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**TEXADA MINES LTD.**

**21 YEARS OF SHIPMENTS OF IRON ORE TO JAPAN**

**PROPERTY FILE**

**TEXADA MINES LTD.**  
**21 YEARS OF SHIPMENTS OF IRON ORE TO JAPAN**  
**March 1973**

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INTRODUCTION & SHORT HISTORY

Texada Mines Ltd. began mining iron ore at the request of the Japanese steel mills. Construction began in 1951, and on May 15, 1952, the first shipment of lumpy ore left Texada Island in British Columbia, Canada, bound for the Japanese steel mills. Texada Mines was the first long-term contract made with the Japanese steel mills after the war, and it came through the good offices of Mitsubishi Shoji Kaisha, Ltd.

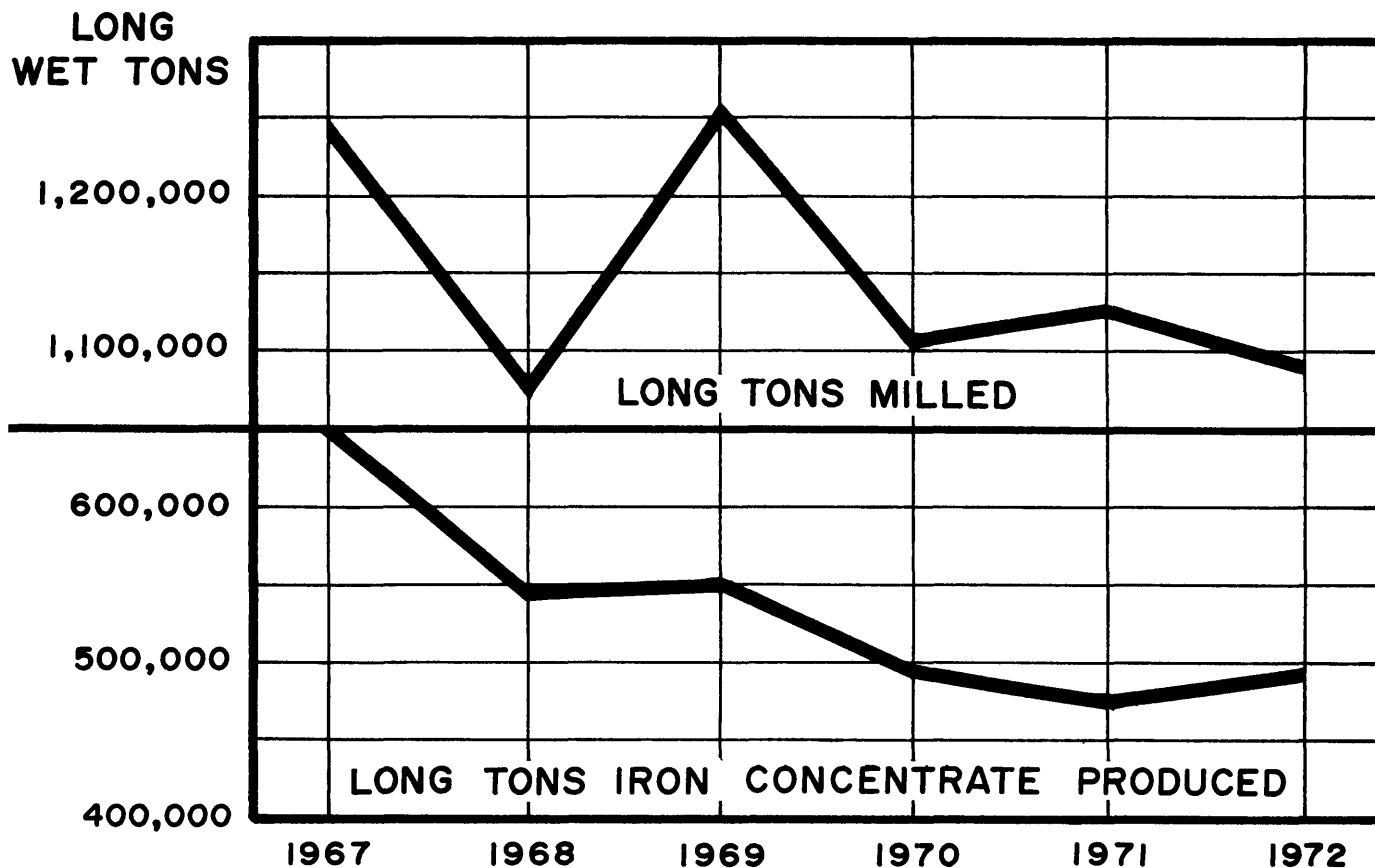
From that first shipload of 4,000 long wet tons (LWT) to the present, Texada Mines has provided reliable service with a quality product. It is expected that by the time of 21 years of service in May 1973, Texada Mines will have shipped nine million LWT of lumpy iron ore and iron concentrate to its Japanese customers. These uninterrupted shipments include:

1,239,825 L/T Lumpy Iron Ore 1952/1956  
 7,785,715 L/T Iron Concentrate 1956/1973  


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 9,025,540 L/T TOTAL

During the last six years, the approximate annual production was about 510,000 LWT. This tonnage was reduced by 50,000 tons for the shipping period 1971/1972 upon the request of the mills. The tentative production and shipment for the years 1973-76 will be about 450,000 tons annually. The following graph shows the ore milled and iron concentrate produced since 1967:



The original Texada Mines was an open pit production operated on the basis of a series of short-term contracts with the Japanese customers. The open pits were operated from 1952 to 1964. However, subsequent exploration work determined that sufficient reserves existed for a long-term contract for an underground mine. Work on that phase began in 1962. Early in 1964, the first ore was hoisted from underground and surface mining was phased out by 1966. With its underground operations, Texada signed a 10-year contract with Mitsubishi Shoji Kaisha, Ltd. and ten Japanese steel mills. Today, the Texada operations, including mine, mill and associated docks and shipping area, represent a considerable investment located on the west coast of Texada Island, approximately 100 miles northwest of Vancouver. It is one of the most efficient and modern mines on the North American continent.



**TEXADA'S IRON CONCENTRATE**  
**--A UNIFORM HIGH-GRADE PRODUCT--**

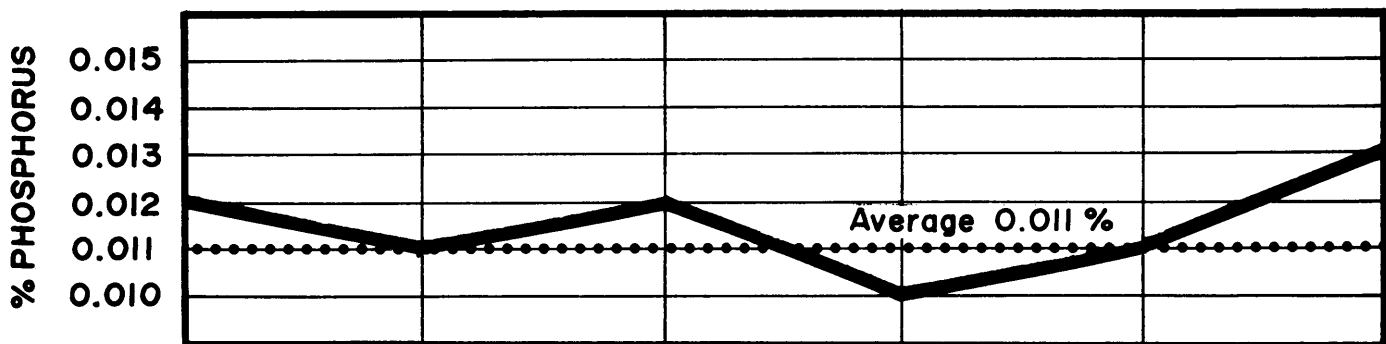
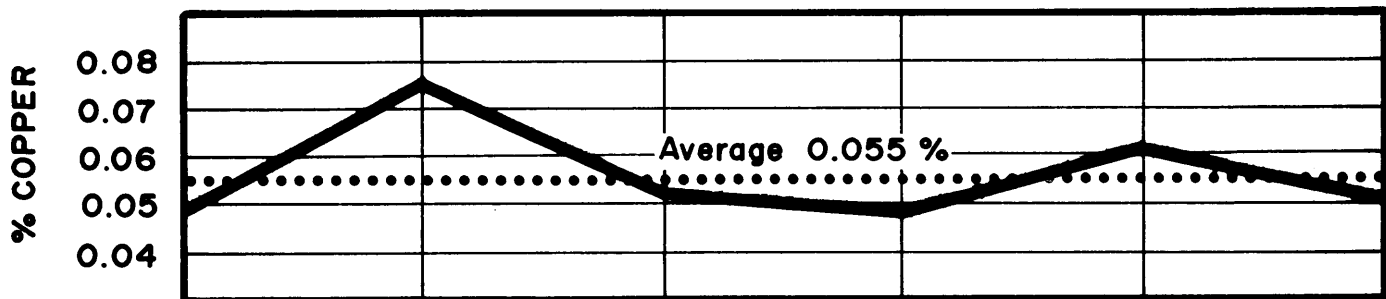
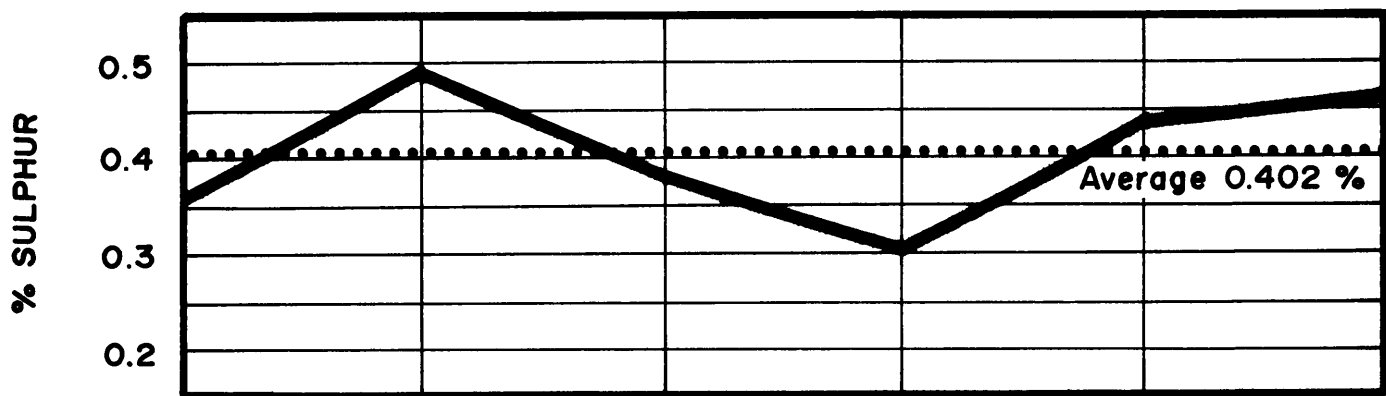
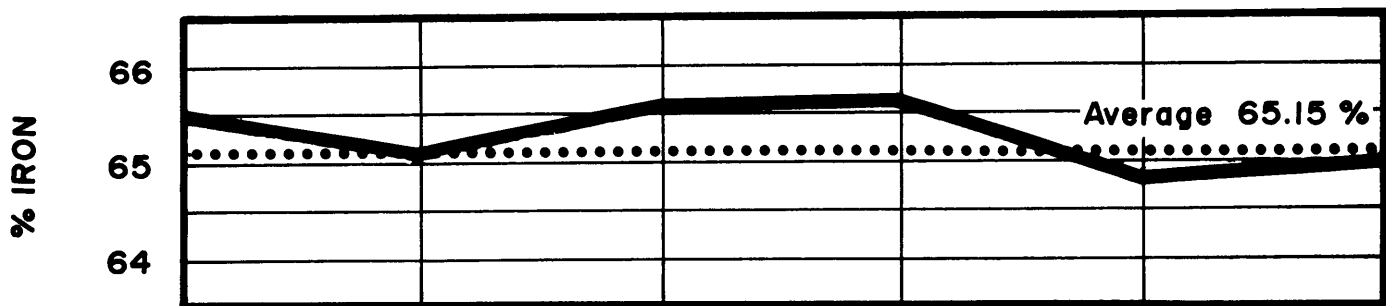
Texada has been able to produce a quality iron ore concentrate by keeping up to date with capital improvements and the latest in mining technology. For example, since 1966, \$1 million (Canadian) has been spent for capital improvements. Included are the transition to and completion of trackless mining and improvements in the mill. These improvements include a regrinding circuit and additional wet magnetic separation and flotation capacity for improvement of iron concentration. For background on trackless mining at Texada, see Appendix A in this booklet. Appendix A is a technical paper, "The Transition to Trackless Mining," prepared by Arnold Walker, vice president and general manager of Texada Mines.

Texada delivers today a rather high-grade, uniform sinter feed concentrate with nearly self-fluxing properties. (Lime CaO plus Magnesium Oxide MgO about 3%.) The average grade on basis of out-turn assays by the Japanese mills show the high grade and small variations of the iron concentrate shipments:

	Guarantee	Average	Variation Plus/Minus
Iron (Fe)	60.00 Minimum	65.150	± 0.6
Copper (Cu)	0.15 Maximum	0.055	± 0.015
Sulphur (S)	4.00 Maximum	0.402	± 0.09
Phosphorus (P)	0.15 Maximum	0.011	± 0.001

The following graph shows how consistent Texada's product has been in the last six years:

# IRON CONCENTRATES - DISCHARGE DATA



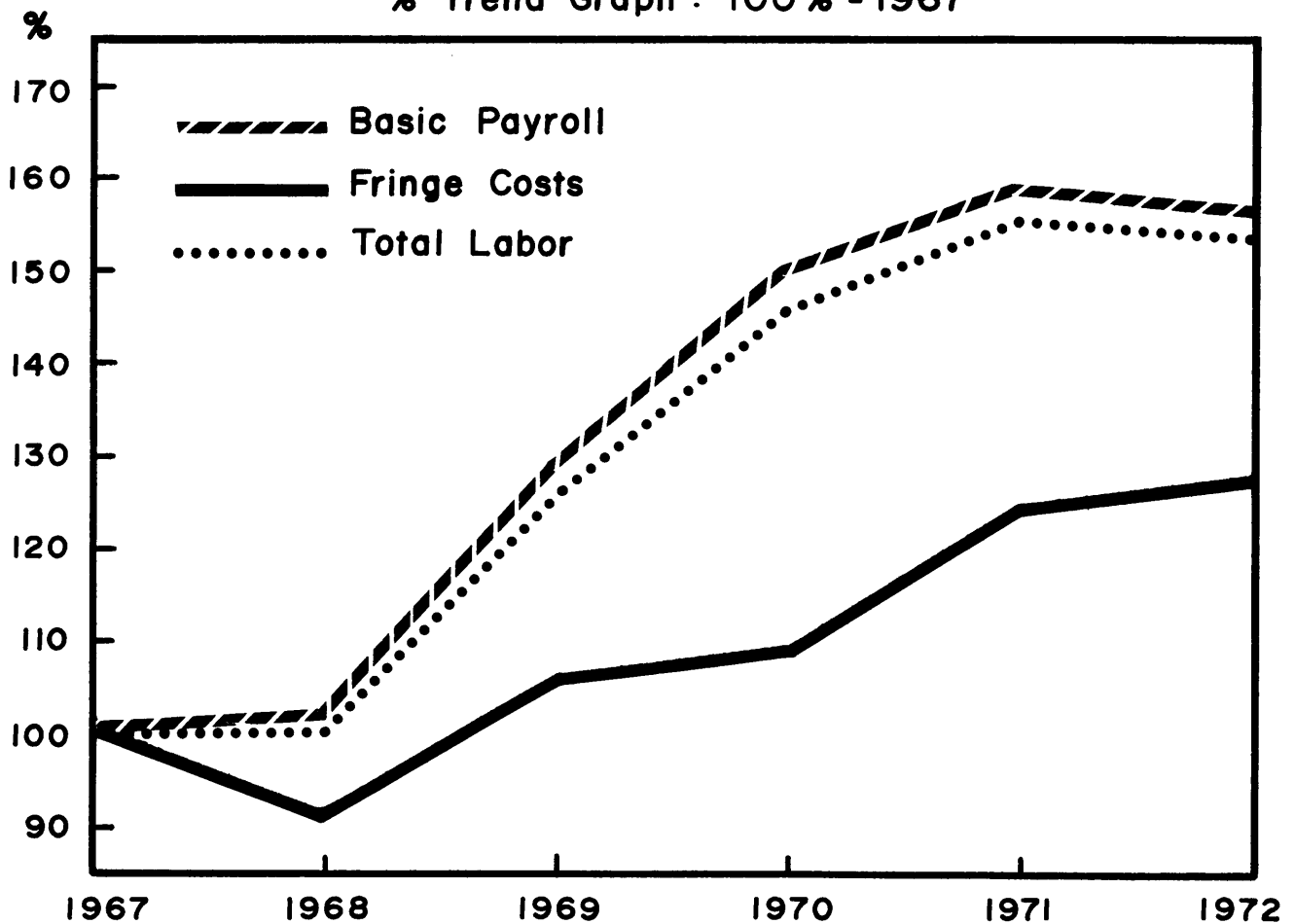
1967                      1968                      1969                      1970                      1971                      1972

THE RISE IN LABOR AND OPERATING COSTS

Texada has been able to keep its operation efficient in the face of rising labor and other operating costs. The following graph shows how, in the past five years, labor costs at the mine have increased 54%. Both basic payroll and fringe benefits have been inching upwards since 1967.

TEXADA MINES LABOR COSTS

% Trend Graph : 100% = 1967

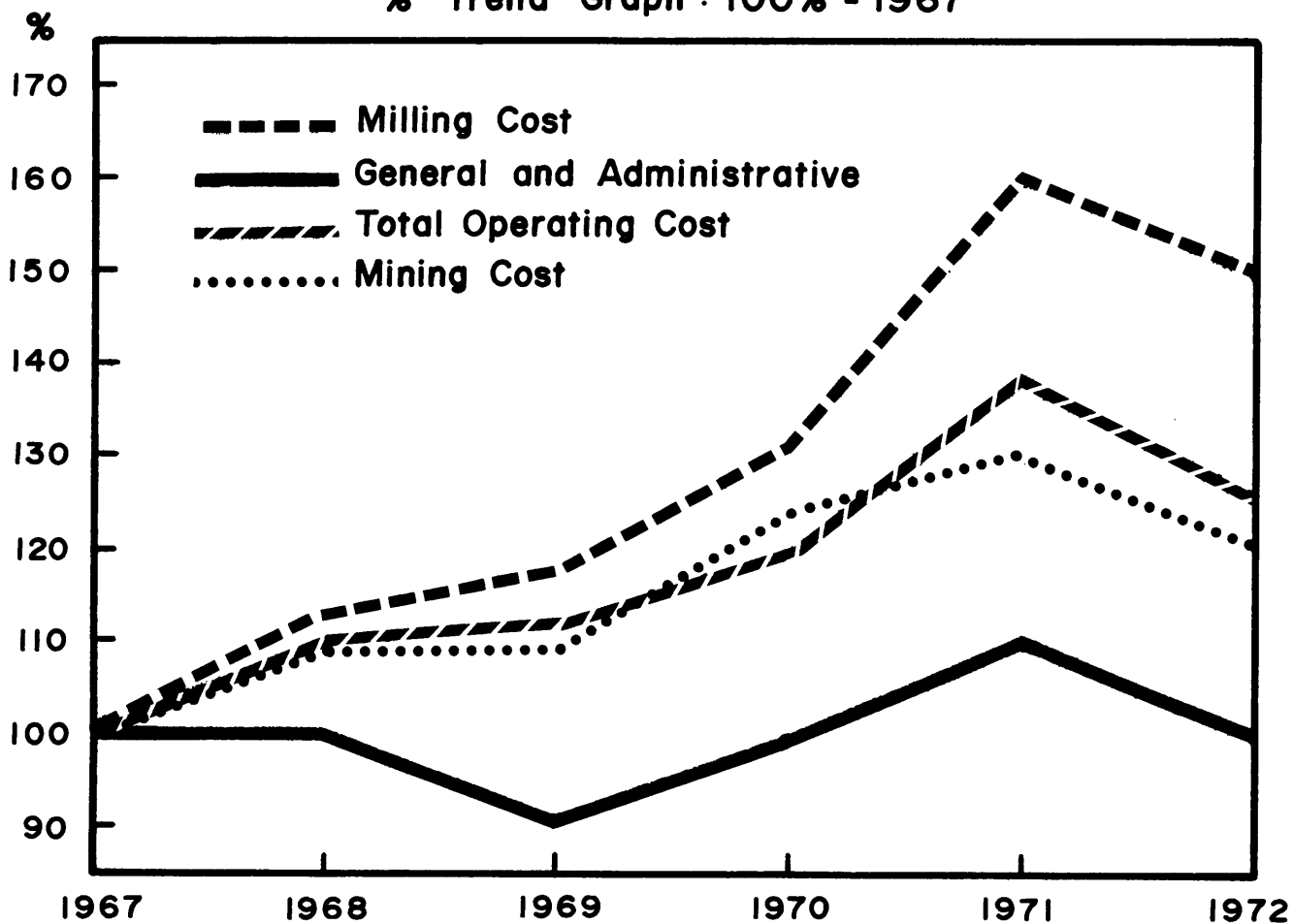




Total production costs at the mine have also increased—up 25% from 1967. Milling, mining and general/administrative costs have gone upward, although there was a slight decrease from 1971 to 1972.

## TEXADA MINES OPERATING COSTS

% Trend Graph : 100% = 1967



Texada has partly compensated for the steadily increasing costs by reducing the number of employees and increasing their productivity by continuing to modernize the facilities. The number of employees has been reduced from 284 in 1967 to 209 by the end of 1972. The output of the miners has been increased from 44.7 tons to 66.1 tons per man shift, a productivity improvement of 48%.

**ADDITIONAL COSTS AT TEXADA**

The current provincial government of British Columbia is considering an increase in the corporate tax which would be an additional expense to Texada. Texada is working with others in the Canadian mining industry to counter the extra tax on the business sector in the province.

**THE FUTURE AT TEXADA**

Texada Mines Ltd. estimates to have sufficient reserves to meet the requirements of the balance of the present contract with the Japanese mills between 1973 and 1976. Texada will determine more definitely the ore supplies later during the years 1974/1975.

Texada Mines owns additional ore reserves located on Vancouver Island; however, these reserves would not produce sinter feed but rather pellet feed at considerably higher costs than those now incurred at the present site. Therefore, these reserves are being held in abeyance until market conditions are more promising.

It might be of interest that Texada Mines has on its property a very sizable deposit (several hundred millions of tons) of limestone usable for the manufacture of cement and/or chemical limestone.

## APPENDIX A

### THE TRANSITION TO TRACKLESS MINING TEXADA MINES LTD.

by

Arnold Walker  
Vice President and General Manager

#### INTRODUCTION

The property of Texada Mines is located on the west coast of Texada Island about 100 miles northwest of Vancouver. A 30 car ferry operates between Powell River and Texada Island making access possible from the mainland or via connecting ferries from Vancouver Island. A scheduled air service operates from Vancouver to a company maintained airstrip near the mine.

The climate is moderate, with about 30 inches of rain during the winter months and relatively dry summers.

The open pit operation began in 1952 on a series of short term contracts. Subsequent exploration programs indicated sufficient reserves for an underground operation and following the negotiation of a ten year contract with Japanese steel mills the underground development work started in 1962. Early in 1964 the first ore was hoisted from underground and surface mining was phased out by 1966.

To date, more than seventeen million long tons of ore have been milled with approximately eight million tons coming from the underground operation. Shipments of iron concentrates total almost nine million long tons. Both the mine and mill operate on a five day week.

#### GEOLOGY

The mineral occurrences are classified as metasomatic in origin. The ore bodies consist of magnetite, chalcopyrite, pyrite and pyrrhotite contained in an envelope of garnet-epidote-actinolite skarn. The skarn zone occurs along the contact of the dioritic Gillies Bay stock and also extends out along much of the contact between the Marble Bay limestone and the older basalts of the Texada formation.

Eight major ore bodies have been outlined within an area roughly 2000 by 5000 feet. All are extremely irregular in shape, varying from steeply dipping tabular or stock-like bodies to relatively thin flat lying lenses. In every case ore continuity is disrupted by extensive faulting. The size of the ore bodies varies from 100 thousand to almost 3 million long tons.

The mineralogy of the ore, a mixture of skarn and magnetite, makes it abrasive, hard and heavy with a specific volume of 10 cubic feet per long ton. In general, ground conditions are good, permitting large openings with only an occasional need for roof support.

#### PRE-TRACKLESS MINING

The underground mine was developed from an 800 foot shaft, an adit connecting with the shaft and main levels at 200 foot intervals. A crusher station below the lowest level is connected with the shaft by 800 feet of conveyerway at 15°.

Long hole open stoping methods, utilizing 125 HP slusher hoists with 72 inch scrapers in scrams ranging from 100 to 250 feet in length produced about 1000 long tons per slusher shift. In most stopes direct scraping to mill holes was possible but where tramming was necessary, 130 cubic foot Granby cars were filled from chutes or by direct scraping. Haulage distances were short and productivity was very satisfactory.

#### TRACKLESS PLANNING

As early as 1965, detailed mine planning clearly showed that a large expenditure would be necessary in the following two to three years to provide ore handling facilities and assure uninterrupted production. The following factors were involved:

- (1) Stopes scheduled for production were beyond the limits of the main ore pass system.
- (2) Development costs would be high for some of the extremely irregular ore bodies unless a flexible method of mining was employed.

**Trackless Planning contd.**

- (3) A number of small ore bodies could be mined simultaneously if the equipment had a high degree of mobility.
- (4) Two gently dipping ore bodies, averaging about 30 feet in thickness were amenable to room and pillar mining.

The decision to gradually convert to trackless mining was based on an examination of trackless operations and a careful study of the comparative costs of conventional and trackless mining. In addition, improvements in safety, accident prevention and supervision expected as a result of the change, would be of increasing benefit. The experience of the mine personnel and the Company's mining consultant favored the use of the Joy Transloaders for both production and stope preparation. Their decision was influenced by the lower cost and also the ready availability of Transloaders at that time. However, one of the room & pillar zones would be opened up by a decline from surface and this necessitated the purchase of a front-end loader capable of loading trucks. A Wagner ST5A Scooptram was selected for this role.

In November 1966 a decline from surface to the Lake Room and Pillar Zone was started using the Scooptram in conjunction with a 3 boom jumbo constructed on the chassis of a surplus open pit ore truck.

A pair of two wheel drive Transloaders were taken underground through the shaft to the 1855 level (145 feet below sea level) and assembled in a previously prepared maintenance garage. These were followed by a 4-wheel-drive Transloader which was put into service on the 1655 level.

**ACCESS RAMPS**

While trackless development work was underway on the 1855 level, a service and access ramp was started from all four available locations. The ramp was driven at -10% from surface, elevation 2070, to the 1855 level and then steepened to -16% down to the 1655 level. The decline from surface was started with the Scooptram and an Eimco 916 L.H.D. The addition of the Eimco 916 enabled the ramp and the room and pillar mining to proceed simultaneously using the same drill jumbo. In the other ramp headings rubber tired drill trucks with jacklegs as well as a three boom jumbo were utilized.

In total, 3,468 feet of ramp was driven to provide access from surface down to the 1655 Level. A further 1,754 feet of -15% decline has since been driven to connect with the 1455, the lowest level.

The East Ramp, 2,575 feet in length, was completed within the past three years and connects the 1855 level with the Lake room and pillar area. The ramps and main haulageways are driven at 14' x 11'.

This system of ramps, in addition to providing access, also serves as the main ventilation airway. It is supplemented by several exhaust airways including a 48" diameter borehole drilled 400 feet from surface to the 2055 level. A summary of the costs of these ramps is shown in Table I.

**TABLE I**  
**SUMMARY OF RAMP COSTS**  
**RAMP SIZE 14' x 11'**  
**FOOTAGE 9,287**

	<b>COST/FOOT</b>
SUPERVISION & LABOUR	\$ 21.68
EXPLOSIVES	7.89
STEEL & BITS	3.54
MISCELLANEOUS	3.81
REPAIR & MAINTENANCE	3.36
TIMBER & SUPPORTS	0.57
LOAD HAUL DUMP	15.06
TOTAL	<u>\$ 55.97</u>

**STOPE PREPARATION**

Long hole stopes are commonly developed with the haulage and undercut drifts along or just below the footwall of the ore zone and with sub-levels at 100 foot intervals. Sub-levels are driven with trackless equipment whenever possible with access from the ramps. In some instances, where the stope tonnage is insufficient to justify lengthy drives in waste, drill sub-drifts are extended from track drifts or from raises within the stope limits. These are driven 8 x 8 with jacklegs and small air or electric slusher hoists. Trackless sub-drifts and undercuts are kept as small as the equipment permits, generally 12' by 10' with a minimum size of 10' x 9'.

Scram drifts are 14' x 11' with drawpoints spaced at 40 to 70 foot centres along one or both sides of the scam. Draw points and undercuts are 12' x 10' and the average drawpoint is 30 feet in length.

Raises between 100 and 250 feet in length are driven with an Alimak raise climber. Slot and drill raises are 6' x 8' or 8' x 8' while service and ventilation raises are 6' x 6'. Short raises up to 50 feet in length, often required for undercut slots, are driven as open raises using stopers and standard staging methods.

An increasing number of raises up to 85 feet in length are being drilled and blasted using long hole drills and drop raising techniques.

The average advance in Alimak raises is 3 feet per man-shift at a cost of \$50.00/foot. Drop raising costs for 400 feet of completed raise have averaged \$30.00/foot.

Drifting performances using trackless equipment have been steadily improving and are currently averaging 5 feet per man-shift with costs averaging about \$45.00 per foot.

A breakdown of these costs is shown in Table II, III and IV.

**TABLE II  
ALIMAK RAISING  
FOOTAGE 468'  
SIZE 7' x 8'**

	<b>COST/FOOT</b>
SUPERVISION & LABOUR	\$ 31.31
EXPLOSIVES	5.95
STEEL & BITS	4.37
LOAD & HAUL	2.77
REPAIR & MAINTENANCE	6.35
MISCELLANEOUS	0.72
TIMBER & SUPPORTS	0.71
TOTAL	<u>\$ 52.18</u>

**TABLE III  
DROP RAISING - FOOTAGE 364'  
SIZE 4' x 5'**

	<b>COST/FOOT</b>
SUPERVISION & LABOUR	\$ 16.89
EXPLOSIVES	4.88
STEEL & BITS	7.13
LOAD & HAUL	1.66
TOTAL	<u>\$ 30.56</u>

## Stope Preparation contd.

**TABLE IV**  
**TRACKLESS DRIFTING\***  
**FOOTAGE 6,404.5'**  
**SIZE 14' x 11' \*\***

	COST/FOOT
SUPERVISION & LABOUR	\$ 17.30
EXPLOSIVES	6.33
STEEL & BITS	3.96
EQUIP. REP. & MAINT.	2.80
LOAD HAUL DUMP	11.34
MISCELLANEOUS	1.55
TRUCKING	0.66
TIMBER & SUPPORTS	1.83
TOTAL	<u>\$ 45.77</u>

\* Includes minor raising footage.

\*\* Average size of openings.

Wherever possible, multiple headings are made available. Drilling is done by a one man crew using a 3 boom drill jumbo, and mucking is done between drilling shifts. Blasting is done by the miner using ammonium nitrate explosives or 80% Forcite in 1½" x 8" cartridges. Cilgel "B" in 1" x 8" cartridges is used in raising and to a minor extent in small sub-drifts.

**ROOM & PILLAR MINING**

Both of the zones amenable to room and pillar mining are continuous over a considerable horizontal extent but are quite irregular in thickness and attitude. Iron ore grades usually show good continuity in contrast to the erratic copper mineralization. Diamond drilling on sections 50 feet apart is used for the preliminary layout. A typical stope is generally advanced and then percussion test holes are drilled on the intermediate 25 foot sections to delimit the ore for the adjacent 100 feet on both sides of the stope.

Stopes are usually 40 feet in width separated by pillars 20' in width. Mining heights range from 12 to 40 feet with thicknesses up to 18 feet being mined in one pass. Thicker zones are mined by taking a top cut by drifting and slashing, securing the back and then benching the remaining ore.

Ore extraction is maintained with two and three boom Joy Drillmobiles, CF93 drills and 10 foot steel. Extension steel is used for slashing and benching when conditions are suitable.

Productivity in the room and pillar areas has varied from 90 to 110 tons per man-shift. Mining costs for these two areas are shown in Tables V and VI.

**TABLE V**  
**18-106E ROOM & PILLAR COSTS**  
**PRODUCTION 82,928 L. TONS**

	COST/TON
SUPERVISION & LABOUR	\$ 0.60
EXPLOSIVES	0.29
TEST HOLE DRILLING	0.07
STEEL & BITS	0.12
EQUIPMENT R & M	0.09
TRUCKING	0.22
MISCELLANEOUS	0.04
TIMBER & SUPPORTS	0.09
LOAD HAUL DUMP	0.620.62
TOTAL	<u>\$ 2.14</u>

## Room &amp; Pillar Mining contd.

**TABLE VI**  
**LAKE ROOM & PILLAR COSTS**  
**PRODUCTION 81,311 L. TONS**

	<b>COST/TON</b>
SUPERVISION & LABOUR	\$ 0.48
EXPLOSIVES	0.21
STEEL & BITS	0.18
EQUIPMENT R & M	0.18
TRUCKING	0.11
MISCELLANEOUS	0.08
TIMBER & SUPPORTS	0.01
LOAD HAUL DUMP	0.47
TOTAL	\$ 1.72

**LONG HOLE STOPING**

Blast hole drilling is done with DH123 drills using 4 foot rods with 2 inch tungsten carbide bits. Drills are mounted on horizontal or vertical bars stabilized by additional bars due to the size of the drifts.

Slot blast holes are spaced 4 feet apart in parallel rows with a 3 foot burden. Parallel fans of holes are drilled from the undercut drift with a burden of 5 feet and a toe spacing of 5' to 6'.

The main rings, generally vertical fans of up and down holes are drilled with a burden of 5 or 6 feet and 8 foot toe spacing. This drilling is done from fringe drifts or a centrally located drill drift.

Average performance is close to 200 feet per man-shift at a total cost of 80¢ per foot.

Loading and blasting is done by separate crews under close supervision. Explosives used are 80% Forcite in both 1½" x 8" and 1¾" x 16" cartridges, Amex and recently Anfomet (a metalized Amex). Local conditions dictate the type of explosive and the size of the blast. Generally, large blasts are preferred because of the improved fragmentation. Once the slot has been opened the blasting face of the stope is usually kept nearly vertical for the full height of the stope in order to reduce caving of drilled ground.

All stope blasts are initiated electrically and both 220 and 440 volt systems are available.

Powder factors vary considerably and a rough average would be 0.35 lbs per long ton. Secondary powder consumption, which is quite significant in some areas, is directly related to the primary factor. Considerable effort is being applied to determining the right balance between ring and toe spacing, type of explosives, method of priming and delay pattern which will result in improved total costs.

**PRODUCTION**

Based on a monthly production of 90,000 long tons, about 10% is produced from room and pillar stopes, up to 5% comes from development headings and the remainder from long hole stopes. This tonnage is handled by eight Transloaders, four are 4 wheel-drive models; and one ST5A Scooptram hauling to the main ore passes, transfer raises, or to secondary haulage units. A particularly difficult ore handling problem in the 2070 Lake Stope has been solved by combining the loaders and trucks. Here, Transloaders muck to a loading chute and two Wagner MTT 423 telescopic shuttle cars haul 2,400 feet to a transfer raise where the ore is picked up 100 feet below by Transloaders and hauled 800 feet to the ore pass. Table VII shows the production costs for this stope.

## Production contd.

**TABLE VII**  
**2070 LAKE PRODUCTION COSTS**  
**PRODUCTION 22,544 L. TONS**

	COST/TON
SUPERVISION & LABOUR	\$ 0.03
EXPLOSIVES	0.33
BLASTING LABOUR	0.19
LONG HOLE DRILLING	0.41
TRUCKING	0.39
TIMBER & SUPPORTS	0.01
LOAD HAUL DUMP*	0.55
MISCELLANEOUS	0.01
TOTAL	\$ 1.92

\*Double handling by Transloader

Room and pillar production in the 18-106 Zone is handled by 4 wheel-drive Transloaders directly to the main ore pass system. In the Lake room and pillar stopes the Scooptram loads directly into a converted 25 ton open pit truck. The truck hauls to surface stockpiles or directly to the mill.

About 55,000 long tons per month are hauled directly to the main ore passes over an average haulage distance of 300 feet.

**ROADS**

As an important factor in efficient transportation, roads are well maintained on-ramps, haulageways and as far as practicable in development headings. Two small graders, Allis-Chalmers Model D's with 12 foot blades operate at least 50 hours per week. In addition, one Transloader is used almost exclusively for ballasting roads with minus one inch crushed rock. Ditches are maintained in most haulageways with drainage to small sumps either directly or via drain holes drilled for that purpose. The cost of road maintenance is charged to Production.

**TRACKLESS EQUIPMENT**

During the first year of trackless mining tire costs were considered to be excessive. The following policy was adopted after a study of the factors affecting these costs:

- (1) Ramps are kept to minimum practicable grades, generally less than 15%. Only four-wheel-drive L.H.D. equipment is used to advance inclined headings.
- (2) Roads are maintained by grading and ballasting.
- (3) Several brands of tires with variations in tread design and construction were tested on different loaders under a variety of conditions and assessed with respect to initial cost, performance and final cost per ton.
- (4) Bucket modifications, including the addition of teeth, were made to reduce the loading effort and tire slippage.
- (5) L.H.D. operators were given additional instruction designed to reduce tire damage.

Along with the production and road maintenance equipment the Company operates four converted jeeps for nipping and servicing. Three diesel Lobos are used by supervision and three recently acquired Wagner personnel carriers are involved primarily with supply handling.

**TRACKLESS MINING COSTS**

Table VIII shows the combined operating costs of the Joy Transloaders. It should be noted that these costs include operating labour averaging \$9.40 per hour. This is an all inclusive cost made up of wage and fringe benefits, contract earnings, an allowance for supervision and secondary blasting and all



Trackless Mining Costs contd.  
road maintenance labour charges.

**TABLE VIII**  
**TRANSLOADER COSTS (Dev. & Prod.)**  
**JUNE 1/71 to MAY 31/72**  
**OPERATING HOURS 19,879**

	COST/HOUR
OPERATING LABOUR	\$ 9.40
REP. & MAINT. LABOUR	4.29
FUEL & LUBE	1.30
REP. PARTS & SUPPLIES	5.31
SHOP OVERHEAD	2.76
TIRES	1.57
TOTAL	<u>\$ 24.63</u>

**TABLE IX**  
**TRANSLOADER COSTS (Dev. & Prod.)**  
**JUNE 1/71 to MAY 31/72**  
**LONG TONS - 1,296,720**  
**PERFORMANCE 65.2 L. T./HOUR**

	COST/LONG TON
OPERATING LABOUR	14.4¢
REP. & MAINT. LABOUR	6.6
FUEL & LUBE	2.0
REP. PARTS & MISC. SUPPL.	8.2
SHOP OVERHEAD	4.2
TIRES	2.4
TOTAL	<u>37.8¢</u>

**TABLE X**  
**COMBINED TRANSLOADER COSTS**  
**MAY 1ST 1966 to FEB. 1ST 1972**

TOTAL COST	\$ 1,746,993
TOTAL OPERATING HOURS	73,662
TOTAL LONG TONS	4,672,385
COST PER HOUR	\$ 23.72
COST PER LONG TON	\$ 0.374
PERFORMANCE	<u>63.4 L.T./HOUR</u>

Repair parts and repair labour costs have been separated and a proportion of indirect repair costs is shown separately as "shop overhead".

Tire costs have been reduced sharply from \$3.78 per hour during the first two years of operation to \$1.57 per hour currently. The cost figures given in the table are averages for June 1971 to May 1972.

Table IX shows the same costs expressed in cents per ton hauled, with an overall performance of 65.2 long tons per hour. The hours used in these figures are taken from the engine running time and therefore include time not spent directly on production work. They also include the cost of

**Trackless Mining Costs Contd.**

development muck handling.

Total production, operating hours and performance of all Transloaders combined since 1966 are shown in Table X.

We are frequently asked about our decision to use Transloaders as the main load, haul, dump equipment. While our choice was influenced by the availability of Transloaders when we were converting to trackless, our five years of experience have shown the four-wheel-drive Transloader to be the best machine for production from drawpoints. The transloader is limited in some uses due to its inability to load directly into ore carriers or backfill stopes without expensive chute preparation. A combination of Transloaders and front-end loader types may be preferable under some conditions.

Compared with front-end loader types the better load distribution in the Transloader results in lower repair costs and smoother travelling characteristics reducing operator fatigue. With the exception of the power and drive train, rebuilding or converting Transloaders from two to four wheel drive is quite within the capabilities of a well equipped machine shop.

Several modifications have been made as a result of maintenance experience over a period of time. A gradual replacement of the original engines with the 6 cylinder Deutz has resulted in improved operating performance. Due to the heavy and abrasive characteristics of the magnetite ore, plate thickness of the bucket assembly has been increased by 50% and the bale arm extended to compensate for the additional weight. Heavier transmissions and improved planetary assemblies have been necessary because of the increased weight of the front ends. The original drive chains on the 4-wheel-drive machines are being replaced by a heavier type. Other changes will undoubtedly be made as new weak points are corrected.

Tire costs are considerably lower with the Transloader, partly because of their smaller size but also due to the loading characteristics of the machine. Another feature of the Transloader, the cable lift on the bucket is a safety feature when mucking drawpoints. Large rocks falling from the drawpoint and striking the bucket lip will break the cable reducing the possibility of damage to the machine and injury to the operator. The same occurrence with a hydraulically operated front-end bucket actually resulted in serious damage to the machine but the operator fortunately escaped injury. An additional advantage is the self draining feature of the Transloader bucket after loading in wet drawpoints.

**MINING COSTS**

In trying to compare the present trackless operation with track and slusher operations of seven years ago, especially on a unit cost basis, several factors must be evaluated or at least recognized.

The first of these is the continued increase in both labour (70%) and material (10%) costs since 1965.

The second factor is that the larger and less irregular ore bodies were developed and mined first. Obviously, these ore bodies governed the location of the crusher and ore pass system. As a result, mining at Texada has seen a progressive increase in the haulage distance along with the increased costs of exploring and developing smaller and more erratic ore bodies.

One positive factor has been the decreasing turnover of personnel in recent years. Although difficult to evaluate in monetary terms, the effect on operating and maintenance costs is no doubt significant.

**TABLE XI  
EMPLOYEE STATISTICS**

Year	Total Undergrnd	Total Shops	Remainder	Total Mine	% Turnover
1965	106	46	110	262	
1966	118	47	103	268	
1967	113	49	122	284	63
1968	90	44	96	230	32
1969	81	40	111	232	21
1970	76	42	112	230	19
1971	73	41	106	220	15
1972	70	39	105	214	25