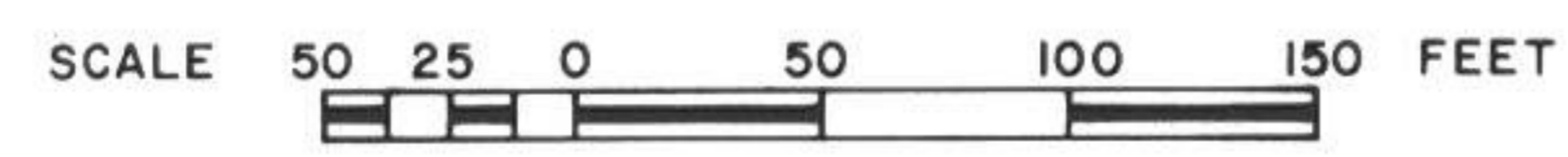
PLAN



- 1 COARSE ORE STOCKPILE
  - 2 CRUSHING PLANT
  - 3 CONCENTRATOR
  - 4 SUBSTATION
  - 5 ADMINISTRATION
  - 6 PUMPHOUSE
- TAILINGS DISPOSAL AREA AFTER FIRST YEAR.
  - TAILINGS DISPOSAL AREA AFTER FIFTH YEAR.

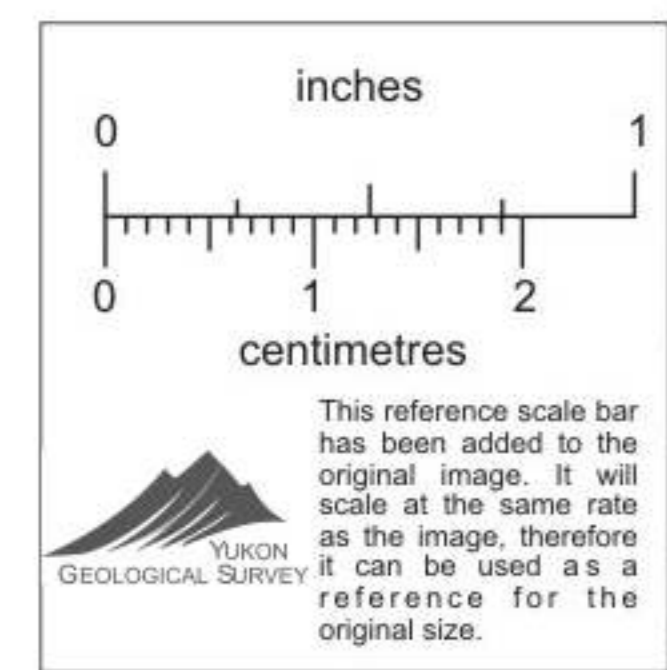
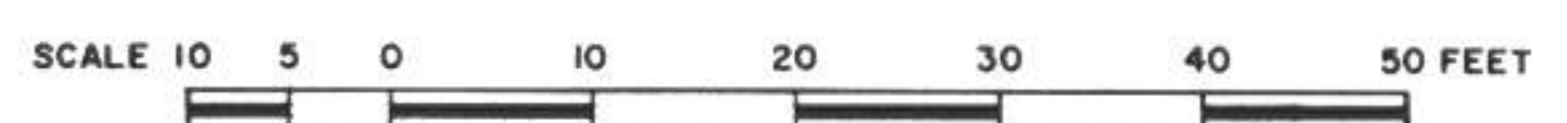
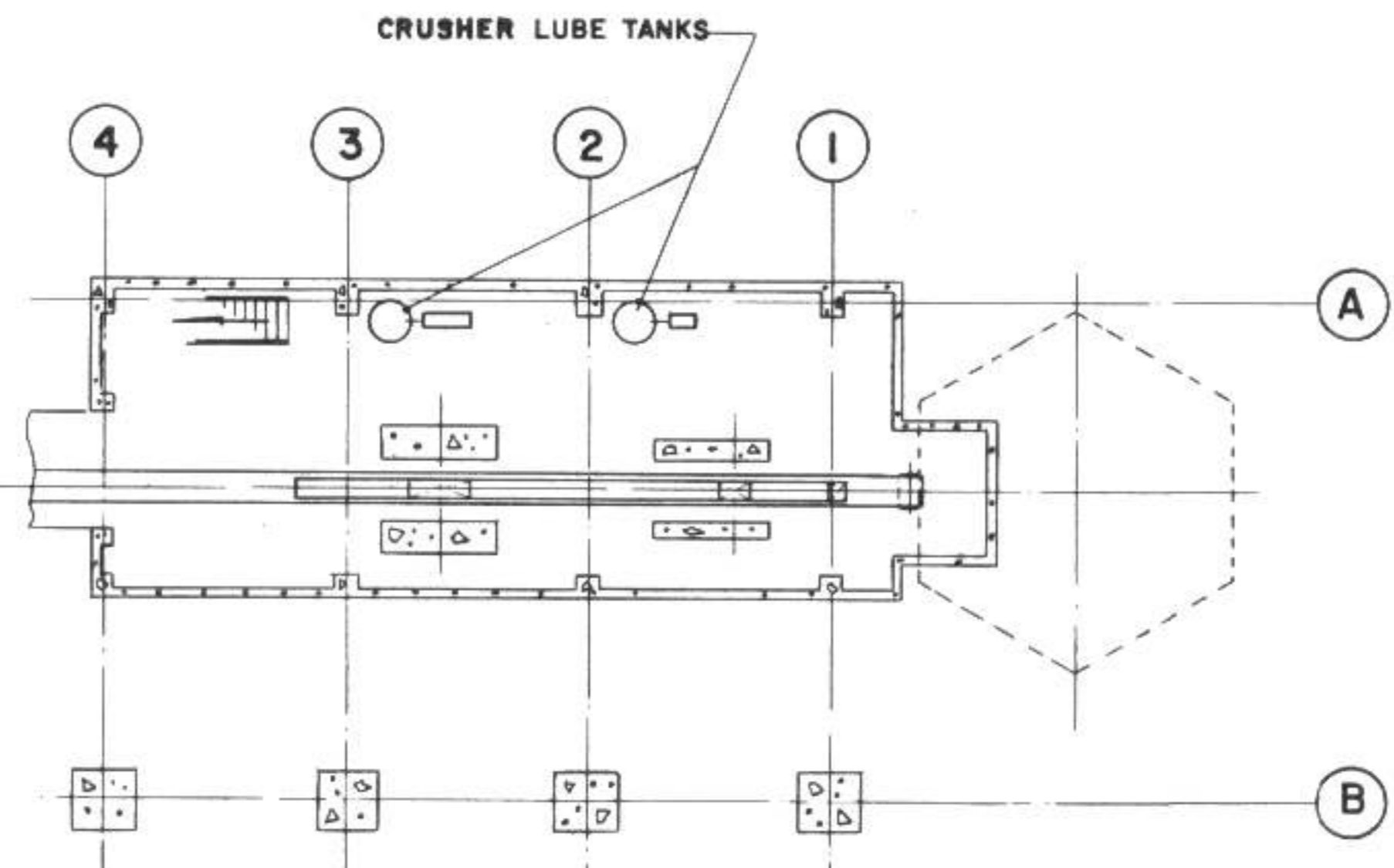
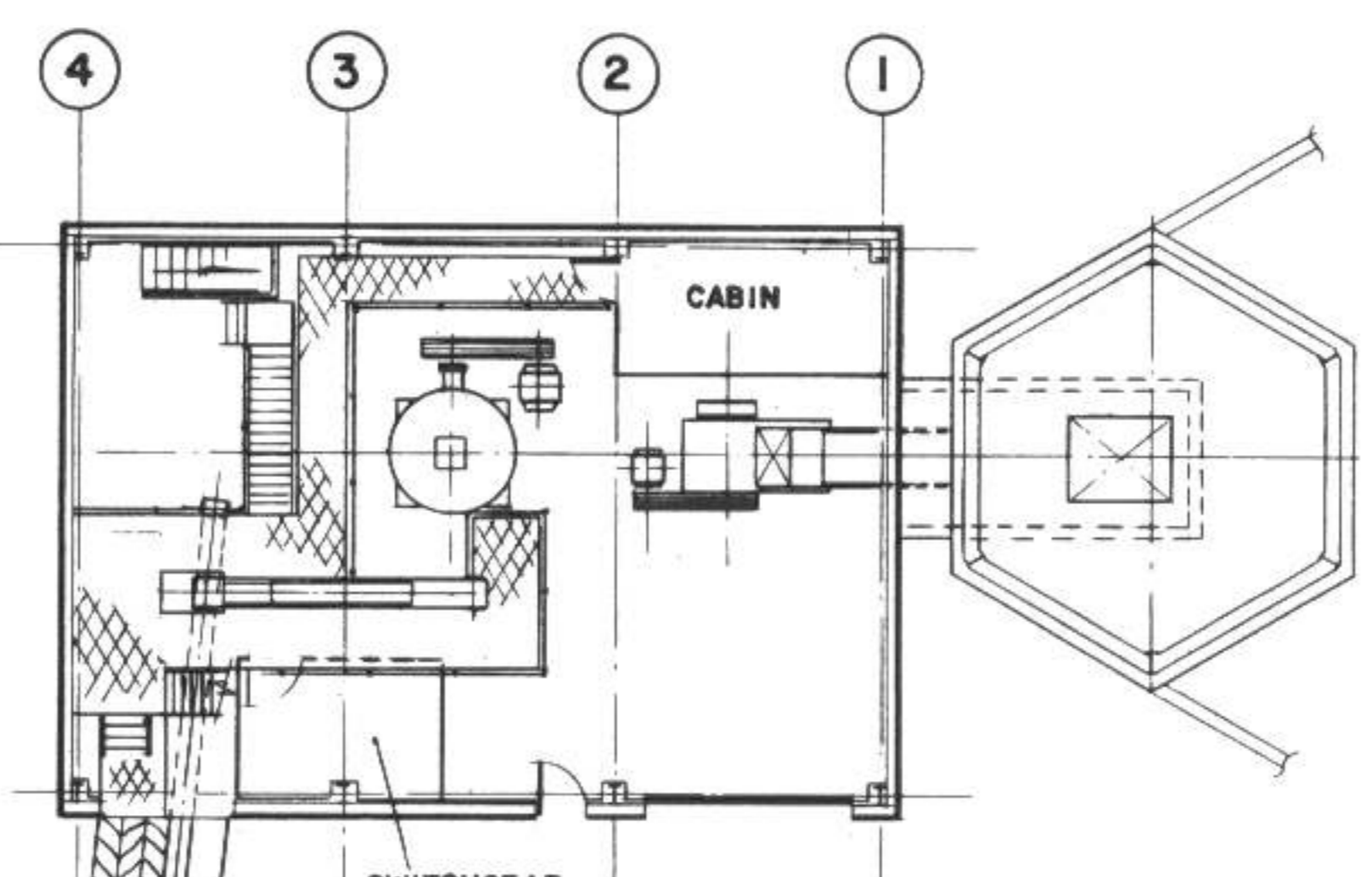
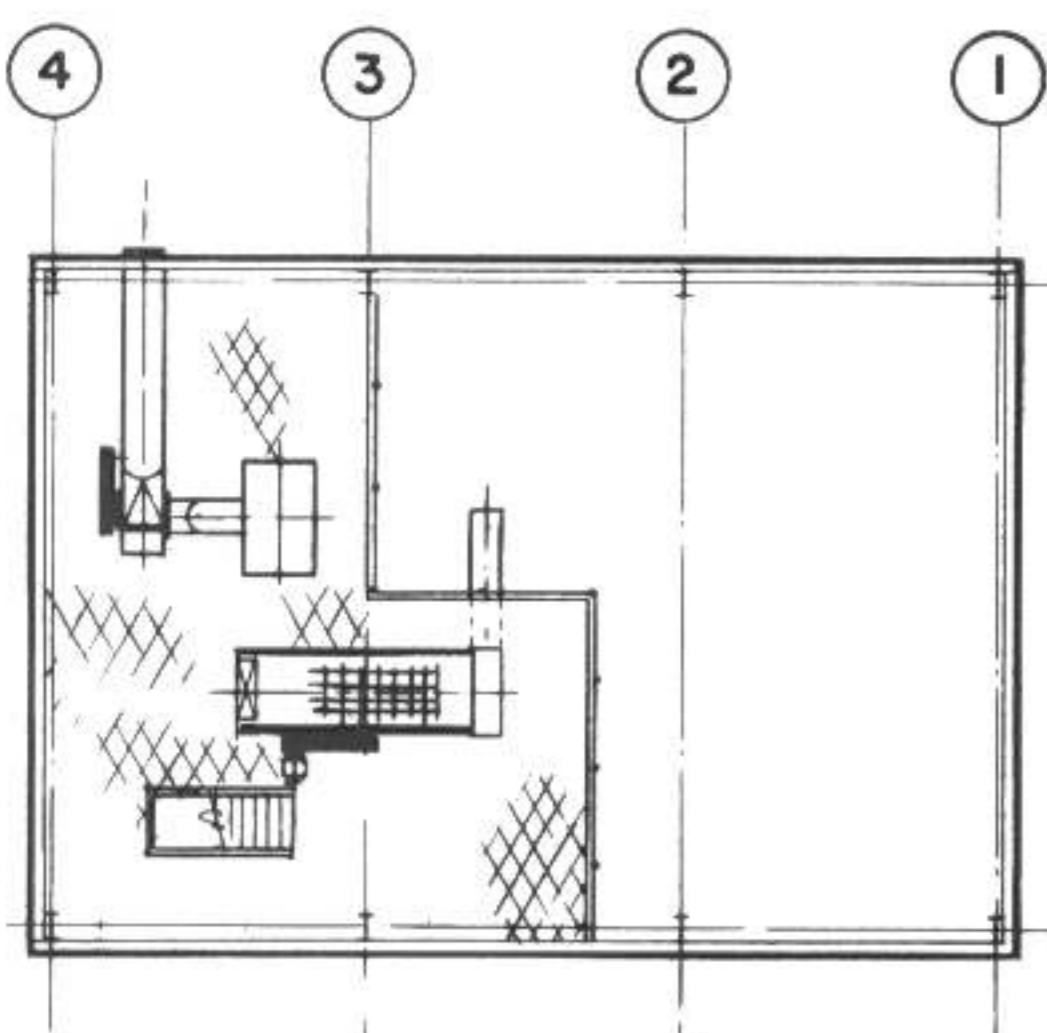
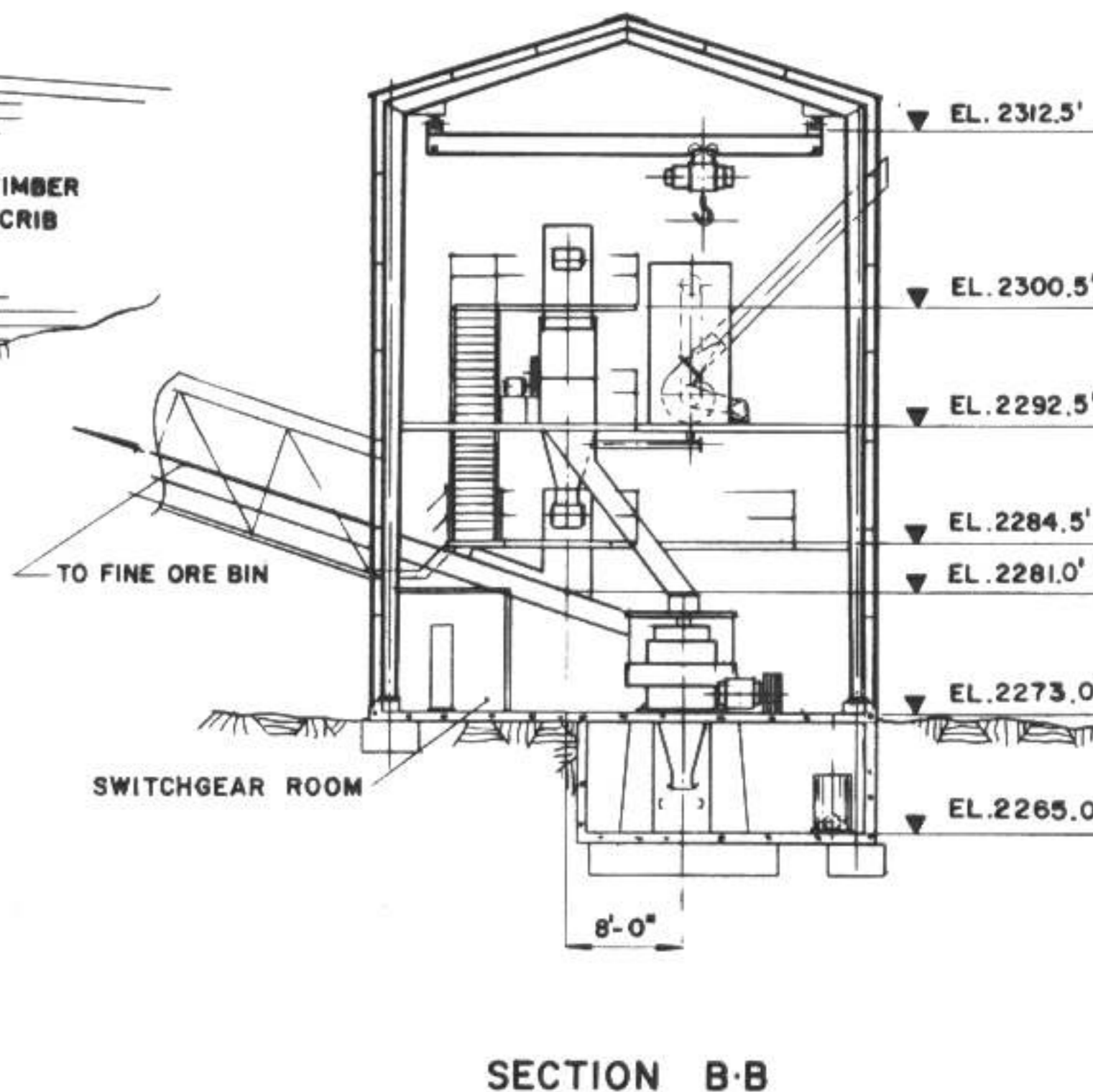
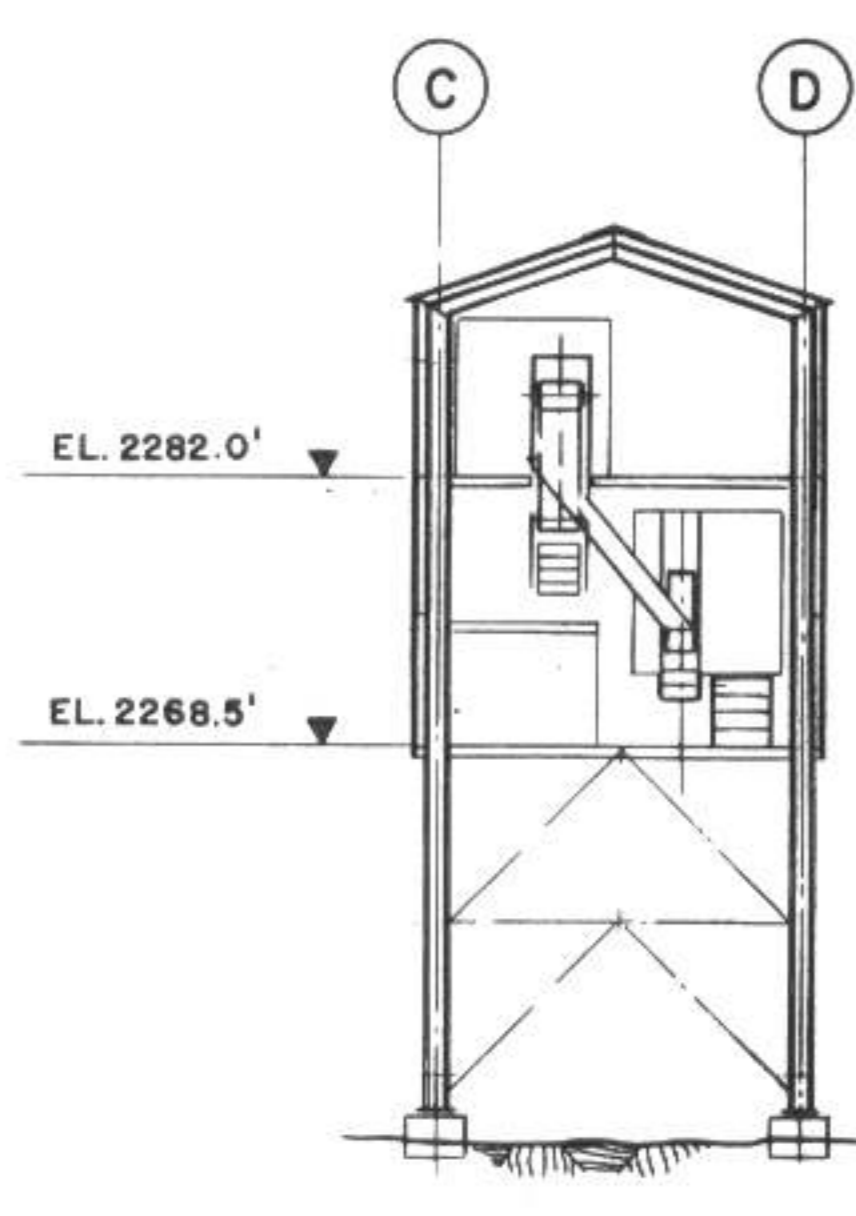
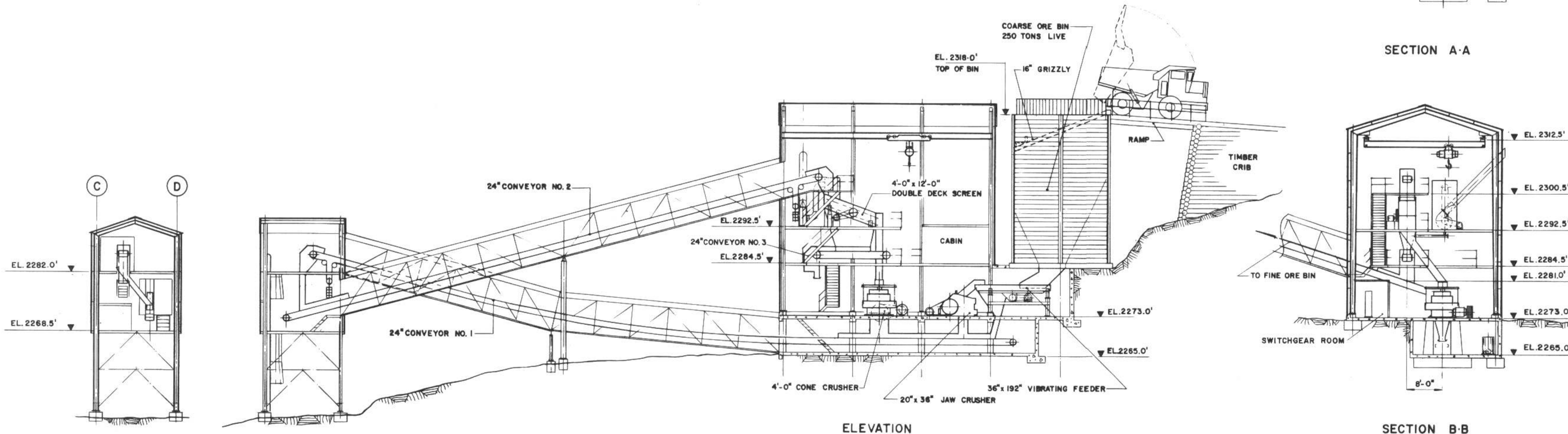
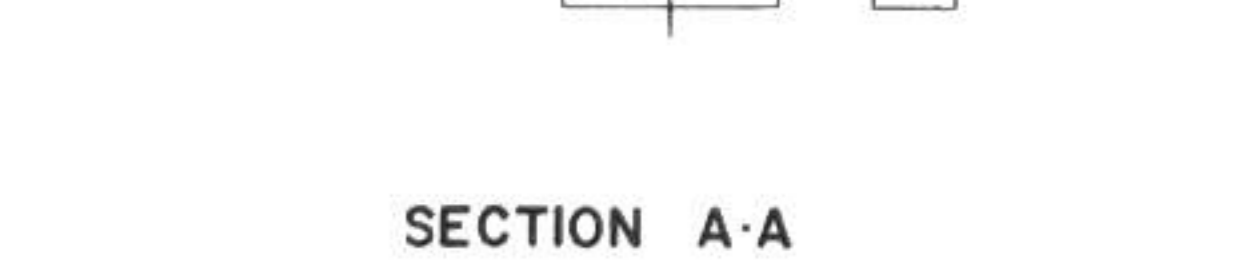
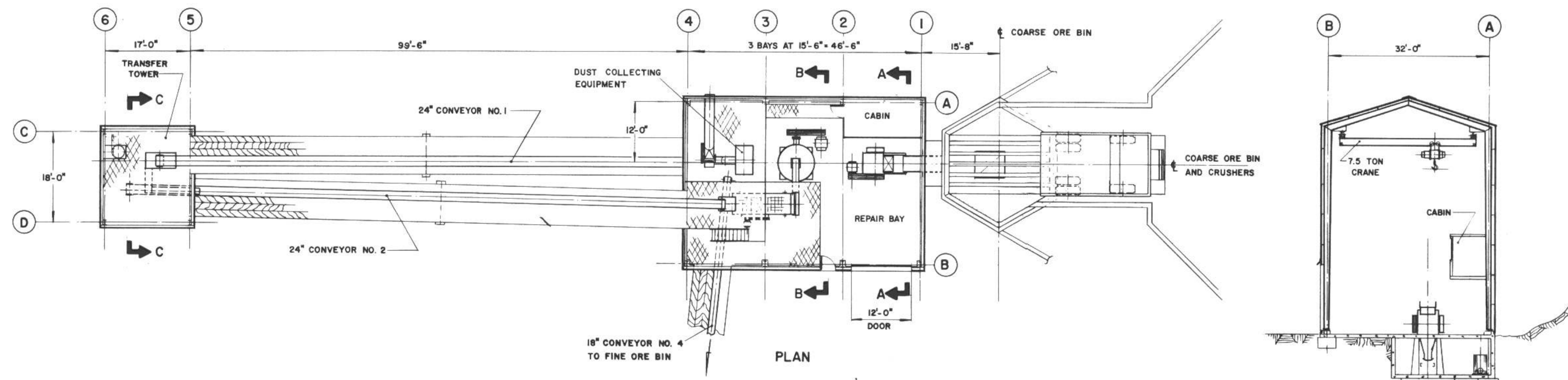


SECTION A-A

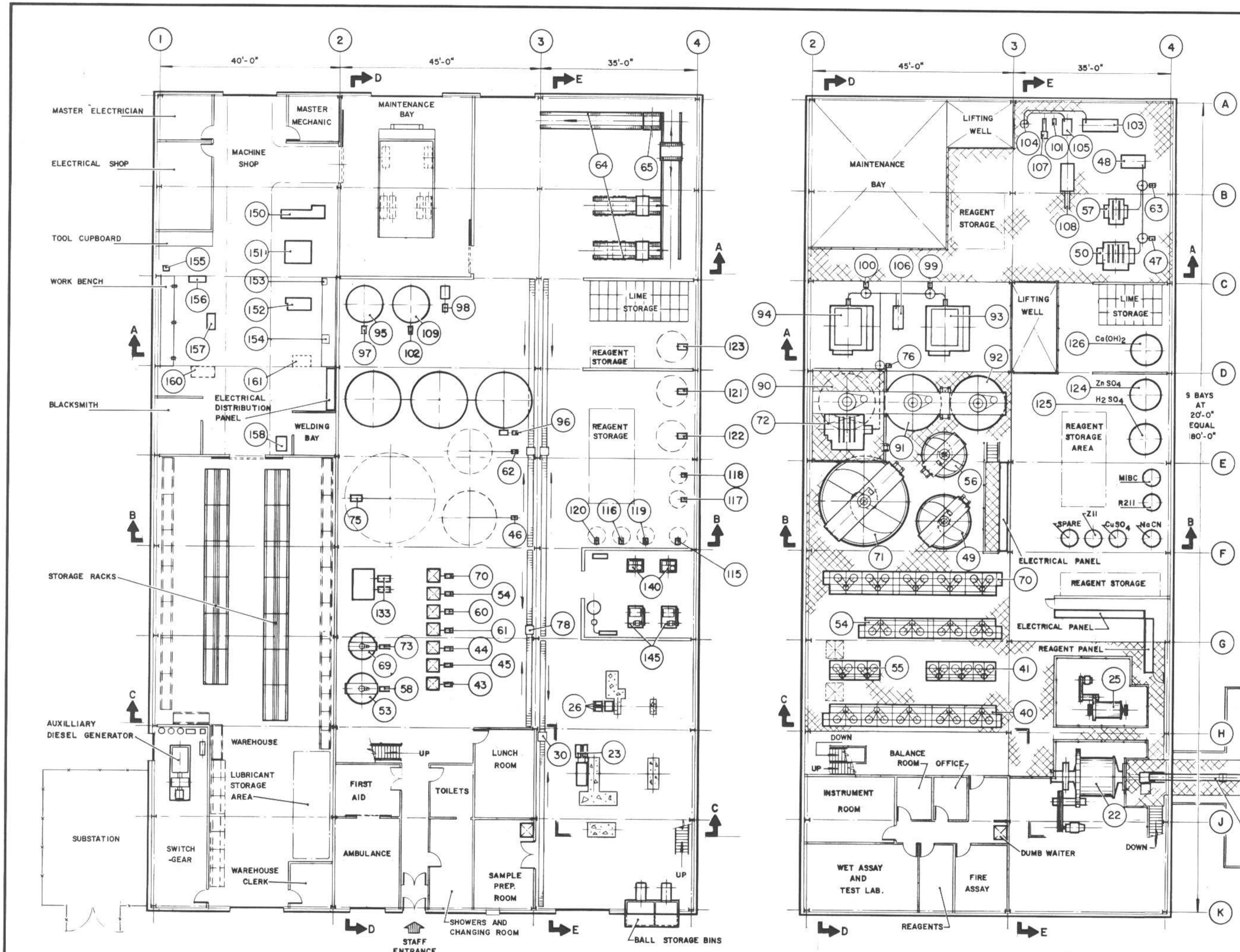


<b>VENUS MINES LTD. (N.P.L.)</b>	
ACRES WESTERN LIMITED	
<b>MILL SITE ARRANGEMENT</b>	
F. J. Martin ACRES WESTERN LIMITED	OCTOBER 1968
PLATE <span style="font-size: 2em; font-weight: bold;">7</span>	



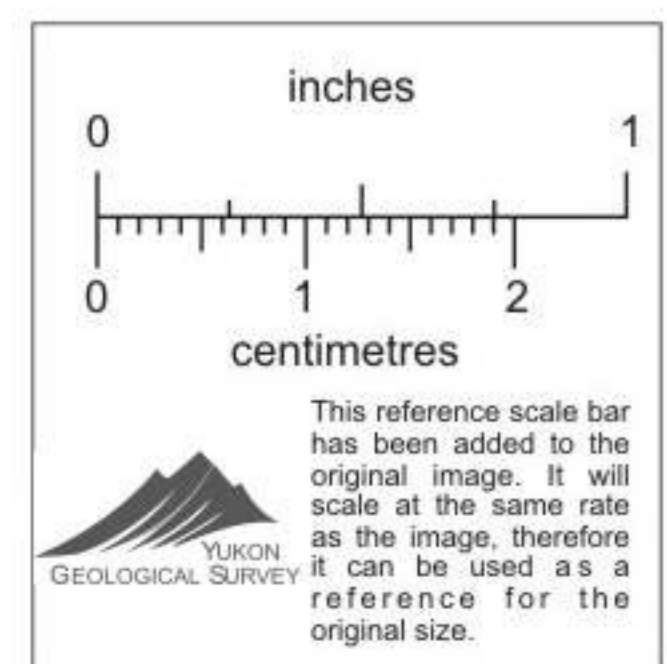
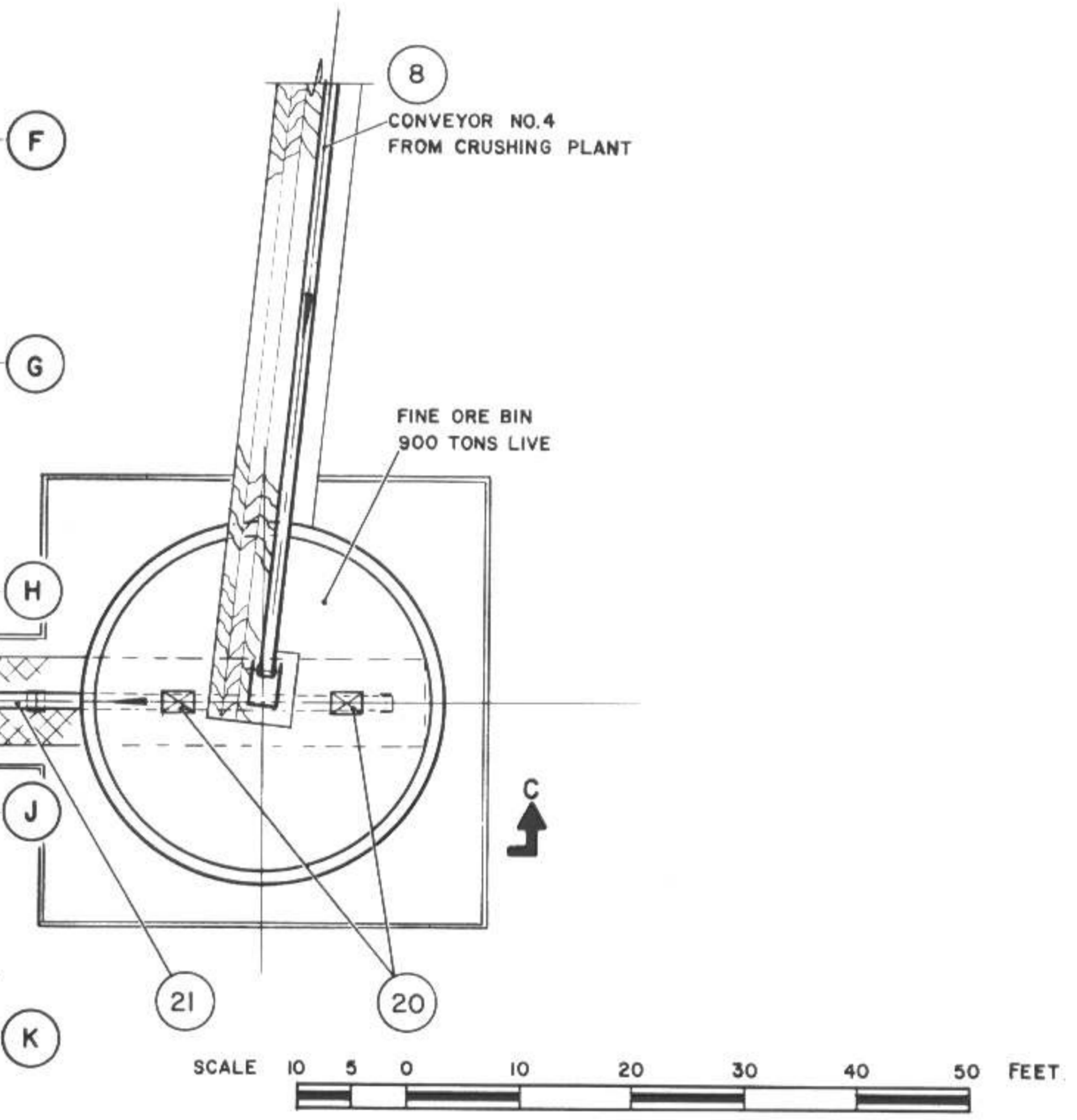


<b>VENUS MINES LTD. (N.P.L.)</b>	
ACRES WESTERN LIMITED	
<b>CRUSHING PLANT</b>	
<i>S. W. Barton</i> ACRES WESTERN LIMITED	OCTOBER 1968
	PLATE <b>9</b>



EQUIPMENT LIST			
AREA	ITEM NO	DESCRIPTION	H.P.
	1-145	SEE EQUIPMENT LIST ON FLOW SHEET, PLATE NO 8.	
MACHINE SHOP	150	LATHE 80" CENTERS.	7.5
	151	MILLING MACHINE	5
	152	RADIAL DRILL, 4'-0" ARM.	5
	153	BENCH DRILL	0.5
	154	BENCH GRINDER	0.5
	155	PEDESTAL GRINDER	2
	156	WET CUT POWER HACKSAW	0.5
	157	PIPE THREADER	3
	158	D.C. PORTABLE WELDER, 18.5 KW.	2.5
	159	MACHINE SHOP CRANE 2 TON CAPACITY - SEE PLATE NO II.	7.5
	160	IRONWORKER ( FUTURE )	
161	HYDRAULIC PRESS 25 TON CAPACITY ( FUTURE )		
		CONNECTED POWER - MACHINE SHOP	56.5

NOTE - FOR SECTIONS REFER TO PLATE NO. II.



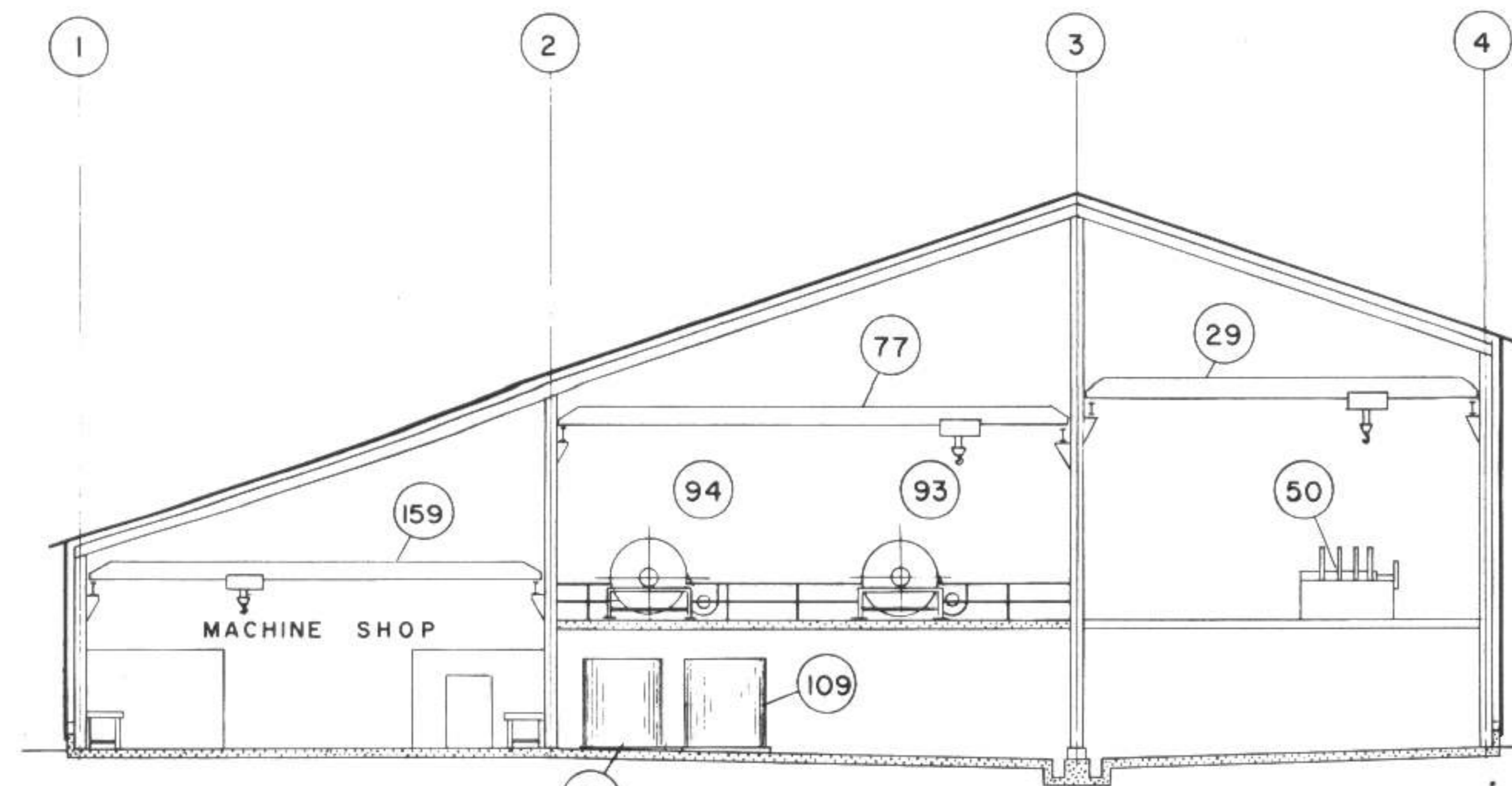
**VENUS MINES LTD. (N.P.L.)**  
ACRES WESTERN LIMITED

**CONCENTRATOR FLOOR PLANS**

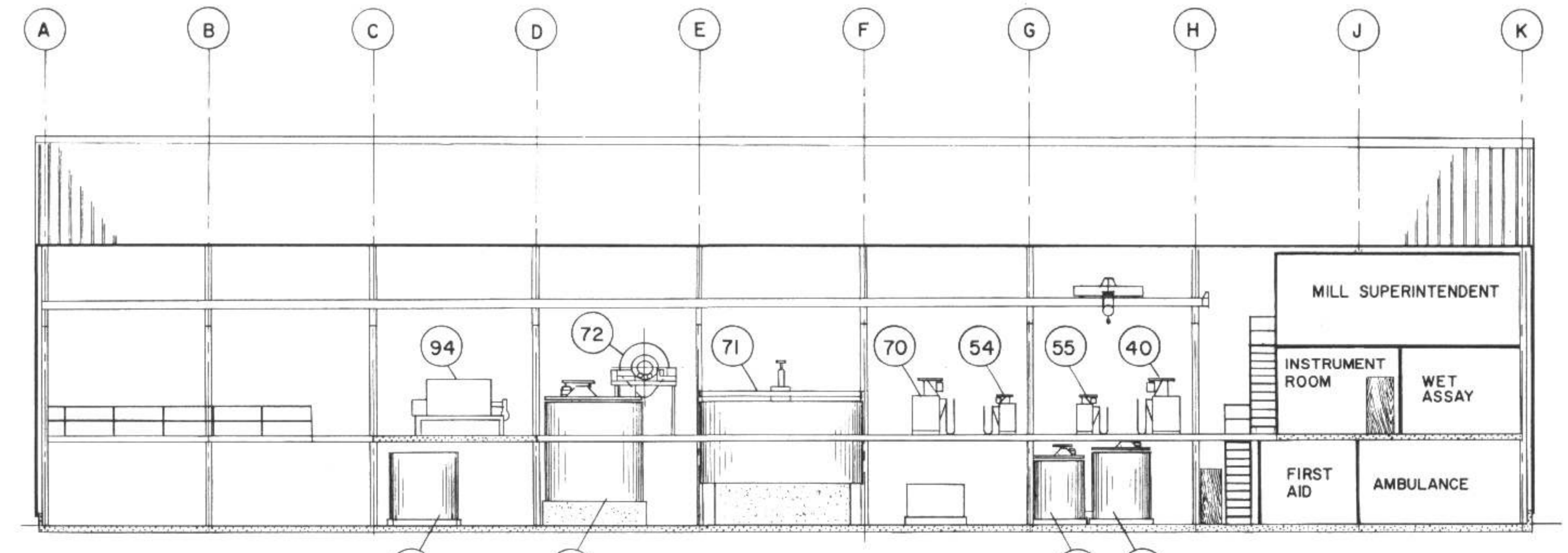
*J. A. Norton*  
ACRES WESTERN LIMITED

OCTOBER 1968

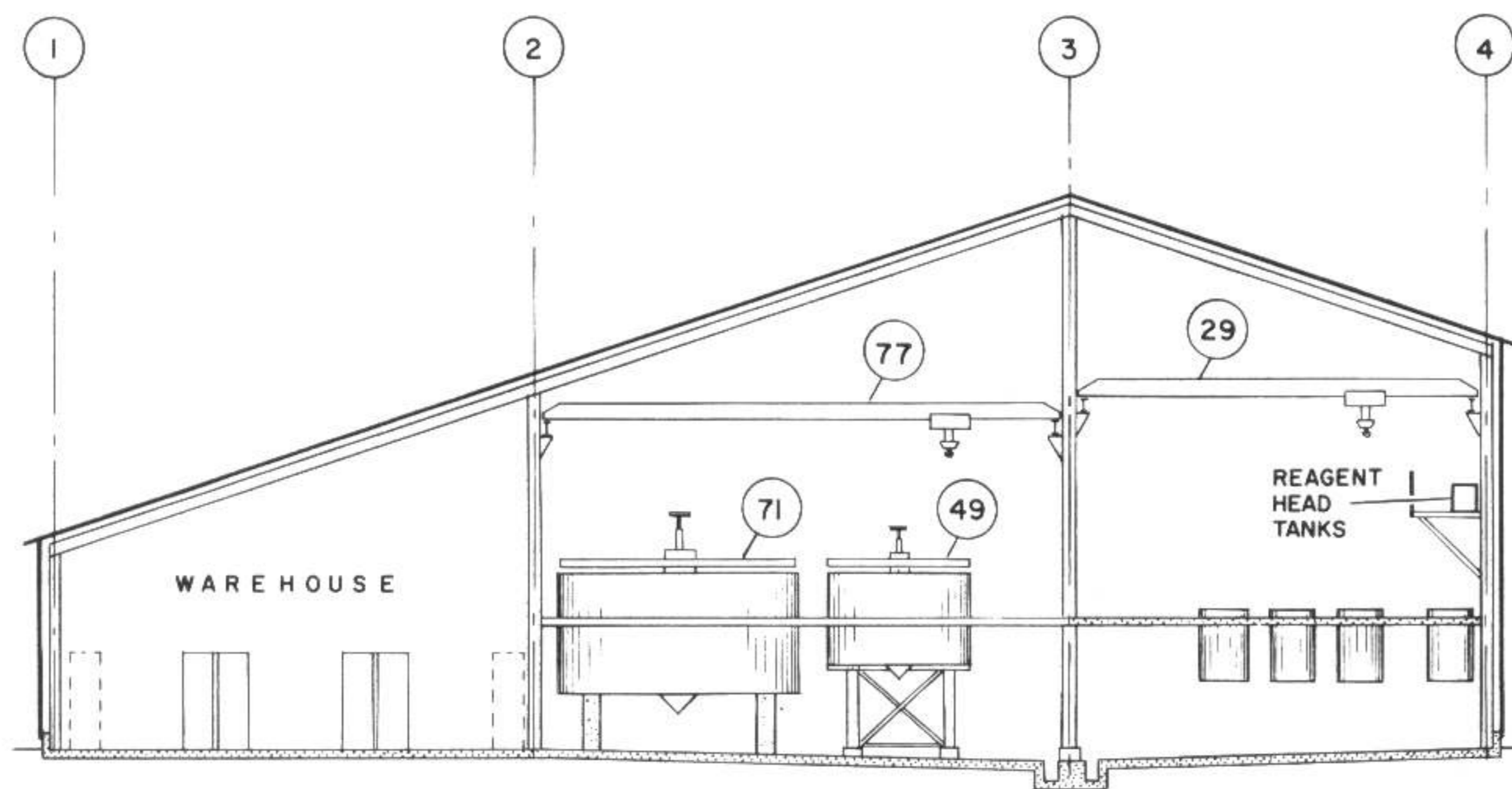
PLATE  
**10**



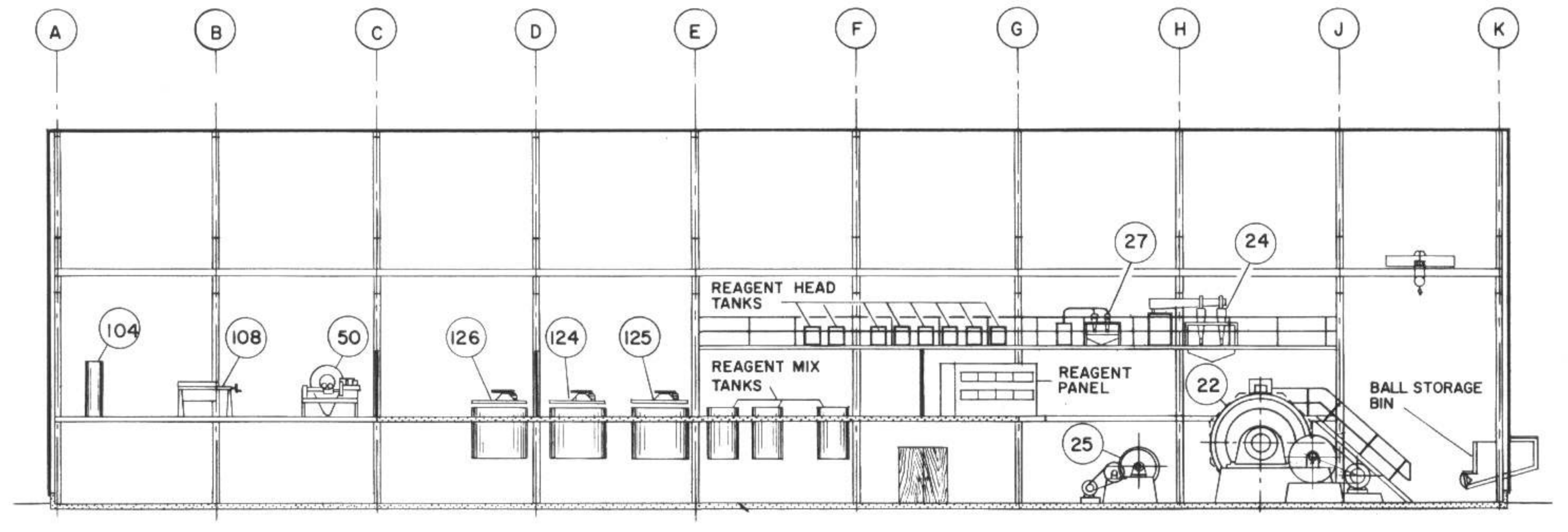
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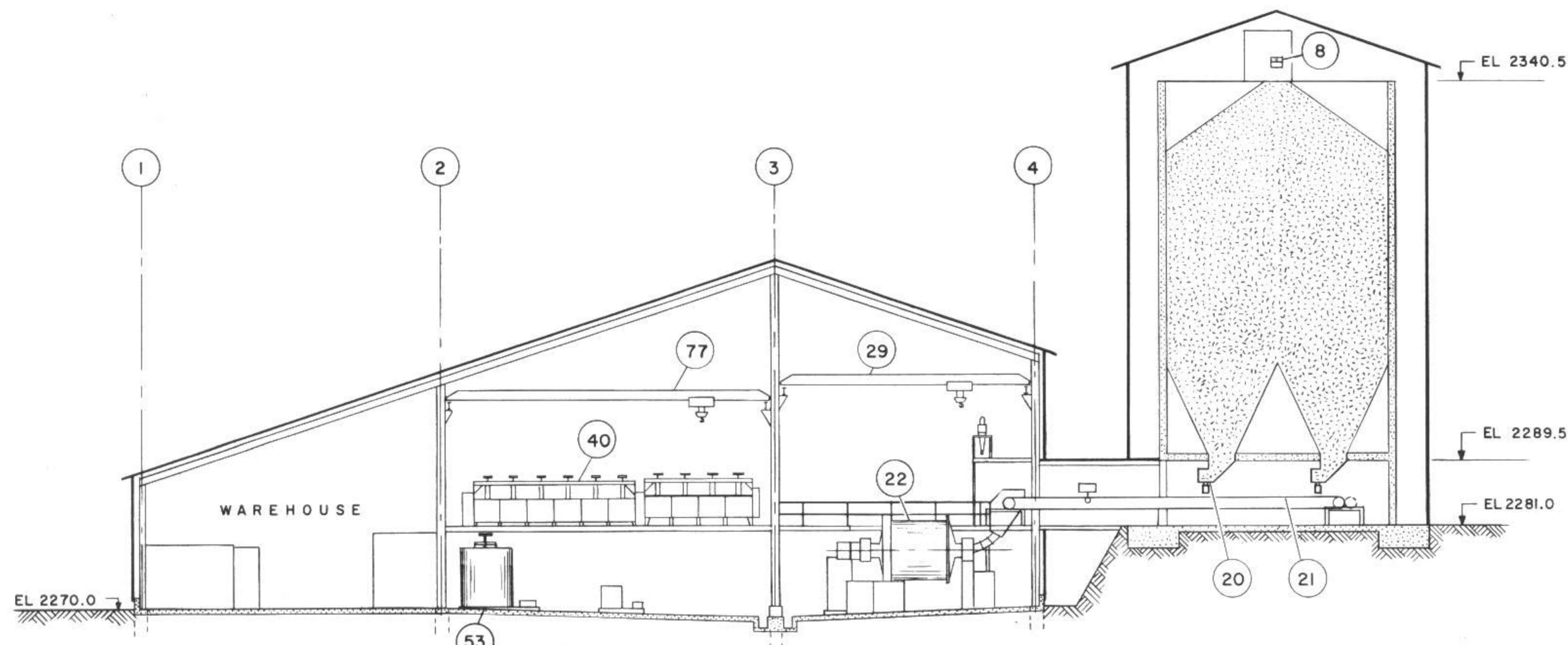
SECTION D-D



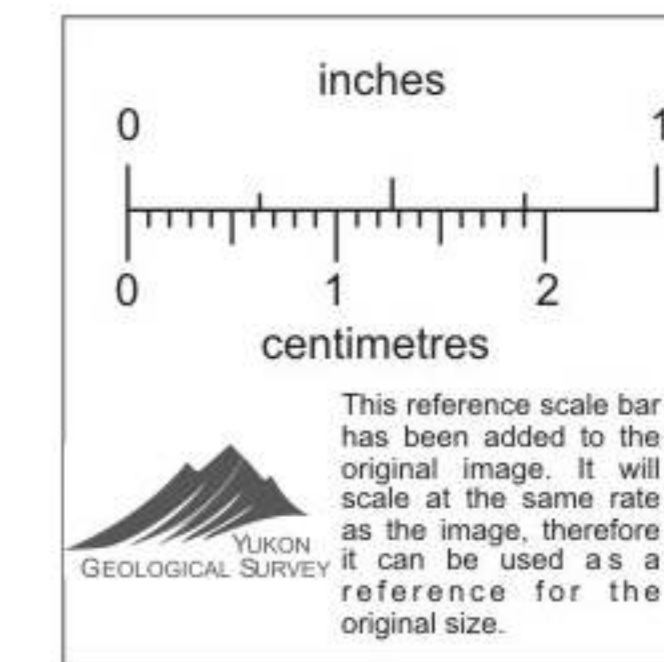
SECTION B-B



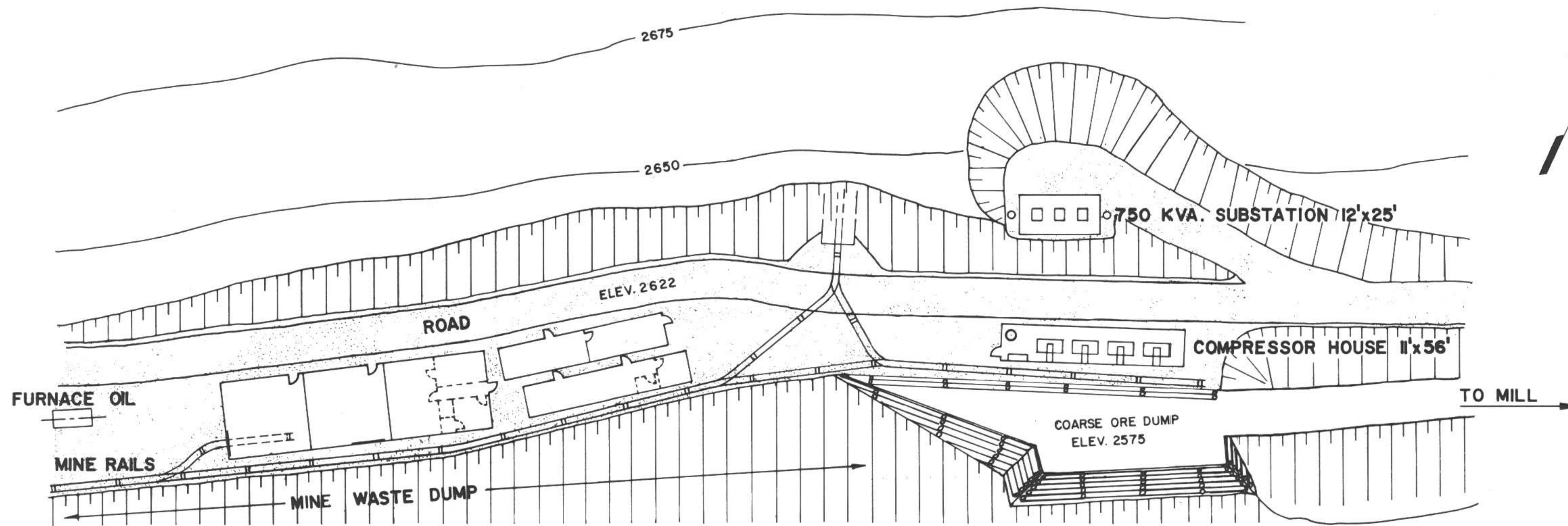
SECTION E-E



SECTION C-C

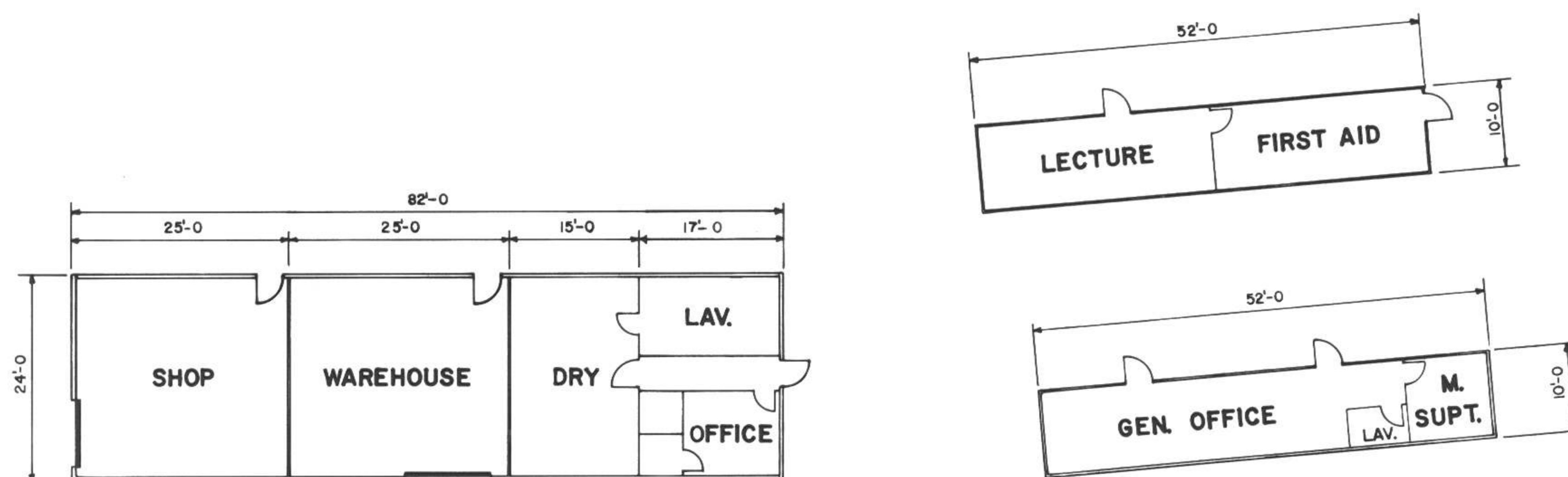


VENUS MINES LTD. (N.P.L.)	
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CONCENTRATOR SECTIONS	
 ACRES WESTERN LIMITED	OCTOBER 1968
PLATE 11	



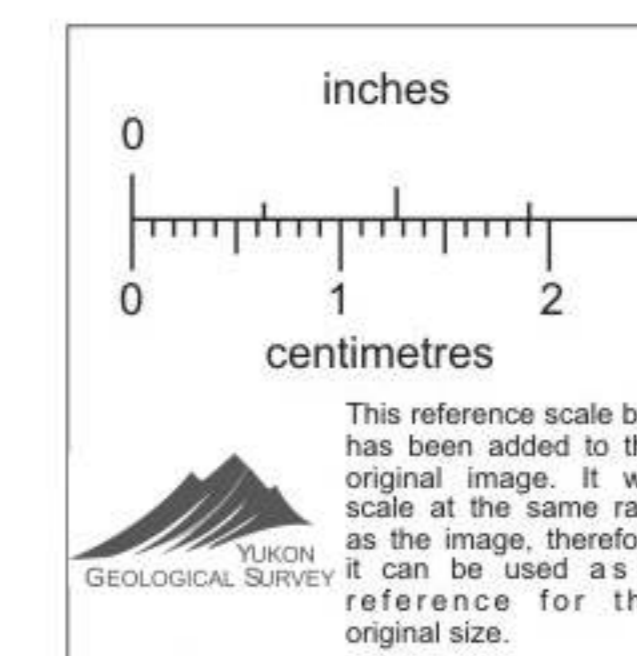
PLAN OF MINE PORTAL AT EL. 2600

SCALE 10 5 0 10 20 30 40 50 FEET



PLAN OF PORTAL BUILDINGS

SCALE 10 5 0 10 20 30 40 50 FEET



VENUS MINES LTD. (N.P.L.)

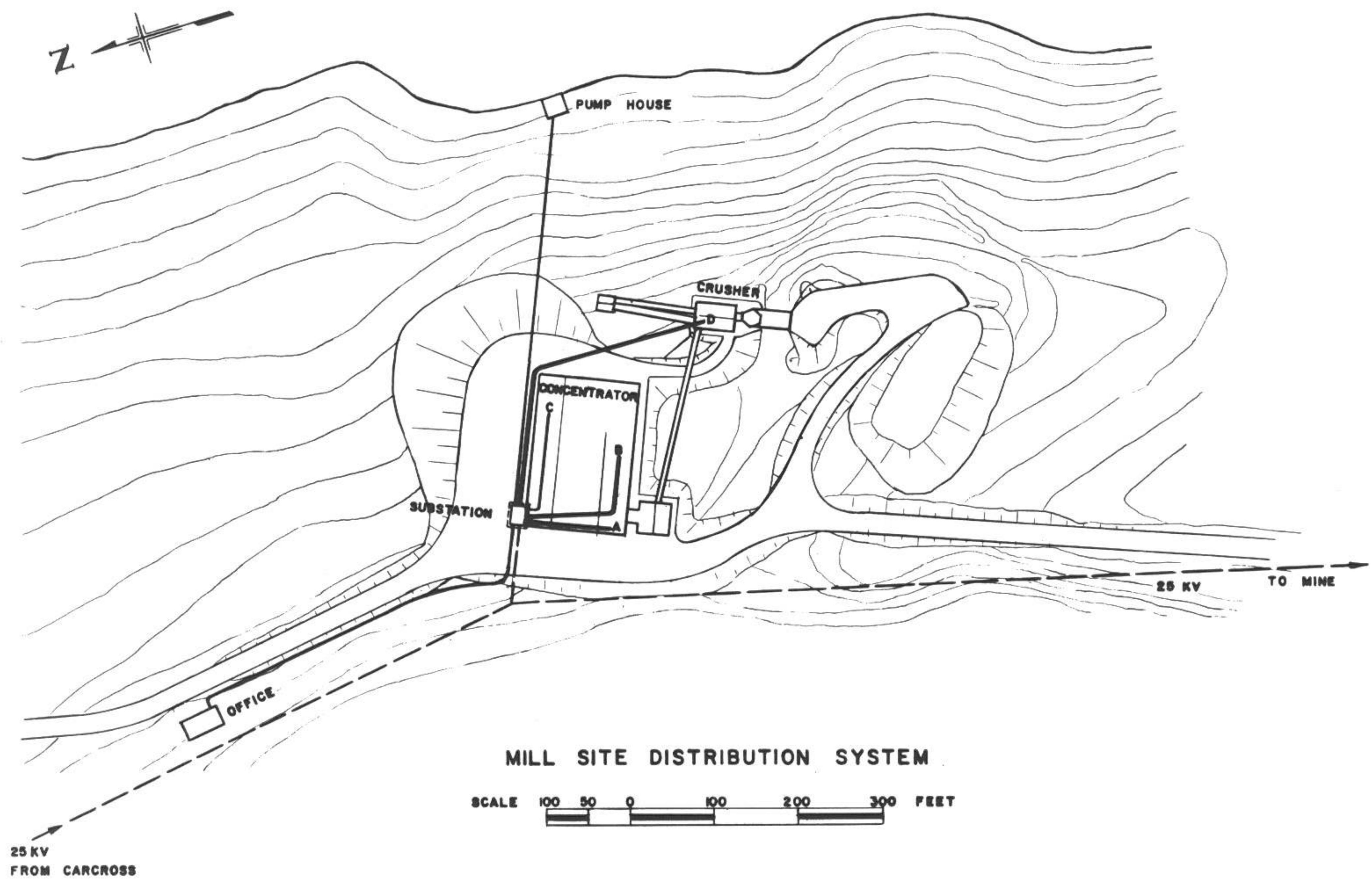
ACRES WESTERN LIMITED

MINE SURFACE FACILITIES

*S. F. Martin*  
ACRES WESTERN LIMITED

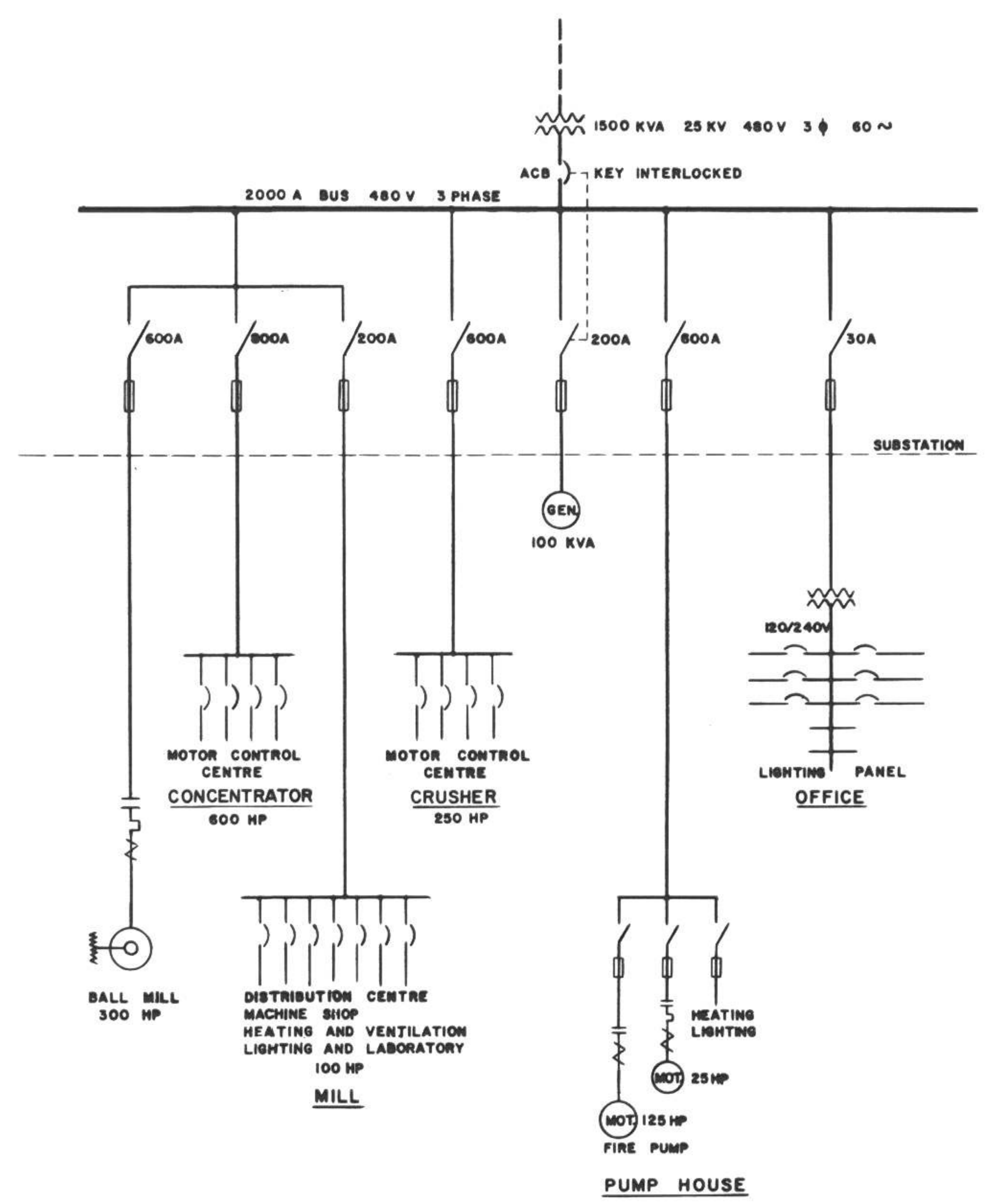
OCTOBER 1968

PLATE  
12

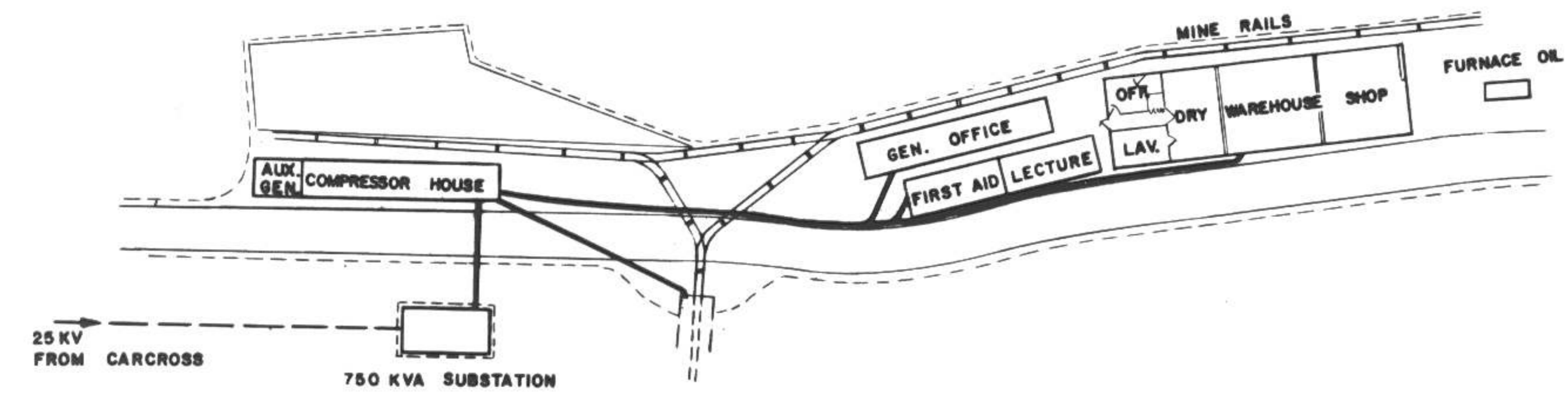


MILL SITE DISTRIBUTION SYSTEM

SCALE 100 50 0 100 200 300 FEET



MILL SITE SINGLE LINE DIAGRAM

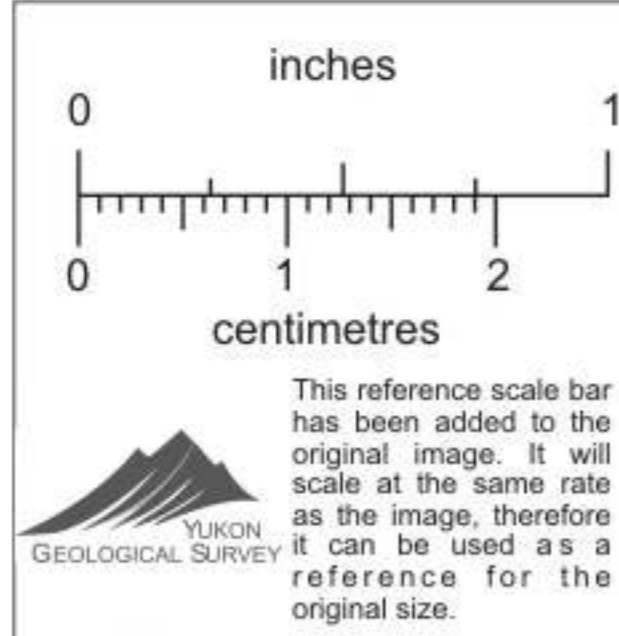


MINE PORTAL DISTRIBUTION SYSTEM

SCALE 30 15 0 30 60 90 FEET

NOTES

- 25 KV TRANSMISSION LINE SUPPLY BY YUKON ELECTRIC CO.
  - 3 PHASE 480V DISTRIBUTION FEEDERS
  - A — BALL MILL
  - B — MOTOR CONTROL CENTRE IN MILL
  - C — SUB-DISTRIBUTION CENTRE IN MACHINE SHOP
  - D — MOTOR CONTROL CENTRE IN CRUSHING PLANT
- HORSE POWER FIGURES SHOWN ARE ESTIMATED DEMAND. CONNECTED HP IS HIGHER



<b>VENUS MINES LTD. (N.P.L.)</b>	
ACRES WESTERN LIMITED	
<b>ELECTRICAL DISTRIBUTION SYSTEM</b>	
F. W. Martin ACRES WESTERN LIMITED	OCTOBER 1968 PLATE 13