**SVERIGES GEOLOGISKA AB**
**Division Prospektering**
**Uppdragsgivare: NSG**
**Hardy Lindroos**
**Fredrik Ros**

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# MINERAL INVESTMENT OPPORTUNITIES IN THE PHILIPPINES

## Internationellt seminarium i London, 1992-02-18

INNEHÅLLSFÖRTECKNING Sid

## 1. Bakgrund till seminariet

Filippinerna har en lång tradition av gruvindustriell verksamhet. Under de senaste åren har landet producerat betydande kvantiteter av guld, koppar och kromit. Samtidigt har landet genomgått en politisk förändring med inriktning mot en större öppenhet för utländska bolag att deltaga i investeringar och utveckling av landets mineralresurser och gruvsektor. Detta har stimulerats bl a genom tillkomsten av en ny, liberalare gruvlagstiftning samt ett antal överenskommelser som gynnar utländsk inblandning.

I syfte att presentera Filippinerna och dess mineral- och malmpotential för utländska intressenter anordnades, med teknisk och finansiell hjälp av Förenta Nationerna (UNDP), ett seminarium i London. Medarrangör var Mining Journal Ltd från London.

Eftersom NSG/SGAB har för avsikt att under 1992 presentera statens samlade mineral- och malmprospektering i Sverige för utländsk publik i seminarieform, ansågs det viktigt att kunskap om detta införskaffades. Avsikten var att lära sig hur ett seminarium av detta slag bästa arrangeras samt vilken information som krävs och bör komma med.

Seminariet i London blev mycket lärorikt och vi har för avsikt att här beskriva faktorer som kan underlätta och förbättra ett kommande NSG seminarium. Vårt uppdrag är att tillsammans med NSGs personal dels presentera ett samlat, och vad vi tror unikt, prospekteringsmaterial från hela Sverige, och dels, visande även på vårt kunnande, locka utländska gruvbolag till Sverige för en fortsatt malm- och mineralprospektering.

## 2. Tekniska och praktiska synpunkter

Ett seminarium av detta slag skall vara välarrangerat vad gäller lokaler, service och presentation. De som talar skall vara proffs. Likaså bör broschyrer och prospekt hålla god standard. På den punkten var London-arrangemanget lyckat där konferenslokalen var det anrika Brewery, mitt i centrum och med alla faciliteter. Vid registreringen fick deltagarna ett "informationspaket" där även viss turistisk information fanns med. Sålunda bör man koppla in en bra turistbyrå/researrangör i uppläggningen ty delen: transporter/inkvartering/sevärdheter är en viktig bit i dagens affärsvärld.

I detta sammanhang kan vissa bitar vara svåra att presentera på ett enkelt och begripligt sätt t ex gruvlagar, investeringsregler o s v. I London gjorde en konsult vid namn Attorney Carag ett tappert försök att presentera vad som gäller i Filippinerna. Dock tog han med för mycket detaljer och vi fick den uppfattningen att han lyfte fram enbart positiva faktorer. Minerallagstiftningen i Sverige är som jämförelse väsentligt enklare och mer tidsenlig. Således bör denna bit presenteras ganska översiktligt med enkla dia-bilder som basfakta. Här är det på sin plats att säga något om inledningsförfarandet. Vi tycker att det -- liksom i London -- bör innehålla tre delar: en kort introduktion med bakgrunden till mötet, en presentation av talare och speciellt inbjudna samt en kort genomgång av dagordningen inklusive smärre praktiska fakta. I London inledde dr. Guy-Bray -- en ansedd mineralexpert/rådgivare från FN -- och sedan fyllde Filippinernas Londonambassadör på med artighetsfraserna. Vi tror att det är viktigt att inledningsdelen har en hög status och anser att exempelvis Sveriges näringsminister skulle vara den mest lämplige att s a s öppna och inleda NSGs planerade seminarium.

## 3. Deltagare

I Londonmötet deltog ca 70 personer -- antalet var de facto begränsat. Vi tror att ca 50 var branschfolk med ekonomisk-geologisk bakgrund, ca 10 var finansmänniskor och ca 10 var inbjudna journalister från dels branschtidskrifter (t ex Mining Journal) dels tidningar av typen Financial Times. Därtill fanns säkert fackfolk från bl a Institution of Mining and Metallurgy, en organisation som var seminariets huvudarrangör. Vi vill här peka på det nödvändiga att i tid s a s kalla på intressenter. Därför bör en annonsering -- t ex i Mining Journal -- ske minst ett halvt år före mötet. Här vill vi informera om att Mining Journals London-chef, dr. W. G. Prast, redan höll en "viss beredskap" för Sverige, väl medveten om pågående privatiseringar. Vi tror att han är den bästa kontakten vad gäller annonsering och internationell bevakning av "investment-seminars".

## 4. Broschyrer och prospekt

Förutom viss reklam fick vi tre typer av trycksaker:

- en fin färgbroschyr bekostad av FN (bifogas rapporten)
- ett 200-sidigt prospekt som kan beskrivas som en "projektkatalog" samt
- xerox-kopior av föredragen och vissa uppsatser om främst ekonomisk geologi och gruvbrytning i Filippinerna

Allt höll en mycket hög kvalitet. Vi vill här ge några synpunkter som kan hjälpa NSG i försäljningssammanhang:

* en översiktlig broschyr inkluderande även ett visst mått av "Sverige-fakta" är viktig och nödvändig. Den kan innehålla bilder som samtidigt presenteras i föredragens inledning och ekonomisk-geologiska del. Den ska vara ganska tunn men den bör definitivt visa landets geografi, malm-mineralproduktion samt aktuella gruvor och fyndigheter. Vi vet att svensk gruvproduktion idag är, räknat i den internationellt vedertagna bedömningen ton per $km^2$, på topplatser för flera metaller och detta bör absolut framhävas. Viktigaste svensk produktionsfakta finns samlat på SGU men här kan sägas att det mesta finns redan sammanställt av SGAB.
* ett prospekt visande malmprovinser, fyndigheter och framförallt nya målområden för prospektering. Det är förvisso till de nya målområdena vi vill locka utländska gruvbolag, därför skall det finnas bra kartor och korta/koncisa beskrivningar över detta. Den Filippinska broschyren fick vi endast i ett exemplar per person (ej med i denna rapport) men vi visar den gärna som en lämplig modell för en bra projektkatalog. Återigen gäller att kartor/figurer skall vara enkla och helst i form av s k färg-CAD. Vidare bör det finnas vissa sammanställningar och register så att man kan få en överblick över "vad finns var". Även s k reading list dvs ett referensregister bör ingå.
* abstract av föredragen inkluderande en kort presentation av föredragshållarna (inklusive deras adresser m m) är ett måste. Överhuvudtaget bör deltagarna få sådan information att de lätt kan få tag i dels ny och mera fullständig information, dels de rätta kontaktpersonerna. Här kan vi notera att just valet av en lämpligt mysig lokal -- där pauser kan nyttjas för konversation -- är nog så viktigt. Att hålla ett seminarium av detta slag i en kontorslokal vore ett kardinalfel.

## 5. Att stimulera till investeringar

Här skall nämnas några exempel på faktorer som kan stimulera investeringar i gruvsektorn/prospekteringen i Filippinerna, i London beskrivet av Antonio Tauchuling, landets gruvminister.

Tauchuling pekade på följande:

- en s a s stabil gruvlagstiftning (en stor sak i denna del av världen)
- ett positivt bemötande till alla utländska intressenter bl a omfattande:
- 100 % ägorätt under ett speciellt och nytt avtal (FTAA)
- all info ner till detaljnivå från samma källa/instans (ej mellanhänder)
- all info av värde i digital form

Här några kommentarer och svenska fokuseringar. De avtal som idag gäller för utländska bolag i Filippinerna är inte särskilt liberala. I stort gäller 60-40 regeln, dvs 60 % filippinsk ägodel och 40 % utländsk. Därför var Tony Robbins från Western Mining (se föredragslistan) ganska kritisk och menade att den filippinska ägoandelen var alltför hög. Trots att WMC hade satsat åtskilliga miljoner de två senaste åren i Filippinerna -- och samarbetet i övrigt var lyckat -- var man beredd att lämna landet pga denna regel.

Vi noterade även att fakta om t ex energislag i ett land (t ex ställdes frågan vad kostar en kilowattimme) är av vikt enär gruvsektorn är en storförbrukare av energi.

Vidare fann vi att man inte kunde visa upp inmutningskartor eller gruvrättskartor från Filippinerna. Troligen fanns detta inte på data. Här tror vi att den relativa ordning och reda som råder i detta sammanhang i Sverige kan komma oss till fördel. Att direkt kunna visa upp en bild över det rådande inmutningsläget inom t ex ett tilltänkt målområde är en sak med stort försäljningsvärde.

Så kan slutligen sägas att information om hos vem olika kartor kan inskaffas, vare sig geologiska eller andra, bör delges.

Ur malmgeologen K. Burtons föredrag kan noteras en dia-bild som gav allt i ett nötskal: "Exploration potential for the most important metals and minerals in terms such as: good, quite good and moderate". Det är en sådan trovärdig summering kopplad till en mera utförlig projektkatalog som torde vara basen för en lyckosam försäljning.

## 6. Sammanfattning och strategiska synpunkter

Seminariet i London har gett oss insikter i hur internationell försäljning av prospektering och gruvprojekt går till. Vi vill med denna rapport fästa NSGs uppmärksamhet på sådana faktorer som kan gynna en motsvarande svensk försäljning. Även om fallet Filippinerna är väsentligt mera omfattande och vissa delar kanske onödigt påkostade, finns lärdomar och idéer som direkt kan överföras på Sverige. Vi tror att det finns anledning för NSG att s a s höja ribban och med förstärkta resurser lägga upp en försäljningsplan som kulminerar i ett väl arrangerat investment-seminarium i slutet av detta år. Här skall direkt sägas att tidigare skisserad tidsplan med ett seminarium i mitten av september är alltför snäv.

**Våra rekommendationer till NSG kan sammanfattas enligt följande:**

* NSG och SGAB bör snarast träffas för överläggningar om hur detta uppdrag bäst och mest effektivt bör skötas med beaktande av de många tips och idéer som presenterades för oss i London

* En personell och finansiell förstärkning under andra halvåret 1992 är helt nödvändig vad gäller denna försäljningsorganisation

* Vissa åtgärder är brådskande t ex kontakt med inbjudna talare samt annonsering i fackpressen liksom högst sannolikt lokalfrågan

* Att få fram en bra projektkatalog tar sin tid. Vi tror att detta arbete (som i och för sig nu pågår) bör forceras

* När direktiven för hur försäljningen av statens gruvegendomar skall gå till enligt departementets önskan (något som givetvis skulle underlätta varje form av planering redan nu) är klara, kan det finnas anledning till en ny strategisk översyn över detta uppdrag

Vi vill slutligen erinra om vissa ekonomiska fakta, kanske redan välkända, men likväl här på sin plats (och som även skymtade fram under London-mötet):

- ett nytt gruvbolag betyder 30-300 milj kr investerade i prospektering. Den lägre siffran är efter 2 år och då vill man "dra sig ur". Den större siffran är kostnaden för att på 6-7 år hitta antingen en mindre sulfidmalm eller en mindre guldmalm -- bägge leder till gruvdrift och varaktigt engagemang samt kraftigt utökade investeringar.

- kartor av typen svensk lågflygsmätning samt multielement- geokemi torde internationellt sett ha ett betydande försäljningsvärde. I kombination med digital topografi, inmutningskartor, fyndighetskartor osv tillåter de en snabb och direkt insyn/värdering av det malmpotentiella läget. En lyckosam försäljning av statens gruvegendomar kan därför betyda en väsentlig intäkt för Sverige. Att därtill få med ett internationellt gruvbolag för mångårig prospektering i landet bör innebära en investeringsvolym som i bästa fall räknas i hundratals miljoner.

# MINERAL INVESTMENT OPPORTUNITIES IN THE PHILIPPINES

8:00 a.m. Registration and Coffee

8:30 a.m. Welcome

Introductory remarks to provide a background to the seminar and the agenda, presented by Dr. J.V. Guy-Bray, Minerals Branch, Department of Technical Co-operation for Development, United Nations, New York.

9:00 a.m. Some Investment Possibilities in the Philippine Mining Industry

The importance of mining to the national economy and a summary of recent steps being taken to stimulate overseas investor interest in this sector, presented by Director Joel Muyco, Mines and Geosciences Bureau, Manila.

9:45 a.m. Economic Geology and Metallogenesis of the Philippines

Detailed information about the structural and economic geology of the archipelago, presented by Dr. C.K. Burton, United Nations Chief Technical Adviser, minerals investment promotion project, Manila.

10:30 a.m. Coffee Break

10:45 a.m. The Philippine Mining Industry

An overview of current mining, quarrying and mineral processing activities, presented by Mr. Antonio N. Tanchuling, Consultant and Director, Benguet Corporation, Manila.

11:30 a.m. Mining Regulations and Foreign Investment Opportunities

Current and anticipated laws and regulations governing the mining industry, including the anticipated mining code, and environmental protection regulations, and relevant Executive Order and Administrative Orders, presented by Attorney Carlo A. Carag, Partner, Carag, Caballes, Jamora & Somera, Manila.

12:15 p.m. Table d'hote Luncheon

1:15 pm Doing Business in the Philippine Mining Industry

Commercial issues of relevance to the international business community, including taxation and accounting requirements, capital markets, and typical structures of corporate ventures between overseas and Philippine companies, presented by Mr Cesar V Purisima, Partner - Audit Division, Sycip, Gorres, Velayo & Co, Manila.

2:15 pm Mineral Exploration and Development Trends in the Philippines

A review of recent efforts and work in progress, presented by Dr W G Prast, Head, Research Services, The Mining Journal Ltd, London.

3:00 pm Coffee Break

3:15 pm Advantages and Disadvantages of Exploring in the Philippines

A current viewpoint, with an emphasis on the management of a successful exploration programme, presented by Mr Tony W Robbins, Exploration Manager - S E Asia/Pacific Region and Operations Manager - Mineral Exploration, Western Mining Corporation Limited, Melbourne.

4:00 pm Panel Discussion

An opportunity for the audience to raise questions for a round-table discussion between the speakers.

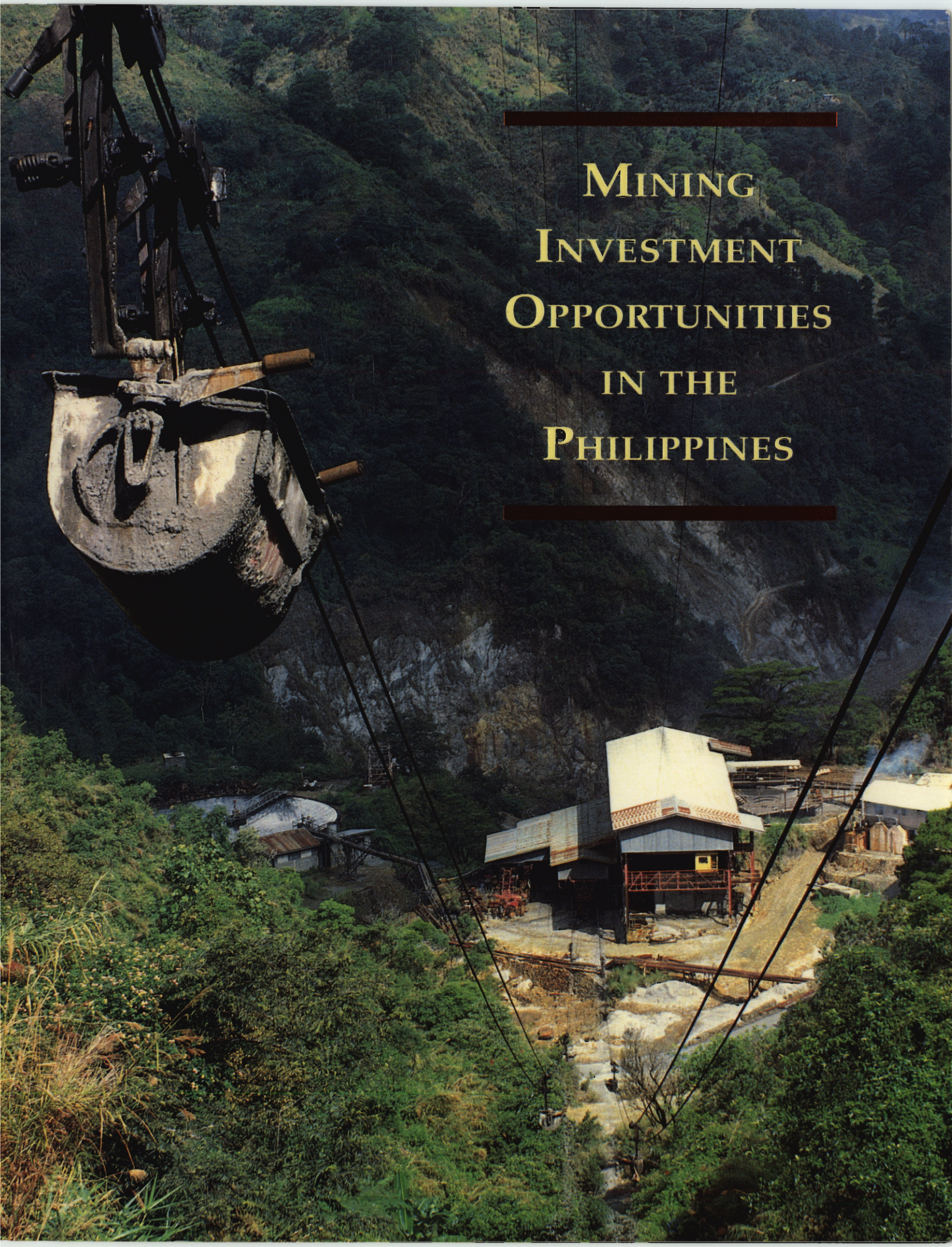
4:30 pm Closing Remarks

Summary of the seminar, presented by Dr J V Guy-Bray, Minerals Branch, United Nations Department of Technical Co-operation for Development, New York.

5:00 pm Adjournment

5:30 pm Reception for seminar delegates and speakers

7:00 pm Close



# Mining Investment Opportunities in the Philippines

# MINING INVESTMENT OPPORTUNITIES IN THE PHILIPPINES

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COVER PHOTO
Overhead tramline at Lepanto copper-gold mine, Mankayan, Benguet. One-tonne-capacity buckets transport the product of the back-filling plant (in the background) to the upper repulping section. Approximately 50% of the mill tailings are utilized for filling mined-out sections of this 3000 t.p.d. underground mine.

Office of the President
Malacañang

# MESSAGE

The Philippines is widely recognized for its abundance of mineral resources. In fact, the country places among the ten biggest world producers of gold, copper and chromite and, in the recent past, of nickel and cobalt as well.

Both local and foreign entities are thus encouraged to avail of investment opportunities being offered in the mining and mineral processing industries in order to develop further this sector.

Out of the total ₱99.9 billion investments in project cost generated in 1990, the mining sector accounted for ₱10.2 billion representing 20 projects. The sector likewise generated 10,300 jobs. This performance also indicated a marked increase over the levels in previous years: ₱207 million in 1987, ₱559 million in 1988, and ₱5.45 billion in 1989.

Under the country's new business climate, a system of mineral resources administration is replacing the old leasehold system with co-production, joint-venture and production-sharing agreements. Also presented for the first time are technical and financial assistance agreements that allow 100% foreign participation in large-scale projects. In addition, a comprehensive package of tax and fiscal incentives is being made available to mining projects as provided for in the Omnibus Investments Code and in the Proposed Mining Code of the Philippines.

Recognizing the importance of the mining industry to the economy, we remain committed to support this sector's continuing development and growth. We believe the stage is now set for a more substantial cooperative effort between mining investors and the government as a whole.

Through this introduction to the country and its mining industry, therefore, the Government of the Republic of the Philippines invites investors, especially foreign investors, to participate in the development and realization of the country's mineral wealth, to the mutual benefit of both the industry and the Philippine nation.

MABUHAY!

Corazon C. Aquino

CORAZON C. AQUINO
President

MANILA
May 24, 1991

# WHY THE PHILIPPINES?

- The Philippines is a popular democracy, with a presidential system of government.
- Among Southeast Asian countries, the Philippines' 7,100 islands have the greatest number of proven deposits of base and precious metals.
- Existing mining laws, which allow co-production, joint venture, co-production sharing agreements, as well as technical and financial assistance agreements for large-scale mining projects, are attractive to investors. The expected approval by Congress of the Mining Code of the Philippines would result in more comprehensive tax and fiscal incentives to mining projects.
- There is a large pool of Filipino professional geologists and mining engineers who have extensive experience in mineral exploration and mining operations.
- English is spoken and understood throughout the archipelago.
- The Philippines offers foreign investors a high standard of living at low cost. First-rate housing, hotels, schools, and recreation facilities are found in Manila and in major cities all over the country.
- Repatriation of the earnings and capital of foreign investors is guaranteed.

**Aerial view of United Paragon's mine site at Longos, Camarines Norte**

# THE PHILIPPINES: AN OVERVIEW



## GEOGRAPHY

A country steeped in history and confluent tradition, the Philippines consists of over 7,100 islands with a land area of over 300,000 square kilometers.

It is situated on the western rim of the Pacific Ocean, between Taiwan in the north and Indonesia in the south. To the southwest are Malaysia, Thailand, and Singapore, with Papua New Guinea, Australia, and New Zealand farther southeast.

The Philippines consists of three main island groups: Luzon, Visayas, and Mindanao. Manila, its capital, is only a short plane ride away from Asia's other business centers.

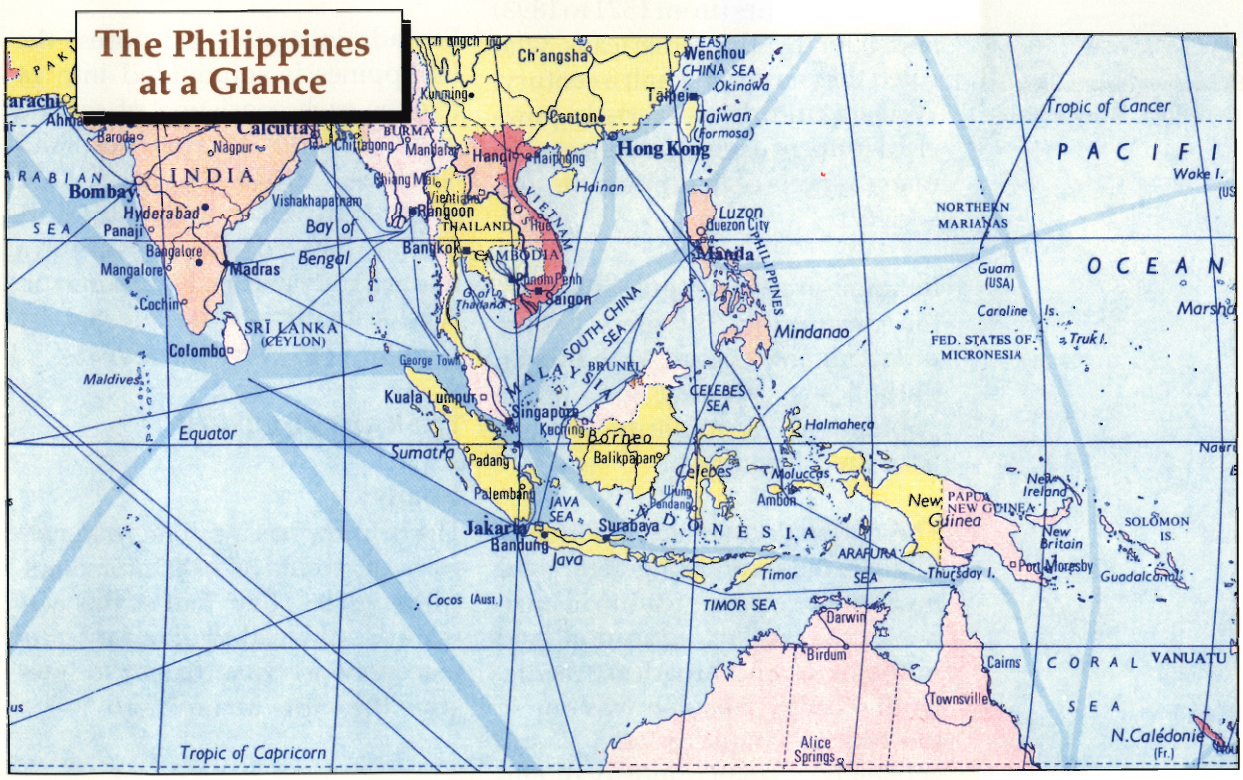
The country has a tropical climate with no extremes in temperature. Average annual rainfall in the Philippines is about 305 centimeters. Temperature ranges from 24° C to 31° C and humidity from 70% to 85%.

## DEMOGRAPHY

Over the past decade, the population of the Philippines has grown at an annual average rate of 2.3%. The 1990 population is estimated at 62 million.

The Philippines enjoys one of the highest literacy rates in Asia with 86% of its people able to read and write. Because of the importance accorded to higher education, the Philippines has one of the highest tertiary education rates in the world.

Mayon Volcano, near Legaspi City, Albay



Makati business district, Metro Manila

In 1989, its labor force was some 24.1 million, 90.8% of which were employed.

The country is rural, with over 60% of the people living in the countryside. However, with the gradual shift toward a strong industry-based economy, there has been marked migration into the urban areas.

## Culture

Philippine culture is a product of diverse ethnic and historical influences. Chinese, Islamic, and Hindu cultures were introduced by merchants and traders from neighboring countries who had been visiting the Philippines since the 3rd century A.D. Western culture was imported by the Spaniards when they colonized the Philippines for almost 400 years (from 1521 to 1898) and later by the Americans who ruled the country for half a century. Western culture has exerted a powerful influence which is reflected in many aspects of Philippine life and society.

Religious freedom is guaranteed by the constitution. Christianity is the predominant religion, with Roman Catholics constituting 85% of the population. A minority practice Islam and Buddhism.

The national language is Filipino. English, the second language, is the medium of communication in business, government, education, and in the news and broadcast media. Until recently, Spanish was one of the official languages and is still spoken by a small minority of Filipinos of Spanish ancestry.

## Government

The Philippines is a democratic and republican state. Its government consists of three independent co-equal branches — executive, legislative, and judicial. Executive power is vested in the President; legislative power in the bicameral Congress; and judicial power in the Supreme Court and in other courts established by law.

The President is elected by direct vote of the people for a single term of six years. The members of Congress are also elected by direct vote of the people — the senators for a term of six years and the representatives for three years. The members of the Supreme Court and of the lower courts are appointed by the President without congressional confirmation.

For administrative purposes, the Philippines is subdivided into 14 regions each consisting of several of the country's 73 provinces and 60 cities. Provinces are further subdivided into municipalities. A province is headed by a governor; a municipality and a city by a mayor. All local officials are elected by popular vote every three years.

## Infrastructure

### Roads

The country has a public road network of around 162,000 kilometers. Although less than half of this network is all-weather standard, the road network is sufficient to integrate the entire archipelago.

## Ports

In 1989, seaports in the country totaled 452. Eight major ports (Cagayan de Oro, Cebu, Davao, General Santos, Iloilo, Manila, Polillo, and Zambales) have been expanded and modernized to meet international standards.

## Telecommunications

Telephone and international direct dialing services are provided mainly by the Philippine Long Distance Telephone Company (PLDT), a private entity operating 94% of the country's telephone network. Its lines currently reach 28 cities and towns in the Philippines and 192 countries worldwide. The PLDT has embarked on a program involving the installation of 500,000 additional telephone lines and a digital microwave system.

Eastern Telecommunications Philippines, Inc., a new entrant to the industry, recently opened its own international digital gateway exchange.

International communication firms offer sophisticated telex, cable, facsimile, data bank access, and voice/data channel facilities.

## Power

The National Power Corporation has a total generating capacity of 6,000 megawatts. The country still relies mainly on imported crude oil (43%) to meet its energy equirements. However, consumption of crude oil is decreasing as the country develops more indigenous sources of energy such as hydropower (35%), geothermal (15%), coal, and natural gas (7%). At present, the country is the world's second largest producer of geothermal energy.

Dependence on oil imports is expected to lessen with the discovery of "world standard" oil. With this discovery, energy officials expect to produce close to 15% of the country's oil requirements. This development has caught the interest of foreign oil companies, a number of which are already holding exploratory talks with government officials and are gathering data for possible entry into local oil exploration ventures.

## Transportation

There is a well-developed network of public land transportation throughout the islands. Buses and jeepneys ply the principal roads of cities and towns. The jeepney, an ubiquitous means of transportation in the Philippines, is a distinctive Filipino invention modeled after the jeeps of World War II. Railway transportation has limited coverage but the expansion of railroad services in Luzon, the most populous island of the archipelago, is underway. The rehabilitation of the country's north and south lines, which is expected to be completed by 1992, would mean the addition of over 700 kilometers of railway tracks. The government has launched a high-priority program geared to meet the increasing demand for public-transport services.

The Philippines has 87 national airports, of which two, the Ninoy Aquino International Airport in Manila and the Mactan International Airport in Cebu, are international airports. Philippine Airlines

Concentrate trucks from Lepanto mine, Benguet, on their way to shipping point

(PAL) is the nation's flag carrier, serving 43 cities in the country and 34 cities around the world. Manila, being at the hub of Southeast Asia, is served by 28 international airlines.

There are several aircraft charter companies that rent and lease small planes and helicopters for inter-island flights for passengers and cargo.

### Other Facilities

The country has 75 international-standard hotels, 33 of which are in Metro Manila. Eight of these are of de luxe category. In Manila, there are also many condominiums and first-class subdivisions with garden bungalows.

The Philippines has an advanced financial system consisting of banking institutions and nonbank financial intermediaries. There are more than 7,000 banking offices operating in the country.

Hospitals in the country number approximately 1,800; 10% are in Metro Manila.

Recreational facilities are available in big cities like Manila, Cebu, Baguio, Davao, and Iloilo where there are country clubs with golf courses, tennis courts, swimming pools, and other recreational facilities. International-standard beach resorts are found all over the country.

Loading ore at the Dizon mine operation of Benguet Corp. in San Marcelino, Zambales

## Resources

### Agriculture

Agriculture accounts for 27% of the country's gross domestic product. Over 11 million hectares of the total land area are devoted mainly to the production of such major crops as rice, corn, coconuts, sugar cane, bananas, pineapples, and tobacco.

### Forest Lands

About 15 million hectares of the country's total land area is classified as forest or timberland. Most of the forests are of the dipterocarp variety although there are extensive reserves of tropical evergreen. Philippine mahogany is considered one of the best hardwoods in the world.

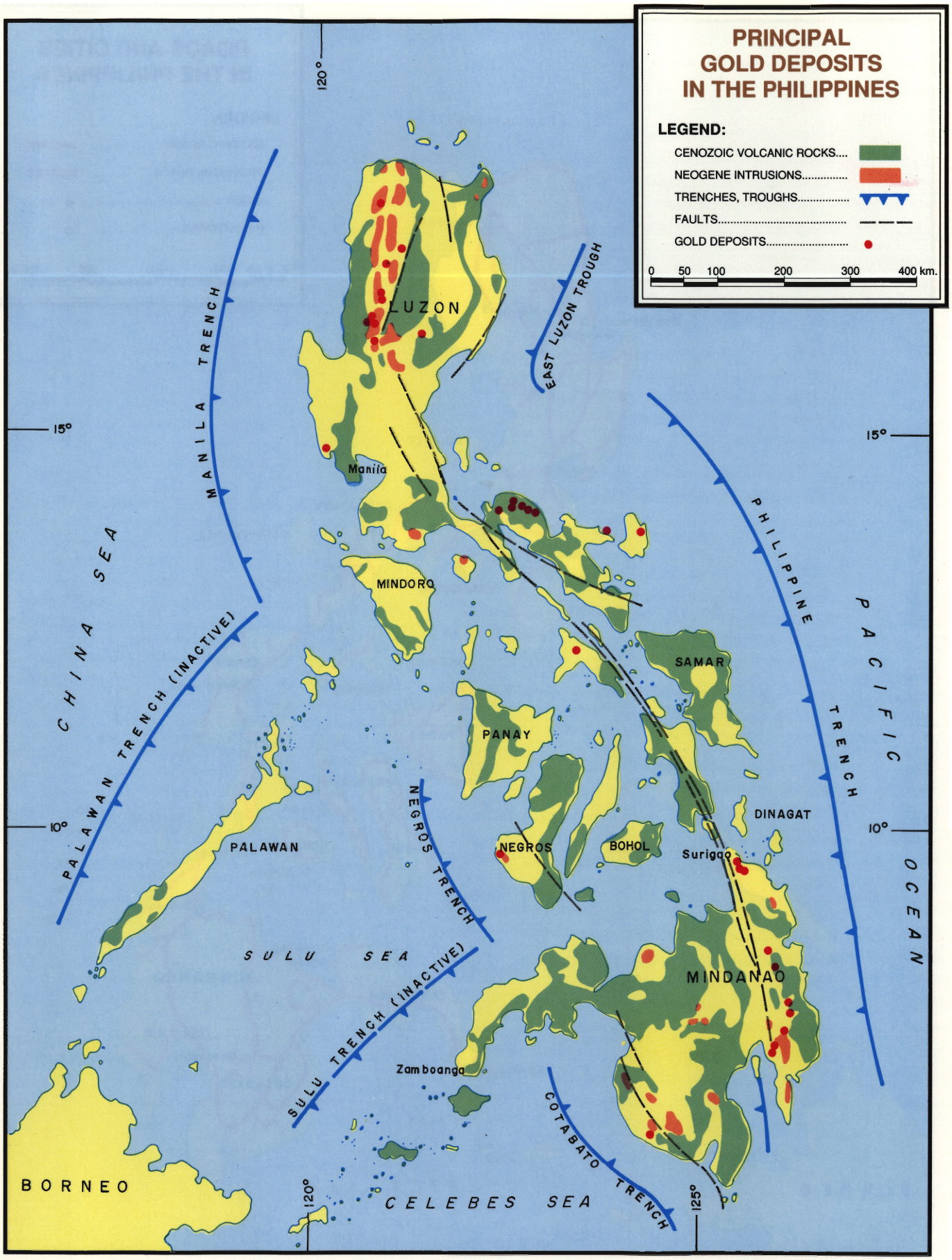
### Minerals

The Philippines has established reserves of about 13 known metallic and 29 nonmetallic minerals. As of 1989, the reserves of the four metals being most actively exploited were estimated as follows:

| | | |
|---|---|---|
| Gold | - | 109 million metric tonnes (mt) of 2.7 grams Au per mt |
| Copper | - | 4,100 million mt of 0.44% Cu |
| Chrome | - | 27.5 million mt of 33.3% $Cr_2O_3$ |
| Nickel | - | 1,600 million mt of 1.16% Ni. |

For many years now, the Philippines has ranked among the 10 biggest producers of copper, gold, and chromite in the world. Prior to the suspension of operations of the


ROADS AND CITIES
IN THE PHILIPPINES
LEGEND:
NATIONAL ROADS
PROVINCIAL ROADS
CITIES
MAJOR TOWNS
0 50 100 200 300 400 km.
120°
15°
10°
125°
BABUYAN I.
Tuguegarao
LUZON
San Fernando
Baguio
Manila
POLILLO I.
CAMARINES
CATANDUANES
Legaspi
Calapan
MARINDUQUE
MINDORO
ROMBLON
MASBATE
SAMAR
Catbalogan
PANAY
Iloilo
LEYTE
Bacolod
CEBU
Cebu
DINAGAT I.
NEGROS
BOHOL
Tagbilaran
Surigao
Puerto Princesa
PALAWAN
Butuan
Cagayan de Oro
MINDANAO
ZAMBOANGA
DAVAO
Davao
Zamboanga
COTABATO
BASILAN
JOLO
SIASI
BORNEO
CELEBES SEA
CHINA SEA
PACIFIC OCEAN


PRINCIPAL
GOLD DEPOSITS
IN THE PHILIPPINES
LEGEND:
CENOZOIC VOLCANIC ROCKS....
NEOGENE INTRUSIONS.....
TRENCHES, TROUGHS.....
FAULTS.....
GOLD DEPOSITS.....
0 50 100 200 300 400 km.
120°
15°
10°
125°
LUZON
Manila
MINDORO
PANAY
NEGROS
BOHOL
SAMAR
DINAGAT
Surigao
PALAWAN
MINDANAO
Zamboanga
BORNEO
MANILA TRENCH
EAST LUZON TROUGH
PHILIPPINE TRENCH
PALAWAN TRENCH (INACTIVE)
NEGROS TRENCH
SULU TRENCH (INACTIVE)
COTABATO TRENCH
CHINA SEA
SULU SEA
CELEBES SEA
PACIFIC OCEAN

## CONSTITUTIONAL PROVISIONS

Article XII of the Constitution ratified by the Filipino people in 1987 prescribes the State's policies on the exploration, development and utilization of mineral resources. These policies declare that:

- Filipino citizens and Filipino corporations and associations at least 60% of whose capital is owned by Filipino citizens are qualified to engage in the exploration, development and utilization of mineral resources;
- All minerals, wherever found, are owned by the State;
- The exploration, development, and utilization of mineral resources shall be under the full control and supervision of the State;
- The State may directly undertake the exploration, development and utilization of mineral resources, or it may enter into co-production, joint venture or production-sharing agreements with Filipino citizens, corporations or associations for a maximum period of 25 years renewable for not more than 25 years under terms and conditions provided by law.
- The President may enter into agreements with foreign-owned corporations involving technical or financial assistance for large-scale mining projects; and
- Congress may allow small-scale utilization of mineral resources by Filipino citizens.

## MINING LAWS

### Presidential Decree No. 463

Mining activities are governed on an interim basis by Presidential Decree (PD) 463 issued on May 17, 1974 pending the enactment by Congress of a more comprehensive mining code. The issuance by the President of Executive Order (EO) 279 (see below) on July 23, 1987, however, rendered ineffective all provisions of PD 463 (including its implementing regulations) which are inconsistent with EO 279.

### Executive Order No. 211

Executive Order 211 was issued by President Aquino on July 10, 1987 to reconcile PD 463, as amended, with Article XII of the 1987 Constitution, which requires an enabling act from Congress to become effective.

### Executive Order No. 279

Pending enactment of the Mining Code, this EO empowers the Secretary of Environment and Natural Resources to enter into joint-venture, co-production or production-sharing mining agreements provided by the 1987 Constitution.

### DENR Administrative Order No. 82, Series of 1990

Approved on November 20, 1990, this Administrative Order sets the implementing guidelines on the award of Mineral Production-Sharing Agreements. It provides that further declaration of location

under PD 463 shall no longer be accepted.

### Mining Code of the Philippines

The Mining Code is the enabling act that will implement Section 2, Article XII of the 1987 Constitution, which repeals the leasehold system, replacing it with co-production, joint venture and production-sharing agreements, and introduces technical and financial assistance agreements for large-scale mining projects.

## MINING INCENTIVES

### Mining Code of the Philippines

If approved by Congress, the Mining Code will provide comprehensive tax and fiscal incentives to mining projects. Among them are the following:

- The exemption from the 5% excise tax based on the gross value of minerals produced under the leasehold system. In lieu thereof, the contractor shall pay the government a basic share of 2% of the gross mining revenue plus an additional share of 10% of the net mining revenues;
- Additional deduction of labor training expenses and value-added tax expenses for export-oriented projects.
- The relaxation of the terms of an agreement by the Government when unfavorable conditions jeopardize the continued viability of the project;
- Guaranteed remittance of the principal and interest on foreign loans;
- Guaranteed remittance of the earnings of the foreign investment;
- Guaranteed repatriation of the entire proceeds of the liquidation of a foreign investment;
- Non-expropriation of the property represented by the foreign investment or of the project, except for reasons of national interest or defense, and only upon payment of just compensation;
- Non-requisitioning of the property represented by the investment or of the enterprise, except in the event of war or national emergency and only for the duration thereof;
- Employment of foreigners for highly technical and specialized operations;
- The right to:
  1. Carry-over of net operating loss as a deduction from taxable income;
  2. Accelerated depreciation of assets;
  3. Deduct exploration and development expenditures;
  4. The non-impairment, alteration and modification of the terms and conditions of a mining agreement during its life;
  5. Incentives under the Omnibus Investments Code of 1987.

### Omnibus Investments Code of 1987

Registered mining projects are entitled to additional tax and fiscal incentives, as follows:

- Income tax holiday for four years for non-pioneer and six years for pioneer projects;
- Tax and duty-free importation of capital equipment until August 12, 1992 (under EO 443, issued on January 3, 1991, a 9% duty on all imported articles is imposed until June 30, 1992);
- Additional deduction for labor expenses;
- Employment of foreign nationals for supervisory, technical, or advisory positions;
- Exemption from wharfage duties;
- Exemption from value-added tax for export-oriented projects; and
- Additional deduction of labor training expenses.

## Taxes on the Mining Industry

There are taxes to which a mining company may be subject under the present laws. Among them are the following:

- Corporate income tax:
  35% of net income
- Excise tax:
  5% of the market value of the minerals produced (but see Mining Incentives, p. 26)
- Value-added tax:
  10% of the selling price of the mineral products if sold locally; export sale is zero-rated
- Tax on interest income and yields from money market placements and similar arrangements: 20%
- Tax on interest paid on foreign loans: 20%
- Real property tax:
  1/4 to 1/2 of 1% of the assessed value of the property situated in the province;
  1/2 of 1% to 2% of the assessed value of the property situated in a city
- Corporate residence tax:
  ₱50 plus up to a maximum of ₱6,000 annually, depending on the assessed value of the property and gross receipts of the corporation excluding dividends received from another corporation.

Section 5 of the Local Tax Code provides that local governments may not tax mining claims, mineral products, and mining operations. This provision is re-stated in the proposed Mining Code. Autonomous regions created by special laws, however, are vested with the power to tax businesses under their jurisdiction, but under the Mining Code any tax imposed by these regions on mining companies shall come from the share of the government in production-sharing agreements.

# MECHANICS OF INVESTMENT

## Business Registration

A foreign investor may invest in mining through the purchase of shares of stock of existing mining companies or by organizing a joint venture corporation with Filipino citizens or with Philippine corporations. Alternatively, it may form a branch of a foreign company, or incorporate with a Philippine subsidiary of a foreign company.

A corporation is organized under the Corporation Code of the Philippines. It must have a minimum paid-up capitalization of ₱100,000 and must be registered with the Securities & Exchange Commission (SEC). If the corporation intends to sell its shares to the public, it must increase its paid up capitalization to at least ₱100 million and must secure from the SEC a license to sell. The sale may be done through the Manila or Makati stock exchanges.

Mining companies may also apply for registration with the Board of Investments (BOI) under the Omnibus Investments Code of 1987 to avail themselves of other incentives. The following procedures govern BOI registration:

- Submission of application for registration of the project and for availment of incentives;
- Evaluation and approval of the application by the BOI, with necessary conditions, within 20 working days;
- Acceptance and compliance by the applicant with pre-registration requirements; and
- Issuance by the BOI of the Certificate of Registration and Certificate of Authority to import capital equipment tax- and duty-free.

## Employment Conditions

Employment is regulated by the Labor Code of the Philippines through the Department of Labor. The Department has jurisdiction over the following matters:

- Hours of work
- Wages
- Working conditions
- Health and safety
- Social welfare benefits
- Employee benefits
- Employment of nonresident aliens
- Labor/management relations

Labor disputes are heard by the Department of Labor through labor arbiters, whose decisions are appealable to the National Labor Relations Commission. The Commission's decisions are final and executory, but a party may appeal to the Supreme Court on errors of law, abuse of discretion or acts in excess of jurisdiction committed by the Commission.

## Other Procedures

The investor shall deal with other government bureaus and agencies regarding the following matters:

- Immigration and employment of foreign nationals
- Foreign exchange in-flow

- Foreign borrowings and investments
- Repatriation of foreign investments
- Peso borrowings by foreign-owned firms
- Remittance of profits and dividends
- Remittance of royalties
- Foreign currency deposits
- Securities transactions
- Export of mine production
- Imports of equipment, spare parts and supplies

Aerial view of Biga pit, Atlas Consolidated Mining, Cebu

# APPENDIX

## PRODUCING COMPANIES

| Name | Products | Location |
|---|---|---|
| 1. Acoje Mining Company | Metallurgical chrome concentrates, lumpy chrome ore | Sta. Cruz, Zambales; Loreto, Surigao del Norte |
| 2. Apex Mining Co., Inc. | Gold, silver | Maco, Davao del Norte |
| 3. Atlas Consolidated Mining and Dev. Corp. | Copper, gold, silver | Toledo City, Cebu |
| 4. Atok Big-Wedge Mining Co. (operated by Benguet Corp.) | Gold, silver | Itogon, Benguet |
| 5. Banahaw Mining and Dev. Corp. | Gold, silver | Bunawan, Agusan del Sur |
| 6. Benguet Corp. | Gold, silver | Itogon, Benguet |
| 7. Benguet Corp. / Consolidated Mines | Refractory chrome concentrates | Masinloc, Zambales |
| 8. Dizon Copper Project (Benguet Corporation) | Copper, gold, silver | San Marcelino, Zambales |
| 9. Goldfields Phils. Corp. | Gold, silver | Labo, Camarines Norte |
| 10. Hinatuan Mining Corp. | Nickel | Taganaan, Surigao del Norte |
| 11. Integrated Chrome Corp. | Metallurgical chrome concentrates | Lagonoy, Camarines Sur; Claver, Surigao del Norte |
| 12. Itogon-Suyoc Mines, Inc. | Gold, silver | Mankayan, Benguet |
| 13. Krominco, Inc. | Metallurgical chrome | Loreto, Surigao del Norte |
| 14. Lepanto Consolidated Mining Co. | Copper, gold, silver | Mankayan, Benguet |
| 15. Manila Mining Corp. | Gold, silver | Placer, Surigao del Norte |
| 16. Marcopper Mining Corp. | Copper, gold, silver | Sta. Cruz, Marinduque |
| 17. Maricalum Mining Corp. (Sipalay Mine) | Copper, gold, silver | Sipalay, Negros Occidental |
| 18. Masbate Gold Operations (Atlas Cons. Mining and Dev. Corp.) | Gold, silver | Aroroy, Masbate |
| 19. Nonoc Mining and Industrial Corp. | Nickel | Nonoc Island, Surigao del Norte |
| 20. North Davao Mining Corp. | Copper, gold, silver | Maco, Davao del Norte |
| 21. Paracale Gold Operation (Benguet Corp.) | Gold, silver | Jose Panganiban, Camarines Norte |
| 22. Philex Mining Corp. | Copper, gold, silver | Tuba, Benguet |
| 23. Philippine Pyrite Corp. | Pyrite | Hinabangan, Samar |
| 24. Rio Tuba Nickel Mining Corp. | Nickel, chromite | Bataraza, Palawan |
| 25. Surigao Cons. Mining Co., Inc. | Gold, silver | Mainit, Surigao del Norte |
| 26. United Paragon Mining Corp. | Gold, silver | Paracale, Camarines Norte |

## Exploration Companies

| Name | Products | Location |
|---|---|---|
| 1. Alpha Resources Dev. Corp. | Gold, silver | Moncayo, Davao del Norte |
| 2. Camarines Minerals, Inc. | Chromite | Puerto Princesa, Palawan |
| 3. Dizon Copper-Silver Mines, Inc. | Copper, gold, silver | San Marcelino, Zambales |
| 4. Global Mining Resources, Inc. | Nickel, iron, chrome | Sta. Cruz, Zambales |
| 5. Gold Fields Asia Ltd. | Gold, silver | Labo, Camarines Norte |
| 6. Kenmare Resources PLC | Gold, silver, chromite | Mabini, Batangas; Puerto Princesa, Palawan |
| 7. Lodestar Mining Corp. | Gold, silver, chromite, nickel | Aroroy, Masbate; Consolacion, Cebu; Puerto Princesa, Palawan |
| 8. Samar Mining Co. | Gold, silver | Maco, Davao del Norte |
| 9. Vulcan Industrial and Mining Corp. | Gold, silver, silica, granite | Cordon, Isabela; Roxas, Palawan; Subic, Zambales |

## Processing Companies

| Name | Products | Location |
|---|---|---|
| 1. Alamag Processing Corp. | Chemical chrome concentrates | Llorente, Samar |
| 2. Ferro-Chemicals, Inc. | Ferro-alloys, ferro-chrome, ferro-manganese, silico-manganese | Manticao, Misamis Oriental |
| 3. Ferro Chrome Philippines, Inc. | Ferro-chrome | Phividec Industrial Authority Zone, Misamis Oriental |
| 4. Integrated Chrome Corp. | Ferro-chrome | Manticao, Misamis Oriental |
| 5. MCCI Corp. | Ferro-silicon | Assumption Heights, Iligan City, Lanao del Norte |
| 6. Metro Alloys Corp. | Ferro-chrome, ferro-silicon | Tagoloan, Misamis Oriental |
| 7. Mindanao Ferro-Alloys Corp. | Ferro-manganese | Assumption Heights, Iligan City, Lanao del Norte |
| 8. Phil. Minerals & Alloys Corp. | Silico-chrome, silico-manganese, ferro-chrome | Manticao, Misamis Oriental |
| 9. Phil. Associated Smelting and Refining Corp. | Copper cathodes | Isabel, Leyte |
| 10. Philippine Sinter Corp. | Sintered iron | Tagoloan, Misamis Oriental |

Foreign investors who are interested in investing in the Philippine mining industry may request information from:

1. Department of Environment and Natural Resources
   Address: DENR Building
   Visayas Avenue
   Diliman, Quezon City
   Metro Manila
   Fax: (632) 994-938

2. Mines and Geo-Sciences Bureau
   Address: North Avenue, Diliman
   Quezon City, Metro Manila
   Fax: (632) 951-635

3. Board of Investments
   Address: Industry and Investments Bldg.
   385 Senator Gil Puyat Avenue
   Makati, Metro Manila
   Fax: (632) 815-0702

4. Chamber of Mines of the Philippines
   Address: Room 504, Valgosons Realty Bldg.
   2151 Pasong Tamo, Makati
   Metro Manila
   Fax: (632) 817-6869

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March 1991

Nonoc nickel refinery in Surigao, the country was also among the leading nickel producers. The refinery is scheduled to resume operations by the second quarter of 1991.

There are also deposits of iron, lead, zinc, platinum, manganese, molybdenum, cobalt, aluminum, and mercury.

Nonmetallic minerals of economic significance are gypsum, salt, sand and gravel, marble, clay, limestone, feldspar, dolomite, magnesite, phosphate rock, guano, and sulfur.

## ECONOMY

### Recent Performance

The Philippine economy recorded respectable growth rates of 5% to 6% in the 1960s and 1970s. However, this positive trend ended at the start of the 1980s as a global recession as well as gross economic mismanagement took their toll.

The change in the country's leadership in 1986 opened the opportunity for the adoption of sweeping political and economic reforms, among them the restoration of democratic institutions, privatization of government-run enterprises, trade liberalization, tax and tariff restructuring, agrarian reform, and formulation of more liberal investment policies.

These reform measures quickly made a positive impact. After experiencing successive years of negative growth, in 1986 the economy grew by 2%. From 1987 up to 1989, growth rates exceeded 5%. The main contributors to the growth during the period were increased consumption, investments, and exports.

Investments have played a prominent role in the country's economic resurgence. From a level of ₱3.18 billion in 1986, registered investments soared to ₱70.75 billion in 1989 — a clear indication that the country is gaining the confidence of both foreign and local investors. The leading sources of foreign investments were the United States, Japan, Taiwan, and Hong Kong.

Total exports between 1980 and 1988 grew at an average compounded rate of 2.5%. In 1989, exports were valued at US$7.8 billion, 10% higher than the previous year's level. Nontraditional exports, led by electronics and garments, now account for four-fifths of export earnings. Philippine imports, however, still outweigh exports, mainly because of the country's heavy dependence on imported oil.

In 1990, numerous difficulties in the form of natural calamities, higher fuel prices, double-digit inflation, and a tight foreign exchange situation pulled down the country's economic performance. Nonetheless, the economy managed to post a 3.1% growth increment.

### Prospects

The slowdown of economic activity in the industrial countries, particularly in the United States (the Philippines' biggest export market) is expected to bear upon the economy, resulting in a slower growth rate in the coming year.

**PASAR's refinery complex in Isabel, Leyte**

Aside from this external factor, the country also has to cope with a number of domestic issues: a huge foreign debt, a widening budget deficit, a shortfall in foreign exchange, and inflationary threats. Nevertheless, the country's economic managers remain confident that some growth can be maintained.

On the whole, the country's fundamentals remain intact and investment opportunities abound. The Philippines still enjoys Generalized System of Preference (GSP) privileges with the U.S. This opens up tremendous advantages for exporters in industries like garments, electronics, and metals.

Other traditional advantages of the Philippines such as a highly-skilled and English-speaking work force, abundant raw materials, high profit returns, and relatively inexpensive cost of living are expected to continue to attract foreign investors.

Aerial view of Marcopper mining facilities at Tapian, Santa Cruz, Marinduque

## GEOLOGY

The Philippine islands are generally composed of Cenozoic rocks, mostly volcanic and sedimentary strata with some plutons of quartz dioritic character and of generally limited size. All of the major islands, however, include a "basement," much of which seems to be Cretaceous but which includes rocks ranging in age at least from the Permian up to the Eocene. Ophiolitic bodies (ultramafic and related rocks of the oceanic crust) of various dimensions and ages are widespread, indicating a complex structural history.

In tectonic terms, a fundamental two-fold division of the archipelago is evident. An elongate, NNW-SSE trending mobile (seismic) zone or belt in the east abuts a stable (aseismic) zone in the SW, centered in the Sulu Sea. The mobile belt is margined, both to east and west by opposed, inward-dipping subduction zones, various segments of which have been intermittently active through much of Cenozoic time.

The oldest rocks (Carboniferous to Jurassic) in the country seem to be restricted to the stable zone. Permian limestone has been proven in place in Palawan and in Carabao Island, Romblon. Fossiliferous Carboniferous argillite occurs as float in Mindoro and ancient schists underlie the Permian outcrops. Similar metamorphic rocks occur also in the Zamboanga peninsula of western Mindanao.

Much of the Philippines' metamorphic rocks occur in the same area, together with all of the country's granitic intrusions believed to be pre-Paleogene. Some ophiolitic bodies are also found and part of the area is underlain by clastic sedimentary rocks and limestone of stable shelf facies, with minor volcanic components.

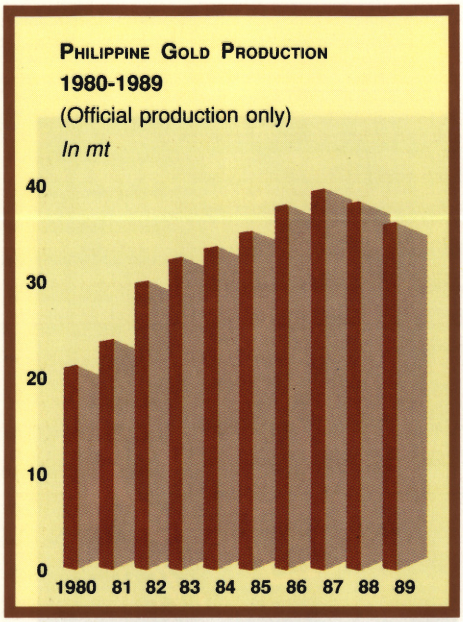
The mobile belt also includes ophiolitic sequences, some of regional extent, but is largely formed by island-arc-related volcanic, volcaniclastic and sedimentary strata of Cretaceous to Quaternary age. Within these successions are diorite, quartz diorite and andesite porphyry bodies up to batholithic dimensions, and generally thought to be of Paleogene to Miocene date. Miocene to recent volcanic edifices are found in various states of preservation.

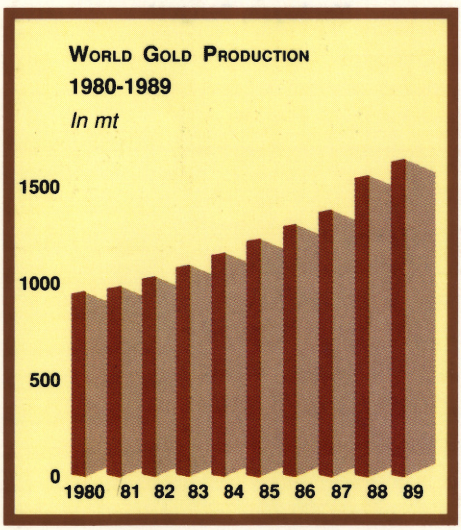
Between sub-parallel magmatic arcs lie a number of long-lived Cenozoic sedimentary basins, sometimes evidently fault-defined (grabens and half-grabens) and generally with thick sedimentary sequences (up to 12,000 meters in the Agusan-Davao trough of eastern Mindanao).

Unconformities in the succession at various levels and different localities often point to extensive tectonic activity, which seems to have reached one culmination at least in the Middle Miocene.

Subduction and related processes around the Philippines have brought into contiguity a series of crustal platelets. For this reason, the archipelago has been described as a "collage of geologic terranes" or an "arc aggregate."

Sub-level mining at Lepanto Mine, Mankayan, Benguet




Oblique collision with the archipelago of a terrane from the southeast is the probable cause of the well-known Philippine fault system which forms a prominent feature approximately co-axial with the mobile belt. The fault system includes numerous branches and, in northern Luzon, fans out into a number of splays. This feature has evidently been active from the Cretaceous.

These geological processes are still in progress as evidenced by historic and current volcanic and seismic activity related both to the subduction zones and to the fault planes.

## MINERALIZATION

### Introduction

The Philippines has long sustained a strong mining industry, attaining world-rank with respect to copper, gold, chromium (chromite), and nickel for many years. In 1989, the country was among the top 10 world producers of copper (10th), gold (8th), and chromite (6th).

These figures are even more impressive considering the Philippines' relatively small size, since those countries with larger production figures are generally of subcontinental extent (such as China, Australia, USA).

### Precious Metals

❑ Gold

Lode and placer gold are found throughout the country. In recent years most, if not all, of the country's 73 provinces have yielded some gold, whether from authorized or unauthorized operations.

Gold mining in the Philippines dates back to the 3rd century A.D., when Chinese traders referred to Luzon as the "Isle of Gold." Gold was also mined during the Spanish regime, as recorded in reports of expeditions in the 1570s, a period when extensive placer mining was carried out in various parts of the country.

The early years of the present century saw a surge in local gold production, both from primary (hard-rock) and secondary (alluvial) sources. By 1941, 41 mines were yielding 30 mt of gold per annum, a level approximating present-day production.

The industry collapsed during the Pacific War and recovered only gradually thereafter. By the 1950s gold as a by-product of copper mining began to assume importance and, lately, has accounted for around half of the country's gold production. For the past six years, official gold production has been measured at more than 30 mt per annum (with a maximum of 35.4 mt in 1986).

The principal gold-producing districts are Baguio (northern Luzon), Paracale (southern Luzon), Masbate (Visayas), Surigao (northeastern Mindanao), and Masara (southeastern Mindanao).

Experts have observed that the largest and richest gold depos-

its tend to lie in the vicinity of the Philippines' fault zone, but there are many exceptions.

Recently, gold exploration has been directed towards epithermal deposits. With the huge volumes of Cenozoic volcanic rocks in the country it is certain that sophisticated exploration techniques will yield considerable additional reserves of gold in the future.

- Silver

The Philippines produces around 50 mt of silver per annum, entirely as a by-product of gold and copper mining. Like gold, silver is widespread in the country, although the ratio of gold to silver in various deposits exhibits a wide range.

- Platinum

Platinum group metals have been detected in ophiolitic (ultramafic) rocks in Zambales, in porphyry copper in Cebu, and with gold in the Paracale gold district. Platinum has been recovered in small quantities together with alluvial gold at some localities in the ophiolite belt of Samar island and in Mindanao.

The potential of this group of metals in the Philippines is still unquantified.

## Iron and Ferro-alloys

- Iron

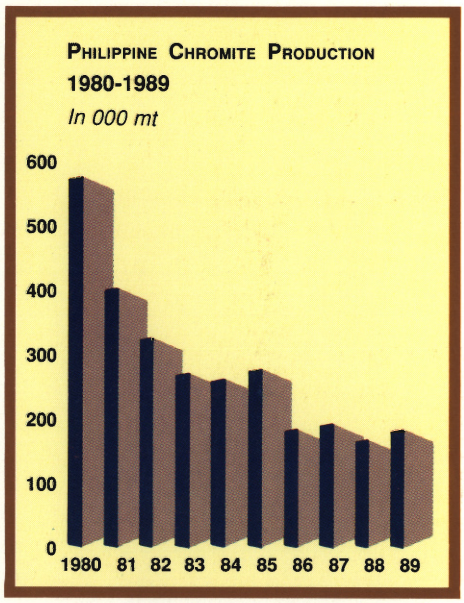
Iron mining dates back to pre-Spanish times when the art of smelting was introduced into the country by the Chinese. In the modern era, serious mining of iron ore did not start until 1934 (at Jose Panganiban, Camarines Norte). Several other mines soon followed, but all were closed during the war. Production resumed in 1948 and by 1952 output had reached 1 million mt. From 1971 to 1973 over 2.2 million mt was produced annually, the highest ever recorded. Thereafter, the industry declined rapidly and production ceased by 1977 when beach sand mining was banned for environmental reasons. Only insignificant quantities have been produced in recent years, mostly as a by-product of other operations.

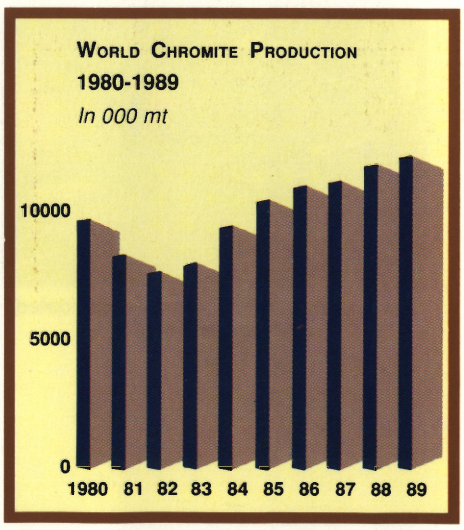
The principal types of iron deposits in the Philippines are contact-metasomatic, lateritic, and beach (magnetite) sands. Total resources are estimated to be about 4 billion mt, but grades are generally low. These reserves, however, may come to assume greater importance as a domestic steel industry develops.

- Chromite

Mining of chromite commenced in 1934 in the south of Luzon, followed in 1938 in Coto, Zambales, northern Luzon. The latter proved to be the largest known deposit of refractory chromite in the world.

Chromite was one of the ores whose production continued during the Japanese occupation.



After the war it experienced strong but rather erratic growth, reaching a peak of 850,000 mt in 1955. In latter years production has declined to around 200,000 mt annually.

Historically, the bulk (85%) of the country's chromite has been derived from the refractory ores of Zambales, which now contributes around 55% of total production. Deposits of chemical grade chromite are found in eastern Samar, and of metallurgical grade in Dinagat Island, off northeastern Mindanao.

Chromite is hosted by ophiolitic rocks which are widespread in the Philippines. Individual chromite bodies are of various sizes from small pods to several million mt. In some cases, weathering and erosion of the host rocks have produced secondary (eluvial, colluvial, or alluvial) accumulations of chromite.

Given the geology of the Philippines, the potential for further discovery of chromite is very good.

- Nickel

The vast nickel laterites of Surigao in northeastern Mindanao were first reported in 1912, although these were not exploited until 1975. The first production of nickel in the Philippines was from nickel sulphide, which was found during the course of chromite mining at Acoje, Zambales. Up to 400 mt of beneficiated nickel sulphide were produced from 1970 to 1976.

The nickel deposits at Nonoc, Surigao del Norte were mined from 1975 to 1982. The escalating cost of fuel soon posed problems because of the energy-intensive recovery process involved. During this period, production of nickel (as metal) ranged from 9,600 to 25,000 mt per annum.

Cobalt was an important by-product (up to 1,347 mt per annum). This put the Philippines among the world's 10 biggest producers of both nickel and cobalt.

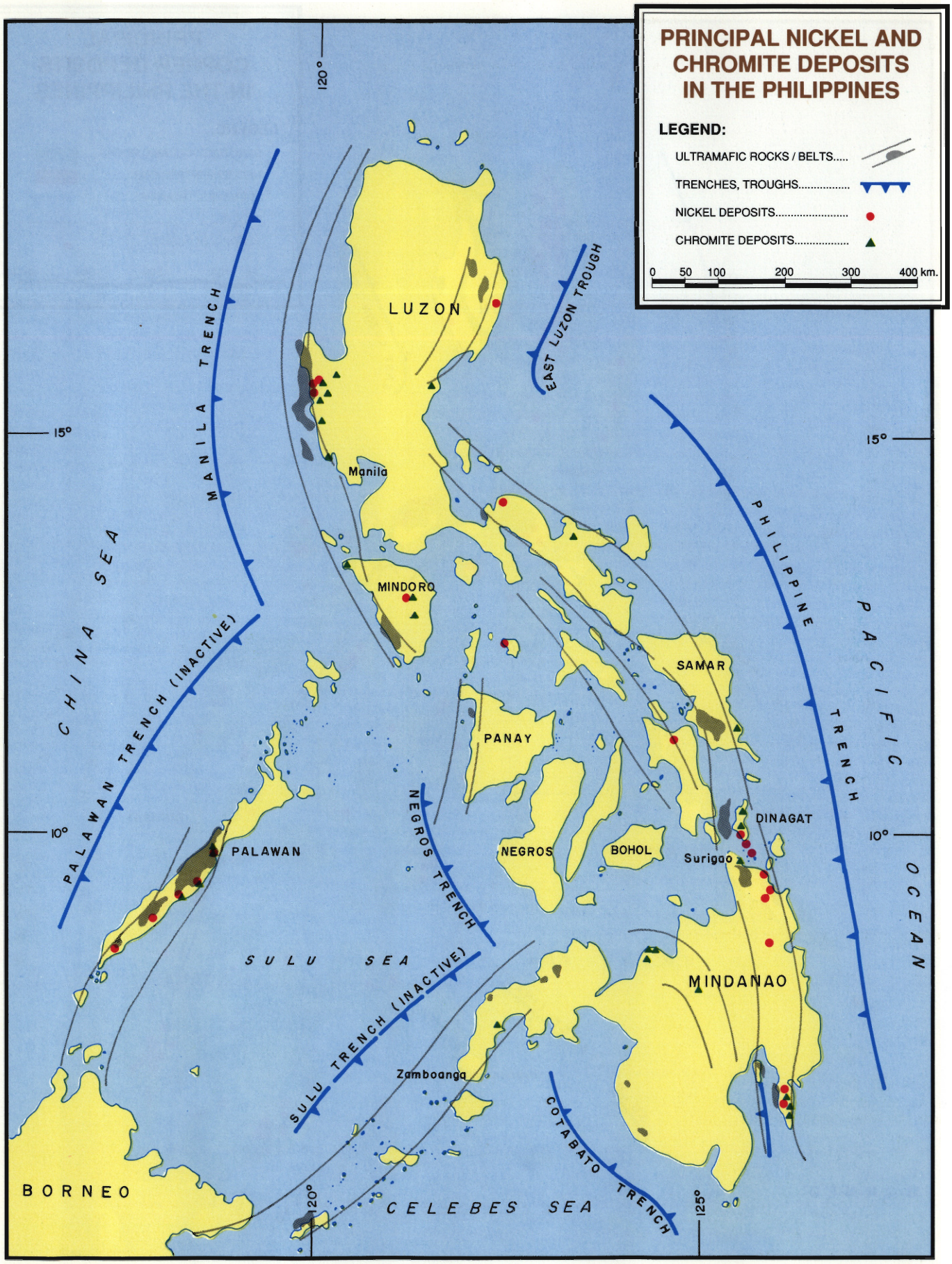
Negotiations are ongoing for the Nonoc mine and refinery to be re-opened in the near future.

Like chromite, nickel accompanies the ophiolitic rocks of the Philippines. While primary (sulphide) and epithermal (recycled) nickel deposits are known, the bulk of the country's deposits are of lateritic type, formed by concentration during the processes of tropical weathering.

- Manganese

Small deposits of manganese are widespread in the Philippines. Commercial exploitation started in 1940. Annual output has varied widely from less than 1,000 mt to 80,000 mt. Production in the past decade, however, has been at very low levels, rising to 2,240 mt in 1988 and 3,000 mt in 1989. The prin-

Fire assay room at Atlas Consolidated Mining, Masbate


PRINCIPAL NICKEL AND CHROMITE DEPOSITS IN THE PHILIPPINES
LEGEND:
ULTRAMAFIC ROCKS / BELTS.....
TRENCHES, TROUGHS.....
NICKEL DEPOSITS.....
CHROMITE DEPOSITS.....
0 50 100 200 300 400 km.
LUZON
Manila
MINDORO
PANAY
NEGROS
BOHOL
SAMAR
DINAGAT
Surigao
PALAWAN
MINDANAO
Zamboanga
BORNEO
CHINA SEA
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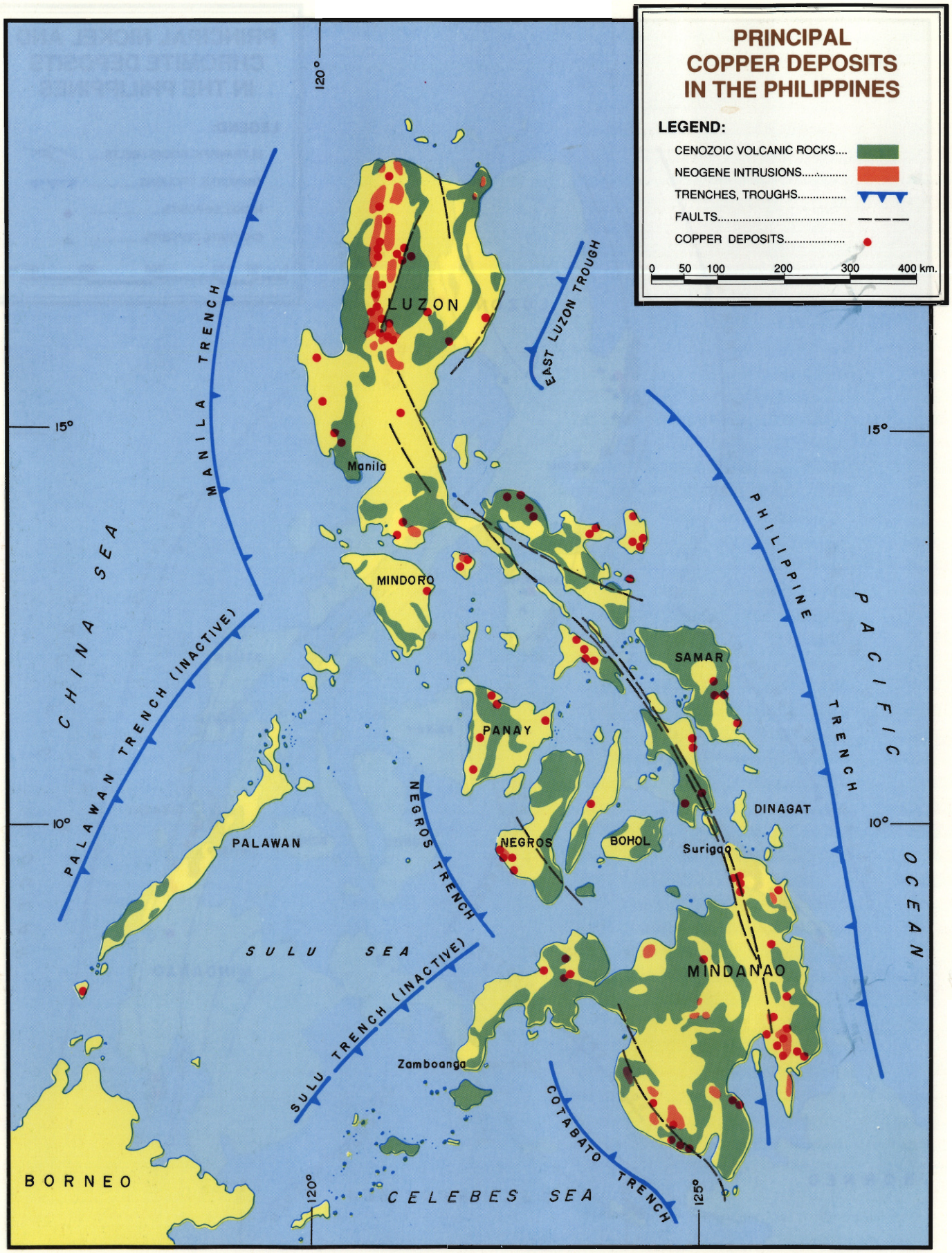
NEGROS TRENCH
SULU TRENCH (INACTIVE)
COTABATO TRENCH
PHILIPPINE TRENCH
120°
125°
15°
10°


PRINCIPAL
COPPER DEPOSITS
IN THE PHILIPPINES
LEGEND:
CENOZOIC VOLCANIC ROCKS....
NEOGENE INTRUSIONS.....
TRENCHES, TROUGHS.....
FAULTS.....
COPPER DEPOSITS.....
0 50 100 200 300 400 km.
120°
15°
10°
LUZON
Manila
MINDORO
PANAY
SAMAR
DINAGAT
Surigao
NEGROS
BOHOL
PALAWAN
MINDANAO
Zamboanga
BORNEO
CHINA SEA
SULU SEA
CELEBES SEA
PACIFIC OCEAN
MANILA TRENCH
EAST LUZON TROUGH
PHILIPPINE TRENCH
PALAWAN TRENCH (INACTIVE)
NEGROS TRENCH
SULU TRENCH (INACTIVE)
COTABATO TRENCH
125°

cipal mining areas have been southeastern Bohol (Anda Peninsula), northeast Palawan (Busuanga Island), Siquijor Island and western Samar.

Deposits are classified as primary and secondary. The former appear to be volcanogenic and marine in origin and of very limited extent. On weathering, the manganese from such deposits sometimes concentrates into extensive secondary layers (up to 25 meters thick) with grades of 40% to 50% manganese. This latter type has supported the main mining operations.

## Non-ferrous Metals

❑ Copper

Mining of copper in the Philippines also has a long history although until the second half of this century it was inferior to gold in value.

Crudely-smelted copper was traded with the Chinese in the 14th century. Late in the Spanish era copper mines were opened at Carawisan (in Panay) in 1842 and at Mankayan (northern Luzon) in 1864.

The metal began to play a major role in the country's mining industry, however, only when the potential of large-scale, disseminated (porphyry) copper deposits began to be realized. The first porphyry mine (that of Atlas in Cebu) was opened in 1955 and the following year Philippine copper production surpassed gold in value. Except for 1958, copper remained the most valuable mining product in the country until 1985.

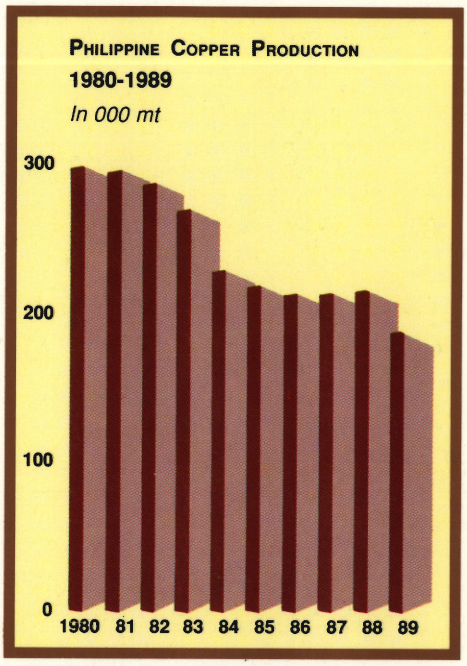
Deposits of vein, contact-metasomatic, Cyprus, Kuroko and Besshi type are also of economic significance.

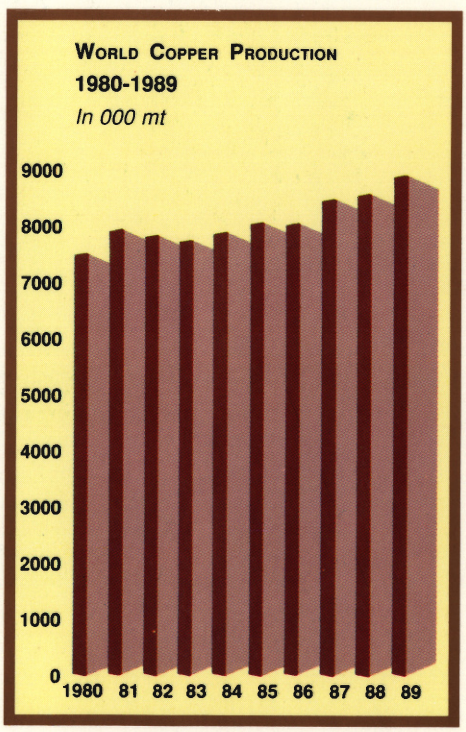
In 1974, there were 18 copper mines in operation, most of them of porphyry-type. Production peaked at 304,500 mt of copper metal in 1980, but declined markedly beginning 1982. For the past several years, annual production has averaged around 200,000 mt, constituting 35% of the country's mine production by value. As mentioned earlier, gold and silver are important by-products of copper mining.

❑ Lead and Zinc

Deposits of lead and zinc are widespread in the mobile belt, particularly in the vicinity of the Philippine fault system. These metals occur in a variety of deposit types — Besshi, Cyprus, Kuroko, contact-metasomatic and vein-type. Lead and zinc have often been recorded in association with copper and gold mineralization, particularly in gold-bearing veins, for instance, in Thanksgiving Mine Benguet and Paracale, Camarines Norte.

Most of the deposits so far discovered, however, appear to be small or remain largely unquantified because of ore-dressing problems. The largest known



deposit is that at Ayala, Zamboanga del Norte (6 million mt at 30% Zn, 2.5% Pb, and 0.3% Cu).

The potential for further discovery of these metals remains largely unknown.

- Molybdenum

Molybdenum in the Philippines is associated with porphyry and contact-metasomatic deposits. Molybdenum-rich porphyrys are found principally in southwestern Negros and Larap, Camarines Norte. In southwestern Negros, molybdenum has constituted a by-product of copper mining.

A porphyry molybdenum deposit has been found and evaluated on Polillo Island, to the east of Luzon, but appears to be sub-economic.

- Mercury

Mercury as cinnabar occurs in limited deposits in central Palawan, Albay (southern Luzon), Sibuyan Island, Romblon and Bataan (central Luzon).

Cinnabar occurs mainly as fissure veins, breccia fillings, cavity fillings, and replacements.

It was mined in Palawan from 1955 to 1975, with production peaking at 200 flasks (6.9 mt) in 1971.

Reserves are estimated at 16 mt at grades of 0.15 to 10.4 lb per mt.

- Aluminum

Extensive deposits of bauxite occur in Bocas Grande Island, northeastern Mindanao and in Samar.

The Mindanao deposits are derived by weathering from ultramafic rocks and, as a consequence, are high in iron.

In Samar, bauxite is associated with lower Miocene karstic limestone, although it again may have been derived from ultramafic rocks, or from volcanic ash. Reserves here are calculated to be 116 million mt. Silica levels are high, often over 10%.

## Non-metallic Minerals and Energy

- Coal

Coal was used late in the 19th century for cement manufacture in Cebu and, subsequently, for steam raising by several industries, but all on a small scale. It was not until the rise in the cost of energy in the 1970s that serious attention was paid to the country's coal resources. A study commissioned in 1977 indicated some 1.5 billion mt of geological reserves. Production is now under way in several areas. A total of 1.33 million mt were mined in 1989.

Philippine coal deposits are mostly found in narrow paralic belts in a tectonically active island arc environment. They range in age from Eocene to Plio-Pleistocene: 42% are lig-

nite to sub-bituminous, 55% sub-bituminous to bituminous, and 3% bituminous to semi-anthracite.

The country's major lignite reserves are in the Cagayan Valley of northern Luzon and in Surigao del Sur, eastern Mindanao. Sub-bituminous coals occur mainly in Semirara Island north of Panay. The thickness of individual seams normally ranges from a few centimeters to three or four meters, and exceptionally up to 25 meters in Semirara.

With the limited amount of oil in the Philippines, coal mining will continue to expand.

- Geothermal

Manifestations of recent and historical geothermal activity are abundant in the mobile belt of the Philippines. In 1926, a survey listed 54 hot springs. Geothermal power was first exploited in 1967 when a small turbo-generator was operated by geothermal steam at Tiwi, Albay, southern Luzon. In 1970, 17,660 hectares at Tiwi was declared the country's first geothermal reservation and a service contract was signed for development of the resources there.

For the past 20 years, the use of geothermal power has accelerated. The Philippines now ranks as the world's second largest producer of geothermal energy (some 888 megawatts in 1990, with an additional 110 megawatts scheduled for 1993, and 440 megawatts more in 1995).

- Fertilizer minerals

The Philippines has considerable, but poorly quantified and only partially-exploited, reserves of fertilizer minerals. Of principal interest are phosphate rock, magnesite, and sulfur.

Some of the widespread limestone in Cebu, Negros Oriental and Leyte has been phosphatized by metasomatic fluids. Individual deposits of phosphate rock appear to be generally thin, but may be quite extensive, such as that at Isabel, Leyte, which extends 1.5 km.

The bulk of the country's magnesite is found in Davao Oriental in southeastern Mindanao. It is formed by tropical weathering of ultramafic rocks. A few hundred to a few thousand metric tons are produced annually by primitive methods. The Bureau of Mines and Geo-Sciences in 1984 assessed reserves at 27 million mt.

The principal source of sulfur in the Philippines consists of pyrite concentrates recovered from the various copper mines. Elemental sulfur deposits around dormant and active volcanoes have considerable potential for future development. Reserves have been estimated at 31 million mt.

**Carbon-filled steel columns for gold extraction at the Nalesbitan, Camarines Norte, mine of Goldfields Philippines Corp.**

- Industrial Minerals

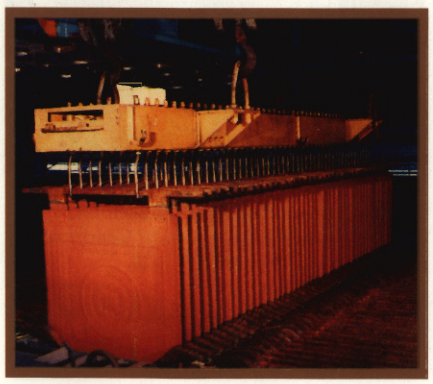
  Asbestos, barite, bentonite, clay of various kinds, diatomite, felspar, gypsum, perlite, silica, and talc are all produced in small quantities in the Philippines.

- Gemstone and Decorative Materials

  No truly precious stones have been mined in the country. True jade, for example, is of doubtful occurrence, but attractive substitutes which have been exploited are:

  "Zambales jade" - the green chrome garnet uvarovite
  "Mindoro jade" - sericite schist

  Other decorative materials are marble, quartz, rhodonite, tektite, opal, obsidian, agate, and serpentinite.



PASAR smelter's copper cathode stockpile

## INDUSTRY PROFILE

### Production

The Philippine mining industry posted a total mineral production value of ₱23.17 billion in 1989. The major contributor continued to be the metallic group, whose output value was ₱17.29 billion (around 75% of the total). Gold and copper each furnished about 34% of the total mineral production by value, and 45% of total metallic mineral production by value .

The non-metallic group, meanwhile, registered a production value of ₱5.9 billion, mainly from the mining of bentonite, limestone and silica (for cement manufacture), and sand and gravel (construction materials).

(N. B. The current rate of exchange is ₱28.00 to US $1.00.)

### Industry Structure

In terms of invested capital, the Philippine mining industry may be categorized into large-, medium-, and small-scale mining operations.

Seven big companies are engaged in mining copper, gold, nickel and chromite; 12 medium-sized companies produce gold, nickel, and chromite. Over 100 licensed individuals are engaged in small-scale mining for gold from alluvial or shallow deposits, mainly in eastern Mindanao. Other small-scale miners exploit pockets of chromite in Zambales (northern Luzon), Palawan and Mindanao.

Three medium-sized companies are engaged in marble quarrying in Romblon, Bulacan (central Luzon) and Zamboanga del Norte where some of the best quality marbles are found. In addition, there are over 40 individual permittees who quarry marble in various locations.

### Markets

The main market for the country's mineral products is Japan, which enjoys the advantage of being relatively nearby.

In 1990, Japan imported almost all of the Philippine production of chromite and nickel and 61% of its copper concentrates. The remaining concentrates went to the Philippine Associated Smelting and Refining Corporation (PASAR) smelter in Leyte, which processes the concentrates into copper cathodes.

The copper cathodes are exported by PASAR mainly to Japan with the balance shipped to Taiwan, South Korea, China, Indonesia, Singapore and Thailand.

All primary gold and by-product gold recovered locally from copper concentrates are required by law to be sold to the Central Bank of the Philippines at the London gold market price. The gold contained in the copper concentrates that are exported to Japan, however, is sold to the smelter together with the copper.

## Status

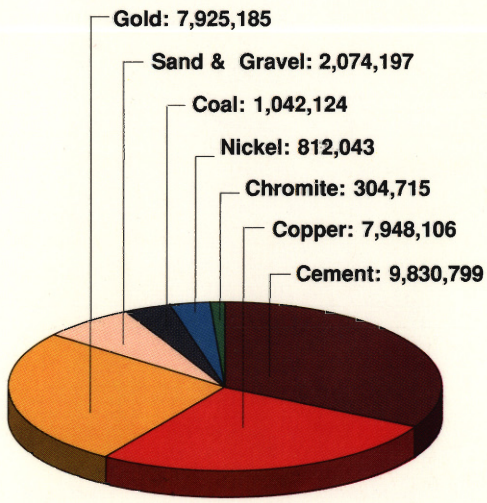
Recognizing the mining industry's importance to the economy, the Philippine government has adopted several measures to ensure its continued growth. Among these measures are the following:

- Grant of incentives to local and foreign investors in the industry
- Establishment of a copper smelter plant, PASAR, to process copper into higher-value products
- Geological and mineral exploration surveys to evaluate the mineral reserves in the unexplored regions of the country
- Assistance to producers during periods of low metal prices in the world markets
- Survey and inventory of areas with non-metallic mineral deposits to encourage their development
- Encouragement of the development of gemstone production.

## Mineral Companies

The Philippine mining industry is composed of producing, exploration and processing companies (see Appendix for the companies' names, mineral products, and locations).

VALUE OF PRINCIPAL PHILIPPINE MINERAL PRODUCTS
As of 1989
*In thousand pesos*




**VALUE OF PRINCIPAL PHILIPPINE MINERAL PRODUCTS**
**In thousand pesos**
**1980-1989**

| | Copper | Gold | Coal | Sand & Gravel | Cement | Chromite | Nickel |
|---|---|---|---|---|---|---|---|
| 1980 | 4,409,254 | 2,784,867 | 58,501 | 613,406 | 2,001,772 | 276,923 | 1,437,235 |
| 1981 | 3,781,862 | 2,642,456 | 63,834 | 691,044 | 2,107,348 | 271,446 | 1,109,343 |
| 1982 | 3,446,324 | 2,651,336 | 189,297 | 858,244 | 2,386,840 | 228,103 | 576,930 |
| 1983 | 4,046,609 | 3,907,180 | 392,544 | 1,022,343 | 2,642,589 | 253,988 | 399,980 |
| 1984 | 4,970,065 | 4,772,591 | 1,133,670 | 1,142,169 | 3,789,887 | 355,250 | 466,391 |
| 1985 | 5,629,951 | 6,087,879 | 1,509,457 | 1,070,919 | 3,273,156 | 426,918 | 1,712,605 |
| 1986 | 5,460,594 | 8,394,773 | 1,149,018 | 1,221,337 | 1,889,581 | 329,426 | 321,855 |
| 1987 | 6,141,259 | 9,352,272 | 931,030 | 1,391,984 | 2,900,562 | 275,119 | 145,230 |
| 1988 | 7,952,916 | 8,843,912 | 1,028,479 | 1,206,861 | 3,279,315 | 298,502 | 293,857 |
| 1989 | 7,948,106 | 7,925,185 | 1,042,124 | 2,074,197 | 9,830,799 | 304,715 | 812,043 |

Source: Mineral News Service - Mines & Geo-Sciences Bureau

The following foreign companies have recently made investments in the mining sector:

- CRA Ltd.
- Galactic Resources Ltd.
- C. Itoh & Co.
- Kawasaki Steel Co., Inc.
- Marubeni Corp.
- Paragon Resources, N.L.
- Placer Development Ltd.
- Renison Goldfields Cons., Ltd.
- Sumitomo Corp.

## Institutional Support

Various agencies of the government and the private sector provide assistance to the mining industry.

Government

- Department of Environment and Natural Resources (DENR) — lays down mineral resources development programs, promulgates rules and regulations implementing the laws on mining and approves contracts for mining rights.

  1. Mines and Geo-Sciences Bureau — recommends policies, regulations, programs on mineral resources development and processes and recommends action on applications for mining rights.
  2. Environmental Management Bureau — formulates and implements policies and programs for environmental management and pollution control approved by the DENR .
  3. National Mapping and Resource Information Authority — supplies the requirements of the DENR for maps, charts, and photogrammetry and other cartographic materials.
  4. Natural Resources Development Corporation — handles corporate activities of the DENR with regard to production, marketing ventures and financing of natural resource development projects.
  5. DENR Regional/Field Offices — enforce the laws on mining in their jurisdiction and implement the policies, plans, programs, projects, rules and regulations issued by the DENR Secretary.

- Securities and Exchange Commission — registers all corporations and partnerships organized in the Philippines, including foreign corporations authorized to engage in business in the Philippines, and licenses sale of securities to the public.
- Department of Trade and Industry — issues export clearance for shipments of copper concentrates and con-

siders petitions of the mining industry for government assistance or relief.

- Board of Investments (BOI) — implements the Omnibus Investments Code and operates a one-stop action center for investors.
- Central Bank of the Philippines — registers inward remittance of foreign funds; regulates repatriation of foreign investments and remittances of profits and dividends; approves the importation of equipment and supplies of all firms through authorized agent banks.
- Commission on Immigration and Deportation — processes and grants visas for foreigners working in the Philippines.
- Department of Finance

1. Bureau of Customs — administers the Tariff and Customs Code of the Philippines on the importation of equipment, supplies and spare parts.

2. Bureau of Internal Revenue — implements the provisions of the National Internal Revenue Code pertaining to the payment of taxes.

- Department of Labor and Employment — enforces labor laws and regulations and performs conciliation and mediation services in labor disputes.
- Asset Privatization Trust — conducts public auction of government assets earmarked for privatization.
- Provincial and municipal governments — issue various permits to operate within their jurisdiction.

Private

- Chamber of Mines of the Philippines — represents the mining industry. The Chamber has information on the activities of its members including their production and can be consulted on legal requirements for organizing mining companies and investment in existing mining projects.
- Engineering consulting firms — provide services from planning to actual construction of mining plants and installations.
- Professional services firms — can assist in the organization of corporations, render audit services, and give advice on management, legal, tax, and other corporate matters.
- Manila and Makati Stock Exchanges — where the shares of mining companies are traded. The member-brokers may underwrite shares of mining companies.
- Academic institutions such as the University of the Philippines, Adamson University, and the Mapua Institute of Technology — have graduate

**Infill drilling at the Nalesbitan operation of Goldfields Philippines Corp. in Camarines Norte**

and post-graduate schools for geology, mining, and metallurgy.

- Banks — aside from handling banking matters such as deposits, withdrawals, and commercial loans, provide assistance on financial matters such as registration of foreign investments, loan syndication, flotation of securities, and foreign exchange regulations.

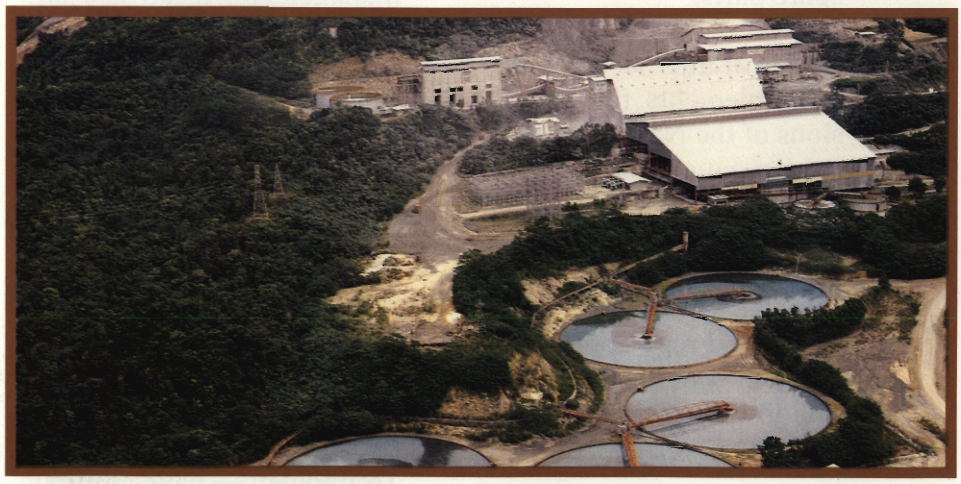
## OUTLOOK

The Philippine Government and the Philippine mining industry are both encouraging foreign investors to participate in developing the country's vast mineral potential. The Government, through the Department of Environment & Natural Resources, the Mines & Geo-Sciences Bureau, the Department of Trade and Industry and the Board of Investments, is doing its part to create a business climate favorable to foreign investments.

International financing institutions and aid agencies are active in the Philippines. The World Bank, the International Finance Corporation, the Asian Development Bank, the United Nations Development Programme, the Australian International Development Assistance Bureau, the Canadian International Development Agency, Metal Mining Agency of Japan and the Japan International Cooperation Agency have extended financing, grants-in-aid and technical support to numerous mining projects of the government and private sectors.

The private sector, through the Chamber of Mines of the Philippines, assists the government in promoting foreign investments in the mining industry. The results have been encouraging. In 1989, foreign equity investments in mining amounted to ₱3.14 billion.

In 1990, equity investments amounted to ₱3.8 billion. These investments have come from foreign mining companies of Austria, Japan, China, Hong Kong, Canada, U.S.A., France, Germany, Australia, the Netherlands and Great Britain.



**Aerial view of Carmen concentrator and mill, Atlas Consolidated Mining, Cebu**