

# **CERRO VERDE**

**1970 - 1976**

**PROYECTO DE PARTICIPACION**

**J. P. ORIHUELA GOMEZ**

## I N T R O D U C C I O N

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Al suscrito le cupo participar en la gesta des de antes del mismo inicio, propiamente llamado, del Proyecto Cerro Verde, cuando aún estaba vigente la tenencia por el anterior concesionario, durante el breve lapso de transición a través del MEM y en el curso de la muy ardua etapa de gestiones de pre-financiación, búsqueda de la financiación puente y financiación definitiva, simultáneamente con la organización de la Empresa Minera del Perú y la implementación de sus primeros cuadros, junto con la delineación de su política, e establecimiento de una imagen y la toma de decisiones; tanto en la prioritización de Proyectos, como en búsqueda de la tecnología más adecuada, compatible con la realidad del momento, y proyectándonos hacia los intereses del futuro.

Una gestión muy especial, sumamente delicada, fue la negociación con Anaconda, para evaluar la posibilidad de compra de los estudios realizados por dicha compañía, dado lo tan reciente de la reversión al Estado de sus derechos mineros y el clima imperante en el primer trimestre de 1970.

En todos estos pasos no había precedentes, se tuvo que innovar y en no pocos casos improvisar; al final, la conclusión es de que fue una experiencia satisfactoria el haber dedicado seis años a una realización de ésta magnitud.

J. P. ORIHUELA GOMEZ

CERRO VERDE

DE PALLAQUEO A ELECTRODEPOSICION

1877

1977

J.P. Orihuela Gómez

Mayo 1976

## INTRODUCCION

Desde el paralelo 60 Norte, Colombia Británica en Canadá hasta el paralelo 40 Sur de Valdivia en Chile, esparcidos en lo que correspondería a una faja de 10,000 Km de largo y unos 40 Km de ancho, con muy notables soluciones de continuidad, se han reconocido hasta ahora cerca de 80 grandes depósitos mineralizados de cobre, repartidos en 10 países, de los dados en llamarseles genéticamente del tipo "Porfiritico", con una reserva combinada del orden de 24,000 M de T.M. de mineral con equivalente de 1% o sea unos 240 M de toneladas de cobre metálico.

Uno de ellos es Cerro Verde, y al igual que los otros sólo "la economía de la escala" hace factible su explotación.

Las reservas mundiales de cobre, a grosso modo son de unos 400 M de T.M. de cobre fino y están distribuidas aproximadamente así:

E.E.U.U.	28 %
Chile	20 %
Rusia	13 %
Zambia	10 %
Zaire	9 %
Canadá	8 %
Perú	7 %

Cerro Verde, a la fecha, es un Proyecto de Inversión Minera, siendo ejecutado por el Gobierno Peruano a través de la Empresa Minera del Perú con el aporte de capitales y tecnología foráneos.

En lo que va del siglo, en el mundo se ha consumido cerca de 200M de toneladas de cobre metálico y la tendencia es que la demanda aumente en 4.5% anual.

Estas páginas sólo son un muy breve resumen de la descripción completa de este Proyecto en el que están enfrascados directamente más de 3000 peruanos con la colaboración de cerca de 300 extranjeros, distribuidos en 5 puntos del globo.

## HISTORIA

Algunas recuas que bajaban por el Camino Real en 1877, pernoctaban en "Tambo Quemado" con su verde carga de mineral - pallaqueado\*, provenientes del "Cerro Verde" para después - de una sudorosa jornada de más de 3 días, ser embarcados - en Islay con rumbo a Swansea, Gran Bretaña.

A mediados de 1977, en menos de 3 horas bajará un "tryler", aire acondicionado, con su dorada carga de cátodos electro-líticos hasta el moderno puerto de Matarani.

En el interim:

- Algunas labores de busconeo en la zona de enriquecimiento supergénico de las diversas "pertenencias" fueron discontinuadas en 1879.

En 1881 se inició un pique, el mismo que en sus 4 niveles principales fué accesible hasta 1971.

- Las diferentes concesiones, de reducida área en su mayoría, hasta 1905 fueron progresivamente integradas por Carlos Lohman, un alemán vecino en Arequipa.

- En 1915 una misión especial del gobierno de los Estados Unidos dirigida por B.L. Miller y J.T. Singewald evaluó - el potencial minero de Sud América (Parte del informe de este viaje fue editado en 1919 por Mc Graw Hill) ellos tuvieron un contacto directo con William Braden en Chile, quien envió geólogos a evaluar Cerro Verde y tomaron una opción de 2 años.

\* Escogido a mano hasta lograr, alrededor de 20% de Cu. total.

- En 1916 Lohman vendió el "paquete" de pertenencias a "Andes Exploration Co. of Mayne"(Braden), quienes ampliaron las existentes labores subterráneas y realizaron una red de perforación a percusión totalizando 9,900 mts. repartidos en 64 taláhdros, exploraciones estimadas en U.S. \$ 2 M y descontinuas al concluir la Primera Guerra Mundial.
- 1919-1964 fué un período inactivo por parte de Andes del Perú (Anaconda) pero los Ingenieros de Minas Mariano Iberico , Marcial García y Edgardo Ponsoni de la División de Exploraciones de Cerro de Pasco Corporation realizaron reconocimiento y estudios preliminares incluyendo observaciones geodesicas en los denuncios de "La Cerro" colindantes con Sta. Rosa y que incluían Cerro Negro.
- De 1964 a 1966 Andes del Perú realizó un total de 32,000 mts de perforación diamantina que les permitió declarar 150M de T.M. de reservas de 1.09% Cu. en base un "cut off" de 0.45% de Cu. total, justificando así un Proyecto de Inversión de U.S. \$ 50 M que incluía una Planta de Lixiviación-Cementación con un producto final con 80% de contenido de cobre fino.
- La primera semana de Diciembre de 1970, al no cumplir las exigencias vigentes, el agrupamiento de concesiones Cerro Verde - Sta. Rosa revirtió al Estado.
- A mediados del mismo mes el Gobierno Central a través del Ministerio de Energía y Minas encargó a la Empresa Minera del Perú, la gestión de este Proyecto hasta su puesta en producción.

La ante vispera del Nuevo Año 1971, el Grta. Juan Bossio, a consejado por sus asesores técnicos, tomó la histórica decisión de "embalsamar" Michiquillay y dar luz verde a Cerro Verde.

De inmediato se iniciaron perforaciones de verificación por medio de la firma nacional Minera del Hill.

El 17 de Febrero, a iniciativa de Minero Perú, se iniciaron negociaciones directas con Anaconda para la adquisición de la información técnica en poder de esa firma, en la mesa de Conferencias se sentaron el Presidente Ejecutivo Gral. Bossio acompañado de los Ing. Marcial García y Julio P. Orihuela; y por Anaconda su Vice Presidente William E. Quigley y 3 asesores técnicos y legales.

- Posteriormente Minero Perú desestimó la cifra dada por Anaconda, aproximadamente 10% del monto de inversión inicial, y se dió iniciô a un programa de trabajos de verificación, principalmente re-perforación diamantina y mapeo detallado del área.
- El 3 de Octubre de 1971 se firmó un doble contrato de financiación y de servicios que permitiría la debida implementación.



## CONCEPTO

Este es un Proyecto que consiste en procesar alrededor de 57 M. de toneladas de diferentes calidades de minerales oxidados de cobre, de un promedio de 0.96% de Cu. total, a razón de 10,000 TM por día y convertirlos finalmente en 450,000 TM como total, a 30,000 T.M. finas por año, en forma de cátodos electrolíticos con un contenido de 99.97% de Cu metálico, significando esto que tiene el mayor valor agregado factible de dar a un producto cuprífero primario, con el primordial objetivo de ganancia de divisas.

Para esto se habrán invertido muy cerca de U.S. \$ 200 M, lo que incluyen 8 M de horas-hombre de personal de la Unidad de Cerro Verde.

De lo que se puede inferir que la rentabilidad no será de las más altas, y hay que mirar esta Primera - Etapa como un "desencape pagado" para la Segunda - Etapa, la misma que tiene un potencial del orden de las 1000 TM de mineral sulfurado de 0.70% de cobre y a nivel de Estudio de Factibilidad, una capacidad instalada de 60,000 TPD con una inversión del orden de U.S. \$ 1,200 M y cuya realización, consistentemente, en función de la capacidad de endeudamiento del País, para la próxima década, por lo que lo más probable es que esta cifra sea revisada con miras a reducirla.

## GEOLOGIA

Litológicamente se reconocen rocas pre paleocénicas instruídas por granodioritas eocénicas así como también más recientes stocks dacítico monzoníticos en la parte central.

En conjunto, los 2 cuerpos dan lugar en superficie a un elipsoide de unos 700 x 2700 mts., con una profundidad económica, por el momento reconocida hasta los 950 mts. aunque indicaciones geoestadísticas, según un "modelo típico" idealizado por Lowell y Guibert, dejan abierta la posibilidad de llegar con valores marginales hasta los 3000 mts. de profundidad; recién a fines del presente año se editarán variogramas individualizados tanto para Cerro Verde como para Santa Rosa ya que difieren substancialmente en su zonamiento. Con esto cabe también la posibilidad de incrementar significativamente (80 % ?) las reservas de mineral lixiviable en canchas.

### Las Reservas Minables de Oxidos

<u>TIPO DE MINERAL</u>	<u>M de T.M.S.</u>	<u>% Cu. To.</u>	CONTENIDO FINO
			<u>T.M. Cu. Total</u>
A. Oxidos de Alta Ley	30'	1.05	313,000
B. Mixtos de Alta Ley	7'	1.78	123,000
C. Oxidos de Baja Ley	7'	0.36	25,000
D. Pitch de Alta Ley	15'	0.68	100,000
E. Mixtos de Baja Ley	1'	1.29	12,000
TOTAL	59'	0.97	573,000

Tipo "A" incluye 2'383,000 T.M.S. de oxidos Santa Rosa de -  
1.05% Cu. To.

## DISEÑO

Además del estudio de Factibilidad, el que probó que la Primera Etapa es un Proyecto Rentable, la Ingeniería de Diseño, ha sido encargada a Wright Engineers Limited de Vancouver, Canadá, quien también actúa como Agente de Compras en Canadá y como enlace con el Export Development Corporation, para cuando se complete el Proyecto se habrán editado unos 2200 planos para construcción, lo que significa unas 180,000 horas de Ingeniería, y en conjunto con los preparados directamente por Minero Perú en la Superintendencia de Obras de la Unidad se habrán originado cerca de 100,000 copias.

En esencia el proceso consiste en:

- Fragmentar a - 2", el mineral obtenido por minado a cielo abierto, por medio de 2 chancadoras y depositarlo en capas de 6 mt. sobre unas canchas impermeabilizadas con asfaltos RC250 y PEN 30/40, estas 3 canchas de superficie - que sigue el contorno del terreno tienen en total alrededor de 1'000,000 m<sup>2</sup>, siendo así las más amplias del mundo
- Regar con una solución de ácido sulfúrico a 0.14 lts. por min/m<sup>2</sup>, hasta lixiviar el 82% del contenido de cobre.
- Almacenar la solución enriquecida, con fines de homogenización, en un reservorio de 40,000 m<sup>3</sup>, de capacidad.
- Filtrar esta solución con un tamiz iónico, LIX 64N, diluído con kerosene al 30% en volúmen, a razón de 14,000

lts/min., entregado finalmente un electrolito concentrado con 45 gr/lt.

Electrodepositar el cobre, usando ánodos de Pb-Ca, dentro de un baño con un tenor de ácido libre inferior a los 130 grs/lt. a fin de minimizar la fuga de Pb, hasta lograr cátodos de unos 72 Kg. con un contenido fino de 99.97% de - Cu.

Este proceso se realiza en una "casa de tanques" que contiene 208 celdas "comerciales" y 18 celdas "matrices", cada una de ellas alojando 47 ánodos y 46 cátodos, forradas interiormente con un plástico de alto impacto, (Paralined) y con una densidad de corriente de 17 amps/pie<sup>2</sup> en las celdas comerciales.

## CONSTRUCCION

La Gerencia de Construcción ha sido dada a British Smelter Constructions Limited de Londres, quien a la vez son Agentes de Compra en el Reino Unido y representantes ante el Export Credit Guarantee Department y el Williams & Glyns - Bank. B.S.C.L. tiene un plantel de 11 ingenieros en la obra y ha sub contratado el íntegro de los trabajos a firmas peruanas.

## ASESORES

Para casos específicos, de instalación o uso inicial, se ha contado con especialistas extranjeros, principalmente de Canadá, Estados Unidos y del Reino Unido, motivado especialmente por vigencia de las patentes y/o tecnología exclusiva ó sofisticada.

Tal ha sido el caso de:

General Mills	LIX 64N
General Electric	Turbinas de Gas
GEC Rectifiers Ltd.	Rectificadores
Heede International	Puentes Grúa
Allis Chalmers	Chancadora Primaria
Amercoat	Sellos T-Lock
Stoodey	Soldadura Especial

Como "Representantes del Propietario" se ha contratado a Parsons & Jurden de Pasadena-California, quienes tienen un residente en la obra.

## LOGISTICA

Sin duda alguna este es el capítulo más serio que ha tocado vivir en el último quinquenio de Cerro Verde.

A la complejidad del contrato de financiación del E.C.G.D. - Británico, lo cual ha limitado substancialmente su aplicación, y a la rigidez del E.D.C. en fiscalizar el contenido Canadiense del préstamo de Ottawa, se sumó la exacerbante (por usar un término benigno) morosidad de nuestras reparticiones estatales en procesar documentación cuya sola mecánica, en algunas instancias alcanza ribetes Kafnianos.

Como si esto fuera poco, en el bienio 74-75 tocó superar la aureola de amplió espectro de la crisis del Medio Oriente y los niveles nunca antes vistos de escalamiento de precios - en los mercados internacionales, con su yapa de tiempos de entrega que quintuplicaban los normales.

Habrán notado que no he mencionado el drama de conseguir a signación de moneda extranjera, al que también está sometido Minero Perú.

Todo esto ha contribuido en gran parte para que el Monto de inversión considerado en U.S. \$ 50M a comienzos de 1971 lle gue a U.S. \$ 200M para fines de 1976, sin alterar la capacidad de tratamiento.

## FINANCIACIÓN

En diferentes proporciones participan:

PAIS	ENTIDAD	MONEDA	MONTO
Perú	Financiado	Soles	77
Perú	Por Financiar	Soles	40
Perú	COFIDE	U.S. Dólares	2
Canadá	E.D.C.	CAN Dólares	22
Estados Unidos	Continental Bank	U.S. Dólares	17
Reino Unido	E.C.G.D.	Libras Esterlinas	18
Reino Unido	W & G Bank	Eurodólar	13
Por financiar		U.S. Dolares	11
TOTAL	EQUIVALENTE	U.S. \$	200M

Sin comprometer la producción futura, de modo que cualquier alza del precio del cobre en el mercado internacional favorecerá el "Flujo de Caja", estimado con precio referencial de U.S. \$ 0.80/lb., para 1977!



## PROYECCIÓN

A partir de 1977, al iniciar la producción de 30,000 T.M. finas de Cu., Cerro Verde permitirá elevar la producción nacional en 14% y con esto elevaría la incidencia de la exportación peruana en el mercado mundial, y abre las posibilidades de crear industrias de semi-transformación en la región.

Sin embargo, el factor de multiplicación interna no es tan pequeño, magnificando el interés social del Proyecto; convirtiéndose en la primera fuente de empleo de la Provincia.

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## ACKNOWLEDGEMENT

In any study of this nature many people contribute much thought and advice without their contributions being acknowledged. In this instance many may be overlooked unwittingly. To such we say thank you.

Much discussion has taken place from time to time between executives and engineers on the staff of Minero Peru, British Smelter Constructions Ltd., and Wright Engineers Limited. Meetings were held in Lima in April, 1971, in London in May, and in Lima and Arequipa in June.

Further meetings were held in Vancouver and Lima in July, in London in August, and in Lima in September and October.

Senors Carrizales, Arauco and Lizarraga of Minero Peru, visited Vancouver in October. Messrs. T. Irwin of British Smelter Constructions Ltd., and L. F. Wright of Wright Engineers Limited, visited Lima in November and Messrs. Bolderston, Doyle, Gwilt and Knechtel, of Wright Engineers Limited, visited Lima, Arequipa and other cities in Peru, in December, 1971, while assembling information for this report.

In all of their discussions, the spirit of co-operation for the purpose of bringing the famous Cerro Verde copper ore deposit into production was most marked. We wish to acknowledge the co-operation of General Juan Bossio Collas and all of his staff throughout the discussions.

All of the Minero Peru personnel who have worked to bring the project to the present point cannot be mentioned here, but the special efforts of the operating division personnel, Senors Carrizales, Arauco, Damiani, Delgado, Lizarraga and Orihuela have been noted.

Mr. I. Walker of Intercontinental Engineering Limited, (Integ) prepared the estimates for the power generating equipment in the Oxide and Sulphide stages.

### Personnel

This study has had the careful work and attention of an unusual number of Wright Engineers Limited's personnel in addition to those whose signatures are affixed and sealed on the signature page. We are grateful for the efforts of those who did not hesitate to work long hours in order to ensure the meeting of our commitment to produce this report in a period of thirty days. In addition to the Wright Engineers Limited's team which visited Lima in December, Mr. J. Barrat, P.Eng., contributed to the electrical distribution design and estimates and Mr. J. Galpin prepared the water supply and waste disposal portions of the report.



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Decree Law No. 18225 - Formation of Minero Peru



Data Generated by Empresa Minero Peru

Registro de Ensayos Compuesto de Diamantina.

Plano topografico con taladros de Andes Del Peru.

Plan of Mining and Waste Dumps.

Mine Unit Costs.

Cerro Verde Mine and Plant Layout.

General Arrangement of 10,000 tons per day Oxide Plant.

Abastecimiento de Aqua a la Unidad de Produccion Cerro Verde Vols. I, II and III.

Power and Water Supplies to Cerro Verde and Ilo

Yacimiento de Cerro Verde, Suministro Electrico, December, 1971.

Proyecto Cerro Verde - Suministro Electrico, Central Habitacional Viviendos, Infraestructura Vial, Infraestructura Portuaria.

List of all available fuels and their prices placed at Cerro Verde plant site.

Memorandum-Log-Ad-195/71 - Applicable Import Duties and local taxes.

Memorandum-Fin/MP-1537/71 - Insurance Rates.

Data from Minero Peru's Central Laboratory in Lima.

Outside Consultants

We appreciate the discussions held between Wright Engineers Limited's engineers and Mr. Walter Meckel, who spent many years in South America working in the copper leaching industry. He is presently consulting for Minero Peru.

Cerro Verde ore including samples of oxide, sulphide and pitch ore, underwent test work in the Britton Research laboratories in Vancouver under the direction of Mr. John Britton, P.Eng.



## TERMS OF REFERENCE

### Original Contract Background

By Supreme Resolution No. 015-EM/DGM of October 3, 1971, a contract was signed in Arequipa, Peru, between Empresa Minero del Peru and British Smelter Constructions Limited in which the latter agreed to provide the following services:

Assistance in obtaining financing for the first phase of the Cerro Verde project and for the sale of products from its operations.

Provision of engineering, procurement, construction management and start-up supervision for the project.

Paragraph 4.11 of this original contract established that in order to obtain financing, British Smelter Constructions Limited, of London, England, and Wright Engineers Limited, of Vancouver, Canada, would carry out a Pre-Feasibility Study of the Cerro Verde Economic and Administrative Unit.

### Contract of Services for Pre-Feasibility Study

A contract was signed in Lima on December 27, 1971, between Empresa Minera del Peru and British Smelter Constructions Limited and Wright Engineers Limited to carry out the Pre-Feasibility Study of the Cerro Verde project with the following stipulated objectives:

The content, technical proficiency and presentation of the Pre-Feasibility Study, subject of this contract, shall be such as to effectively serve for obtaining financing as established in Clause Three of the Original Contract.

Said Pre-Feasibility Study is solely and exclusively meant to serve the purpose of obtaining financing for the first phase of operation of the Cerro Verde Economic and Administrative Unit.

Consequently the parties agree to clearly differentiate between the Pre-Feasibility Study, for which this Contract is being drawn up, and the Techno-Economic Study described in Clause Four of the Original Contract.

The Pre-Feasibility Study, for which this Contract is being drawn up, shall be carried out in Canada. Wright Engineers Limited and British Smelter Constructions Limited undertake to do so in accordance with the most advanced scientific and technical precepts.

The duration of the contract shall be 30 working days, with 10 copies of the report mailed from Vancouver on February 7th, 1972.



## GENERAL SUMMARY

The basic purpose of this report is to evaluate the Cerro Verde oxide ore deposits. However without including the basic information regarding the "pitch" oxide, the mixed oxide and sulphide reserves, it is not possible to give a clear picture of the economic viability of the project as a whole and its value to Peru. They have therefore been dealt with to the necessary degree to show their approximate value. Minero Peru has spent Soles 54,549,000 U.S. \$1,409,535 and plans on spending a further amount of \$8,456,730 by December 1974, on exploration, civil works and further metallurgical evaluation of the oxide ore. Wright Engineers Limited's engineers find that with an additional expenditure on capital assets of \$68,898,372, the oxide orebody can be brought into production. The \$68,898,372 can be further broken down into a foreign content of \$49,857,674 and a local content of \$19,040,698.

This sum includes all construction, engineering and construction management costs of the mining and treatment plant and of all the related facilities, such as power and water supply, waste disposal, transportation and operating inventory. An amount of \$3,285,000 is required for working capital. This makes a total of \$82,049,637 when the Minero Peru expenditures are added.

The further evaluation of the sulphide orebody tentatively scheduling production for January 1985, calls for a further expenditure of \$89,973,876 on the same basis.

Assuming that authority to proceed with further studies is received by May 1st, 1972, production is scheduled to commence December 15th, 1974.

The cash flow is prepared on the basis of mining and processing oxide ore at the rate of 10,000 metric tons per day (3.5 million metric tons per year). In the case of the sulphide orebody, the rate has been assumed to be 20,000 metric tons per day (7.0 million tons per year).

During the 13 years of processing the oxide and mixed ore, copper sales estimated at 45 cents per pound of copper amount to \$320,654,000, yielding a gross operating profit of \$170,984,000. Total engineering and construction costs will be \$75,796,000, loan interest is estimated at \$33,218,000. Working capital required is \$3,285,000 and warehouse inventory and equipment is \$3,409,000 making a total capital requirement of \$115,702,000. Income tax, fees and employee benefits will consume \$23,822,000. Assuming a Minero Peru equity of \$9,631,000, loan capital will reach a maximum of \$81,000,000 leaving a return to Minero Peru of \$45,067,000 after all obligations are discharged.

The ore reserves have been assessed by Wright Engineers Limited based on 81 drill holes. Wright Engineers Limited's engineers have visited the site and have checked all data and procedures and have checked the assaying of the drill core both by Minero Peru and independent laboratories. They find proved ore of:



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Assuming that authority to proceed with further studies is received by May 1st, 1972, production is scheduled to commence December 15th, 1974.

The cash flow is prepared on the basis of mining and processing oxide ore at the rate of 10,000 metric tons per day (3.5 million metric tons per year). In the case of the sulphide orebody, the rate has been assumed to be 20,000 metric tons per day (7.0 million tons per year).

During the 13 years of processing the oxide and mixed ore, copper sales estimated at 45 cents per pound of copper amount to \$320,654,000, yielding a gross operating profit of \$170,984,000. Total engineering and construction costs will be \$75,796,000, loan interest is estimated at \$33,218,000. Working capital required is \$3,285,000 and warehouse inventory and equipment is \$3,409,000 making a total capital requirement of \$115,702,000. Income tax, fees and employee benefits will consume \$23,822,000. Assuming a Minero Peru equity of \$9,631,000, loan capital will reach a maximum of \$81,000,000 leaving a return to Minero Peru of \$45,067,000 after all obligations are discharged.

The ore reserves have been assessed by Wright Engineers Limited based on 81 drill holes. Wright Engineers Limited's engineers have visited the site and have checked all data and procedures and have checked the assaying of the drill core both by Minero Peru and independent laboratories. They find proved ore of:





	<u>Metric Tons</u>			
Oxide ore	26,086,201	Assaying	1.195%	copper
Mixed sulphide ore	5,256,424	"	1.736%	"
Sulphide ore	39,270,537	"	1.090%	"
"Pitch" ore	<u>17,204,687</u>	"	.788%	"
	<u>87,817,849</u>			

The cut-off grade was taken at .45% copper.

The "pitch" ore has not been evaluated in this report.

Dilution has been assumed at 15% at a grade of .225% copper to determine the tons of mineable ore entering the processing plants.

All processes used in this report are standard throughout the world.

It has been assumed that when the oxide ore has been exhausted, that the mixed oxide and sulphide ore will be treated in the oxide leaching plant. The residue containing .711% sulphide copper will be stockpiled until the concentrator is ready to treat it.

The cash flow data on the sulphide plant is to be found in the oxide sulphide cash flow on Pages 0-15 to 0-23.

The fiscal year of the financial projections on the discounted cash flow programme is assumed to run from May 1st to April 30th, in accordance with the construction time-table on Drawing No. 655-000-1204:

Year one is assumed to commence with the acceptance of financing arrangements between Minero Peru, E.C.G.D. and E.D.C. and the banks which by contract is to be within seventy-five days of the delivery of this study.

Sales of copper by years are listed in the metallurgical production balance.

The summary of operating costs (Page 0-52) supplies the report year for the production costs by years.

The Minero Peru expenditure line does not include the fixed asset portion of Minero Peru's expenditures. These are added in with construction costs in the construction cost line so that it may be depreciated with the remainder of the plant. It should be noted that when converting from Soles to U.S. dollars, the official rate of exchange of 38.7 to 1 has been used.

Working capital has been added in Year three. Inventory has also been added in year three.



Water supply for the oxide stage of the project comprises a 12 inch diameter pipeline with pumping stations connecting an intake at Congata on the Rio Chili to the main storage tank at the Cerro Verde plant. The installation will deliver a continuous supply of 100 litres per second, a distance of approximately 13 kilometres with a static head of 650 metres.

The water supply source for the sulphide stage consists of the oxide water system supplemented with a line of wells east of Laguna Salinas. These will be connected to the Cerro Verde plant via a canal-pipeline installation with a total length of approximately 80 kilometres and a gravity fall of 1,600 metres. The system will deliver 317 litres per second at a continuous rate to satisfy the second stage requirements.

The tailings disposal system selected for the sulphide stage is not necessarily the optimum system. Further investigation will be required to determine the most suitable.

The location of suitable waste disposal areas has been strongly influenced by the need to keep these clear of orebodies which may be mined in the future.

For the oxide development, it is estimated that there will be a total demand of some 17.5 megawatts and for the sulphide development there will be a total demand of some 56 megawatts. A basic supply of 9 megawatts has been assumed from the Sociedad Electrica de Arequipa Ltd., available at all times of the year and throughout the life of the plant, leaving 8.5 megawatts and 47 megawatts respectively for the two phases to be supplied by Cerro Verde.

Cost of the power requirements for this initial study is based on on-site diesel power generation being used for the oxide development. Steam turbine power generation on site will be used for the sulphide.

For the oxide stage, the combined power from S.E.A.L. and the diesel generators will be distributed at 4,160 volts to the principal load centres throughout the plant and open pit area. Within the process areas, power will be distributed at 4,160 volts to the large motors and 480 volts to small motors. Power for the water supply pumping station will be taken directly from the 138 kv S.E.A.L. transmission line with suitable step-down transformers.

For the sulphide stage, on site power will be generated and distributed at 13.8 kv and will feed the sulphide plant system through suitable step-down transformers. Power for the water well system at Laguna Salinas will be provided by small diesel generators situated in the vicinity of the wells.

For the purpose of presenting a logical and coherent schedule for evaluating the mining and treatment of the proved oxide and sulphide ore reserves, the assumption is made that the sulphide plant is constructed during years 11, 12 and 13 of the project. One result of the process outlined here is that there is a surplus of sulphuric acid on which no value has been placed. It should be of substantial economic benefit to this section of Peru.



While the pitch ore has not been evaluated in this report, metallurgical tests have shown a reasonable recovery of copper with a high acid consumption. Since acid will be available at no cost during the sulphide stage, this could be processed in the acid plant (extending its useful life) by increasing the capacity of the electrowinning plant to handle the sulphide and pitch ore electrolyte.

In the areas of the report where sufficient engineering has not yet been done, we have not necessarily made the optimum choice, but have presented practical and effective solutions on which an evaluation can be placed. In each case we have chosen to evaluate what we believe to be the most costly solution. When full information becomes available, the costs may be substantially reduced. In any event, this report should not be taken as a final authority. The engineering is still in a preliminary stage and many months of intensive examination lie ahead.

As time is of the essence in achieving the results outlined herein, the construction schedule of 32 months has been determined as the minimum duration which would allow the project to proceed in an orderly fashion and permit effective cost control.

Any attempt to shorten this period resulting from delay in initial discussions can add considerably to the costs.

In estimating the capital costs, we have endeavoured to allow for an increase of 5% in imported materials and 7% for Peruvian materials and labour.

No escalation has been allowed for once operations commence. The price of copper will keep pace with rising costs as the floor price will be determined by the rising costs of low grade copper producers. The ore grades at Cerro Verde are not in this class and this property should never be faced with a squeeze on costs (See Drawing No. 655-000-1205).

### Planning Considerations

A Master Plan (Plano Regulador) has been drawn up to establish the framework for all aspects of project development. The preliminary concept of the plan is presented in this report.

Cerro Verde has been sub-divided into five zones:

- Mine
- Crushing and Screening Plant
- Oxide Plant
- Sulphide Plant
- Ancillary



The arrangement of site areas, their size, shape and internal subdivision is based on careful analysis of the function and relationship of all the facilities and their horizontal and vertical transportation paths for production, maintenance and personnel.

The principal objectives of the Master Plan and project design in general are not only operational efficiency, economy of construction and maintenance, but also allow modifications and major expansion without interference with other facilities or plant operations.

The pattern of major roads, roads and yards within zones, major trunk services and service distribution within zones, will all conform to the framework of the Master Plan.

Planning will be an essential consideration in every phase of the project design; from the overall Arequipa region; to the Cerro Verde site; the individual zone; the facility within the zone.



## SCOPE:

This report takes into consideration the mining and processing of three types of copper ore, oxide, sulphide and mixed oxide and sulphide. For the first years of operation, 3,500,000 metric tons per year of oxide ore will be mined and processed at a daily rate of 10,000 metric tons. This will be followed by approximately two years of mixed ore at the same rate as the oxide ore. The future sulphide plant will process 7,000,000 metric tons per year of leached, mixed ore and sulphide ore at a daily rate of 20,000 metric tons per day.

For the oxide plant, the oxide and mixed ore will be crushed to minus 3/8 inch for leaching by sulphuric acid solutions. The copper bearing solutions from the leaching vats will undergo iron purification and solvent extraction to produce copper solutions to acceptable impurity levels for the electrowinning circuit which will produce by electrolysis copper cathodes of a high degree of purity suitable for world markets. The use of solvent extraction and iron purification will allow recycling of barren solution resulting in reduced process water requirements and will ensure greater efficiency in the tank house, as well as improved purity of the cathode copper.

The mixed ore will utilize the same process plant as the oxide ore for the extraction of the oxide portion of the mixed ore as cathode copper. The waste containing the sulphide portion of mixed ore will be stockpiled for processing by the future sulphide plant.

Initially the sulphide plant will process the stockpiled portion of the mixed ore and as soon as this is exhausted, will process the sulphide ore. While the mixed ore is being processed, the crushing plant will not be required and the ore will be fed directly to the grinding circuit. The sulphide ore will be crushed to minus 5/8 inch for processing by conventional grinding and flotation to produce a copper concentrate. The concentrate will be oxidized by roasting and leached in pachuca tanks to produce a copper bearing solution suitable for production of cathode copper by the electrowinning circuit which will be expanded to handle the increased production. For the sulphide ore and the sulphide portion of the mixed ore, the leaching vats, iron purification plants, solvent extraction plant and the solution storage tanks used for the oxide ore will not be required.

Time has not allowed a review of alternative systems where applicable but any change in systems made during later detailed studies will only reduce the capital and/or operating costs and consequently will improve the cash flow position. For the oxide plant the areas in particular which will require more study before finalizing are power generation and waste disposal. All capital and operating costs have been developed in sufficient detail for financing purposes. The requirements of the sulphide plant have not been developed in the same detail as the oxide plant, but the total capital and operating costs are considered realistic. Only limited metallurgy has been available and considerable more test work will be required before the sulphide plant can be finalized in detail.



In the capital cost sections of this report, the costs have been broken down into two main classifications, those incurred and to be paid for by foreign exchange and those requiring local currency only. Foreign costs have been calculated by adding to the factory price freight costs to the port of entry and consular dues 8-1/2%. Local costs consists of Peruvian import duties, port charges, freight to the site and installation costs.

It will be noted that the capital costs except for construction management and engineering costs have an area code number which corresponds to the number used in the detailed estimate not included in this report. These numbers will be used as the basis for cost control as the project develops.

In Section II, the mining aspects of the project are fully evaluated.

In Section III, the report outlines the proposed methods of treatment of the ores and describes the metallurgical characteristics insofar as they are available.

In Section IV, the water supply and distribution in an area of limited water resources are dealt with together with waste disposal areas.

In Section V, the transportation, access, housing requirements and maintenance services are described.

In Section VI, the power supply and distribution are examined thoroughly and future requirements in the sulphide stage are estimated and methods of supply considered.

Estimated engineering and construction management costs are listed in this Summary section and are added into the capital estimate for inclusion in the construction cost line. Mining equipment replacement in future years is also added into the construction cost line of the cash flow.



CASH FLOW

PROJECT 655

RUN CO2

CERRO VERDE

## OXIDE ONLY

DURATION	13 Years
DEPRECIATION RATE	20 Percent
INCOME TAX RATE	45 Percent

FINANCING

<u>Source</u>	<u>Amount</u>	<u>Rate</u>
Loan - United Kingdom	\$ 21,190,000	6-1/2%
Loan - Canada	\$ 21,190,000	7-1/4%
Loan - Additional	\$ <u>12,700,000</u>	10%
Foreign Total	\$ 55,080,000	
Loan - Peru	\$ 26,000,000	10%
Equity	\$ <u>9,550,000</u>	
Local Total	\$ <u>35,550,000</u>	
Gross Total	\$ 90,630,000	



COPPER AT 45 CENTS PER POUND - OXIDE ONLY.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

1	2	3	4	5	ACCUMULATED
0.	0.	4477.	33128.	33128.	70733.
0.	0.	5197.	14219.	13298.	32714.
5429.	1102.	620.	620.	620.	8391.
-5429.	-1102.	-1340.	18289.	19210.	29628.
8205.	30000.	30000.	345.	0.	68550.
439.	442.	1073.	1353.	1215.	4522.
64.	480.	1184.	1497.	1343.	4568.
53.	397.	979.	1206.	952.	3587.
0.	400.	1700.	2470.	1950.	6520.
0.	0.	3285.	0.	0.	3285.
0.	0.	3409.	0.	0.	3409.
8761.	31719.	41630.	6871.	5460.	94441.
-14190.	-32821.	-42970.	11418.	13750.	-64813.
-14190.	-47011.	-89981.	-78563.	-64813.	-64813.
0.	0.	0.	0.	0.	0.
-14190.	-32821.	-42970.	11418.	13750.	-64813.
-14190.	-47011.	-89981.	-78563.	-64813.	-64813.
1790.	9700.	9700.	0.	0.	21190.
1790.	9700.	9700.	0.	0.	21190.
1060.	5820.	5820.	0.	0.	12700.
0.	8000.	18000.	0.	0.	26000.
0.	0.	0.	0.	0.	0.
4640.	33220.	43220.	0.	0.	81080.
0.	0.	0.	2119.	2119.	4238.
0.	0.	0.	2119.	2119.	4238.
0.	0.	0.	2540.	2540.	5080.
0.	0.	0.	5200.	5200.	10400.
0.	0.	0.	11978.	11978.	23956.
-9550.	399.	250.	-560.	1772.	-7689.
-9550.	-9151.	-8901.	-9461.	-7689.	-7689.
4640.	37860.	81080.	69102.	57124.	57124.





COPPER AT 45 CENTS PER POUND - OXIDE ONLY.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

6 3                      7 4                      8 5                      9 6                      10 7      ACCUMULATED

33128.	33128.	33128.	33128.	33128.	236373.
13298.	13298.	13298.	13298.	13167.	99073.
620.	620.	620.	620.	620.	11491.
-----					
19210.	19210.	19210.	19210.	19341.	125809.
=====					
406.	1224.	223.	0.	1578.	71981.
1077.	939.	801.	663.	525.	8527.
1189.	1035.	881.	727.	573.	8973.
698.	444.	190.	0.	0.	4919.
1430.	910.	390.	0.	0.	9250.
0.	0.	0.	0.	0.	3285.
0.	0.	0.	0.	0.	3409.
-----					
4800.	4552.	2485.	1390.	2676.	110344.
-----					
14410.	14658.	16725.	17820.	16665.	15465.
-50403.	-35745.	-19020.	-1200.	15465.	15465.
=====					
0.	227.	517.	3948.	6449.	11142.
-----					
14410.	14430.	16207.	13871.	10215.	4322.
-50403.	-35972.	-19764.	-5893.	4322.	4322.
=====					
0.	0.	0.	0.	0.	21190.
0.	0.	0.	0.	0.	21190.
0.	0.	0.	0.	0.	12700.
0.	0.	0.	0.	0.	26000.
0.	38.	88.	674.	1094.	1896.
-----					
0.	38.	88.	674.	1094.	82976.
-----					
2119.	2119.	2119.	2119.	2119.	14833.
2119.	2119.	2119.	2119.	2119.	14833.
2540.	2540.	2540.	0.	0.	12700.
5200.	5200.	5200.	0.	0.	26000.
-----					
11978.	11978.	11978.	4238.	4238.	68366.
-----					
2432.	2491.	4317.	10307.	7072.	18932.
-5257.	-2765.	1552.	11860.	18932.	18932.
=====					
45146.	33168.	21190.	16952.	12714.	12714.
=====					



COPPER AT 45 CENTS PER POUND - OXIDE ONLY.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

11 - y	12 - 5	13 - 10	14 - 11	15 - 12	ACCUMULATED
33128.	27327.	23826.	0.	0.	320654.
13107.	12954.	12843.	0.	0.	137977.
620.	620.	620.	0.	0.	13351.
19401.	13753.	10363.	0.	0.	169326.
1143.	727.	0.	0.	0.	73851.
387.	249.	111.	0.	0.	9274.
419.	265.	112.	0.	0.	9769.
0.	0.	0.	0.	0.	4919.
0.	0.	0.	0.	0.	9250.
0.	0.	0.	0.	0.	3285.
0.	0.	0.	0.	0.	3409.
1949.	1241.	223.	0.	0.	113757.
17452.	12512.	10140.	0.	0.	55569.
32917.	45429.	55569.	0.	0.	55569.
6099.	4450.	3563.	0.	0.	25255.
11352.	8061.	6576.	0.	0.	30313.
15674.	23736.	30313.	0.	0.	30313.
0.	0.	0.	0.	0.	21190.
0.	0.	0.	0.	0.	21190.
0.	0.	0.	0.	0.	12700.
0.	0.	0.	0.	0.	26000.
1021.	725.	564.	0.	0.	4208.
1021.	725.	564.	0.	0.	85288.
2119.	2119.	2119.	0.	0.	21190.
2119.	2119.	2119.	0.	0.	21190.
0.	0.	0.	0.	0.	12700.
0.	0.	0.	0.	0.	26000.
4238.	4238.	4238.	0.	0.	81080.
8135.	4549.	2903.	0.	0.	34521.
27068.	31617.	34521.	0.	0.	34521.
8476.	4238.	0.	0.	0.	0.



COPPER AT 45 CENTS PER POUND - OXIDE ONLY.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

1                    2                    3                    4                    5                    ACCUMULATED

-----

-5429.           -1102.           -1340.           18289.           19210.           29628.

-----

0.                0.                0.                1442.            1442.            2884.  
0.                0.                0.                1353.            1215.            2568.  
0.                0.                0.                1497.            1343.            2840.  
0.                0.                0.                1206.            952.             2158.  
0.                0.                0.                2470.            1950.            4420.  
0.                0.                0.                10320.           12307.           22628.

-----

0.                0.                0.                18289.           19210.           37499.

-----

0.                0.                0.                0.                0.                0.

-----

0.                0.                0.                0.                0.                0.  
0.                0.                0.                0.                0.                0.  
0.                0.                0.                0.                0.                0.  
0.                0.                0.                0.                0.                0.

-----

0.                0.                0.                0.                0.                0.

-----

0.                0.                0.                0.                0.                0.

-----

0.                0.                0.                0.                0.                0.

-----

0.                0.                0.                0.                0.                0.

-----

0.                0.                0.                0.                0.                0.

-----

0.                0.                0.                0.                0.                0.

=====



COPPER AT 45 CENTS PER POUND - OXIDE ONLY.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

6	7	8	9	10	ACCUMULATED
19210.	19210.	19210.	19210.	19341.	125809.
1442.	1442.	1442.	0.	0.	7211.
1077.	939.	801.	663.	525.	6573.
1189.	1035.	881.	727.	573.	7245.
698.	444.	190.	0.	0.	3490.
1430.	910.	390.	0.	0.	7150.
13373.	13791.	14036.	6573.	0.	70403.
19210.	18561.	17740.	7963.	1098.	102072.
0.	648.	1469.	11246.	18243.	31607.
0.	25.	58.	449.	729.	1264.
0.	38.	88.	674.	1094.	1896.
0.	0.	3.	12.	80.	96.
0.	6.	14.	112.	182.	316.
0.	71.	165.	1249.	2086.	3573.
0.	577.	1304.	9996.	16156.	28034.
0.	230.	521.	3998.	6462.	11213.
0.	346.	782.	5998.	9693.	16820.
0.	155.	352.	2699.	4362.	7569.
0.	227.	517.	3948.	6449.	11142.



COPPER AT 45 CENTS PER POUND - OXIDE ONLY.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

11	12	13	14	15	ACCUMULATED
19401.	13753.	10363.	0.	0.	169326.
0.	0.	0.	0.	0.	7211.
387.	249.	111.	0.	0.	7320.
419.	265.	112.	0.	0.	8041.
0.	0.	0.	0.	0.	3490.
0.	0.	0.	0.	0.	7150.
1578.	1143.	727.	0.	0.	73851.
2384.	1657.	950.	0.	0.	107063.
17017.	12096.	9413.	0.	0.	70134.
680.	483.	376.	0.	0.	2805.
1021.	725.	564.	0.	0.	4208.
189.	291.	364.	0.	0.	942.
170.	120.	94.	0.	0.	701.
2061.	1622.	1399.	0.	0.	8657.
14955.	10473.	8013.	0.	0.	61476.
5982.	4189.	3205.	0.	0.	24590.
8973.	6284.	4807.	0.	0.	36886.
4037.	2827.	2163.	0.	0.	16598.
6099.	4450.	3563.	0.	0.	25255.



CASH FLOW

PROJECT 655

RUN CS2

CERRO VERDE

## OXIDE AND SULPHIDE

DURATION	20 Years
DEPRECIATION RATE	20 Percent
INCOME TAX RATE	45 Percent

FINANCING

<u>Source</u>	<u>Stage 1</u> <u>Amount</u>	<u>Stage 2</u> <u>Amount</u>	<u>Rate</u>
Loan - United Kingdom	\$21,190,000	\$30,200,000	6-1/2%
Loan - Canada	\$21,190,000	\$30,200,000	7-1/4%
Loan - Additional	<u>\$12,700,000</u>	<u>\$10,650,000</u>	10%
Foreign Total	\$55,080,000	\$71,050,000	
Loan - Peru	\$26,000,000		
Equity	<u>\$ 9,550,000</u>	<u>\$ 9,353,000</u>	
Local Total	<u>\$35,550,000</u>	<u>\$ 9,353,000</u>	
Gross Total	\$90,630,000	\$80,403,000	



COPPER AT 45 CENTS PER POUND - OXIDE & SULPHIDE.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

1	2	3	4	5	ACCUMULATED
0.	0.	4477.	33128.	33128.	70733.
0.	0.	5197.	14219.	13298.	32714.
5429.	1102.	620.	620.	620.	8391.
-5429.	-1102.	-1340.	18289.	19210.	29628.
8205.	30000.	30000.	345.	0.	68550.
439.	442.	1073.	1353.	1215.	4522.
64.	480.	1184.	1497.	1343.	4568.
53.	397.	979.	1206.	952.	3587.
0.	400.	1700.	2470.	1950.	6520.
0.	0.	3285.	0.	0.	3285.
0.	0.	3409.	0.	0.	3409.
8761.	31719.	41630.	6871.	5460.	94441.
-14190.	-32821.	-42970.	11418.	13750.	-64813.
-14190.	-47011.	-89981.	-78563.	-64813.	-64813.
0.	0.	0.	0.	0.	0.
-14190.	-32821.	-42970.	11418.	13750.	-64813.
-14190.	-47011.	-89981.	-78563.	-64813.	-64813.
1790.	9700.	9700.	0.	0.	21190.
1790.	9700.	9700.	0.	0.	21190.
1060.	5820.	5820.	0.	0.	12700.
0.	8000.	18000.	0.	0.	26000.
0.	0.	0.	0.	0.	0.
4640.	33220.	43220.	0.	0.	81080.
0.	0.	0.	2119.	2119.	4238.
0.	0.	0.	2119.	2119.	4238.
0.	0.	0.	2540.	2540.	5080.
0.	0.	0.	5200.	5200.	10400.
0.	0.	0.	11978.	11978.	23956.
-9550.	399.	250.	-560.	1772.	-7689.
-9550.	-9151.	-8901.	-9461.	-7689.	-7689.
4640.	37860.	81080.	69102.	57124.	57124.



COPPER AT 45 CENTS PER POUND - OXIDE & SULPHIDE.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

6	7	8	9	10	ACCUMULATED
33128.	33128.	33128.	33128.	33128.	236373.
13298.	13298.	13298.	13298.	13167.	99073.
620.	620.	620.	620.	620.	11491.
19210.	19210.	19210.	19210.	19341.	125809.
406.	1224.	223.	0.	1578.	71981.
1077.	939.	801.	663.	525.	8527.
1189.	1035.	881.	727.	573.	8973.
698.	444.	190.	0.	0.	4919.
1430.	910.	390.	0.	0.	9250.
0.	0.	0.	0.	0.	3285.
0.	0.	0.	0.	0.	3409.
4800.	4552.	2485.	1390.	2676.	110344.
14410.	14658.	16725.	17820.	16665.	15465.
-50403.	-35745.	-19020.	-1200.	15465.	15465.
0.	227.	517.	3948.	6449.	11142.
14410.	14430.	16207.	13871.	10215.	4322.
-50403.	-35972.	-19764.	-5893.	4322.	4322.
0.	0.	0.	0.	0.	21190.
0.	0.	0.	0.	0.	21190.
0.	0.	0.	0.	0.	12700.
0.	0.	0.	0.	0.	26000.
0.	38.	88.	674.	1094.	1896.
0.	38.	88.	674.	1094.	82976.
2119.	2119.	2119.	2119.	2119.	14833.
2119.	2119.	2119.	2119.	2119.	14833.
2540.	2540.	2540.	0.	0.	12700.
5200.	5200.	5200.	0.	0.	26000.
11978.	11978.	11978.	4238.	4238.	68366.
2432.	2491.	4317.	10307.	7072.	18932.
-5257.	-2765.	1552.	11860.	18932.	18932.
45146.	33168.	21190.	16952.	12714.	12714.





COPPER AT 45 CENTS PER POUND - OXIDE & SULPHIDE.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

11	12	13	14	15	ACCUMULATED
33128.	27327.	23826.	47420.	61572.	429646.
13107.	12954.	12843.	20249.	22356.	180582.
620.	620.	620.	930.	930.	15211.
19401.	13753.	10363.	26241.	38286.	233853.
11543.	38827.	39822.	223.	0.	162396.
872.	949.	1664.	1780.	1340.	15182.
564.	1030.	1827.	1970.	1530.	15894.
68.	367.	833.	958.	746.	7891.
0.	0.	0.	0.	0.	9250.
0.	0.	0.	0.	0.	3285.
0.	0.	800.	0.	0.	4209.
13047.	41173.	44946.	4931.	3666.	218107.
6354.	-27420.	-34583.	21310.	34620.	15746.
21819.	-5601.	-40184.	-18874.	15746.	15746.
5854.	287.	287.	287.	959.	18820.
499.	-27707.	-34870.	21022.	33660.	-3074.
4821.	-22886.	-57757.	-36734.	-3074.	-3074.
4000.	13100.	13100.	0.	0.	51390.
4000.	13100.	13100.	0.	0.	51390.
1350.	4650.	4650.	0.	0.	23350.
0.	0.	0.	0.	0.	26000.
979.	0.	0.	0.	128.	3004.
10329.	30850.	30850.	0.	128.	155134.
2119.	2119.	2119.	6040.	6040.	33270.
2119.	2119.	2119.	6040.	6040.	33270.
0.	0.	0.	2130.	2130.	16960.
0.	0.	0.	0.	0.	26000.
4238.	4238.	4238.	14210.	14210.	109500.
6590.	-1095.	-8258.	6812.	19578.	42559.
25522.	24427.	16168.	22981.	42559.	42559.
17826.	44438.	71050.	56840.	42630.	42630.



## CERRO VERDE

## COPPER AT 45 CENTS PER POUND - OXIDE &amp; SULPHIDE.

(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

16	17	18	19	20	ACCUMULATED
61572.	61572.	61572.	61572.	31546.	707480.
22356.	22356.	22356.	22356.	9854.	279860.
930.	930.	930.	930.	465.	19396.
30286.	30286.	30286.	30286.	21227.	408224.
532.	498.	229.	2155.	1805.	167615.
997.	605.	211.	0.	0.	16995.
1095.	656.	219.	0.	0.	17864.
532.	320.	106.	0.	0.	8849.
0.	0.	0.	0.	0.	9250.
0.	0.	0.	0.	0.	3285.
0.	0.	0.	0.	0.	4209.
3156.	2079.	765.	2155.	1805.	228067.
35130.	36207.	37521.	36131.	19422.	180157.
50876.	87083.	124604.	160735.	180157.	180157.
6071.	15536.	16206.	16740.	7461.	80837.
29058.	20670.	21314.	19390.	11960.	99319.
25984.	46654.	67968.	87359.	99319.	99319.
0.	0.	0.	0.	0.	51390.
0.	0.	0.	0.	0.	51390.
0.	0.	0.	0.	0.	23350.
0.	0.	0.	0.	0.	26000.
1002.	2170.	2235.	2283.	1144.	11839.
1002.	2170.	2235.	2283.	1144.	163969.
6040.	6040.	6040.	0.	0.	51390.
6040.	6040.	6040.	0.	0.	51390.
2130.	2130.	2130.	0.	0.	23350.
0.	0.	0.	0.	0.	26000.
14210.	14210.	14210.	0.	0.	152130.
15851.	8630.	9339.	21673.	13104.	111159.
58410.	67041.	76380.	98054.	111159.	111159.
28420.	14210.	0.	0.	0.	0.

COPPER AT 45 CENTS PER POUND - OXIDE & SULPHIDE.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

1                      2                      3                      4                      5                      ACCUMULATED

-5429.                -1102.                -1340.                18289.                19210.                29628.

0.                    0.                    0.                    1442.                    1442.                    2884.  
0.                    0.                    0.                    1353.                    1215.                    2568.  
0.                    0.                    0.                    1497.                    1343.                    2840.  
0.                    0.                    0.                    1206.                    952.                    2158.  
0.                    0.                    0.                    2470.                    1950.                    4420.  
0.                    0.                    0.                    10320.                    12307.                    22628.

0.                    0.                    0.                    18289.                    19210.                    37499.

0.                    0.                    0.                    0.                    0.                    0.

0.                    0.                    0.                    0.                    0.                    0.  
0.                    0.                    0.                    0.                    0.                    0.  
0.                    0.                    0.                    0.                    0.                    0.  
0.                    0.                    0.                    0.                    0.                    0.

0.                    0.                    0.                    0.                    0.                    0.

0.                    0.                    0.                    0.                    0.                    0.

0.                    0.                    0.                    0.                    0.                    0.

0.                    0.                    0.                    0.                    0.                    0.

0.                    0.                    0.                    0.                    0.                    0.

0.                    0.                    0.                    0.                    0.                    0.



COPPER AT 45 CENTS PER POUND - OXIDE & SULPHIDE.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

6	7	8	9	10	ACCUMULATED
19210.	19210.	19210.	19210.	19341.	125809.
1442.	1442.	1442.	0.	0.	7211.
1077.	939.	801.	663.	525.	6573.
1189.	1035.	881.	727.	573.	7245.
698.	444.	190.	0.	0.	3490.
1430.	910.	390.	0.	0.	7150.
13373.	13791.	14036.	6573.	0.	70403.
19210.	18561.	17740.	7963.	1098.	102072.
0.	648.	1469.	11246.	18243.	31607.
0.	25.	58.	449.	729.	1264.
0.	38.	88.	674.	1094.	1896.
0.	0.	3.	12.	80.	96.
0.	6.	14.	112.	182.	316.
0.	71.	165.	1249.	2086.	3573.
0.	577.	1304.	9996.	16156.	28034.
0.	230.	521.	3998.	6462.	11213.
0.	346.	782.	5998.	9693.	16820.
0.	155.	352.	2699.	4362.	7569.
0.	227.	517.	3948.	6449.	11142.



COPPER AT 45 CENTS PER POUND - OXIDE & SULPHIDE.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

11                    12                    13                    14                    15                    ACCUMULATED

-----  
-----  
19401.                13753.                10363.                26241.                38286.                233853.

-----  
-----  
0.                    0.                    0.                    0.                    0.                    7211.  
872.                  949.                  1664.                  1780.                  1390.                  13228.  
564.                  1030.                  1827.                  1970.                  1530.                  14166.  
68.                    367.                    833.                    958.                    746.                    6462.  
0.                    0.                    0.                    0.                    0.                    7150.  
1578.                  11407.                  6039.                  21533.                  32479.                  143439.

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-----  
3082.                  13753.                  10363.                  26241.                  36145.                  191656.

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-----  
16319.                  0.                    0.                    0.                    2140.                  50067.

-----  
-----  
652.                    0.                    0.                    0.                    85.                    2002.  
979.                    0.                    0.                    0.                    128.                    3004.  
189.                    287.                    287.                    287.                    287.                    1436.  
163.                    0.                    0.                    0.                    21.                    500.

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-----  
1984.                  287.                  287.                  287.                  523.                  6944.

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-----  
14334.                  0.                    0.                    0.                    1617.                  43986.

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-----  
5733.                  0.                    0.                    0.                    647.                  17594.

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-----  
8600.                  0.                    0.                    0.                    970.                  26391.

-----  
-----  
3870.                  0.                    0.                    0.                    436.                  11876.

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-----  
5854.                  287.                  287.                  287.                  959.                  18820.  
-----  
-----



COPPER AT 45 CENTS PER POUND - OXIDE & SULPHIDE.  
(FIGURES SHOWN IN THOUSANDS OF U.S. DOLLARS)

16                    17                    18                    19                    20                    ACCUMULATED

-----  
38286.                38286.                38286.                38286.                21227.                408224.

-----  
0.                    0.                    0.                    0.                    0.                    7211.  
997.                  605.                  211.                  0.                    0.                    15041.  
1095.                656.                  219.                  0.                    0.                    16136.  
532.                  320.                  106.                  0.                    0.                    7420.  
0.                    0.                    0.                    0.                    0.                    7150.  
18956.                532.                  498.                  229.                  2155.                165810.

-----  
21580.                2113.                1034.                229.                2155.                218767.

-----  
16705.                36173.                37252.                38057.                19072.                197327.

-----  
668.                  1446.                  1490.                  1522.                  762.                  7893.  
1002.                2170.                  2235.                  2283.                  1144.                11839.  
300.                  400.                  617.                  841.                  1069.                4666.  
167.                  361.                  372.                  380.                  190.                  1973.

-----  
2137.                4379.                4715.                5027.                3167.                26372.

-----  
14567.                31793.                32536.                33029.                15904.                171817.

-----  
5826.                7000.                7000.                7000.                6361.                50783.

-----  
8740.                24793.                25536.                26029.                9542.                121034.

-----  
3933.                11156.                11491.                11713.                4294.                54465.

-----  
6071.                15536.                16206.                16740.                7461.                80837.  
=====



## NOTES ON CASH FLOW AND OPERATING ACCOUNT STATEMENT

1. Copper Sales

The annual value of saleable copper produced, at a fixed price of 45 U.S. cents per pound.

2. Production Costs

The calculated cash costs (i.e. excluding depreciation) of producing the saleable copper detailed in 1 above, plus the costs of placing in stockpile and production in-progress ore, mined but not processed.

3. Minero Peru Expenditures/Fees

The estimated preproduction expenses of Minero Peru in connection with the Cerro Verde project, plus a head office charge to be paid to Minero Peru following start-up.

4. Gross Operating Profit

Item 1 above, minus the sum of Items 2 and 3.

5. Engineering and Construction Costs

The engineering and capital costs incurred in the construction of the mining facilities plus the renewal of plant and equipment required during the operating years.

6. Loan Interest - United Kingdom

The heading includes:

- i) A once only commitment fee of 1/8% of the loan total for each year of the lending period.
- ii) A once only negotiating fee of 1/8% on loan totals.
- iii) An annual management fee of .05% on the original loan total.
- iv) Interest at the rate of 6-1/2% per annum on the loan balance.

7. Loan Interest - Canada

Interest at the rate of 7-1/4% per annum on the loan balance.

8. Additional Loan Interest

At the rate of 10% per annum on the loan balance.



9. Loan Interest - Poru  
Interest at the rate of 10% per annum on the loan balance.
10. Working Capital  
A sum calculated to be necessary to cover operating costs between the time the first copper is produced and actually paid for.
11. Inventory  
An estimated value of stocks and spares necessary to be held to ensure the smooth operation of the mine.
12. Total Capital Requirements  
Represents the annual total of Items 5 to 11 inclusive as detailed above.
13. Gross Cash Flow  
The annual net funds generated or to be financed from other sources when the total Capital Requirements (Item 12) is deducted from the Gross Operating Profit (Item 4).
14. Gross Cash Flow Cumulative  
The cumulative total on a year-to-year basis of the annual Gross Cash Flow (Item 17).
15. Income Tax, Fees and Employee Benefits  
The total deduction for taxes, fees and benefits, brought forward from Item 49.
16. Net Cash Flow  
The annual balance when Item 15 is paid out of funds available. (Item 13).
17. Net Cumulative Cash Flow  
The cumulative total of the annual balances appearing in Item 16 above.





18. Loan - United Kingdom

The estimated non-Peruvian or foreign content included in the construction costs amounts to \$49,858,000. Of this total, the United Kingdom and Canadian Banks will supply finance amounting to 85% or \$42,380,000. It has further been estimated that this \$42,380,000 will be divided 50%-50% or \$21,190,000 by each country.

19. Canadian Loan

See above.

20. Additional Loan

The estimated amount of \$12,700,000 necessary to cover the balance of non-Peruvian construction costs, plus preproduction interest to be raised outside of Peru.

21. Loan - Peru

The construction costs (Stage 1) include Peruvian expenditures of \$19,040,698. The loan of \$26,000,000 to be raised in Peru will meet these costs and the related interest.

22. Retained Bond Benefit

The calculated Bond Benefit from Item 14; this amount is not paid out in cash, but is retained by Minerio Peru.

23. Total Capital Available

The total of Items 18 to 22 inclusive.

24. Loan Repayment - United Kingdom

The repayment of Item 18 over a 10 year period commencing 6 months after start-up in 20 equal instalments.

25. Loan Repayments - Canada

The repayment of Item 19 over a 10 year period commencing 6 months after start-up in 20 equal instalments.

26. Loan Repayment - Additional

The repayment of Item 20 over a period of 5 years commencing 6 months after start-up in 10 equal instalments.



27. Loan Repayments - Part

The repayment of Item 21 over a period of 5 years commencing 6 months after start-up in 10 equal instalments.

28. Total Loan Repayments

The total on an annual cumulative basis of Items 24 to 27 inclusive.

29. Equity Cash Flow

The net annual amount to be financed from the Equity Capital of \$10,000,000 to meet the annual shortfall of cash after taking into account all forms of expenditure from sales income or, the adding to equity on an annual basis, the surplus of cash after the payments of all expenditure out of Sales Income.

30. Equity Cumulative Cash Flow

The year-to-year cumulative total of Item 29.

31. Outstanding Balance of Loans

The annual balance due by the company to banks on the four loan accounts detailed in Items 18 to 21 inclusive.

4. Gross Operating Profit

Repeat of the Item 4 figures from previous sheet. These figures are the basis for calculation of deductions, taxes, fees and benefits.

Note: Deductions allowed before calculating benefits, Items 32 to 37 inclusive.

32. Preproduction Interest

Claimed at a 20% annual rate for depreciation purposes.

33. United Kingdom Loan Interest

United Kingdom loan interest for the year can be claimed in full, income permitting. If full amount cannot be claimed, the excess is added to the preproduction interest balance.

34. Canadian Loan Interest

As for Item 33.



35. Additional Loan Interest

As for Item 33.

36. Peruvian Loan Interest

As for Item 33.

37. Depreciation Allowance

Claimed at a 20% annual rate on the total fixed assets (sum of costs under Item 5).

38. Total Deductions

The sum of Items 32-37 inclusive.

39. Profit Subject to Fees and Benefits

Item 4 less Item 38.

40. Cash Benefits

Cash payment to the Comunidad of 4% of Item 39.

41. Bond Benefit

Bonds assigned to the Comunidad equivalent in value to 6% of Item 39.

42. Bond Interest

Cash payment to the Comunidad of 10% of the accumulated total of Item 41.

43. Technical Fees

Cash payment to the "Instituto Cientifico y Technologico Minero" of 1% of Item 39.

Note: In the event that the Item 39 figure in any given year is zero, then only Item 42 of the preceeding four items will be payable.

44. Total Fees and Benefits

The sum of Items 40-43 inclusive.



45. Profit Subject to Income Tax

Item 39 less Item 44.

46. Deduction for Capital Reserve

Allowance of 40% of Item 45 or U.S. \$7,000,000, whichever is less.

47. Taxable Profit

Item 45 less Item 46.

48. Income Tax

Taken as 45% of Item 47.

49. Total Income Tax, Fees and Benefits

The sum of Items 44 and 48, which also appears as Item 15 on the preceding sheet.



PROJECT 655 CERRO VERDE - STAGE 1 - OXIDE

AREA NUMBER	FACTORY PRICE	INLAND FREIGHT	CONSULAR DUES	MARITIME FREIGHT	FOREIGN TOTAL	IMPORT DUTY	PORT CHGS + FREIGHT	INSTALL COST	LOCAL TOTAL	GROSS TOTAL
011	494415.	9250.	39975.	35177.	578817.	26742.	9250.	0.	35992.	\$614809.
012	2310000.	20602.	157649.	89549.	2577800.	94921.	21205.	100000.	216126.	\$2793926.
021	6720949.	91776.	530533.	498029.	7841287.	356486.	91776.	0.	448262.	\$8289549.
026	0.	0.	0.	0.	0.	0.	0.	1954925.	1954925.	\$1954925.
030	2044289.	39817.	129498.	163822.	2377426.	89127.	59725.	131911.	280763.	\$2658189.
040	0.	0.	0.	0.	0.	0.	0.	405000.	405000.	\$405000.
041	0.	0.	0.	0.	0.	0.	0.	62550.	62550.	\$62550.
043	33840.	680.	2102.	2516.	39138.	1440.	960.	5000.	7400.	\$46538.
044	1004509.	27468.	55985.	99154.	1187116.	39948.	17580.	296300.	353828.	\$1540944.
051	1059000.	6600.	77328.	55435.	1198363.	51102.	13200.	1770000.	1834302.	\$3032665.
052	65000.	1200.	4096.	4416.	74712.	2781.	1200.	345000.	348981.	\$423693.
053	241000.	3200.	15856.	12442.	272498.	10532.	3200.	560000.	573732.	\$846230.
054	20000.	400.	1232.	1454.	23086.	843.	400.	129950.	131193.	\$154279.
055	0.	0.	0.	0.	0.	0.	0.	75000.	75000.	\$75000.
056	0.	0.	0.	0.	0.	0.	0.	75250.	75250.	\$75250.
057	0.	0.	0.	0.	0.	0.	0.	1000000.	1000000.	\$1000000.



WRIGHT ENGINEERS LIMITED

1101 WEST BENDER ST  
VANCOUVER, B.C.

## PROJECT 655 CERRO VERDE - STAGE 1 - OXIDE

AREA NUMBER	FACTORY PRICE	INLAND FREIGHT	CONSULAR DUES	MARITIME FREIGHT	FOREIGN TOTAL	IMPORT DUTY	PORT CHGS + FREIGHT	INSTALL COST	LOCAL TOTAL	GROSS TOTAL
062	275126.	0.	13801.	13107.	302034.	9281.	4213.	0.	13494.	\$315528.
063	875531.	550.	41089.	35508.	952678.	27455.	9262.	0.	36717.	\$989395.
064	2811885.	40000.	207449.	147432.	3206766.	137027.	43644.	322800.	503471.	\$3710237.
066	136548.	0.	9580.	2758.	148886.	6125.	294.	0.	6419.	\$155305.
071	1153348.	14452.	72424.	81237.	1321461.	49325.	25741.	712461.	787527.	\$2108986.
073	248485.	4012.	15457.	13999.	281953.	10361.	4932.	160852.	176145.	\$458098.
074	2429512.	36057.	154485.	209231.	2829285.	107015.	68608.	404646.	580269.	\$3409554.
075	1191694.	24114.	72605.	118824.	1407237.	51322.	45620.	276635.	373577.	\$1780814.
081	4833425.	59700.	298316.	365754.	5557195.	204735.	130665.	2281352.	2616752.	\$8173947.
083	2721302.	61676.	206509.	208296.	3197783.	139484.	63276.	1356620.	1559380.	\$4757163.
084	760936.	12431.	48180.	48052.	869599.	32515.	17192.	153560.	203267.	\$1072866.
085	3413393.	40979.	209422.	212759.	3876553.	141527.	66000.	3972849.	4180376.	\$8056929.
TOTAL	34844187.	494964.	2363571.	2418951.	40121673.	1590094.	697943.	16552661.	18840698.	\$58962371.



## PROJECT 655 CERRO VERDE - STAGE 1 - OXIDE

AREA NUMBER	AREA TITLE	TOTAL WEIGHT	***** FOREIGN	EXPENDITURES LOCAL	***** TOTAL
011	SURFACE VEHICLES	462,500.	\$578,817.	\$35,992.	\$614,809.
012	WAREHOUSE INVENTORY	1,070,240.	\$2,577,800.	\$216,126.	\$2,793,926.
021	MINING EQUIPMENT	4,588,800.	\$7,841,287.	\$448,262.	\$8,289,549.
026	MINE DEVELOPMENT	1,954,925.	\$0.	\$1,954,925.	\$1,954,925.
030	CONVEYORS PHASE 1	2,986,224.	\$2,377,426.	\$280,763.	\$2,658,189.
040	GENERAL	0.	\$0.	\$405,000.	\$405,000.
041	SEWAGE	0.	\$0.	\$62,550.	\$62,550.
043	FUEL STORAGE	48,000.	\$39,138.	\$7,400.	\$46,538.
044	PROCESS WATER	1,438,000.	\$1,187,116.	\$353,828.	\$1,540,944.
051	SERVICE SHOP WAREHOUSE ETC	665,000.	\$1,198,363.	\$1,834,302.	\$3,032,665.
052	MINE OFFICE AND CHANGE HOUSE	60,000.	\$74,712.	\$348,981.	\$423,693.
053	PLANT OFFICES LABORATORY CHG. HSE	161,000.	\$272,498.	\$573,732.	\$846,230.
054	MEDICAL BUILDING	20,000.	\$23,026.	\$131,193.	\$154,279.
055	MISCELLANEOUS BUILDINGS	0.	\$0.	\$75,000.	\$75,000.
056	ADMINISTRATION BUILDING AT AREQUIPA	0.	\$0.	\$75,250.	\$75,250.
057	PROJECT HOUSING	0.	\$0.	\$1,000,000.	\$1,000,000.



WRIGHT ENGINEERS LIMITED

1101 WEST PENDER ST.  
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CAPITAL COST SUMMARY

1 FEBRUARY 1972

PROJECT 655 CERRO VERDE - STAGE 1 - OXIDE

AREA NUMBER	AREA TITLE	TOTAL WEIGHT	***** FOREIGN	EXPENDITURES LOCAL	***** TOTAL
062	ELECTRICAL SUB STATION	210,650.	\$302,034.	\$13,494.	\$315,528.
063	ELECTRICAL POWER DISTRIBUTION	463,100.	\$952,678.	\$36,717.	\$989,395.
064	ELECTRICAL POWER GENERATING PLANT	2,610,200.	\$3,206,766.	\$503,471.	\$3,710,237.
066	ELECTRICAL COMMUNICATIONS	14,710.	\$148,886.	\$6,419.	\$155,305.
071	PRIMARY CRUSHING	1,320,269.	\$1,321,461.	\$787,527.	\$2,108,988.
073	COARSE ORE STOCKPILE AND RECLAIM	295,200.	\$281,953.	\$176,145.	\$458,098.
074	SECONDARY AND TERTIARY CRUSHING	3,467,574.	\$2,829,285.	\$580,269.	\$3,409,554.
075	SCREENING	2,320,000.	\$1,407,237.	\$373,577.	\$1,780,814.
081	VAT LEACHING	6,735,499.	\$5,557,195.	\$2,616,752.	\$8,173,947.
083	ACID PRODUCTION	3,663,800.	\$3,197,783.	\$1,559,380.	\$4,757,163.
084	IRON PURIFICATION	859,582.	\$869,599.	\$203,267.	\$1,072,866.
085	ELECTRO WINNING	7,632,264.	\$3,876,553.	\$4,180,376.	\$8,056,929.
TOTAL		43,047,537.	\$40,121,673.	\$18,840,698.	\$58,962,371.





CAPITAL COST SUMMARYOXIDE STAGE - Cont'd.

	<u>Expenditures</u>		<u>Total Cost</u>
	<u>Foreign</u> <u>Content</u> <u>\$</u>	<u>Local</u> <u>Content</u> <u>\$</u>	
SECTION VII - Screening (Cont'd.) Area Code 75	1,407,237	373,577	1,780,814
- Vat Leaching and Storage Area Code 81	5,557,195	2,616,752	8,173,947
- Acid Production and Solvent Extraction Area Code 83	3,157,770	1,556,737	4,714,507
- Iron Purification Area Code 84	869,599	203,267	1,072,866
- Electrowinning Area Code 85	3,876,553	4,180,376	1,072,866
- Mobile Equipment Area Code 83	40,013	2,643	42,656
SECTION VIII- Surface Vehicles and Warehouse Inventory Area Codes 11 and 12	3,156,617	252,118	3,408,735
Sub-Total	40,121,673	18,840,698	58,962,371
- Site Services	931,502		931,502
- Site Stores and Equipment Control	348,560		348,560
Sub-Total	41,401,735		60,242,433
- Training		200,000	200,000
- Insurances	1,170,000		1,170,000
- Engineering, Consultant's fees and Construction Management @ 12-1/2%	7,285,939		7,285,939
Total	49,857,674	19,040,698	68,898,372

Note: - No account has been taken of Peruvian Fiscal Stamp Tax.



CAPITAL COST SUMMARY

1 FEBRUARY 1972

PROJECT 655 CERRO VERDE - STAGE 2 - SULPHIDE

AREA NUMBER	FACTORY PRICE	INLAND FREIGHT	CONSULAR DUES	MARITIME FREIGHT	FOREIGN TOTAL	IMPORT DUTY	PORT CHGS + FREIGHT	INSTALL COST	LOCAL TOTAL	GROSS TOTAL
011	70680.	1500.	5688.	5598.	83466.	3835.	1500.	0.	5335.	\$88801.
012	1000000.	5900.	80472.	48852.	1135224.	52738.	11800.	0.	64538.	\$1199762.
021	4496569.	56930.	355035.	310431.	5218965.	237417.	56930.	0.	294347.	\$5513312.
031	626887.	13490.	39408.	57039.	736824.	27473.	21363.	128681.	177517.	\$914341.
040	0.	0.	0.	0.	0.	0.	0.	500000.	500000.	\$500000.
044	3010423.	164437.	241848.	576697.	3993405.	179989.	95508.	4276228.	4551725.	\$8545130.
046	177414.	3090.	12463.	12103.	205070.	8395.	2611.	66560.	77566.	\$282636.
047	646251.	48993.	51253.	167786.	914283.	40423.	27170.	97500.	165093.	\$1079376.
048	0.	0.	0.	0.	0.	0.	0.	1026659.	1026659.	\$1026659.
051	340683.	379.	24430.	15539.	381031.	16046.	3758.	646000.	665804.	\$1046835.
052	16250.	300.	1024.	1104.	18678.	695.	300.	57500.	58495.	\$77173.
053	100000.	1400.	6712.	5413.	113525.	4466.	1400.	257500.	263366.	\$376891.
055	0.	0.	0.	0.	0.	0.	0.	100000.	100000.	\$100000.
056	0.	0.	0.	0.	0.	0.	0.	754950.	754950.	\$754950.
057	0.	0.	0.	0.	0.	0.	0.	1000000.	1000000.	\$1000000.
063	767348.	0.	38832.	24694.	830874.	25504.	7272.	0.	32776.	\$863650.



WRIGHT ENGINEERS LIMITED

1101 WEST PENDER ST  
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CAPITAL COST SUMMARY

1 FEBRUARY 1972

PROJECT 655 CERRO VERDE - STAGE 2 - SULPHIDE

AREA NUMBER	FACTORY PRICE	INLAND FREIGHT	CONSULAR DUES	MARITIME FREIGHT	FOREIGN TOTAL	IMPORT DUTY	PORT CHGS + FREIGHT	INSTALL COST	LOCAL TOTAL	GROSS TOTAL
064	5250000.	80000.	426400.	280774.	6037174.	280539.	80000.	0.	360539.	\$6397713.
065	5250000.	80000.	426400.	280774.	6037174.	280539.	80000.	0.	360539.	\$6397713.
066	333334.	0.	0.	0.	333334.	0.	0.	25000.	25000.	\$358334.
075	0.	0.	0.	0.	0.	0.	0.	200000.	200000.	\$200000.
078	188134.	3923.	9755.	26699.	228511.	7433.	7218.	568053.	582704.	\$811215.
083	1750000.	39866.	123189.	127862.	2040917.	83386.	39866.	0.	123252.	\$2164169.
085	5250000.	90000.	391200.	303923.	6035123.	259696.	90000.	1260000.	1609696.	\$7644819.
087	10000000.	140000.	651200.	565137.	11356337.	435257.	140000.	0.	575257.	\$11931594.
090	1540736.	35520.	94506.	228594.	1899356.	70499.	66206.	1086362.	1223067.	\$3122423.
091	5625149.	59338.	360283.	650063.	6694833.	257683.	156486.	38590.	452759.	\$7147592.
092	1281272.	16784.	79765.	117185.	1495006.	55710.	20988.	34350.	111048.	\$1606054.
093	727008.	11658.	47136.	58776.	844578.	32396.	12378.	46250.	91024.	\$935602.
095	2100000.	35000.	170900.	142364.	2448164.	113858.	35000.	900000.	1048868.	\$3497032.
TOTAL	50548138.	888508.	3637799.	4007407.	59081852.	2473987.	957754.	13070183.	16501924.	\$75583776.

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WRIGHT ENGINEERS LIMITED

1101 WEST PENDER ST  
VANCOUVER 1, B.C.

## CAPITAL COST SUMMARY

1 FEBRUARY 1972

PROJECT 655 CERRO VERDE - STAGE 2 - SULPHIDE

AREA NUMBER	AREA TITLE	TOTAL WEIGHT	***** FOREIGN	EXPENDITURES LOCAL	***** TOTAL
011	SURFACE VEHICLES	75,000.	\$83,466.	\$5,335.	\$88,801.
012	WAREHOUSE INVENTORY	590,000.	\$1,135,224.	\$64,538.	\$1,199,762.
021	MINING EQUIPMENT	2,846,500.	\$5,218,965.	\$294,347.	\$5,513,312.
031	CONVEYORS PHASE II	1,068,060.	\$736,824.	\$177,517.	\$914,341.
040	SITE DEVELOPMENT	0.	\$0.	\$500,000.	\$500,000.
044	WATER SUPPLY LAGUNA SALINAS	8,692,651.	\$3,993,405.	\$4,551,725.	\$8,545,130.
046	WATER RECLAIM SULPHIDE STAGE II	165,550.	\$205,070.	\$77,566.	\$282,636.
047	TAILINGS PIPELINE	2,516,150.	\$914,283.	\$165,093.	\$1,079,376.
048	TAILINGS DAM	0.	\$0.	\$1,026,659.	\$1,026,659.
051	SERVICE SHOP WAREHOUSE ETC	187,884.	\$381,031.	\$665,804.	\$1,046,835.
052	MINE OFFICE AND CHANGE HOUSE	15,000.	\$18,678.	\$58,495.	\$77,173.
053	PLANT OFFICES LABORATORY CHG. HSE	70,000.	\$113,525.	\$263,366.	\$376,891.
055	MISCELLANEOUS BUILDINGS	0.	\$0.	\$100,000.	\$100,000.
056	ADMINISTRATION BUILDING AT AREQUIPA	0.	\$0.	\$754,950.	\$754,950.
057	PROJECT HOUSING	0.	\$0.	\$1,000,000.	\$1,000,000.
063	POWER DISTRIBUTION	363,576.	\$830,874.	\$32,776.	\$863,650.



WRIGHT ENGINEERS LIMITED

1101 WEST PENDER ST.  
VANCOUVER 1, B.C.

## CAPITAL COST SUMMARY

1 FEBRUARY 1972

PROJECT 655 CERRO VERDE - STAGE 2 - SULPHIDE

AREA NUMBER	AREA TITLE	TOTAL WEIGHT	***** EXPENDITURES *****		
			FOREIGN	LOCAL	TOTAL
064	POWER GENERATOR NO.1	4,000,000.	\$6,037,174.	\$360,539.	\$6,397,713.
065	POWER GENERATOR NO.2	4,000,000.	\$6,037,174.	\$360,539.	\$6,397,713.
066	INSTALLATION GENERATORS	3,358,334.	\$333,334.	\$25,000.	\$358,334.
075	SCREENING PLANT	100,000.	\$0.	\$200,000.	\$200,000.
078	FINE ORE STORAGE	360,900.	\$228,511.	\$582,704.	\$811,215.
083	ACID PRODUCTION	2,493,300.	\$2,040,917.	\$123,252.	\$2,164,169.
085	ELECTRO WINNING	9,000,000.	\$6,035,123.	\$1,609,696.	\$7,644,819.
087	ROASTING	7,000,000.	\$11,356,337.	\$575,257.	\$11,931,594.
090	CONCENTRATOR GENERAL	3,337,300.	\$1,899,356.	\$1,223,067.	\$3,122,423.
091	GRINDING & CLASSIFICATION	7,824,300.	\$6,694,833.	\$452,759.	\$7,147,592.
092	FLOTATION	1,010,380.	\$1,495,006.	\$111,048.	\$1,606,054.
093	DEWATERING	618,930.	\$844,578.	\$91,024.	\$935,602.
095	LEACHING PHASE 2	1,750,000.	\$2,448,164.	\$1,048,868.	\$3,497,032.
TOTAL		61,493,815.	\$59,081,852.	\$16,501,924.	\$75,583,776.

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WRIGHT ENGINEERS LIMITED

1101 WEST PENDER ST  
VANCOUVER 1 BC



CAPITAL COST SUMMARYSULPHIDE STAGE

	Expenditures		
	Foreign Content	Local Content	Total Cost
	\$	\$	\$
SECTION I - Preproduction Stripping	-	-	-
SECTION II - Mining Equipment Area Code 21	5,218,965	294,347	5,513,312
SECTION IV - Waste Supply and Waste Disposal Area Codes 44, 46, 47 and 48	5,112,758	5,821,043	10,933,801
SECTION V - Ancillary Buildings Area Codes 51, 52, 53, 55 and 56	513,234	1,842,615	2,355,849
- Housing Area Code 57	-	1,000,000	1,000,000
SECTION VI - Power and Electrical Area Codes 63, 64, 65 and 66	13,238,556	778,854	14,017,410
SECTION VII - Site Development Area Code 40	-	500,000	500,000
- Crushing and Screening Area Code 75	-	200,000	200,000
- Conveyors Area Code 31	736,823	177,517	914,341
- Fine Ore Storage Area Code 78	228,511	582,704	811,215
- Concentrator Area Codes 90, 91, 92 and 93	10,933,773	1,877,898	12,811,671
- Acid Production Area Code 83	2,040,917	123,252	2,164,169





MINERO PERU EXPENDITURES ON CERRO VERDEPRIOR TO PRODUCTION

All expenditures are expressed in Soles

Figures shown (Thus) are in U.S. Dollars

<u>Item</u>	<u>Operating Expenses</u>	<u>Capital Expenditures</u>		<u>Total</u>
		<u>Depreciable</u>	<u>Exploration and Other</u>	
Estimated expenditures up to December 31, 1971 (excluding Pilot Plant)	49,585,500 (1,281,280)	4,963,500 (128,255)		54,549,000 (1,409,535)
<hr/>				
<u>1972</u>				
Overhead (Lima Office)	36,000,000 (930,230)			
Operating Expenses Cerro Verde	12,352,100 (319,175)			
Pilot Plant (Operations and Laboratory)	21,260,400 (549,360)			
Pilot Plant (Purchase and Install)		60,000,000 (1,550,390)		
Pilot Plant (Auxiliary Equipment, Office, etc.)		6,895,700 (178,185)		
Quality Control Equipment and other		23,501,600 (607,275)	3,387,000 (87,520)	
Miscellaneous Cerro Verde Capital Expense:				
Land Purchase			6,000,000 (155,040)	
Vehicles, Furniture, etc.		1,890,700 (48,860)		
Access Road			20,000,000 (516,795)	
Road Improvement			16,000,000 (413,435)	
Power Supply to Pumphouse (Included in Wright Engineers Limited's estimate)				
Buildings	"	"	"	



MINERO PERU EXPENDITURES ON CERRO VERDEPRIOR TO PRODUCTION - Cont'd.

<u>Item</u>	<u>Operating Expenses</u>	<u>Capital Expenditures</u>		<u>Total</u>
		<u>Depreciable</u>	<u>Exploration and Other</u>	
Exploration			29,988,000 (774,885)	
Intermediate Road Improvement	200,000 (5,170)			
Mine Equipment, Pilot Plant		7,800,000 (201,550)		
<hr/>				
1972 Total	69,812,500 (1,803,935)	100,088,000 (2,586,260)	75,375,000 (1,947,675)	(6,337,870)
<hr/>				
1973 Company Overhead	36,000,000 (930,230)			
* Exploration			10,000,000 (258,400)	(1,188,630)
<hr/>				
1974 Company Overhead	36,000,000 (930,230)			(930,230)
<hr/>				

\* Not budgeted by Minero Peru, but recommended by Wright Engineers Limited.

Note:

No account is taken of any income resulting from pilot plant operations because of lack of information. Any income from this source should be added to operating profit in year one.



MINERO PERU EXPENDITURES ON CERRO VERDE  
RECONCILIATION FOR CASH FLOW STATEMENT

Minero Peru expenditures up to and including Year 3 of Cash Flow period. Year 1 considered to be May 1st, 1972 - April 30th, 1973.

Spent by Minero Peru prior to Year 1	\$ 1,409,535
Plus 1/3 of 1972 estimated expenditures	\$ <u>2,112,625</u>
	\$ 3,522,160
<u>Year 1</u>	
2/3 1972 estimated expenditures	\$ 4,225,245
1/3 1973 estimated expenditures	\$ <u>396,210</u>
	\$ <u>4,621,455</u>
Sub-Total taken into account in Financial Projections in Year 1	\$ 8,143,615
<u>Year 2</u>	
2/3 1973 estimated expenditures	\$ 792,420
1/3 1974 estimated expenditures	\$ <u>310,080</u>
	\$ 1,102,500
<u>Year 3</u>	
2/3 1974 estimated expenditures	\$ <u>620,150</u>
Total Minero Peru actual and estimated expenditures included in this report	\$ <u>9,866,265</u>
Depreciable fixed assets included in above	\$ <u>2,714,515</u>



CAPITAL INVESTMENT SCHEDULE AND COST SUMMARY

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JAN 1972

PROJECT NO.655

CERRO VERDE PROJECT

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CONSTRUCTION DURATION	* 4.00 YEARS
LENGTH OF REPORTING PERIODS	12 MONTHS
ANNUAL INTEREST RATE (PERCENT)	0.00
PERIOD INTEREST RATE (PERCENT)	0.00
NUMBER OF PROJECT SECTIONS	8
NUMBER OF PROJECT ITEMS	42

\* The four years of construction duration referred to above includes the period prior to the three years, May 1st, 1972, to December 15th, 1974.

CONSTRUCTION CAPITAL INVESTMENT SCHEDULE

JAN 1972

PROJECT NO. 655

CERRO VERDE PROJECT

4.00 YEARS

0.00 PERCENT ANNUAL INTEREST

12 MONTH PERIODS

PERIOD	AMOUNT	INTEREST	TOTAL	ACCUMULATED
1	3814660.	0.	3814660.	3814660.
2	8936014.	0.	8936014.	12750674.
3	34012130.	0.	34012130.	46762804.
4	32676842.	0.	32676842.	79439646.
TOTALS	79439646.	0.	79439646.	

CAPITAL COST ESTIMATE SUMMARY

JAN 1972

PROJECT NO. 655

CERRO VERDE PROJECT

ITEM NO.	DESCRIPTION	EQUIPMENT COST	CONSTRUCTION COST	OVERHEAD COST	TOTAL COST
<b>SECTION 1 I. MINEROD PERU EXPENSES</b>					
1	M.P. EXPENSES PRIOR TO APRIL 1972	0.	0.	3522160.	3522160.
2	M.P. SPECIAL COSTS (INCL. PILOT PLANT)	0.	0.	3863505.	3863505.
3	M.P. EXPENSES AND OVERHEAD 1972 TO 1974	0.	0.	2480600.	2480600.
SECTION TOTALS		0.	0.	9866265.	9866265.
<b>SECTION 2 II. MINING</b>					
4	MINING EQUIPMENT AREA 21	7660227.	629322.	0.	8289549.
5	PRE-PRODUCTION STRIPPING AREA 26	0.	1954925.	0.	1954925.
SECTION TOTALS		7660227.	2584247.	0.	10244474.
<b>SECTION 3 III. METALLURGY. CONSULTANTS</b>					
6	OUTSIDE CONSULTANTS (N.A.)	0.	0.	0.	0.
SECTION TOTALS		0.	0.	0.	0.
<b>SECTION 4 IV. SITE DEVELOPMENT (WATER)</b>					
7	SITE PREPARATION & SEWAGE AREA 40	0.	467550.	0.	467550.
8	FUEL STORAGE AREA 43	39138.	7400.	0.	46538.
9	PROCESS WATER AREA 44	854949.	685995.	0.	1540944.
SECTION TOTALS		894087.	1160945.	0.	2055032.

CAPITAL COST ESTIMATE SUMMARY

JAN 1972

PROJECT NO. 655

CERRO VERDE PROJECT

ITEM NO.	DESCRIPTION		EQUIPMENT COST	CONSTRUCTION COST	OVERHEAD COST	TOTAL COST
<b>SECTION 5 V. ANCILLARY BLDG.S HOUSING</b>						
10	MAINTENANCE SHOP, WAREHOUSE	AREA 51	1198363.	1834302.	0.	3032665.
11	MINE OFFICE, CHANGE HOUSE	AREA 52	59712.	363981.	0.	423693.
12	PLANT OFFICE. LABORATORY	AREA 53	272498.	573732.	0.	846230.
13	MEDICAL BUILDING	AREA 54	18086.	136193.	0.	154279.
14	MISC. PLANT BUILDINGS	AREA 55	0.	750009.	0.	750009.
15	AREQUIPA ADMIN. BLDG.	AREA 56	0.	75250.	0.	75250.
16	AREQUIPA-TIABAYA HOUSING	AREA 57	0.	1000000.	0.	1000000.
<b>SECTION TOTALS</b>			<b>1548659.</b>	<b>4733467.</b>	<b>0.</b>	<b>6282126.</b>
<b>SECTION 6 VI. POWER (ELECTR. DISTRIB.)</b>						
17	ELECTRICAL GENERAL	AREA 60	0.	0.	0.	0.
18	ELECTRICAL SUB STATION	AREA 62	199413.	116115.	0.	315528.
19	ELECTRICAL POWER DISTRIBUTION	AREA 63	590212.	399183.	0.	989395.
20	ELECTRICAL POWER GENERATION	AREA 64	3183991.	526246.	0.	3710237.
21	ELECTRICAL COMMUNICATIONS	AREA 66	148886.	6419.	0.	155305.
<b>SECTION TOTALS</b>			<b>4122502.</b>	<b>1047963.</b>	<b>0.</b>	<b>5170465.</b>
<b>SECTION 7 VII. PROCESS PLANTS</b>						
22	CONVEYORS	AREA 30	1912057.	746132.	0.	2658189.
23	PRIMARY CRUSHING	AREA 71	1058949.	1050039.	0.	2108988.
24	C.O. STOCKPILE AND RECLAIM	AREA 73	222668.	235430.	0.	458098.
25	SECONDARY AND TERTIARY CRUSHING	AREA 74	2294768.	1114786.	0.	3409554.
26	SCREENING	AREA 75	1098998.	681816.	0.	1780814.
27	VAT LEACHING	AREA 81	5557195.	2616752.	0.	8173947.
28	ACID PRODUCTION	AREA 83	2996185.	1760978.	0.	4757163.
29	IRON PURIFICATION	AREA 84	698488.	374378.	0.	1072866.

CAPITAL COST ESTIMATE SUMMARY

JAN 1972

PROJECT NO. 655

CERRO VERDE PROJECT

ITEM NO.	DESCRIPTION	EQUIPMENT COST	CONSTRUCTION COST	OVER-HEAD COST	TOTAL COST
30	ELECTRO WINNING AREA 85	3876553.	4180376.	0.	8056929.
SECTION TOTALS		19715861.	12760687.	0.	32476548.
SUB-TOTAL - EQUIPMENT AND CONSTRUCTION		33941336.	22287309.	9855265.	66094910.
SECTION 8 VIII. PROJECT MANAGEMENT, DESIGN					
31	SURFACE VEHICLES AREA 11	574857.	39952.	0.	614809.
32	INVENTORY AREA 12	2577800.	216126.	0.	2793926.
33	SITE SERVICES	0.	0.	931502.	931502.
34	(N.A.)	0.	0.	0.	0.
35	SITE STORES, EQUIPMENT CONTROL	0.	0.	348560.	348560.
36	LIMA EXPENDITURES (COMMUNICATION)(N.A.)	0.	0.	0.	0.
37	TRAVEL (VISITORS) (N.A.)	0.	0.	0.	0.
38	FISCAL STAMPS (N.A.)	0.	0.	0.	0.
39	INSURANCES	0.	0.	1170000.	1170000.
40	TRAINING PROGRAMME	0.	0.	200000.	200000.
41	ENG, CONSULT FEE, CONST MANAGMNT. (12 )	0.	0.	7285939.	7285939.
42	PRE-FEASIBILITY STUDY (N.A.)	0.	0.	0.	0.
SECTION TOTALS		3152657.	256078.	9935001.	13344736.
PROJECT TOTAL ESTIMATED COST		37093993.	22543387.	19802266.	79439646.
ACCUMULATED CONSTRUCTION INTEREST				0.	0.
TOTAL ESTIMATED CAPITAL INVESTMENT		37093993.	22543387.	19802266.	79439646.



10-0



## ITEM COST DISTRIBUTION FACTORS IN PERCENT

JAN 1972

## CERRO VERDE PROJECT

ITEM NO.	P E R I O D N U M B E R																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	96	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	37	38	25	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	10	90	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	40	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	10	80	10	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	10	45	45	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	70	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	10	80	10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	60	40	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	20	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	25	75	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	25	65	10	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	34	33	33	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	25	75	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	21	79	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	60	40	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	40	60	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	40	60	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	40	60	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	20	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	9	36	55	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	9	36	55	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	20	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	20	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0
37	0	16	38	46	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	17	33	50	0	0	0	0	0	0	0	0	0	0	0	0	0
39	25	25	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
41	0	18	73	9	0	0	0	0	0	0	0	0	0	0	0	0	0
42	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



METALLURGICAL PRODUCTION BALANCE

<u>Year</u>	<u>Ore Description</u>	<u>Quantity Mined (6) (m Tons)</u>	<u>Ore Grade (% Cu)</u>	<u>Available Mined Cu (m Tons)</u>	<u>Available Cu in Concentrate (1) (m Tons)</u>	<u>Available Marketable Cu (m Tons)</u>	<u>Marketable Copper (lbs) (5)</u>
1	-	-					
2	-	-					
3	Oxide	682,600	1.000	6,826	-	4,513(2) (4) (6,075) (4)	9,949,360 (13,392,945) (4)
4	Oxide	3,500,000	1.072	37,520	-	33,393 (2)	73,618,208
5 to 11 (incl) (7 years)	Oxide	24,500,000	1.072	262,640	-	233,750 (2)	515,325,250
12	( Oxide	1,317,400	1.072	14,123	-	12,569 (2)	27,709,617
	( Mixed Oxide	2,182,600	0.771	16,828	-	14,977 (2)	33,018,294
13	Mixed Oxide	3,500,000	0.771	26,985	-	24,017 (2)	52,947,878
14	( Mixed Oxide	362,600	0.771	2,796	-	2,488 (2)	5,485,045
	( Mixed Sulphide	6,044,900	0.771	46,606	41,945	39,848 (3)	87,848,901
	( Sulphide	592,800	1.078	6,390	5,751	5,463 (3)	12,043,730
15	Sulphide	7,000,000	1.037	72,590	65,331	62,064 (3)	136,826,294
16 to 19 (incl) (4 years)	Sulphide	28,000,000	1.037	290,360	261,324	248,257 (3)	547,307,382
20	Sulphide	<u>3,586,453</u>	<u>1.037</u>	<u>37,192</u>	<u>33,473</u>	<u>31,799</u> (3)	<u>70,104,075</u>
Total		<u>81,269,353</u>		<u>820,856</u>	<u>407,824</u>	<u>713,773</u>	<u>1,572,184,035</u>
Sub-Total	Oxide Ore	30,000,000		321,109	N/A	284,860 (285,787) (4)	626,602,435 (630,046,020) (4)
Sub-Total	Mixed Oxide Ore	6,045,200		46,609	N/A	41,482	91,451,217
Sub-Total	Mixed Sulphide Ore	6,044,900		46,606	41,945	39,848	87,848,901
Sub-Total	Sulphide Ore	39,179,343		406,532	365,879	347,583	766,281,482

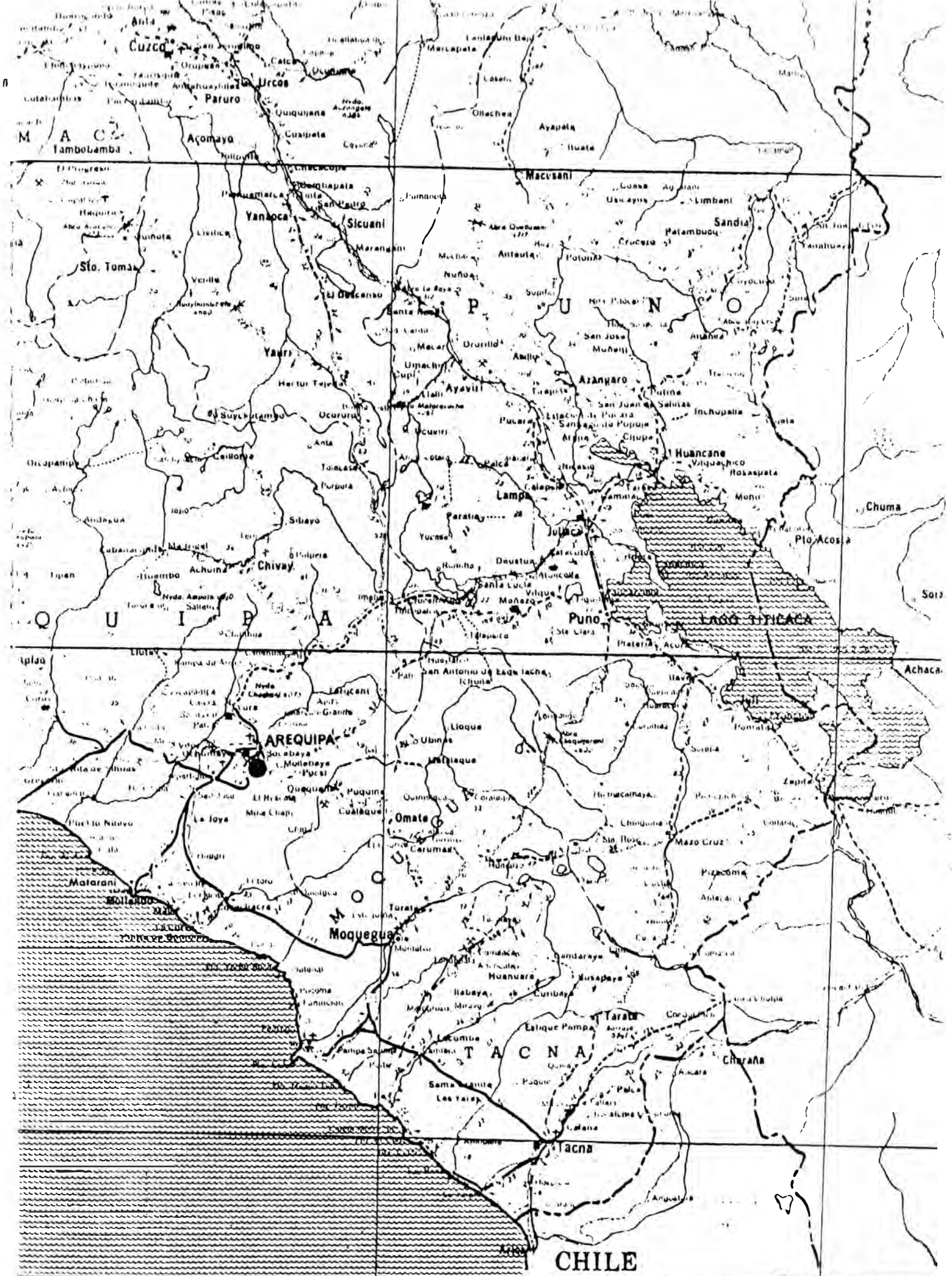
- Notes: (1) Recovery rate sulphide ore to concentrate assumed as 90%  
(2) Recovery rate oxide ore to copper assumed as 89%  
(3) Recovery rate sulphide concentrate to copper assumed as 95%  
(4) 1,562 Metric Tons required to initially fill the process circuit (Year 3 Total = 6,075 Metric Tons)  
(5) One Metric Ton equals 2,204.6 pounds  
(6) Includes dilution

SUMMARY OF OPERATING COSTS BY YEARS

Year	Comment	Mining	Water Supply	Processing		Administ. & General	Transport. & Marketing	Total	Production Costs	Minero Peru Head Office	
			and Tailings Disposal	Oxide	Sulphide Roasting						Sulphide Concentrator
1 )	Construction										
2 )											
3	(6 months only)	827,820	42,553	2,986,826		1,741,210	218,886	5,817,295	5,197,295	620,000	
4		3,678,675	85,106	5,973,652		3,482,420	1,619,601	14,839,450	14,219,454	620,000	
5	thru 9 (5 years) (per year)	13,784,925 (2,756,985)	425,530 (85,106)	29,868,260 (5,973,652)		17,412,100 (3,482,420)	8,098,003 (1,619,601)	69,588,818 (13,917,764)	66,488,818 (13,297,764)	3,100,000 (620,000)	
10		2,626,608	85,106	5,973,652		3,482,420	1,619,601	13,787,387	13,167,387	620,000	
11		2,565,985	85,106	5,973,652		3,482,420	1,619,601	13,726,764	13,106,764	620,000	
12		2,696,362	85,106	5,973,652		3,482,420	1,336,014	13,573,554	12,953,554	620,000	
13		2,756,985	85,106	5,973,652		3,482,420	1,164,853	13,463,016	12,843,016	620,000	
14	End Oxide, Start Sulphide	2,897,806	634,754	597,365	2,987,429	7,184,077	4,559,525	2,318,309	21,179,265	20,249,265	930,000
15	thru 19(5 years) (per year)	24,552,500 (4,910,500)	3,173,770 (634,754)		14,937,145 (2,987,429)	35,920,385 (7,184,077)	22,797,625 (4,559,525)	15,050,892 (3,010,178)	116,432,317 (23,286,463)	111,782,317 (22,356,446)	4,650,000 (930,000)
20	(6 months only)	1,093,868	317,377		1,493,715	3,592,039	2,279,763	1,542,290	10,319,052	9,854,052	465,000
Totals		<u>57,481,534</u>	<u>5,019,514</u>	<u>63,320,711</u>	<u>19,418,289</u>	<u>46,696,501</u>	<u>66,202,323</u>	<u>34,588,050</u>	<u>292,726,922</u>	<u>279,861,922</u>	<u>12,865,000</u>

Note that copper required to fill circuit has not been considered as part of recovered copper. (3,443,585 pounds)










MINERO PERU  
**CERRO - VERDE**  
Arequipa Peru

MINE AND OXIDE PLANT  
PERSPECTIVE FROM SOUTH EAST

 Wright Engineers Limited  
Vancouver Canada

DWG BY G.T.	CHKD L.G.
SCALE N/A	DWG NO 855 000 1203

