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\* Pilgrim (Al Smith) Galli Exploration Associates/Coeur d'Alene Mines  
 (Ex: Tylor/Metoil)  
 Dave Cockrum (Geol) Production: 280,532 T @ 0.17 opt Au & 0.258 Ag (Recovered)  
 Reserves: 100,000 T @ 0.5 opt (Prod. 0.1-0.15) JDS-GCNL  
 Tails: ±300,000 - 0.01-0.015 Recovery + Surf assay  
 Galli Expl.

±\* Moss Mine [ 200,000 T @ 0.11 opt Au 0.6 Ag to 300' level: vn to 60' wide  
 + 1940 Fm streams - Ar  
 19,000 T @ 0.294 - 1.35 Ag UG. - 300' level: Potential 400,000 T @ .1 Au  
 90,000 T @ 0.13 (op) Bill Faults: Data from Fischer Watt/WLK notes

Oatman - Gold Road

United Western ±200,000 T @ 0.2 Fischer-Watt  
 Tom Reed Tails 1.5 m.t. @ 0.025  
 \*\*\* → Gold Road 395,000 T @ 0.245 opt Au Diluted to 5' + 15% = Mineable SAA  
 (or) 556,000 T @ 0.24 Au 0.28 Ag 1942 - Sharon Steel  
 \*\*\* → Gold Rd-Red Top 560,000 @ 0.21 opt Au inferred.  
 Vivian Area ±100,000 T @ .2-.3 Au ?? UG. Sun River Gold (Gamin -1XL)  
 Pete Drobeck (Ex-FW)  
 White Chief X0,000 T @ .3 + ?? UG Minor operation/Cn Mill

Also .0x opt Au @ X00,000 T @ Kibble Camp SE of Mocking Bird (op)

±\* Secret Pass/ Tincup (Santa Fe/Pacific Mining) Fred Jenkins, Mgr.  
 ±100,000 T @ 0.15 opt Au Martin Steinpress, Geol.  
 +  
 ±800,000 T @ 0.05 - Rumour: to be confirmed 3/9/87

-----  
Mohave Co. - Trip Report - Feb. 4-17  
 Reconnaissance

Feb.

- 4: Drive to Kingman (Buy maps BLM in Phoenix)
- 5: Mohave Co. Museum; Oatman, Topock, Bullhead City, Union Pass
- 6: Lost Basin; Gold Basin: Excelsior Mine & vicinity, Santa Fe RDH 1/87
- 7: Gold Basin: Cyplocic - Fry Mines & vicinity; White Hills
- 8: Pope Mine Area; VanDeeman Mine area (Fischer-Watt)
- 9: VanDeeman area & west; Gold Bug-Mohave veins (Ivy Minerals)
- 10: Rain: Courthouse, Library; Mockingbird (Chevron +)
- 11: Pilgrim (Al Smith) Mine Area; Dave Cockrum, Galli Explor. (Royal Apex)
- 12: Klondyke-Golden Door Area: Gary Allen (Combined Metals Red. Co.);  
 Cottonwood Landing, BLM-Kingman (Bob Harrison, Geol.)
- 13: Fischer-Watt (Durning + Hillemeier); North Portland Area
- 14: Truck repair, Roadside, Union Pass, Katherine area
- 15: New Tire; Secret Pass Area; Tincup (Santa Fe Minerals)
- 16: Union Pass to Oatman: Arabian, Thumb Butte, Moss Back, Moss Mine (Crown Resource)
- 17: Fischer-Watt; Drive to Tucson

FRK:mek

F.R. Koutz

cc: F.T. Graybeal

→ WLR Gold Cost/Prod/Good

Copy Fee FTG ✓  
PGV ✓  
DMS ✓

sent 12/4/86  
mko

# Ortiz Gold Mine Holds Down Costs







# ASARCO

*WLC file Gold General  
Cost/Tws/Grade*

RECEIVED

DEC 23 1986

EXPLORATION DEPARTMENT

Northwestern Exploration Division

John C. Balla  
Manager

December 19, 1986

Mr. W.L. Kurtz, Manager  
Western U.S.A.  
ASARCO Incorporated  
P.O. Box 5747  
Tucson, AZ 85703

Pegasus Gold Incorporated

Dear Mr. Kurtz:

In conjunction with the Northwest Mining Association convention, the local business newspaper published a special report on mining, which contained a number of articles on various mining activities.

Last week when I was in Tucson we talked about Pegasus' financing activities, and as luck would have it, one of the articles in the special report was on just that subject. A copy is enclosed for your interest. Of special interest is a local article on Milton Zink's (Pegasus' Senior Vice President, Secretary and General Counsel) current problems.

Also enclosed is an article on Coeur d' Alene Mines and Hecla, which will be of interest.

Very truly yours,

*John C. Balla*

John C. Balla

JCB/dt  
Enclosures

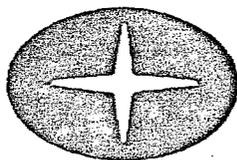
cc: R.L. Brown with enclosures

Journal of Business  
Spokane, Washington  
December 4, 1986

# SPECIAL REPORT



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Journal of Business  
Spokane, Washington  
December 4, 1986

**43,000 FINE TROY OUNCES**

**GOLD DENOMINATED  
WORKING CAPITAL FACILITY**

to



**PEGASUS GOLD CORPORATION**

provided by

**Citibank, N.A.**

**PEGASUS GOLD**

**"FASTEST GROWING GOLD COMPANY  
IN THE UNITED STATES"**

For further information contact:  
A. Douglas Belanger  
Vice President-Corporate Affairs  
Suite 400, North 9 Post Street  
Spokane, Washington 99201  
(509) 624-4653

Prospectus dated September 16, 1986

Swiss Franc Public Issue

Journal of Business  
Spokane, Washington  
December 4, 1986



# PEGASUS GOLD CORPORATION

Spokane, Washington  
guaranteed by

## PEGASUS GOLD INC.

Vancouver, British Columbia, Canada

**5¾% Guaranteed Convertible Bonds**  
**Due October 10, 1996, of SFr. 60,000,000**

Convertible into shares of Pegasus Gold Inc.  
Exchangeable for a payment related to the price of gold.

**BANQUE GUTZWILLER, KURZ, BUNGENER S.A.**

**BANK HEUSSER & CIE AG**  
**BANQUE NATIONALE DE PARIS (SUISSE) S.A.**  
**NIPPON KANGYO KAKUMARU (SUISSE) S.A.**

**BANQUE KLEINWORT BENSON SA**  
**COMPAGNIE DE BANQUE ET D'INVESTISSEMENTS, CBI**  
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**ARMAND VON ERNST & CIE AG**  
**CHEMICAL N.Y. Capital Market Corporation**  
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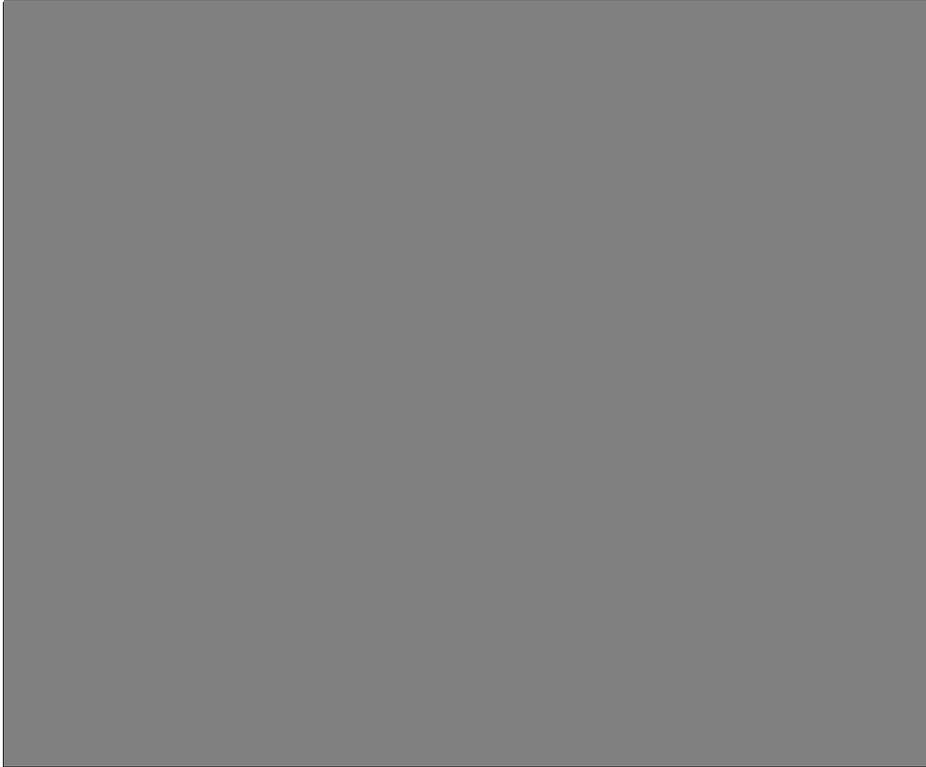
**BANCA DEL SEMPIONE**  
**CITICORP INVESTMENT BANK (SWITZERLAND)**  
**LTCB (SCHWEIZ) AG**  
**RUEGG BANK AG**  
**THE INDUSTRIAL BANK OF JAPAN (SWITZERLAND) LTD.**

Spokane Chronicle  
December 18, 1986

Pegasus Gold Incorporated

Journal of Business  
Spokane, Washington  
December 4, 1986

Coeur d' Alene Mines  
Corporation





tion," with two active areas, one in

Journal of Business  
Spokane, Washington  
December 4, 1986

December 4, 1986

*Journal of Business*

# SPECIAL REPORT

REGIONAL FINANCIAL



el









1710-609 GRANVILLE ST.  
P.O. Box 10363 STOCK EXCHANGE TOWER  
VANCOUVER, B.C.  
V7Y 1G5  
**683-7265**  
(AREA CODE 604)

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APR 2 1986

EXPLORATION DEPARTMENT

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Gdd newspaper  
Fins/Grade*

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SUBSCRIPTION RATE  
\$300.00 PER YEAR

# *George Cross News Letter*

*"Reliable Reporting"*

NO.63(1986)  
APRIL 2, 1986

NO.63(1986)  
APRIL 2, 1986

File Odd Tans/Grede

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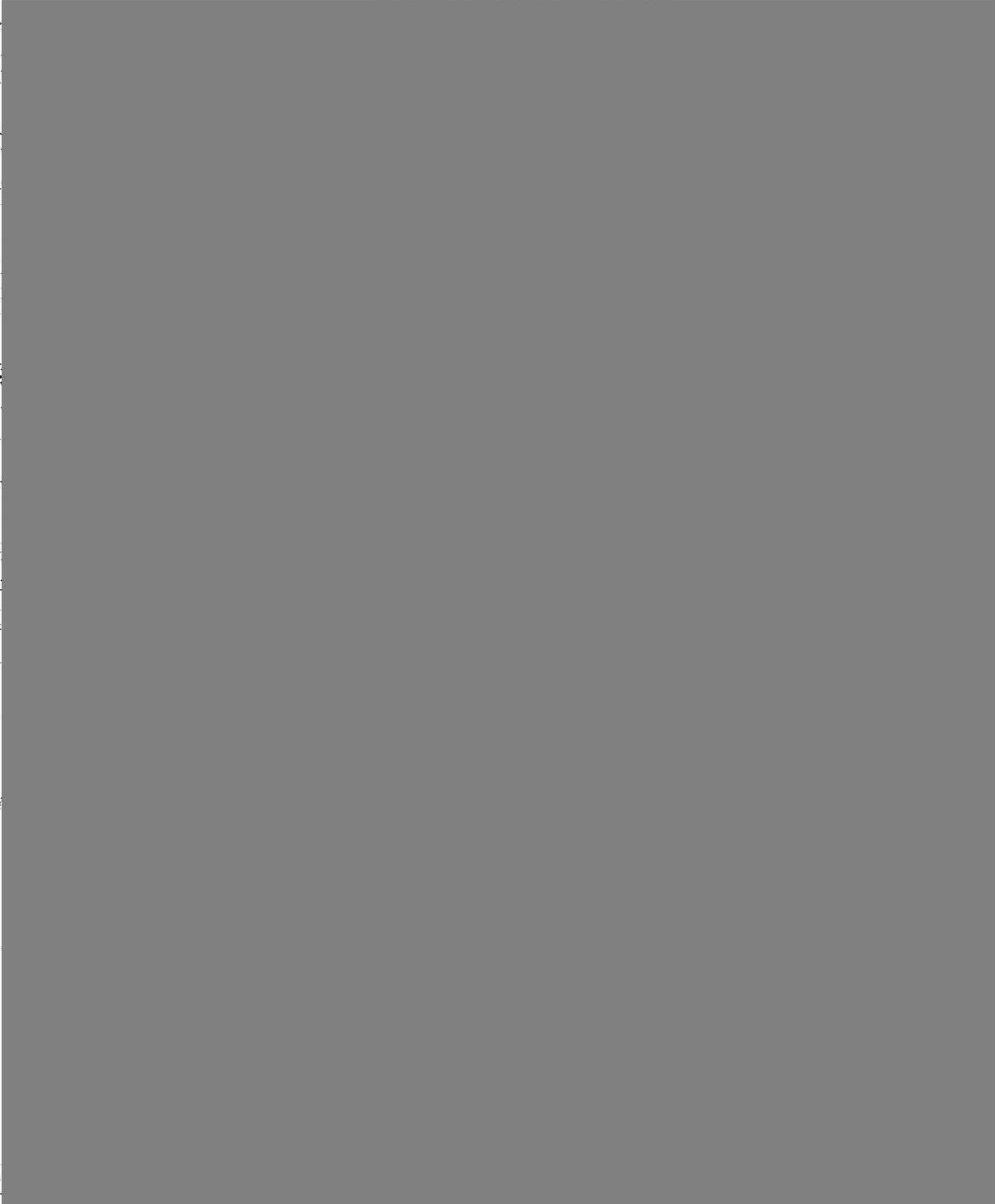
1710-609 GRANVILLE ST.  
P.O. Box 10363 STOCK EXCHANGE TOWER  
VANCOUVER, B.C.  
V7Y 1G5  
**683-7265**  
(AREA CODE 604)

*George Cross News Letter*  
*"Reliable Reporting"*

NO.55(1986)  
MARCH 19, 1986

NO.55(1986)  
MARCH 19, 1986

WESTERN CANADIAN INVESTMENTS



## Florida Canyon

The results of a very successful 1985 drilling program changed the status of the Florida Canyon Project from exploration to development in mid-year. Drilling 21,034 feet, reverse circulation and diamond core increased the reserves from 11.8 million tons ore to 17.8 mineable tons ore grading 0.025 ounces per ton gold. The new pit design also decreased the stripping ratio to 1.09 to 1. All additional reserves were developed in the West Trend area and is still open to the south. Preliminary evaluations indicate that future drilling may increase the present 6 year mine life to 8 years, but additional drilling is required to establish increased ore reserves.

Morrison-Knudsen Engineers of Boise, Idaho was retained to develop a feasibility study for Florida Canyon. With a capital cost of 14.0 million, and mining 3 million tons of ore, the study concluded 53,000 ounces gold per year will be produced at a direct production cost of \$221 per ounce.

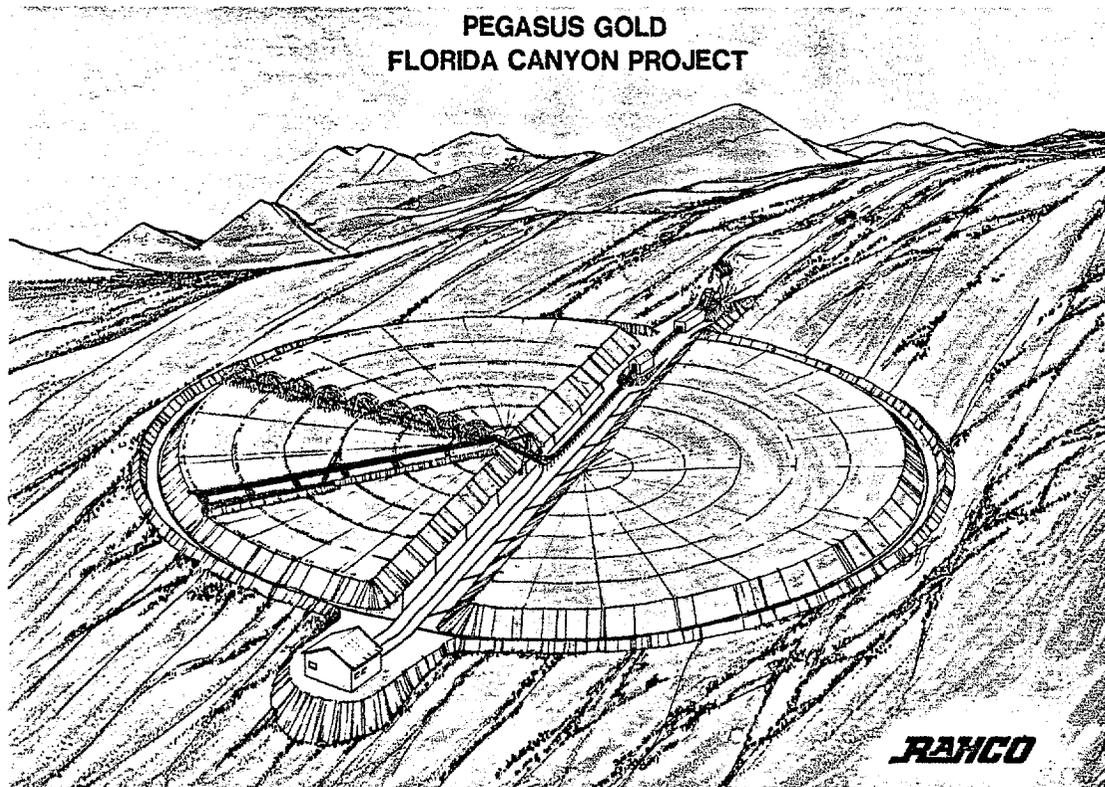
The Board of Directors gave the Florida Canyon Project preliminary approval in December 1985, subject to the completion of a corporate finance package. With construction starting in the spring of 1986, gold production is expected to commence in September 1986.

Detail engineering and construction management will be done by Morrison Knudsen Engineers. Flexibility has been designed into the project to easily increase production, to take advantage of favorable changes in the price of gold. Operating costs have been minimized by designing an innovative conveyor system to load the pad with crushed and agglomerated ore to an ultimate height of 60 feet. Similar conveyor systems have been used successfully by other industries, however, Florida Canyon will be the first gold heap leach mine to utilize it.

The mined ore will be delivered directly to the crushing plant or to the run of mine stock pile. The ore will be crushed, agglomerated with cement and loaded on the leach pad by means of a mobile stacking conveyor. The heap will be leached by percolating an alkaline solution of dilute sodium cyanide through the heap to dissolve the gold. The gold in solution will be recovered by the Merrill-Crowe process (zinc precipitation), similar to the process employed at the Zortman/Landusky Mine.

Robert Turner, previously resident mine manager at Zortman/Landusky has moved to Winnemucca where he will be responsible for the development of Florida Canyon as General Manager.

PEGASUS GOLD  
FLORIDA CANYON PROJECT



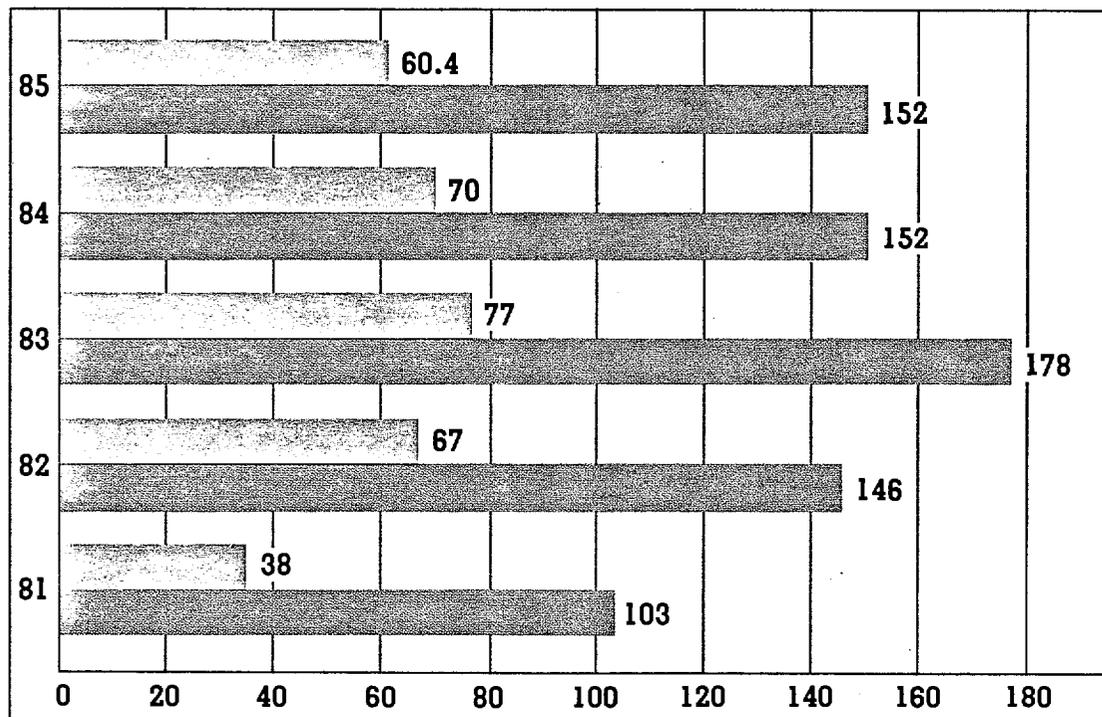
Artists rendering of new pad for Florida Canyon using innovative material handling system built by R.A. Hanson of Spokane, WA.

## Ore Reserves & Mineral Inventory (Gold Equivalent)

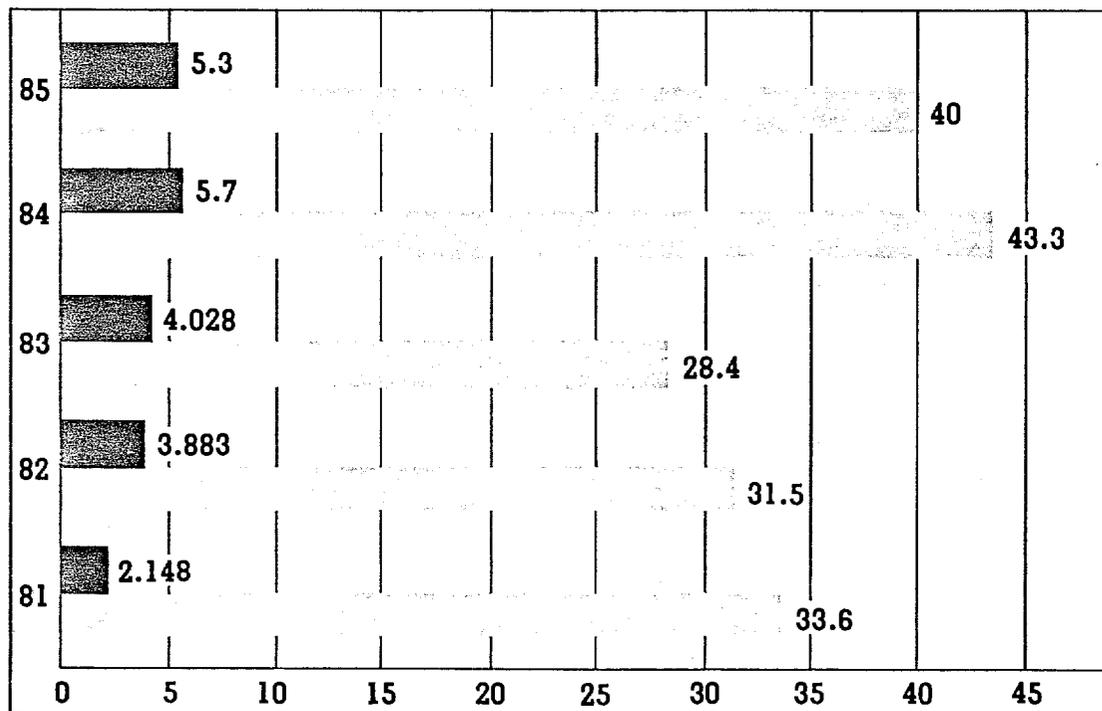
	Tons	Grade	Contained Gold
Zortman/Landusky	40,000,000	0.021	982,300
Florida Canyon	17,800,000	0.025	445,000
Montana Tunnels	41,200,000	0.043	2,184,000
Beal	11,800,000	0.049	590,000
<b>Total</b>	<u>110,800,000</u>		<u>4,201,300</u>

*- conventional milling probably necessary*

## Mining and Production Statistics (Zortman/Landusky)



Ounces  
(In Thousands)  
 Gold  
 Silver



Ore Tonnage  
(In Millions)  
 Mined  
 Reserves





**WORLD  
MINE PRODUCTION OF  
GOLD  
1983 - 1987**

**THE GOLD INSTITUTE/L'INSTITUT DE L'OR  
1001 Connecticut Ave., N.W., Washington, D.C. 20036 U.S.A.**

## WORLD MINE PRODUCTION OF GOLD

1983 - 1987

With the excellent cooperation of mining and related enterprises throughout the world, The Gold Institute/l'Institut de l'Or has prepared this report on the World Mine Production of Gold. Mine production is defined as the gold produced from underground, surface, and alluvial sources.

Totals in thousands of troy ounces are given for each of the 57 countries known to produce at least one thousand troy ounces of gold annually from these sources.

The countries are arranged in the order of size of their projected production in 1985. For each country, actual production in 1983 is given, as well as estimated or projected production for each of the years 1984, 1985, 1986 and 1987.

The equivalents in metric tons, as well as the percentages of change from the previous years are shown for the world totals.

An additional summary of the 57 known gold producing countries of the world divides their production figures into four parts: those of the largest producing country, the second largest producing country, the total of the four next largest producing countries, and the total of all the 51 other producing countries.

Following the presentation of the gold production figures are the names of the mining and related enterprises which cooperated by providing information for this study, listed alphabetically by country.

The figures in this report are based on the latest gold mining estimates available to us in January 1985, and reflect revisions of estimates and projections in our previous publication of January 1984.

\*\*\*\*\*

February 1985

MINE PRODUCTION OF GOLD  
 IN THOUSANDS OF TROY OUNCES

C O U N T R Y	---ACTUAL---		----- PROJECTED -----		
	1983	1984	1985	1986	1987
South Africa	21,846	21,880	21,863	22,023	22,184
Soviet Union	9,100	9,200	9,400	9,600	9,700
Canada	2,363	2,615	2,862	3,117	3,323
United States	1,957	2,129	2,567	2,987	2,973
Brazil	1,728	1,630	2,042	2,443	2,624
China, People's Republic of	1,830	1,900	2,000	2,150	2,300
Australia	941	1,151	1,636	1,657	1,648
Papua New Guinea	588	577	1,083	1,069	1,077
Philippines	802	842	866	866	902
Chile	571	553	581	588	594
Colombia	289	439	432	431	431
Zimbabwe	430	430	430	430	430
Ghana	303	320	340	390	510
Dominican Republic	361	339	312	300	297
Peru	225	225	225	225	225
Mexico	209	216	223	249	263
North Korea	160	164	166	168	170
Spain	120	136	127	112	97
Sweden	103	119	127	116	123
Yugoslavia	120	120	120	120	120
Japan	101	103	103	103	103
India	69	71	87	89	101
Indonesia	74	85	85	85	85
Malaysia	76	76	76	76	76
France	70	62	70	70	70
Romania	65	67	68	70	72
Zaire	60	60	60	60	60
South Korea	60	60	60	60	60
Bolivia	49	45	50	50	50
Fiji	50	40	50	58	62
Nicaragua	47	47	47	47	47
Costa Rica	30	30	40	40	40
Venezuela	25	25	25	25	25
Argentina	21	21	21	21	21
Finland	25	24	19	21	21
Liberia	15	15	15	15	15
Ethiopia	14	14	14	14	14
Mali	13	13	13	13	13
New Zealand	8	8	13	28	28
Ecuador	11	11	11	11	11

**THE GOLD INSTITUTE / L'INSTITUT DE L'OR**

ADMINISTRATIVE OFFICE / BUREAU ADMINISTRATIF

1001 Connecticut Ave., N.W. — Suite 1140

Washington, D.C. 20036

<u>C O U N T R Y</u>	---ACTUAL---		-----PROJECTED-----		
	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Taiwan	11	11	11	11	11
Zambia	10	10	10	10	10
Portugal	7	7	9	9	9
Guyana	9	9	9	9	9
French Guyana	4	4	4	4	4
El Salvador	3	3	3	3	3
German Federal Republic	2	2	2	2	2
Honduras	2	3	1	2	2
Gabon	1	1	1	1	1
Sudan	1	1	1	1	1
British Solomon Islands	1	1	1	1	1
Burma	1	1	1	1	1
Rwanda	1	1	1	1	1
Tanzania	1	1	1	1	1
Madagascar	1	1	1	1	1
Congo	1	1	1	1	1
Other African Countries	1	1	1	1	1

**WORLD TOTAL**

	44,985	45,920	48,387	50,057	51,024
<i>Equivalent in metric tons</i>	1,399	1,428	1,505	1,557	1,587
Change from previous year		+2.1%	+5.4%	+3.5%	+1.9%

**ADDITIONAL SUMMARY**

South Africa

Million Troy Ounces	21.8	21.9	21.9	22.0	22.2
<i>Equivalent in metric tons</i>	678	681	681	684	684
Change from previous year		+0.4%	0%	+0.5%	+0.9%
% of World Total	48.4%	47.8%	45.3%	43.8%	43.5%

Soviet Union

Million Troy Ounces	9.1	9.2	9.4	9.6	9.7
<i>Equivalent in metric tons</i>	283	286	292	298	302
Change from previous year		+1.1%	+2.2%	+2.1%	+1.0%
% of World Total	20.2%	20.0%	19.4%	19.2%	19.0%

Canada, China, U.S., Brazil

Million Troy Ounces	7.9	8.3	9.5	10.7	11.2
<i>Equivalent in metric tons</i>	246	258	295	333	348
Change from previous year		+5.1%	+14.5%	+12.6%	+4.7%
% of World Total	17.6%	18.1%	19.6%	21.4%	22.0%

All 51 Other Countries

Million Troy Ounces	6.2	6.5	7.6	7.8	7.9
<i>Equivalent in metric tons</i>	193	202	236	243	246
Change from previous year		+4.8%	+16.9%	+2.6%	+1.3%
% of World Total	13.8%	14.1%	15.7%	15.6%	15.5%

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costbook/grade



July 18, 1983

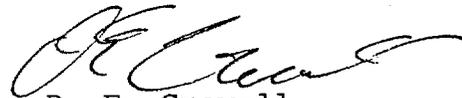
Memorandum to: Messrs. J. R. Stringham  
D. F. Skidmore  
W. L. Kurtz ✓

Subject: Round Mountain Milling Capital and  
Operating Costs at 40,000 Tpd Milling Rate

The Copper Range, Davey McKee, and CSMRI data have been reviewed in order to form an opinion as to the accuracy of the projected capital and operating costs for the 40,000 Tpd expansion by 1986.

The capital cost calculated by Davey McKee appears to be reasonable and I feel that the numbers used should be accurate enough for evaluation purposes. It would take many man hours to develop any basis for challenging Davey McKee's numbers and then I doubt that any significant increase in accuracy could be obtained since there are no obvious errors. The numbers used (in 1983 dollars) are \$78,600,000 spent in 1984 and \$130,000,000 spent in 1985.

The operating cost also seem reasonable except that I believe they have underestimated the costs of cyaniding the flotation concentrate. This would add another 10 cents per ton to their cost of 1.99 for crushing, screening, and processing to give a total direct processing cost of 2.09 per ton. They also add indirects for both mine and mill of 79 cents per ton for technical services, exploration, general plant and administration.

  
D. E. Crowell

DEC/ab

~~908~~ WJK FILE



1722 FOURTEENTH STREET, BOULDER, COLORADO 80302 USA / PHONE (303) 442-7501, TELEX 45-4443

GOLD COSTS 1984

A Summary of Worldwide Production Costs

Metals Economics Group has compiled the most recently available worldwide gold cost information for over 130 producing mines and development projects in one easy-to-access summary chart. In addition, the chart also includes important background data on mine types, production rates, and grades. GOLD COSTS 1984 is a compilation of material from the 1984 issues of *PRODUCTION COST UPDATE*, a quarterly newsletter that also includes cost information for silver, copper, lead-zinc, and nickel.

The introduction to GOLD COSTS 1984 graphically presents a cash cost curve for the charted data and analyzes the cost position of the larger producers, showing, for example, that Homestake, Dome, Round Mountain, and Benguet's operations are currently close to break-even levels at \$300 per ounce gold. Large producers that fall in the lower half of the curve include Campbell Red Lake, Jerritt Canyon, Carlin, Lupin, Pueblo Viejo, Driefontein Consolidated, Kloof, and Vaal Reefs.

The chart is presented in alphabetical order by project name. The cost figures represent both actual operating costs at producing mines and estimated costs for projects still in the development stage, as reported by companies or the media. Wherever possible, these costs have been confirmed by phone contact with the companies involved and qualified as to which cost components are included.

GOLD COSTS 1984 is free with a subscription to *PRODUCTION COST UPDATE* (US\$685 per year), or can be purchased separately for US\$195. To order, please fill out the order form overleaf.

(over)

ASARCO Incorporated

FEB 21 1985

SW Exploration

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Mail order to:

Metals Economics Group  
1722 14th Street  
Boulder, Colorado 80302  
USA

①

Wise for Gold, (costs)

WLR  
Telecopied to  
RLB and  
John Balla  
2-21-85  
WLR

GILZ EDGE

2-21-85

COSTS:

CUBA PIT

Contract Mining (Daegerstrom Quote)

ORE (Blast, load, haul Dump)	\$ 1.70/ton
Waste ( - - - - - )	<u>1.50</u>

at 2:1 Stripping Ratio Mining  
 Cost will be  $(2 \times 1.50) + 1.70 =$  \$ 4.70 pto

MILLING

CRUSHING + STACKING	\$ 1.50/ton	
Cyanidation + Stripping	1.50/ton	
Beneficiation Improve	<u>0.10/ton</u>	
	\$ 3.10	\$ 3.10
Overhead		<u>1.00</u>
Per ton ore Mined + Treated		\$ <u>8.80</u>

TAILINGS

Load, Stack, Agglomerate	\$ 1.50/ton
Cyan. + Rec	1.50/ton
Pads Lining	<u>1.30</u>
	4.30
OVERHEAD	<u>1.00</u>
Per ton tailings treated	\$ 5.10/ton

GIBT EDGE

2-21-85

VIRGEN MANTO

MINING COSTS	\$ 19.00 / TM
HAULING ..	1.00
CRUSHING & STACKING	1.50
Cyn. + Rec	<u>1.50</u>
	\$ 23.00 / TM

Investment for UNDERGROUND

INGLINE (FROM 4860' to 4820' ELEV)

- 400' to OREBODY
- 700' to steepened deposit
- 440' Raises to tunnel (48° slope)
- 200' Vent. Raise to SURFACE

1100' of 8'x10' DRIFT @ \$150/FT	165,000
640' of 5'x5' RAISES @ 200/FT	<u>128,000</u>
	\$ 293,000

MACHINERY

2 - 3 Yd LHD's @ 80,000	160,000
1 - Pneumatic Jumbo (2 Machines)	80,000
1 COMPRESSOR	15,000
PICKUPS, SERVICE TRUCKS	<u>50,000</u>
	\$ 305,000

SURFACE INSTALLATIONS	<u>150,000</u>
	\$ 455,000

GILTEDGE  
VIRGEN MANTO (cont)

2-21-85

SUMMARY

DEVELOPMENT	\$ 293,000
MACHINERY	<u>455,000</u>
	\$ 748,000
FOR 223,000 tons -	\$ 3.35 / ton.

OVERHEAD COSTS

MANAGER	\$ 2000 / month
METALLURGIST	1500
MAINTENANCE MAN	1500
ACCOUNTANT	<u>1000</u>
	6000 x 12 = \$ 72,000 / YR

72,000 x 1.4 = 100,800

Misc. (Transport, lights, Materials) 100,800

\$ 201,600

@ 500 tpd, 200,000 t/year = \$ 1.00 / ton.

Total Costs

MING TREAT	\$ 23.00
INVESTMENT	3.35
OVERHEAD	<u>1.00</u>
	\$ 27.35

GILT EDGE

2-21-85

<u>INCOME:</u>	<u>GRADE</u>	<u>RECOVERY</u>	<u>Am RECOVERED</u>
<u>CUBA PIT</u>	0.05	80%	0.04
<u>TAILINGS</u>	(0.044)	-	0.035
<u>VIRGEN MANTO</u>	0.14	-	0.128

VALUES PER TON

REFINERY  
Au  $300/oz - 3/oz$  (TREATMENT CHARGES) = \$297<sup>00</sup>/oz

<u>CUBA PIT</u>	0.04 x 297	=	\$1188/ton
<u>TAILINGS</u>	0.035 -	=	10 <sup>40</sup> /ton.
<u>V. Manto</u>	0.128 -	=	38 <sup>02</sup> /ton

Total RECOVERABLE Au = 62,000 oz

GROSS VALUE. C. Pit	1188 x 400,000	=	\$4.8M
- - Tailings	10 <sup>40</sup> 500,000	=	\$5.2M
- - V. Manto	38 <sup>02</sup> 223,000	=	\$8.5M

GILT EDGE

2-21-85

RESUME

CUBA PIT

INCOME	\$ 11.90
COSTS	<u>8.80</u>
	\$ 3.10 / ton
for 400,000 tons	\$ 1.2 M

TAILINGS

INCOME	\$ 10.40
COSTS	<u>5.10</u>
	\$ 5.30 / ton
for 500,000 tons	\$ 2.7 M

VIRGEN MANTO

INCOME	\$ 38.00
COSTS	<u>27.35</u>
	10.65 / ton
for 223,000 tons	\$ 2.4 M

NO ROYALTIES, JV PARTNERS, TAXES  
OR OTHER COSTS CONSIDERED

02 610450

GROSS REVENUES  $\frac{\$83,200,000}{5,250,000 T} = \$15.85/T$

$5,250,000 T \times \text{grade Au} = 167,000 \text{ oz}$   
 $\text{grade Au} = .0318 \text{ or } 96\% \text{ recovery of } .033 \text{ Au}$

$5,250,000 T \times \text{grade Ag} = 1,100,000$   
 $\text{Ag} = .209 \text{ or } 70\% \text{ recovery of } .3 \text{ Ag}$

$5,250,000 T \times \text{Zn} = 61,000,000 \text{ lb Zn}$   
 $= 11.62 \text{ \$/ton}$   
 $\div 20 = .581\% \text{ Zn recovered or } 83\% \text{ recovery of } .7 \text{ Zn}$

$5,250,000 T \times \text{Pb} = 12,200,000 \text{ lb Pb}$   
 $= 2.23 \text{ \$/T}$   
 $\div 20 = .116\% \text{ Pb recovered or } 38\% \text{ recovery of } .3 \text{ Pb}$

Gold only  
 $.0318 \text{ recovered} \times T = 102$

$31.5 T = 102$

If costs are  $\text{\$/T}$

then  $31.5 T \times \text{\$/T} = \text{\$25002/ton}$

Will file  
 Gold costs from grade

# The Northern Miner

ASARCO Incorporated

NOV 21 1984

Founded 1915

SW Exploration

5000 x 0.065 x 305 = 118,635  
1000 NO  
1000 1000  
Vol. 70 No. 35

CANADA'S MINING, OIL & GAS NEWSPAPER

November 8 1984

*George Cross*  
*we're Gold Cost* WK

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P.O. Box 10383 STOCK EXCHANGE TOWER  
VANCOUVER, B.C.  
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**683-7265**  
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NO.236(1984)  
DECEMBER 7, 1984

*George Cross News Letter*  
*Reliable Reporting*

NO.236(1984)  
DECEMBER 7, 1984

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Costs Gdd Costs

MT

wk

*Montana Powell*

*for*

*wk*

**MINERAL**

**DEC 20 1984**

**BENEFICIATION DEPT**

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*George Cross News Letter*

*"Reliable Reporting"*

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OCT - 1 1984

NO. 184(1984)  
SEPTEMBER 25, 1984

WESTERN CANADIAN INVESTMENTS

*263*

WJK

U.S. MINERALS EXPLORATION COMPANY

CENTENNIAL MINERALS LTD.

MONTANNA TUNNELS

BASE CASE

KEY STATISTICS

Milling Rate - Tons Per Year	5,250,000
Total Capital Cost (Includes Working Capital of \$5,469,000)	U.S. \$ 97,334,000 (X)
DCFROR For NPV = 0 at 100 Percent Debt	32.6
DCFROR for NPV = 0 at 100 Percent Equity	40.5
Payback Period, Years	2.49
Gold Price	U.S. \$ 350.00/oz ✓
Silver Price	U.S. \$ 7.50/oz ✓
Lead Price	U.S. \$ 0.27/lb ✓
Zinc Price	U.S. \$ 0.48/lb ✓
Ounces of Bullion Produced Per Year	1,251,581
Containing 166,585 Ounces Gold	
1,084,996 Ounces Silver	
Average for First 9 Years Operation	
Tons of Lead Concentrate Per Year	9,069
Tons of Zinc Concentrate Per Year	60,707

<u>Annual Averages</u>	<u>\$ Millions</u>
Gross Revenue	\$ 81.910
Direct Operating Cost	42.326
Operating Earnings	39.586
Depreciation	10.654
Debt Interest	2.573
Earnings Before Tax	26.357
Tax	7.846
Net Earnings	\$ 18.511
	=====

X 
$$\frac{97,334,000 - 5,469,000}{91,865,000} \div 15,000 \text{ tpd} = \$ 6.125 \text{ per daily ton}$$

Use GoldCosts WLK

WLK 15707

GEORGE CROSS NEWS LETTER LTD.NO.162(1984)

PAGE TWO

AUGUST 22, 1984



F. R. Koutz  
April 1984

From Ivosevic: Gold and Silver Handbook

Production-Reserve Data - Au-Ag Deposits

<u>Deposit</u>	<u>Million Tons</u>	<u>Au opt</u>	<u>Ag opt</u>	<u>Other</u>
Getchell, NV	1.3	0.25		Production to 1950
Carlin	11.	0.32		1965 Initial Reserves
Carlin	12.5	0.281		Production to 1979
Cortez-Gold Acres	12.	0.115		1969-76 Production
Windfall-Rustler	3.	0.035		Initial Reserves 1976
Jerritt Canyon	11.9	0.22		Initial Reserves 1981
Delamar, ID	12.	0.025	2.5-4.5	1983 Total Reserves
Sam Goosley, B.C.	31.	0.025	2.8	Byproduct Cu+Sb 1980 Initial Reserves
Candelaria, NV	13.	0.002	3.15	1980 Initial Reserves
Pueblo Viejo	43.	0.120	0.76	+Cu,Zn & Hg Ultimate Reserves
Telfer, W. Aust.	4.	0.28		1000 TPD Reserves
Mary (Silver Peak, NV)	2.	0.3		Production
Vunda, Fiji	?	1.		
Bingham Canyon		.006	0.05	Historical Production Grade
Bingham Canyon	103,000 TPD	.001	0.03	0.62% Cu Present Grade
OK Tedi	37.	.083		16,500 TPD Leached cap grade and future production rate.
OK Tedi	414			0.7% Cu 45,000 TPD : Main Orebody
Berkeley Pit, Butte	50,000 TPD	<.001	0.12	+0.3% Cu
Tomboy, Battle Mtn.	6	0.15	Minor	9 m.t. Lower Grade Resources

with pin Gold Tomboy  
 W/LK

Production-Reserve Data - Au-Ag Deposits (continued)

<u>Deposit</u>	<u>Million Tons</u>	<u>Au opt</u>	<u>Ag opt</u>	<u>Other</u>
Mother Lode	Vein	0.1-1.		Historical Production - 0.3 opt Au Dissem. in Wall Rock
Red Ledge, ID		0.25	0.7	2.7% Cu Stockwork Zone - Volcano- genic Massive Sulfide
Typical Stringer Zone		0.05	2.	Exhalite Facies of Massive Sulfides
Typical Grade		0.06	3.	Back-Arc, Volcanogenic Au-Ag Deposits
Ballarat, CA		0.04		Protore SE End of District - Exhalite or Paleoplacer
Troy, MT	64		1.5	0.7% Cu 7,500 TPD Initial Reserves
Homestake		0.3	0.07	Sulfide Facies Exhalites - Homestake Fm.
Buick Mine, MO	Av. Grade		0.08	5% Pb, 1% Zn
Metalline, WA	Av. Grade		0.03	2.3% Zn, 0.85% Pb
Taylor, NV	6-12		3.2	+ Base Metals, 1200 TPD, Limestone Host
Creta & Lobaris, OK			1.5	2% Cu in 1.5 Beds - Grey Shale
Georgia & Siberia		0.23		+ Cu in 65' beds - Graphitic Schists
Cirque, B.C.	16.5		1.6	2.3% Pb, 6.9% Zn - Metalline-Type
Nacimiento, NM			.09	5% Cu - Sandstone Hosted Pods to 50% Cu, 6 oz Ag
Silver Reef, UT			10	+ Cu-U-V Reserves
Mt. Isa-McArthur River	30-180		1	Pb, Zn, Cu - Some Au in Cu Zones
Yellow Knife, NWT	2	>0.21		Reserves (1980), 1800 TPD, ¼ m.t. Orebodies
Witwatersrand		0.205		+U, 3' Maximum Zones
Taupo, NZ-Sinter		2.48	14.8	Highest Grades - Recent Sinter Zone
Lupin, Contwayto Lake NWT	3.8	0.358		1000 TPD - UG Cordilleran Exhalative

# PRECIOUS METALS

# PRECIOUS METALS

J. ARON & COMPANY

## PRECIOUS METALS PRICES 1979-1984

GOLDMAN, SACHS & CO.

85 Broad Street, New York, New York 10004 (212) 902-1000/Cable: ARONCO/Telex: 128249-62966

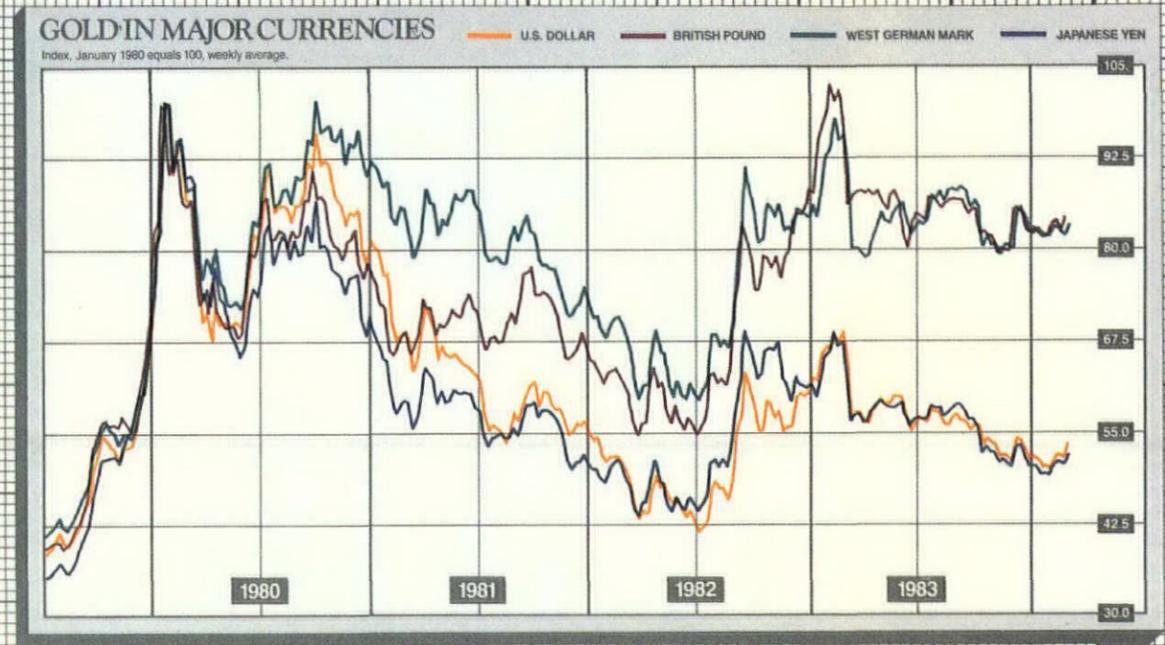
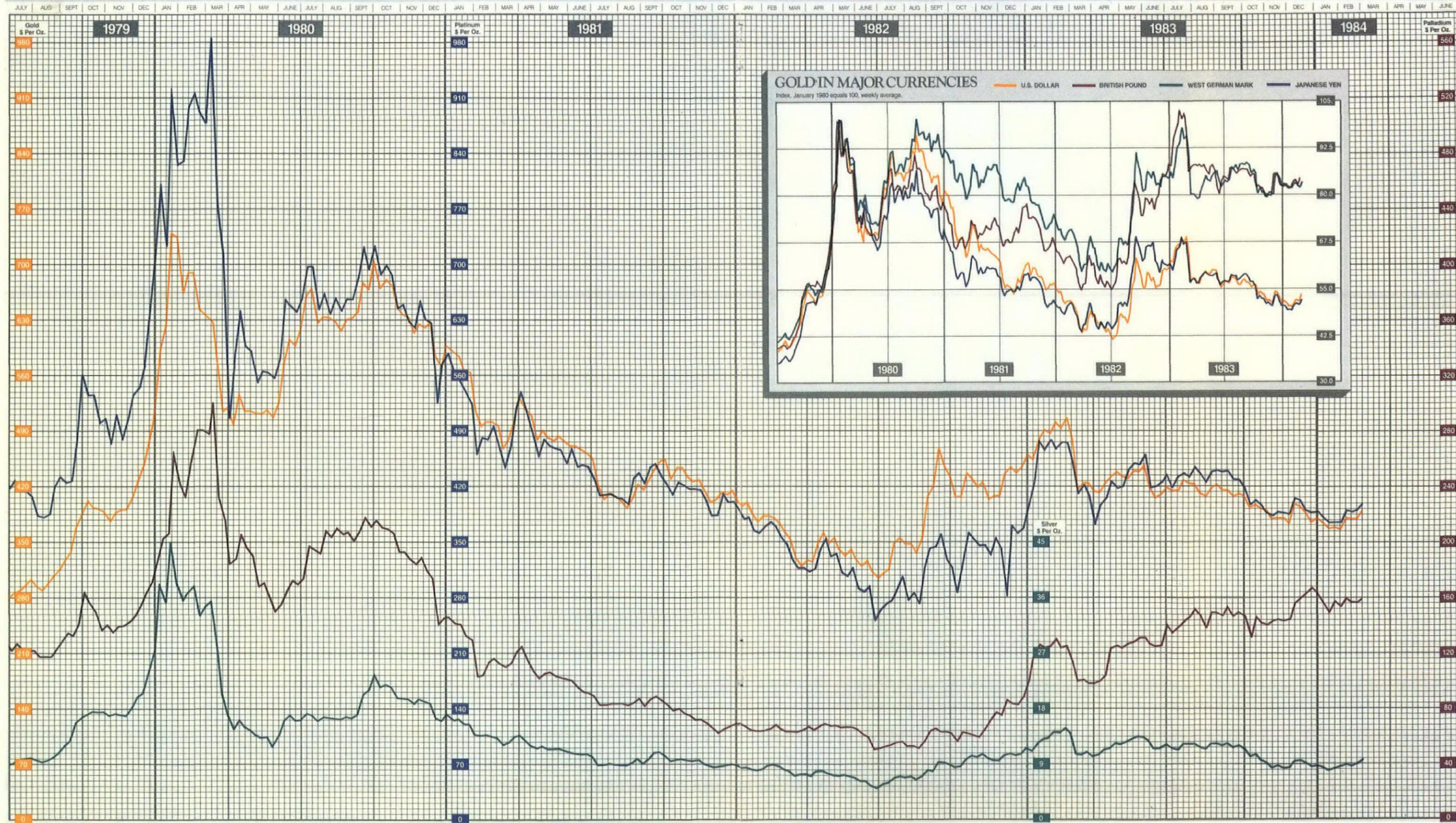
PLATINUM Low end of Metals Week dealer quoted range.

GOLD London dealer afternoon price.

PALLADIUM Low end of Metals Week dealer quoted range.

SILVER Handy & Harman spot quote.

All prices weekly average, in dollars per troy ounce.



## PRECIOUS METALS PEOPLE ON THE MOVE

**KEVIN O'SULLIVAN JOINS SHAREAMERICA AS VICE PRESIDENT OF OPERATIONS**

ShareAmerica recently announced the appointment of Kevin M. O'Sullivan as vice president of operations and systems. ShareAmerica is a brokerage concern headquartered at 502 Park Avenue in New York City.

Prior to joining ShareAmerica, Mr. O'Sullivan was senior manager of Investment Services Consulting at Coopers & Lybrand. His experience also includes fourteen years in senior operational and financial positions at several national brokerage firms, including Harris Upham & Co., and Dillon Read, Inc.

Mr. O'Sullivan is currently a member of the Certified Financial Planning Institute, the International Precious Metals Institute and The Securities Industry Association's Financial Management and Internal Audit Groups.



Kevin O'Sullivan

**ENGELHARD REALIGNS OPERATIONS AND ADDS LONDON AND HONG KONG TRADING OFFICES**

Engelhard Corporation, Edison, NJ, has realigned its operations into two business units consisting of a chemical division and a metals division. These units will be headed by two newly appointed executives.

Cyrus H. Holley has been appointed president of the new Chemical Division. He was previously vice president of Engelhard Corporation and chief operating officer of Engelhard Industries division.

Nelson B. Colton has been named president of the new metals division. He previously was chairman and chief executive officer of Engelhard Industries.

Engelhard Corp. is expanding its international trading activities in precious metals by opening trading offices in London and in Hong Kong. The London trading office, which has been in operation since October, recently hired as its head, Leonard Quartaraco, formerly a precious metals dealer with Gerald Metals Inc., Stamford, Connecticut.

The formation of Engelhard Metals (Hong Kong) Limited (EMHK), was carried out to meet the increased demand for precious metals in the Far East. EMHK will place particular emphasis on trading with Japan, Hong Kong, Singapore, China and Australia.

Michael G. Johnston has been named managing director. Henry F. Yap, deputy managing director; Stephen Lai, controller; and Desmond C. Wong, chief dealer.

Opening the Hong Kong office will enable Engelhard to of-

fer nearly 24-hour physical trading opportunities. With its inauguration, the only gap remaining to around-the-clock trading will be the time between the close of trading in New York and the opening in Hong Kong, a matter of only two or three hours.

Trading will emphasize the platinum group metals and silver. Gold will be traded to a lesser degree.

**EDYTHE M. CARLEEN NAMED INSIDE SALES ADMINISTRATOR FOR LEACH & GARNER REFINING DIVISION**

Edythe M. Carleen has been appointed to the new position of Inside Sales Administrator for the Leach & Garner Refining Division, headquartered in Attleboro, Massachusetts.

Responsible for all inside sales activities within the Refining Division, Carleen will act as liaison with all customers to handle inquiries and ordering as well as to provide follow-up service for all Refining accounts.

Prior to joining the Refining Division, Carleen was Export Manager for General Findings, a division of Leach & Garner which manufactures precious metal jewelry findings. She was also associated with A.T. Cross, where she was Export Order Service Manager.

Refining is a division of Leach & Garner Company, a major producer of precious metals in the United States and Canada.

**REFINEMET'S GOLD AND SILVER OPERATION IS BEING SOLD**

Refinemet International Co., Woonsocket, RI, has agreed to sell its gold and silver trading operation to Fundamental Resources, Inc., Greenwich, CT, a precious metals scrap and copper trading firm.

The sale includes Refinemet's active contracts in fine gold and fine silver, and its trading inventories. A Refinemet spokesman confirmed that the company effectively was out of the gold and silver trading business, but would continue its trading activities in platinum group metals and its brokering services. Under the terms of the agreement in principle with Fundamental, gold and silver trading beginning March 5 will be the responsibility of, and for the account of, Fundamental.

When Refinemet reported its financial results for its third quarter, it disclosed that it was not in compliance with covenants in its aggregate credit facility. Therefore, the company is attempting to reduce the amount of current borrowings necessary for its operations.



Edythe M. Carleen

**TOURISTS STEAL \$7-MILLION WORTH OF ANTIQUE SILVER**

Antique silver items valued at more than £5-million (\$7.3-million) were stolen from Woburn Abbey, a stately home located in Bedfordshire, England, in March. Police described it as a "highly professional" theft.

Police said the thieves took 47 pieces of silver heirlooms, including one tray weighing 40 pounds, after

disconnecting a sophisticated television camera alarm system at the estate. The raid was carried out during the night hours.

A £100,000 (\$146,000) reward was immediately offered by the insurers of the silver for information leading to the recovery of the antiques. Police believe it likely that the robbers planned in advance to sell the items abroad as the value of the silver contained in the heirlooms amounts to only several thousand dollars.

Pieces taken included the Reform Cup, a trophy commemorating the passing of the 1832 Reform Act, as well as two baskets made by the 18th century Huguenot silversmith, Paul de Lamerie.

Police believe the thieves planned the heist by visiting the stately home as tourists. The three rooms which contained the silver are normally open to the public.—American Metal Market

\*\*\*

The gold/silver price ratio, therefore, is a spread that allows traders to distinguish the different effects the same news will have on each metal. But price performance can be complex. For example, an increasing ratio signifies gold is either rising faster than silver in a rising market or falling slower in a declining market. If the ratio drops, silver is either rising faster than gold in a rising market or falling slower in a declining market. The ratio could drop during a rise in the price of both metals; rise during a price decline in both metals; or stay unchanged whether the prices of both metals were rising or falling.

So, how does one trade on the price ratio? As an example, if one concludes that the ratio is low, then buy a kilo gold contract and sell a 1,000-ounce silver contract. If the price of both metals goes up one would lose by buying the 1,000 ounces of silver to fill the contract, but gain by selling the kilo gold contract. It's the ratio that counts. If it increases, then the profit on the gold is greater than the loss on the silver.

\*\*\*

**PRECIOUS METALS AND DINOSAURS**

(Continued from page 2)

theory. He noted that natural chemical processes in the Earth could have concentrated these exotic metals in the sediments. So he and a colleague at the University, Jean-Marc Luck, examined the relative concentrations of two isotopes of osmium in the sediments—a ratio that can't be substantially altered by geochemical processes. The isotope ratio measured, <sup>187</sup>Os to <sup>186</sup>Os, is influenced by the decay of <sup>187</sup>Re to <sup>187</sup>Os and so provides an indication of whether the parent material came from the Earth's crust or some other source. The ratio in the sediment turns out to be very close to that found in meteorites and very different from that in the Earth's crust. Deeper down, however, in the Earth's mantle, the osmium isotope ratio does resemble that found in meteorites. So there's one other conceivable explanation, which is that the metal was spewed out during a huge volcanic explosion

whose dust blocked out the sun. But such an explosion would have been much larger than any known in Earth's history. The Yale researchers, and other scientists find the notion of a six-mile-wide asteroid colliding with the Earth a much more likely catastrophe.

But in spite of the study, some prominent paleontologists do not buy the asteroid theory. One of them is Edwin Colbert, curator of the world's largest dinosaur collection at the American Museum of Natural History in New York City, and author of a new book, **Dinosaurs: an Illustrated History**. He says that if such a cataclysm kicked up enough dust to suddenly alter the weather and the environment, why were just dinosaurs killed off while companion species, such as birds and crocodiles and snakes, emerged intact?

According to Edwin Colbert, if man lasts as long as the dinosaur, he's got 100-million years ahead of him. Yet, considering the mess man is making of his modern environment, there is the danger that man will become extinct before he solves the riddle of the dinosaurs.—The Columbus Dispatch and Science (1984)

\*\*\*

**SILVER AND ELECTRIC BAND-AIDS**

Electricity speeds up the rate at which broken bones knit. But what would happen if you electrified a skin wound? That's the question bio-chemist Oscar M. Alvarez and colleagues at the University of Pitts-

burgh Medical School asked themselves recently. The answer: a 30-percent reduction in healing time.

The new procedure involves dipping a nylon cloth in silver, which acts as an electrical conductor. The cloth is then connected to a battery energized with a tiny electric current, and placed on the wound.

The Pittsburgh group treated minor surface abrasions on the skin of several domestic pigs, and the results showed that the electrified wounds healed in an average of 2.9 days. This, compared with 4.1 days for wounds treated with the silver cloth but without electricity and 4.6 days for those wounds left open to the air.

According to Alvarez, tests indicate that both the silver and the electricity are responsible for the rapid healing. "It is fairly apparent," he explains, "that the electrical-silver complex stimulates cells from surrounding tissue to aggregate at the wound site, increasing protein production and enhancing the healing process."

Manufactured by the Sybron Corporation, the silver-coated bandage has recently been classified as a drug. Approval by the Food and Drug Administration should follow on the heels of human tests, now being conducted by Dr. James Albright, chief of orthopedic surgery for the St. Louis Medical Center, in Shreveport, Louisiana. If all goes well, you will find the bandages on your pharmacy shelf in a few years.—OMNI (1/84)

\*\*\*

**DID YOU KNOW THAT?**

The first coins struck in North America were crude bits of silver minted in 1652 for circulation in the Boston area.

Just 32 years after the Pilgrims landed at Plymouth, John Hull was given the task of providing coinage for the colony. Working at Joseph Jenks' iron works in nearby Sanguis, Hull used blacksmith's tools to impress the letters NE for New England on the front of each coin and the denomination, expressed as a Roman numeral, on the back.

The undated coins, which were minted in 3-, 6-, and 12-pence denominations, were discontinued after just four months. Their simple designs invited clipping and counterfeiting.—George Stebinsky, The Columbus Dispatch.

\*\*\*

**The Silver Bloc** is a group of American senators from the silver producing states of Idaho, Utah, Montana, Nevada, Colorado and Arizona.—Dr. J. M. Ridgway, Institute of Geological Sciences, London, U.K.

Wickfield Gold Cost Management

FIG

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JUL 5 1984

EXPLORATION DEPARTMENT

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NO.126(1984)  
JUNE 29, 1984

NO.126(1984)  
JUNE 29, 1984

JDS

New York, July 10, 1984

MEMORANDUM FOR: Mr. F. T. Graybeal

California  
Sonora Gold Property

Your memorandum of June 29 grates a little on me, as one who has "quoted" the so-called "dogma" from time to time.

First, you are setting up a straw man to attack by misquoting the dogma to begin with. (Nobody suggests that the labor involved in dismantling and transportation are counterbalancing factors: the issues are the same whether a ball mill sits on a foundation somewhere or in a yard, and obviously transportation costs for secondhand equipment are fundamentally the same as for new equipment.)

The dogma correctly stated is: "Inexperienced people will often assume that great savings will be realized by buying a second-hand mill, just like buying a good secondhand truck with low mileage. However, this is generally a naive hope because in mill construction the cost of civil works (i.e. foundations, roads, tailings lines, tailings disposal areas, water recirculation, etc.) not to speak of warehouse, machine shops, office building, etc. etc., are a much more substantial part of total surface costs than the simple items of mill equipment. A rule of thumb is that the mill equipment will cost about 25% of the total for the mill, and that total surface construction including the mill may amount to around 60% to 70% of a project. With mill equipment thus running at something like 10% to 20% of the cost, the opportunities for saving by shaving on equipment costs are always worth looking at, but are not of a magnitude to turn a loser into a winner."

The figure you quote of \$6,500/daily ton does not appear to me to be a remarkably low cost. Total surface construction costs at Troy amounted to around \$7,000/daily ton of capacity for a brand-new installation in a remote area requiring substantial site preparation and road, etc., not to speak of heavy environmental control expenditure, and severe climate mandating enclosed buildings.

There is no doubt that we have ample room for careful and innovative thinking in dealing with the high cost of construction, and we should not overlook any opportunities for savings, but I think it counterproductive to leave on the record something that appears

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JUL 16 1984

EXPLORATION DEPARTMENT

Xc: JDS  
HSE/GJS

to perpetuate the pure myth which seems to be embedded in the cultural heritage of our exploration group, namely that geologists find good ore bodies only to have them turned down or made uneconomic by overly conservative and stodgy engineers.



T. C. Osborne

cc: RLBrown  
WLKurtz  
DECrowell

~~JRS~~ - ~~JRS~~ → wk file  
Gold (costs, tonnage, price)

June 29, 1984

MEMORANDUM FOR: File

Sonora Gold Property  
Jamestown, California

Sonora Gold has announced plans to develop an open pit gold reserve of 25,000,000 tons averaging 0.065 oz. Au near Jamestown, California. The advertised capital expenditure is \$32.4 million for a flotation mill capacity of 5,000 tons per day, equivalent to \$6,500/daily ton.

This remarkably low cost if true may result from installation of second hand concentrating facilities purchased from the Lakeshore porphyry copper concentrator in Arizona. Cimetta Engineering is doing the work, and they must feel nervous about the project as I understand they have asked for payment in advance. If these costs are accurate, it places in doubt the often-quoted dogma that there is no advantage to using second hand facilities because the labor involved in dismantling and transportation tends to counterbalance savings derived from the purchase of used equipment.

*F. T. Graybeal*  
F. T. Graybeal

cc: R. L. Brown  
W. L. Kurtz  
D. ~~B~~. Crowell

RECEIVED  
JUL 3 1984  
EXPLORATION DEPARTMENT

WCK

Wallace Miner - Dec. 22, 1983

Wickham - 6 del  
Costs Hrs/Gravel

# PRINCIPAL GEOLOGICAL CONTROLS of 1 Million Ounce Au Districts

<i>Province</i>	<i>Controls</i>	<i>Mines</i>
<p>Norseman to Wiluna <i>York</i></p> <p>1. Murchison 2. Southern Cross 3. Eastern</p>	<p>Strike faults with subsidiary oblique faults</p> <p>Reverse faults</p> <p>Bedded tuffs</p> <p>Banded iron formations</p>	<p>Kalgoorlie—Golden Mile and Mt. Charlotte, Victory, Paddington to Bardoc, Agnew to Wiluna</p> <p>Norseman, Sandstone, Kookynie, Day Dawn</p> <p>Morning Star (near Hill 50), Big Bell, Reedy's, Southern Cross, Copperhead North</p> <p>Hill 50, Nevorla, Mt. Morgan, Lancefield, Laverton</p>

Total 20 million ounces

Archaean < 80

Proterozoic < 70

Pal < 70

Alluvial < 60

Dec 7, 1983  
 Cecil Fisher GSA  
 Cecil Fisher GSA

38 mill 02 171, mil for an Kalgovite

MA Chardeth 840 mill for <sup>3,000</sup> short cu  
to exploit deeper in

Horsant 8 mill tons <sup>very</sup> rich

Expl guides = 1. Metallurgical maps  
2. Horseman - under  
shale fits

Horsant Sandstone

<i>Company Name</i>	<i>Tons (millions)</i>	<i>Grade (oz./ton)</i>	<i>Production Rate (tons/day)</i>
<b>Western Mining</b>	<b>4.1</b>	<b>0.17</b>	<b>2,000</b>
<b>Newmont*</b> <b>60%</b>	<b>2.0</b>	<b>0.12</b>	—
<b>Hampton</b> <b>40%</b>			
<b>Homestake</b> <b>48%</b>	<b>40.0</b>	<b>0.15</b>	<b>3,000</b>
<b>KLV</b> <b>52%</b>			
<b>Hampton</b> <b>20%</b>	<b>4.0</b>	<b>0.19</b>	<b>500</b>
<b>CSR</b> <b>80%</b>			
<b>Occidental</b> <b>55%</b>	<b>3.0</b>	<b>0.13</b>	<b>600</b>
<b>Black Hills</b> <b>45%</b>			
<b>Pancontinental*</b>	<b>7.8</b>	<b>0.11</b>	<b>2,500</b>
<b>Pioneer</b> <b>75%</b>	<b>2.4</b>	<b>0.18</b>	<b>600</b>
<b>Poseidon</b> <b>25%</b>			
<b>Sons of Gwalia*</b>	<b>1.7</b>	<b>0.12</b>	<b>600</b>
<b>CRA</b>	<b>1.0</b>	<b>?</b>	<b>600<sup>f</sup></b>
<b>Exxon</b> <b>55%</b>	<b>5.0<sup>f</sup></b>	<b>0.2</b>	<b>1,000<sup>f</sup></b>
<b>Carr Boyd</b> <b>40%</b>			
<b>Others</b> <b>5%</b>			
<b>Spargos*</b>	<b>0.75</b>	<b>0.45</b>	<b>500</b>

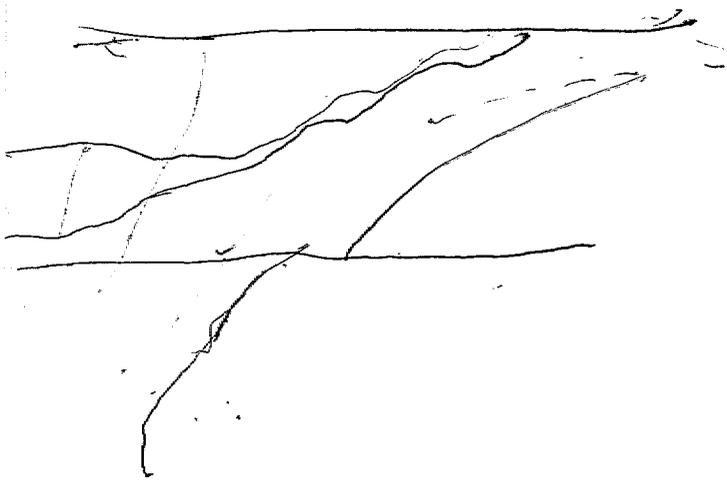
\*Reported reserves—evaluation continues    <sup>f</sup>Unconfirmed reports

## RECENT STRATIFORM DISCOVERIES

<i>Owner</i>	<i>Tons (millions)</i>	<i>Grade (oz./ton)</i>	<i>Production Rate (tons/day)</i>
Whim Creek	4.3	0.08	650
Metana*	1.6	0.13	600
Hill 50	1.1	0.40	600
Nevoria*	1.6	0.16	600
Marvel Loch	0.9	0.18	200
A.C.M.†	18.0	0.15	3,200
W.M.C.	0.4	0.23	700
Nolex      45%			
Eastern    36%	1.0	0.19	1,000
Samantha 19%			

\*Under construction

†Presently being evaluated



*W.K. would you like  
 this in your "gold"  
 file +, if so,  
 which one?  
 These two pages only  
 Gold/Silver Cost/tuns/Grads*

MINE PRODUCTION OF GOLD

IN THOUSANDS OF TROY OUNCES

C O U N T R Y	ACTUAL	ESTIMATED	-----PROJECTED-----		
	1981	1982	1983	1984	1985
South Africa	21,143	21,380	21,540	21,540	21,540
Soviet Union	9,645	9,867	10,035	10,306	10,575
Canada	1,413	1,840	1,960	2,153	2,458
China, People's Republic of	1,690	1,770	1,930	2,040	2,160
United States	1,378	1,422	1,777	1,986	2,098
Brazil	1,068	1,159	1,477	1,567	1,707
Australia	530	727	831	821	805
Philippines	753	784	791	804	794
Papua New Guinea	547	593	584	587	1,187
Colombia	535	525	532	562	560
Chile	400	513	515	521	526
Ghana	393	418	450	460	490
Zimbabwe	371	416	422	424	426
Dominican Republic	348	371	340	339	339
Peru	220	220	223	225	230
Mexico	199	205	221	224	230
North Korea	160	164	167	172	177
Yugoslavia	140	147	152	159	166
Spain	105	119	122	122	122
Japan	99	103	103	183	254
Sweden	64	76	86	92	93
India	80	77	84	90	93
Zaire	70	70	75	80	80
Romania	66	68	69	71	73
Indonesia	56	58	62	66	68
France	29	46	52	52	52
Fiji	26	44	52	60	60
Bolivia	66	33	45	60	64
Nicaragua	35	41	41	41	41
South Korea	35	35	35	35	35
Costa Rica	16	18	28	46	56
Finland	21	19	19	17	17
Guyana	19	19	19	19	19
Argentina	12	19	19	19	19
Venezuela	18	18	18	18	18
Zambia	20	16	16	16	16
Ecuador	4	4	16	16	16
Ethiopia	12	12	12	12	12

**THE GOLD INSTITUTE / L'INSTITUT DE L'OR**

ADMINISTRATIVE OFFICE / BUREAU ADMINISTRATIF

1001 Connecticut Ave., N.W. — Suite 1140

Washington, D.C. 20036

C O U N T R Y	ACTUAL	ESTIMATED	-----PROJECTED-----		
	1981	1982	1983	1984	1985
Taiwan	11	11	11	12	12
Portugal	7	7	10	12	14
Honduras	2	2	9	9	9
Congo	7	7	7	7	7
Liberia	7	7	7	7	7
Malaysia	6	6	6	6	6
French Guyana	4	4	4	4	4
New Zealand	6	4	3	3	23
German Federal Republic	3	3	3	3	3
El Salvador	1	1	1	2	3
Sudan	1	1	1	1	1
British Solomon Islands	1	1	1	1	1
Burma	1	1	1	1	1
Rwanda	1	1	1	1	1
Mali	1	1	1	1	1
Gabon	0	1	1	2	2
Tanzania	0	1	1	1	1
Madagascar	0	1	1	1	1
Other African Countries	1	1	1	1	1
<b>WORLD TOTAL</b>	<b>41,846</b>	<b>43,477</b>	<b>44,990</b>	<b>46,080</b>	<b>47,774</b>
<i>Equivalent in metric tons</i>	<i>1,305</i>	<i>1,352</i>	<i>1,399</i>	<i>1,433</i>	<i>1,486</i>
Change from previous year		3.6%	3.5%	2.4%	3.7%

ADDITIONAL SUMMARY

South Africa

Million Troy Ounces	21.1	21.4	21.5	21.5	21.5
<i>Equivalent in metric tons</i>	<i>658</i>	<i>665</i>	<i>670</i>	<i>670</i>	<i>670</i>
Change from previous year		+1.1%	+0.7%	0%	0%
% of World Total	50.4%	49.2%	47.9%	46.7%	45.1%

Soviet Union

Million Troy Ounces	9.6	9.9	10.0	10.3	10.6
<i>Equivalent in metric tons</i>	<i>300</i>	<i>307</i>	<i>312</i>	<i>321</i>	<i>329</i>
Change from previous year		+2.3%	+1.7%	+2.7%	+2.6%
% of World Total	23.0%	22.7%	22.3%	22.4%	22.1%

Canada, China, U.S., Brazil

Million Troy Ounces	5.5	6.2	7.1	7.7	8.4
<i>Equivalent in metric tons</i>	<i>173</i>	<i>193</i>	<i>222</i>	<i>241</i>	<i>262</i>
Change from previous year		+11.6%	+15.3%	+8.4%	+8.7%
% of World Total	13.2%	14.2%	15.9%	16.8%	17.6%

All 51 Other Countries

Million Troy Ounces	5.6	6.0	6.3	6.5	7.3
<i>Equivalent in metric tons</i>	<i>174</i>	<i>188</i>	<i>195</i>	<i>202</i>	<i>225</i>
Change from previous year		+7.5%	+4.0%	+3.5%	+11.5%
% of World Total	13.4%	13.9%	13.9%	14.1%	15.2%

1-17-80

make copy for: Gold file ✓  
Penny Cotts file  
WLC file -

FROM: W. L. KURTZ

To: JC Bulke

In case you missed their  
note Re operating costs

This is what makes  
German Gulch look  
attractive and we  
should get aggressive  
with Mc Cartney

with fuel  
(GSD)

Gold  
Heap Leach

Road Maintain

2.54

Lendosky 1 mill/yr

3.50

18 million tons @ .027  
last yr. 1055

65% recovery

Zutman 1 mill/yr

3.40

17 million tons @ .032  
last yr. .06

65% recovery

Capital Cost for mine \$27 million

June 6, 1980

FILE MEMORANDUM

CARLIN MINE

In checking my notes from a 10/19/76 field trip at the Carlin Mine Larry Noble, resident geologist, stated that original ore reserve drilling was on 100' spacing and aggregated approximately 250,000 feet at a cost of \$1.50/ft. Subsequent closer spaced drilling within the orebody outline increased the reserve by 10%.

W. L. Kurtz

WLK:1b



Exploration Department  
Western USA

February 26, 1981

WLK file: 6020

TO: R.L.Brown  
D.F.Skidmore  
D.E.Crowell

New Mines  
Construction Time

See attached article:

Candelaria Ag: 8,000 tpd heap leach . . . "Eleven months later the mine was already working at its rated 8,000 t/d, heap leaching was underway and the refining furnace was operational, though construction of the \$20 million ore processing and refining facility had only started in Spring 1980." . . .

Alligator Ridge Au: heap leach . . . "construction schedule at this significantly smaller (750,000 s ton/year ore) surface mine was even shorter -- 6½ months for the processing units." . . .

Bechtel was contractor.

*W.L. Kurtz*  
W. L. Kurtz

WLK:lb  
Att.









1

No DP Caldwell  
1/17/77  
WKK for Gold

THE NORTHERN MINER  
March 6, 1975

Silver copper in B.C.



Keep

CELL FILE  
GOLD-SILVER

tws/corts

Occidental	CANDAZARIA	20MM	4.0 oz Ag	4/1?
Hornstake	CREENE	5MM	4.98 oz Ag	5/1?
Freeport	JERRIT CANYON	+5MM	+3 oz Au	
Deuel	Battleman	+10MM	.1 oz Au	2 pits
DOM	Gold Hill Nevada Virginia City	+1MM	.09 Au	4.3 Ag
Superior Oil	STIBNITE	10-15MM	0.1 Au	
Placer	GOLDEN SUNLIGHT	50MM	.05 oz Au	Experiment leaching
?	RUBY GULCH	16MM	.04 oz Au	.42 Ag
Lacana	TOURMALINE-ECKHORN	+3MM	.07	initial 25,000 heap leach
Cypress	Northumberland	11	.05-10G	heap leach experiment
being examined by ASARCO	Wanatchee (LD)			
Gr. Electric?	GETCHELL			
Getty	MERCOR			
?	LANDOSKY			
Superior Oil	FEATHERHEAD			
Goldfields?	ORTIZ			
	SAN LOUIS			
Placer	SAM GOOSLEY			
Eastern Superior	DEZAMAR IDAHO			

Goldfields 20cm 2.4g or 41.5 1.8 Imperial County Big Chief

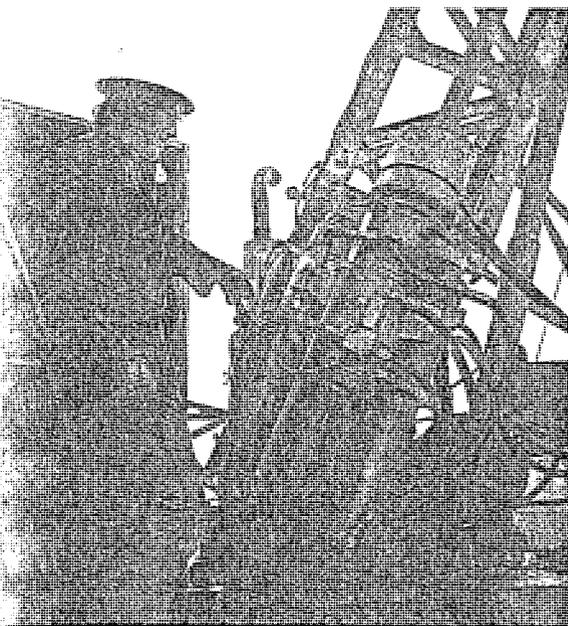
From Gold Mine Site PTG present 11392 ? 6-7M ± 0.06AU?

0.14/100  
NM  
Legnos 450 cost/hr  
Zutman 1.037  
Lambert 1.03

From Gold Mine Site  
GO NW 674 + 5 pm 11 AU 3 near surface deposits  
OCC

work file gold.

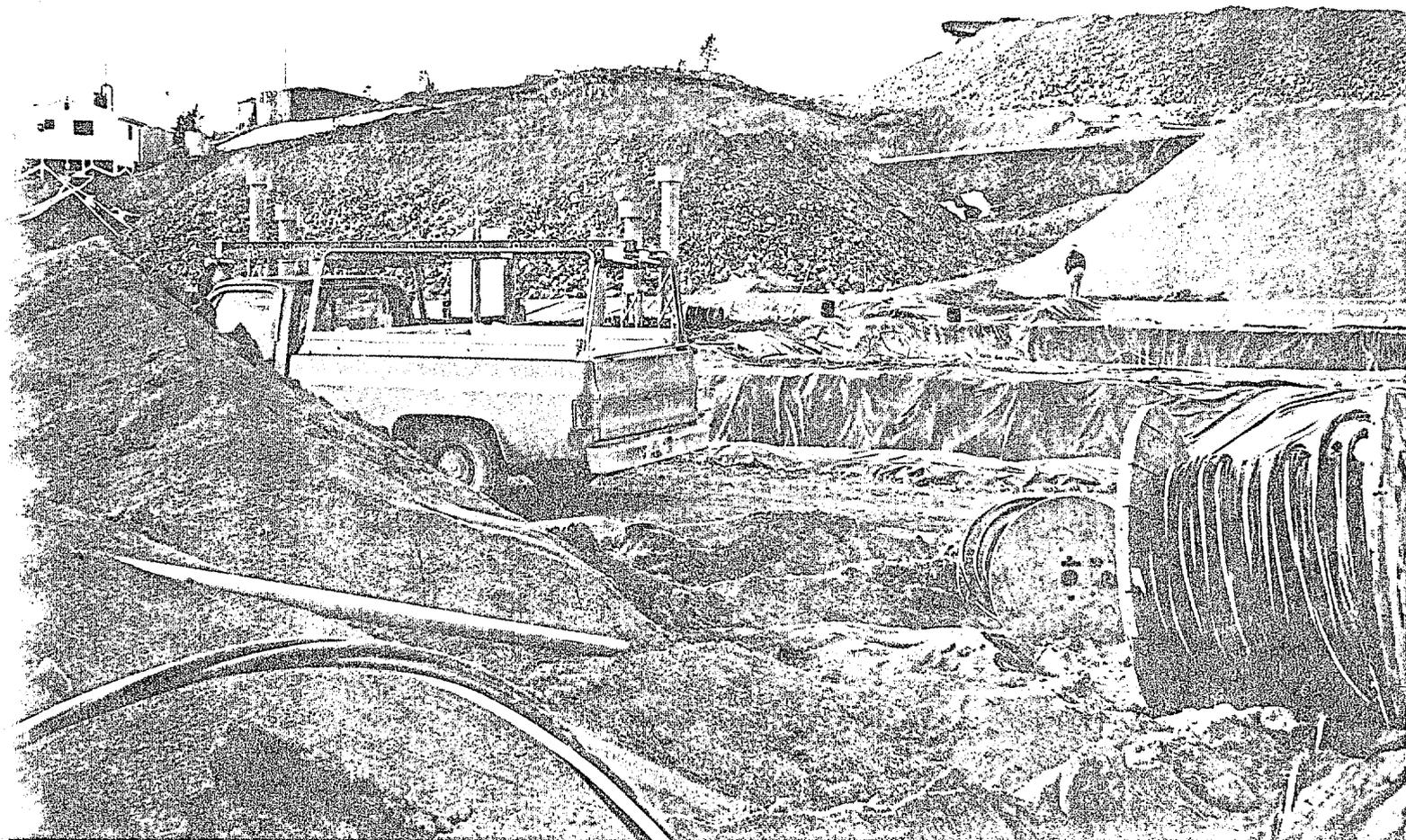
\$4.50 predicted 1982 costs before depl, deprec, vacants  
Set including administration



Exploration to extend ore zones and field testing to refine leaching techniques are ongoing activities.

### MINING AND PRODUCTION STATISTICS

	ZORTMAN			LANDUSKY		
	1980	1981	1982 Projected	1980	1981	1982 Projected
Tons ore added to leach piles	675,000	1,096,000	1,750,000	615,000	951,000	1,750,000
Tons of low grade ore	—	—	—	121,000	116,000	—
Tons of ore — total	675,000	1,096,000	1,750,000	736,000	1,067,000	1,750,000
Grade of ore —						
ounces/ton gold	0.031	0.024	0.037	0.031	0.028	0.029
ounces/ton silver	0.273	0.230	0.230	0.419	0.250	0.369
Tons of waste stripped	620,000	1,101,000	1,473,000	603,000	982,000	1,478,000
Production —						
gold ounces	15,000	24,000	36,000	19,000	14,000	30,000
silver ounces	24,000	77,000	112,000	28,000	27,000	57,000



Gidd - Cost / Capital / Time

Case Gidd

WLK

Gold Mining COSTS / Reserves

W L H Welfer Gold





# ASARCO

FAX to JCBulla sent 1/11/89 make WLK

Mining Department

JDSell - your copy

RECEIVED

January 10, 1989

JAN 10 1989

EXPLORATION DEPARTMENT

FILE MEMO

Florida Canyon Gold - Nevada  
Pegasus Gold Inc.

The following operating cost data for Florida Canyon Gold was obtained from J. S. Hastings, former V.P. Exploration for Pegasus Gold. He indicated that while they were not the exact numbers, they were "reasonably accurate." I assume they are very close to the real figures. Since they are 1987 costs, he suggests that 5% be added as escalation. He also asked that they be kept company confidential.

### Florida Canyon - 1987 Operating Costs

2,000,000 tons/year ore  
0.026 oz/ton Au reserve  
0.021 oz/ton Au being mined  
1:1 waste/ore ratio  
65% recovery

1. Mining Costs (per ton)

Ore	\$1.10	
Waste	<u>1.10</u>	
Sub-Total		\$2.20

2. Processing costs (per ton)

Crush & Agglomerate	\$0.55	
Leach	0.90	
Recovery Plant	0.54	
Refining	0.05	
Pad prep.	0.50	
G & A	<u>0.60</u>	
Sub-Total		<u>3.14</u>

TOTAL PER TON		<u>\$5.34</u>
---------------	--	---------------

In 1987, Pegasus conducted an in-house feasibility study on the possible results of going to a higher grade, lower tonnage operation and came up with the following projected operating costs:

Florida Canyon - 1987 Feasibility Study

1,000,000 tons/year ore  
0.030 oz/ton Au reserve  
1.93:1 waste/ore ratio  
65% recovery

1. Mining Costs (per ton)

Ore	\$1.40	
Waste	<u>1.10</u>	
Sub-Total		\$2.50

2. Processing costs (per ton)

Crush & Agglomerate	\$0.90	
Leach	0.35	
Recovery Plant	0.70	
Refining	0.06	
Pad prep.	0.75	
G & A	<u>1.00</u>	
Sub-Total		<u>3.76</u>

TOTAL PER TON \$6.26

The following Zortman Landusky figures without G & A were also provided:

Zortman Landusky 1987

Mining - \$2.00/ton  
Processing - \$1.30/ton

  
S. A. Anzalone

SAA:brw

cc: R. J. Kupsch  
D. E. Crowell  
D. F. Skidmore  
R. L. Brown  
F. T. Graybeal  
W. L. Kurtz

77



**STATISTICAL SUMMARY**

*Homestake Mining Company and Subsidiaries*

**W. L. KURTZ**

(Quantities in thousands)	1988	1987	1986	1985	1984
<b>GOLD OPERATIONS<sup>1</sup></b>					
<b>Tons of Ore Processed</b>					
Homestake	2,455	2,346	2,304	2,346	1,897
McLaughlin	1,095	1,082	1,022	660	
Round Mountain	3,225	2,760	1,666	1,339	1,143
El Hueso	1,036				
KMA	873	899	827	786	717
Total	<u>8,684</u>	<u>7,087</u>	<u>5,819</u>	<u>5,131</u>	<u>3,757</u>
<b>Ounces Produced</b>					
Homestake	390	326	342	343	296
McLaughlin	204	189	173	84	
Round Mountain	58	48	42	35	30
El Hueso	35				
KMA	94	115	113	105	107
Total	<u>781</u>	<u>678</u>	<u>670</u>	<u>567</u>	<u>433</u>
<b>Cash Production Cost—per ounce</b>					
Homestake	\$ 298 <sup>+16</sup>	\$ 329	\$ 285	\$ 276	\$ 310
McLaughlin	235 <sup>+11</sup>	229	240	291	
Round Mountain	248 <sup>+25</sup>	216	203	221	259
El Hueso	290 <sup>+180!</sup>				
KMA	281 <sup>+38</sup>	198	193	191	217
Weighted Average	\$ 275	\$ 271	\$ 253	\$ 259	\$ 283
<b>Full Production Cost—per ounce</b>					
Homestake	\$ 314	\$ 347	\$ 298	\$ 294	\$ 324
McLaughlin	346	352	364	422	
Round Mountain	276	247	234	246	296
El Hueso	470				
KMA	319	229	215	205	246
Weighted Average	\$ 327	\$ 321	\$ 298	\$ 294	\$ 303

<b>ORE RESERVES (Proven and Probable)<sup>1</sup></b>	12/31/88			12/31/87		
	Tons	Grade (oz/ton)	Ounces	Tons	Grade (oz/ton)	Ounces
Homestake Mine						
—Underground	18,571	0.218	4,048	19,032	0.213	4,054
—Open Cut	6,613	0.120	792	6,560	0.126	825
McLaughlin Mine <sup>2</sup>						
—Sulfide	16,994	0.131	2,233	22,409	0.120	2,692
—Oxide	4,622	0.060	277			
Round Mountain	62,385	0.032	2,021	51,974	0.034	1,767
Wood Gulch	490	0.098	48			
Mineral Hill	542	0.306	166			
El Hueso	15,958	0.035	559			
Golden Bear	241	0.543	131			
KMA						
—Mt. Charlotte	4,233	0.113	478	4,572	0.115	526
—Fimiston						
Underground	1,729	0.215	372	1,735	0.216	375
Open Pit	2,081	0.111	231	1,186	0.127	151
Fortnum	734	0.093	68			
Total	<u>135,193</u>		<u>11,424</u>	<u>107,468</u>		<u>10,390</u>

<sup>1</sup>Includes Homestake's proportionate share of ownership: Homestake 100%, McLaughlin 100%, Round Mountain 25%, El Hueso 100%, Wood Gulch 100%, Mineral Hill 50%, Golden Bear 36.6%, KMA (Mt. Charlotte and Fimiston) 48% share from 1984 through September 1987, then reduced to 38.4% following the sale of 20% of Homestake Gold of Australia Limited, and Fortnum 80%.

<sup>2</sup>Includes 6,203 tons of stockpiled ore at a grade of 0.073 per ton in 1988 and 4,456 tons at 0.078 ounces per ton in 1987.

• Projected Australian dollar outlays and expenses have been converted to U.S. dollars at an exchange rate of A\$1.00/US\$ .85

• Projected Canadian dollar outlays and expenses have been converted to U.S. dollars at an exchange rate of C\$1.00/US\$ .84

## STATISTICAL SUMMARY

Homestake Mining Company and Subsidiaries

(Quantities in thousands)	1988	1987	1986	1985	1984
<b>BASE METALS<sup>1</sup></b>					
<b>Tons of Ore Milled</b>	1,909	1,723	576	1,141	750
Lead Content (percent)	6.0	5.8	6.9	6.9	8.1
Zinc Content (percent)	0.8	0.8	1.4	1.4	1.8
Copper Content (percent)	0.7	0.6	1.0		
<b>Tons of Production</b>					
Refined Lead Products	100	85	41	66	58
Zinc Concentrate	20	17	12	24	20
Copper Concentrate	36	20	4		
<b>Tons of Ore Reserves</b>					
Lead Content (percent)	31,343	31,902	30,175	10,032 <sup>2</sup>	18,043
Zinc Content (percent)	5.1	5.1	5.5	8.0 <sup>2</sup>	5.6
Copper Content (percent)	0.9	0.9	1.0	2.2 <sup>2</sup>	1.4
	0.3	0.3	0.4		
<b>OIL AND GAS</b>					
<b>Production Sold<sup>3</sup></b>					
Natural Gas (MCF)	12,573	11,835	12,184	10,850	12,614
Crude Oil and Condensate (Bbls)	673	703	785	890	864
<b>Cash Lifting Costs</b>					
(\$ per Equivalent MCF)	.53	.48	.48	.81	.81
<b>Net Proved Reserves</b>					
Natural Gas (MCF)	56,727	65,840	72,900	88,600	93,810
Crude Oil and Condensate (Bbls)	3,681	3,448	3,092	4,214	4,676
Gas Equivalents (MCF, 6:1)	78,815	86,528	91,452	113,884	121,866
<b>URANIUM</b>					
<b>Tons of Ore Processed</b>	29	24	73	62	107
<b>Production U<sub>3</sub>O<sub>8</sub> (lbs.)</b>	497	489	605	602	684
<b>Tons of Ore Reserves<sup>4</sup></b>	65 <sup>6</sup>	69 <sup>6</sup>	92 <sup>6</sup>	103 <sup>4</sup>	310 <sup>4</sup>
Grade (percent)	0.339	0.339	0.371	0.186	0.200

<sup>1</sup>Statistics represent Homestake's share of Buick prior to the formation of Doe Run and its 42.5% share of Doe Run starting November 1, 1986.

<sup>2</sup>The decrease in ore reserves and the increase in reserve grade reflect adoption of a higher ore cut-off due to low lead prices.

<sup>3</sup>Net working interests, excluding royalties.

<sup>4</sup>Reduced to reflect only ore reserves that could be economically recovered and sold profitably under existing sales contracts.

<sup>5</sup>Does not include quantities of uranium that may be recovered through solution mining and ion-exchange recovery.

<sup>6</sup>Reflects only ore reserves that can be economically recovered and sold under current market conditions when produced concurrent with solution mining.

## AVERAGE PUBLISHED METAL PRICES<sup>1</sup>

Homestake Mining Company and Subsidiaries

	1989 <sup>3</sup>	1988	1987	1986	1985
<b>Gold—Per ounce</b> (London Final)	\$400.47	\$437.05	\$446.47	\$367.51	\$317.27
<b>Silver—Per ounce</b> (Handy & Harman)	\$ 5.94	\$ 6.53	\$ 7.01	\$ 5.47	\$ 6.14
<b>Lead—Per pound</b> (Producer) <sup>2</sup>	39.17¢	37.14¢	35.94¢	22.05¢	19.07¢
<b>Zinc—Per pound</b> (U.S.)	80.87¢	60.20¢	41.92¢	38.00¢	40.37¢
<b>Uranium—Per pound</b> (in concentrate)	\$ 11.60	\$ 14.55	\$ 16.78	\$ 17.00	\$ 15.60

<sup>1</sup>Source: Metals Week, except for uranium which is NUEXCO.

<sup>2</sup>For 1987, 1988 and 1989, North American Producer; for 1985-1986, U.S. Producer.

<sup>3</sup>Through February 10, 1989.

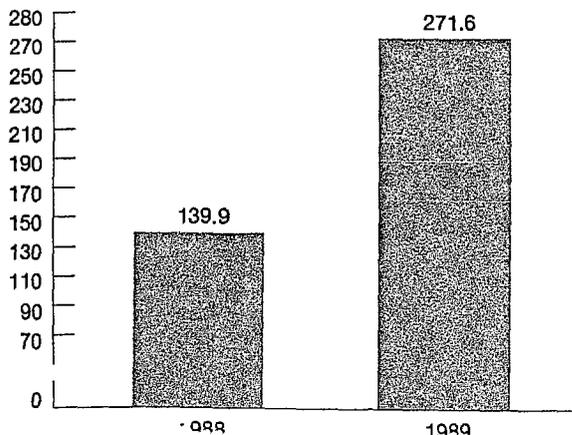
**Highlights**

	1st Quarter	
	1989	1988
Net income (\$000)	16,528	19,181
Average gold price (\$)	399	457
Ounce of gold sold (000)	271.6	139.9
Cash cost/ounce sold (\$):		
Production costs	179	156
Royalties	48	56
Other	9	11
Costs applicable to sales	236	223
General & administrative costs	19	16
Total cash cost per ounce	255	239
Total cost/ounce sold (\$) <sup>(1)</sup>	306	273
Tons mined (000 wet, including waste) <sup>(2)</sup>	28,035	19,217
Ore placed on leach pads (000 dry tons)	6,121	3,302
Ore milled (000 dry tons):		
Mill Number 1	326	295
Mill Number 2	733	832
Mill Number 3	202	—
Mill Number 5	1,227	—
Total tons milled	2,488	1,127

Notes: <sup>(1)</sup> Exclusive of financing costs, exploration expense, other income and federal income taxes

<sup>(2)</sup> Exclusive of material mined by American Barrick Resources Company on behalf of the Company.

**First Quarter Gold Sales** (000 oz.)



**To The Shareholders**

Newmont Gold Company reported another strong operating quarter due to the benefits of its ongoing major capital expansion program. Gold sales nearly doubled while material mined increased by 46 percent from prior year record levels. Despite these gains, however, net income for the quarter declined primarily due to a \$58 drop in the average price received for an ounce of gold.

First quarter net income was \$16.5 million, or 16 cents per share, compared with \$19.2 million, or 18 cents per share, in the first quarter of 1988. Average gold price realized was \$399 an ounce in the latest quarter, compared with \$457 an ounce in the first quarter last year. Gold sales increased to 271,600 ounces, up 94 percent from the 139,900 ounces sold in the first quarter of 1988. Cash costs of production in the quarter were \$255 per ounce compared with \$239 per ounce in the 1988 quarter.

Tons of waste and ore mined during the latest quarter increased to 28.0 million from 19.2 million tons in last year's corresponding quarter.

Ore placed on leach pads during the quarter nearly doubled to 6.1 million tons from 3.3 million tons placed on pads in the prior year's first quarter. The company's four mills, two of which are new, treated 2.5 million tons of ore during the 1989 first quarter, compared with 1.1 million tons treated by two mills in the first quarter of 1988.

The company's expansion program continued during the quarter. Mill Number 5, with a design capacity of 16,000 tons, was commissioned and is operating near design capacity. Work continues on Mill Number 4 which is designed to handle 4,500 tons of ore per day. It will be completed in June of this year. Gold produced from the expanded South Area leach increased to 74,400 ounces during the first quarter despite extremely cold weather conditions. First quarter capital expenditures were \$39.9 million, about one-third of the company's 1989 current capital spending forecast of approximately \$120 million. As a result of its expansions in 1988 and 1989, gold production is expected to reach a record 1.4 million ounces this year.

Minimal exploratory drilling was done during the first quarter due to severe weather conditions. However, \$14 million has been budgeted for exploration activities in 1989 to further define mineralization on Newmont Gold's properties along the Carlin Trend in Nevada.

The headquarters of Newmont Gold and Newmont Mining Corporation, which owns 90 percent of Newmont Gold, were relocated from New York to Denver in February. The senior managements of both companies have been fully integrated and are now able to interact daily to make and execute decisions more effectively. The Boards of Directors of Newmont Gold and Newmont Mining also have been integrated, allowing for greater insight to issues before the companies.

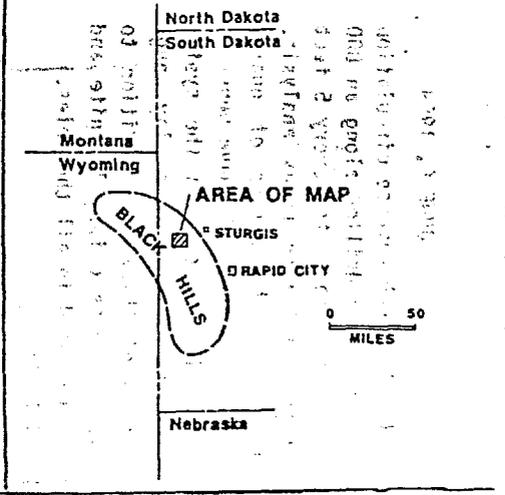
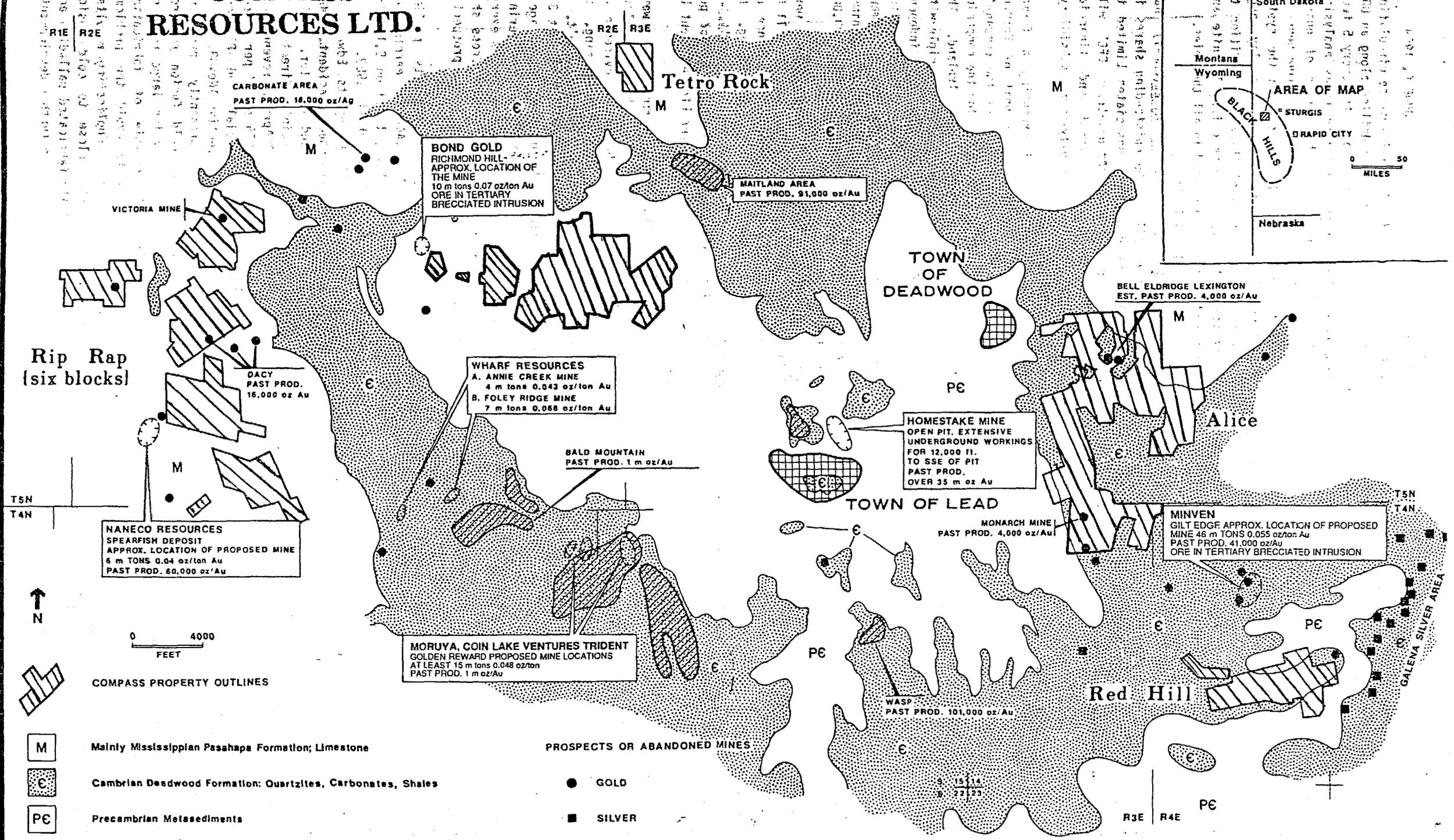
Gordon R. Parker  
Chairman and  
Chief Executive  
Officer

T. Peter Philip  
President and  
Chief Operating  
Officer

May 19, 1989

# COMPASS RESOURCES LTD.

## BLACK HILLS SOUTH DAKOTA PROPERTIES.



**CARBONATE AREA**  
PAST PROD. 18,000 oz/Au

**BOND GOLD**  
RICHMOND HILL-  
APPROX. LOCATION OF  
THE MINE  
10 m tons 0.07 oz/ton Au  
ORE IN TERTIARY  
BRECCIATED INTRUSION

**MAITLAND AREA**  
PAST PROD. 91,000 oz/Au

VICTORIA MINE

**DACY**  
PAST PROD.  
16,000 oz Au

**WHARF RESOURCES**  
A. ANNIE CREEK MINE  
4 m tons 0.043 oz/ton Au  
B. FOLEY RIDGE MINE  
7 m tons 0.066 oz/ton Au

**BALD MOUNTAIN**  
PAST PROD. 1 m oz/Au

**HOMESTAKE MINE**  
OPEN PIT. EXTENSIVE  
UNDERGROUND WORKINGS  
FOR 12,000 ft.  
TO SSE OF PIT  
PAST PROD.  
OVER 35 m oz Au

**BELL ELDRIDGE LEXINGTON**  
EST. PAST PROD. 4,000 oz/Au

**Rip Rap**  
(six blocks)

**NANECO RESOURCES**  
SPEARFISH DEPOSIT  
APPROX. LOCATION OF PROPOSED MINE  
6 m TONS 0.04 oz/ton Au  
PAST PROD. 68,000 oz/Au

**MORUYA, COIN LAKE VENTURES TRIDENT**  
GOLDEN REWARD PROPOSED MINE LOCATIONS  
AT LEAST 15 m tons 0.048 oz/ton  
PAST PROD. 1 m oz/Au

**MONARCH MINE**  
PAST PROD. 4,000 oz/Au

**MINVEN**  
GILT EDGE APPROX. LOCATION OF PROPOSED  
MINE 46 m TONS 0.055 oz/ton Au  
PAST PROD. 41,000 oz/Au  
ORE IN TERTIARY BRECCIATED INTRUSION



0 4000  
FEET

COMPASS PROPERTY OUTLINES

- M Mainly Mississippian Pasahapa Formation; Limestone
- C Cambrian Deadwood Formation: Quartzites, Carbonates, Shales
- PE Precambrian Metasediments

PROSPECTS OR ABANDONED MINES

- GOLD
- SILVER

Areas with extensive Gold Ore workings

ALL UNITS EXTENSIVELY INTRUDED BY TERTIARY  
ALKALIC SILLS, DIKES, LACOLITHS.

LEAD GOLD MINING DISTRICT, SOUTH DAKOTA  
LOCATION OF COMPASS RESOURCES PROPERTIES

# Let the record speak for itself

For the past 82 years, junior mining companies listed on the Vancouver Stock Exchange have made major contributions towards exploration and development of a great number of mines in Canada and the United States.

In an address to the National Mineral Outlook Conference in May, 1988, Dr. Norman B. Keevil, Jr., President and Chief Executive Officer of Teck Corporation said:

*"The challenge of today is exploration. More exploration and better exploration."*

Without exploration, we could not present the following list that demonstrates some notable production achievements initiated by junior mining companies.

Company	Present Reserves	Production	Company	Present Reserves	Production
Aiton Mines Ltd. (now Teck Corporation)	26.4 million tons 0.73% Copper	Copper 289,000,000 lbs. Gold 383,000 ozs. Silver 2,300,000 ozs. See Dynasty/Curragh	Highland Bell Ltd. (now Teck Corp.)	38,000 tons 9 oz/ton Silver	Moly 14,500 lbs. Silver 33,500,000 ozs. Gold 16,000 ozs.
AEX Minerals Corp. (now Curragh Resources)	Grum 30.6 million tons 9% Lead-Zinc 2 oz/ton Silver		Highland Valley Copper (formerly Bethlehem Lornex, Valley Copper, Highmont)	807 million tons 0.43% Copper	Copper 1,301,732,000 lbs. Gold 27,000 ozs. Silver 5,153,000 ozs. Moly 16,697,000 lbs.
Bar Resources Ltd. (now Equinox - Cominco)	1.4 million tons 0.05 oz/ton Gold	Gold 120,000 ozs. Silver 500,000 ozs.	Highmont Mining Corporation (now Highland Valley Copper)		Copper 111,000,000 lbs. Moly 15,200,000 lbs.
Belmoral Mines Ltd.	1.2 million tons 0.23 oz/ton Gold	Gold 150,600 ozs.	Hycroft Resources & Development Corp. (58% owned Granges)	30.0 million tons 0.03 oz/ton	Gold 92,400 ozs.
Bema Gold Corporation	9.9 million tons 0.05 oz/ton Gold	Production started 1989	International Corona Resources Ltd. (now Corona Corporation)	10.1 million tons 0.373 oz/ton Gold	Gold 654,000 ozs.
Bethlehem Copper Corp. Ltd. and Valley Copper Mines Limited (now Highland Valley Copper)		Copper 998,000,000 lbs. Gold 53,500 ozs. Silver 4,700,000 ozs.	International Mahogany Resources	Jolu 605,000 tons 0.46 oz/ton Gold	Gold 24,000 ozs.
Blackdome Mining Corporation	280,000 tons 0.74 oz/ton Gold 12.41 oz/ton Silver	Gold 76,500 ozs. Silver 205,000 ozs.	Lornex Mining, Corp. Ltd. (now Highland Valley Copper)		Copper 1,800,000,000 lbs. Moly 40,500,000 lbs. Gold 3,000,000 ozs. Silver 10,300,000 ozs.
Bralorne Pioneer Mines Ltd. (now Corona Corp.)	1 million tons 0.27 oz/ton Gold	Gold 4,100,000 ozs. Silver 951,000 ozs.	Mascot Gold Mines Ltd.	9.1 million tons 0.09 oz/ton Gold	Gold 48,600 ozs. Silver 26,700 ozs.
Breakwater Resources Ltd.	4.3 million tons 0.25 Gold	Gold 434,000 ozs. Silver 671,000 ozs.	MFC Mining Finance Corp. (now Minerva Gold Corp.)	Stibnite 1.4 million tons 0.037 oz/ton Gold	Gold 93,000 ozs.
Brenda Mines Ltd.	31 million tons 0.17% Copper 0.04% Moly	Copper 443,000,000 lbs. Moly 113,000,000 lbs. Gold 48,000 ozs. Silver 3,200,000 ozs.	Golden Reward	4.2 million tons 0.04 oz/ton Gold	Production to start 1989
Cariboo Gold Quartz Mining Co. Ltd. (now Mosquito Creek Gold Mining Co. Ltd.)	327,000 tons	Gold 1,200,000 ozs. 0.11 oz/ton Gold Silver 165,000 ozs.	Minerex Resources Inc. (now North West Resources Ltd.)	1.4 million tons 0.12 oz/ton Gold	Production started 1988
Coast Copper Co. Ltd.	Past Producer 1962-1969	Copper 2,727,500 lbs. Gold 2,000 ozs. Silver 377,000 ozs. Iron 1,077,457,000 lbs.	New Imperial Mines Ltd.	Past Producer 1967-1982	Copper 2,427,000 lbs. Gold 184,400 ozs. Silver 2,320,000 ozs.
Cowichan Copper Co. Ltd.	Past Producer 1962-1978	Copper 30,323,000 lbs. Gold 28,900 ozs. Silver 72,747 ozs.	Northair Mines Limited	Past Producer 1976-1982	Gold 166,500 ozs. Silver 846,000 ozs. Gold 23,300 ozs.
Craigmont Mines Ltd.	Past Producer 1961-1982	Copper 888,000 lbs. Gold 2,500 ozs. Silver 7,500 ozs.	Pacos Resources Ltd. (now Granges Exploration Ltd.)	Tartan 409,000 tons 0.21 oz/ton Gold 0.3 million tons 0.044 oz/ton Gold 2.0% Copper 5.4% Zinc	Gold 123,400 ozs. Silver 1,130,300 ozs. Copper 139,559,000 lbs. Zinc 264,579,000 lbs.
Dolly Varden Mines Ltd.	Past Producer 1928-1959	Silver 18,600,000 ozs.	Pegasus Exp. Ltd. (now Pegasus Gold Inc.)	Montana Tunnels 43.1 million tons 0.024 oz/ton Gold 48.3 million tons 0.02 oz/ton Gold 34.0 million tons 0.02 oz/ton Gold	Gold 952,000 ozs.
Dynasty Explorations Ltd. (now Curragh Resources)	85 million tons 10% Lead-Zinc	Lead 965,800 tons Zinc 1,208,500 tons Gold 8,400 ozs. Silver 20,714,000 ozs.	Pioneer Metals Corporation	Premier 8.3 million tons 0.07 oz/ton Gold 0.7 million tons 0.6 oz/ton Gold	Production to start 1989
Eastmaque Gold Mines Ltd. (American Girl)	2 million tons 0.04 oz. Gold 10 million tons 0.03 oz. Gold	Gold 30,000 ozs.	Puffy		Production started 1988
Endako Mines Ltd.	140 million tons 0.14% Moly	Moly 227,000,000 lbs.	Privateer Mine Ltd.	Past Producer 1933-1975	Gold 276,000 ozs. Silver 120,000 ozs.
Equity Silver Mines Limited	16.2 million tons 2.5 oz/ton Silver 0.03 oz/ton Gold 0.25% Copper	Copper 85,000,000 lbs. Gold 216,000 ozs. Silver 40,000,000 ozs.	Prominent Resources Corporation Ltd.	6.1 million tons 0.10 oz/ton Gold	Production started 1988
Erickson Gold Mines Ltd. (now Total Energy Corp.)	227,000 tons 0.43 oz/ton Gold	Gold 213,000 ozs. Silver 148,500 ozs.	Pyramid Mines Ltd. (now Pine Point Mines Limited)	Past Producer 1964-1986	Lead 33,974,000 lbs. Zinc 72,942,000 lbs.
Galactic Resources Ltd.	Ridgeway 56 million tons 0.03 oz/ton Gold Summitville 16 million tons 0.03 oz/ton Gold	Gold 80,000 ozs. Gold 222,000 ozs.	Queenstake Resources Ltd.	Not Available	Gold 53,000 ozs.
Giant Mascot Mines (now Corona Corp.)	Pacific Nickel Past Producer 1958-1979	Copper 28,400,000 lbs. Nickel 57,800,000 lbs. Cobalt 310,000 lbs.	Rea Gold Corporation	Bissett 1.3 million tons 0.23 oz/ton Gold	Production to start 1989
Gibraltar Mines Ltd.	163 million tons 0.30% Copper 0.02% Moly	Copper 1,000,000,000 lbs. Moly 9,000,000 lbs. Gold 4,000 ozs. Silver 1,700,000 ozs.	Reeves Macdonald Mines Ltd.	Past Producer 1949-1971	Copper 61,000 lbs. Lead 178,000,000 lbs. Zinc 450,000,000 lbs. Silver 638,000 ozs.
Glamis Gold Ltd.	4.3 million tons 0.04 oz/ton	Gold 133,700 ozs.	Scottie Gold Mines Ltd.	Past Producer 1981-1985	Gold 86,600 ozs. Silver 44,000 ozs.
Golden Knight Resources Inc.	8.1 million tons 0.25 oz/ton Gold	Production started 1988	Silbak Premier Mines Ltd. (now Pioneer Metals Corporation)	7 million tons 0.07 oz/ton Gold 2.6 oz/ton Silver	Gold 1,800,000 ozs.
Goliath Gold Mines Ltd. (now Hemlo Gold Mines Inc.)	19.9 million tons 0.32 oz/ton Gold	Gold 1,400,000 ozs.	Skyline Explorations Ltd.	385,000 tons 0.85 oz/ton Gold	Production started 1988
Granduc Mines Ltd.	Past Producer 1971-1983	Copper 420,000,000 lbs. Gold 65,500 ozs. Silver 3,800,000 ozs.	Sonora Gold Corp.	23.6 million tons 0.06 oz/ton Gold	Gold 134,800 ozs.
Grandview Resources Inc.	9.5 million tons 0.05 oz/ton Gold	not available	Torwest Resources Ltd. and Red Mountain Mines Ltd.	Past Producer 1966-1972	Moly 3,855,000 lbs.
Granisle Copper Ltd.	Past Producer 1966-1982	Copper 472,450,000 lbs. Gold 148,000 ozs. Silver 1,906,000 ozs.	Western Mines Ltd. (now Westmin Resources Limited)	13.8 million tons 2.4% Copper 5.28% Zinc 0.07 oz/ton Gold	Copper 170,000,000 lbs. Lead 107,000,000 lbs. Zinc 830,000,000 lbs. Gold 467,000 ozs. Silver 21,500,000 ozs.
			Wharf Resources Ltd.	24.0 million tons 0.04 oz/ton Gold	Gold 136,000 oz.
			Windarra Minerals Ltd.	1.2 million tons 0.4 oz/ton Gold	Production started 1989
			Yreka Mines Ltd.	Past Producer 1902-1967	Copper 8,677,114 lbs. Gold 1,604 ozs. Silver 145,871 ozs.

## Mining contributes to our economy

Mining contributes substantially to our resource based economy through taxes and job creation. The net present value of these accomplishments alone is in excess of sixty billion dollars.

## Capital is required to find and develop new mines

The Vancouver Stock Exchange has been successful in raising necessary capital since the turn of the century.

This information was presented by the B.C. & Yukon Chamber of Mines and sponsored by the following companies who support the role of the Vancouver Stock Exchange.

Bema Gold Corporation	Eastmaque Gold Mines Ltd.	Granges Exploration Ltd.	Magellan Resources Corp.	Red Fern Resources Ltd.
Bethlehem Resources Corporation	Electra North West Resources Ltd.	Gulf International Minerals Ltd.	Newhawk Gold Mines Ltd.	Sonora Gold Corp.
Black Swan Gold Mines Ltd.	Equinox Resources Ltd.	Hemlo Gold Mines Inc.	Napoleon Exploration Ltd.	Southern Gold Resources Ltd.
Blackdome Mining Corp.	Equity Silver Mines Limited	Hughes Lang Group	Noranco Mining Corporation	Taurus Resources Ltd.
Breakwater Resources Ltd.	Esperanza Explorations Ltd.	Imperial Metals Corporation	Northair Mines Ltd.	Teck Corporation
Canamin Resources Ltd.	Gibraltar Mines Limited	Inca Resources Inc.	Oversas Platinum Corporation	Welcome North Mines Ltd.
Colony Pacific Explorations Ltd.	Glamis Gold Ltd.	Inel Resources Ltd.	Pine Point Mines Ltd.	Westmin Resources Limited
Cominco Ltd.	Goldenbell Resources Incorporated	International Mahogany Corp.	Placer-Dome Inc.	Gerle Gold Ltd.
Consolidated Silver Standard Mines Ltd.	Golden Knight Resources Inc.	Laramide Resources Ltd.	Prime Resources Corporation	
Continental Gold Corp.	Goldsmith Minerals Limited	LaToka Resources Ltd.	Queenstake Resources Ltd.	
Corona Corporation		Les Entreprises de Richard Atkinson Ltd.	Rea Gold Corp.	

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EXPLORATION DEPARTMENT

# George Cross News Letter

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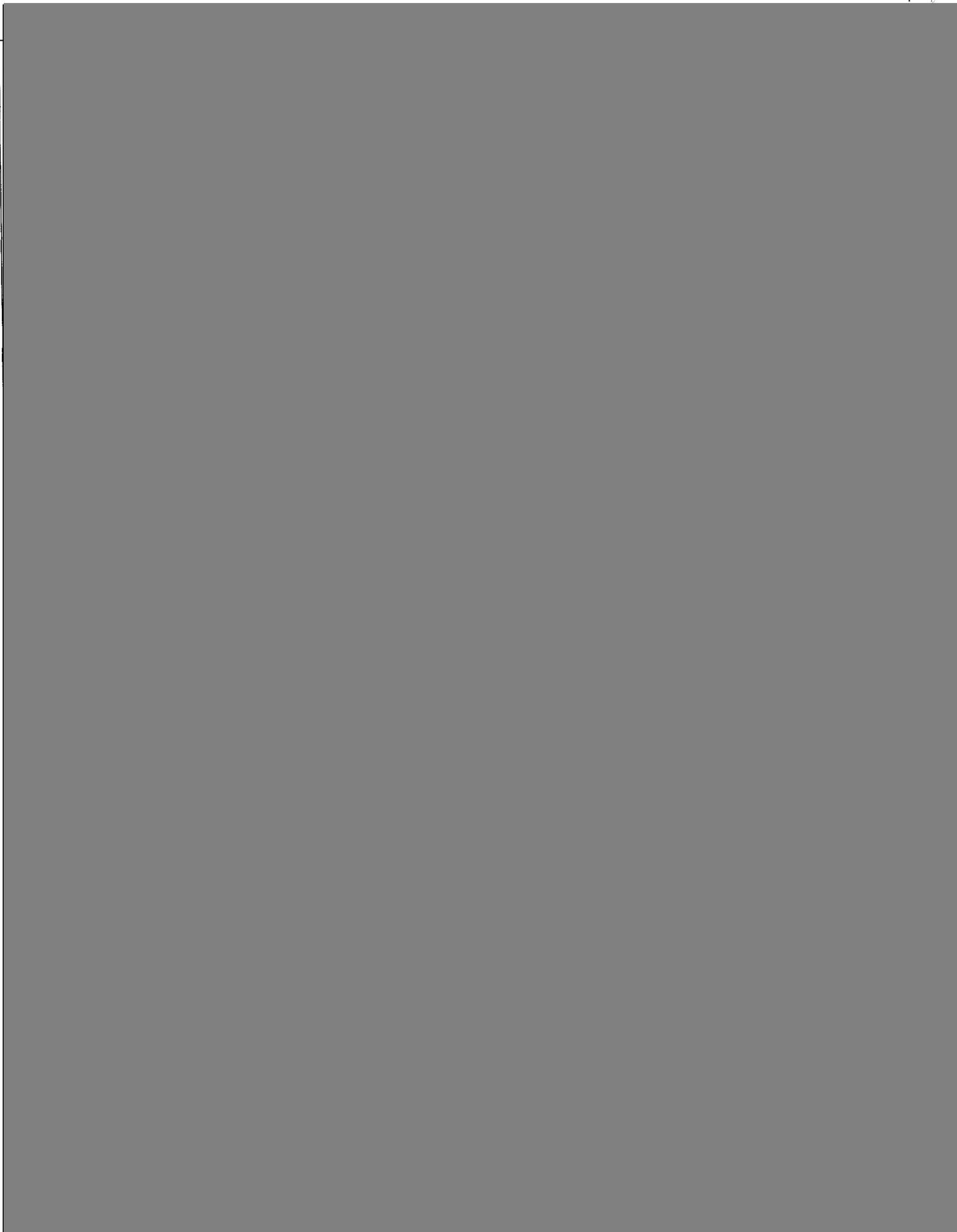
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JUNE 14, 1989

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June 14, 1989

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Company	Property	Location	Reserves	Treatment Rate (t/y)	Output (oz/y)	Start Date	Capital	Type	Remarks
<b>U.S.A.</b>									
American Barrick	Post	Carlin Trend, Nevada	4.2 Moz	1.8 M		1991		Cn	Second mill to treat deeper sulphide ore. JV mining plan under discussion with Newmont.
Newmont Gold	Rain	Carlin Trend, Nevada	—	1.0 Mt	100,000			P/Cn	1 Mt/y heap leach pad under construction.
US Gold Corp. (Silver State)	Tonkin Springs	Nevada	350,000 oz		50,000	1989	\$16 M	P/Cn	Expansion programme including a 1,500 t/d CIL plant.
U. S. Gold Corp. (Silver State)	White Pine	Nevada	—		16,000	1989	\$2.0 M	P/Cn	Open pit, heap leach operation.
Centurion Gold	Zaca	California	—		37,000	1990		P	Feasibility studies completed and major permits received.
Galactic Resources (48%)	Ridgeway	South Carolina	1.9 Moz	5.4 M	135,000	1989	\$80 M	P	Full production early in 1989. JV with BP Gold Corp. (52%).
Homestake/Inco Gold	Mineral Hill (Jardine)	Gardiner, Montana	—	136,000	42,000	1989		U	Project previously known as Jardine. JV between the two companies.
Echo Bay Mines	McCoy	Nevada	—	2.5 M		1989		Cn	7,500 t/d mill underway at McCoy mine site. Will also treat Cove ore.
Echo Bay Mines	Golden Butte	Nevada	80,000 oz		25,000	1989		P	Pre-stripping underway in mid 1988.
Freeport McMoRan (60%)	Big Springs	Jerritt Canyon district, Nevada	—		90,000	1989		Cn/Rf	Construction of mill and fluid bed roaster. JV with Bull Run Gold Mines.
Amax Gold Inc	Wind Mountain	Nevada	328,000 oz		40,000 Au, 300,000 Ag	1989	\$16 M	P	Heap leach operation.
Newmont Gold Co	No.4 Mill	Carlin Trend, Nevada		1.6 M		1989	\$61 M	Cn	Construction of new mill near Carlin and Golden Quarry open pits.
Echo Bay Mines	Cove	Nevada	4.0 Moz		225,000 Au, 2.5 Moz Ag	1989	\$90 M	P	Gold production expected to reach 1.0 Moz/y by 1992 from this and other Echo Bay operations.
Freeport McMoRan Gold (70%)	Jerritt Canyon	Nevada	2.8 Moz	2.52 M (est)	380,000	1989	\$43 M	P/Sm	Expansion from 3,600 t/d. FMC owns 30% of Jerritt Canyon. New plant to treat highly carbonaceous and sulphide ore.
Marigold Mining	Marigold	Valmy, Nevada	263,000 oz	406,000 (milled), 730,000 (heap leach)		1989	\$10 M	P/Cn	JV owned 70% by the Cordex Syndicate. Production decision imminent. Corona/Placer/Rayrock 30% Santa Fe Pacific.
Piedmont	Haile	South Carolina	60,000 oz					P	Second leach pad area to be constructed. Production to be raised from present 8,000 oz/y Au, 5,700 oz Ag/y.
Coin Lake Gold Mines	Golden Reward	Black Hills, South Dakota	—	1.8 M	65,000 Au, 50,000 Ag	1989		P	Company awaiting final permits from State authorities.
Eastmaque Gold Mines	Cargo Muchacho	Ogilby, S Carolina	—	136,000		88/89		U/P/Cn	Three ore zones on property — Padre/Madre, American Girl & American Boy.
Meridian Minerals	Royal Mountain King	California	—	900,000	60,000 Au, 60,000 Ag	1989		U	Previously worked from 1870s to 1950s. Mother Lode has right to buy a 49% stake. 2,500 t/d mill under construction. JV with Mother Lode Gold Mines.
Newmont Gold Co	No.5 Mill	Carlin Trend, Nevada	—	5.76 (est)		1989		Cn	New plant to cater for major expansion of Golden Quarry open pit.
Battle Mountain Gold	San Juan	California	187,000 oz		35,000	1989	\$28 M	U	Development studies underway and mining permits sought. JV with Centurion Gold.
Hecla Mining	Yellow Pine	Idaho	118,000 oz		25,000	88/89		P	Ore treated at nearby Stibnite gold mine by Pioneer Metals.
Stan West Mining	McCabe	Arizona	252,000 oz	162,000	50,000 Au, 140,000 Ag	1989	\$5 M		Mine development under way. Ultimate reserves assessed at 3 Mt.
Bond International Gold (BIG)	Bullfrog	Nevada	1.9 Moz	3.0 M	220,000	1989	\$100	P/Cn	Project comprises Bull Frog open pit, Montgomery/Shoshone open pit and CIL plant. Output should rise to some 300,000 oz/y soon.
BP Gold	Rawhide	Nevada	1.02 Moz		86,000 Au, 276,000 Ag	1989	\$9 M		Initial output at 30,000 oz/y Au in '89.
Newmont Gold	Post	Carlin Trend, Nevada	4.2 Moz			1991	\$30 M	P	JV mining plan being discussed with American Barrick. Could become one of largest gold mines outside South Africa. JV with American Barrick Resources.
Cornucopia Resources	Ivanhoe Hollister	Carlin Trend, Nevada	191,000 oz	2.95 M	40,000	1989	\$20 M	P/Cn	Heap leaching. Planning to mine the oxide ore of the Rowena/Ashby zone first. Mill to treat oxide & sulphide ores under consideration. JV with Galactic Resources.
Bema Gold/Glamis Gold	Champagne	Arco, Idaho	101,000 oz		20,000	1989		P	Test heap leaching under way.
Bema Gold/Glamis Gold	Buffalo Gulch	Elk City, Idaho	—		20,000	89/90		P	Permits for full scale mining expected before end of 1989.
BP Mineral America	Barney's Canyon	Bingham (Utah)	—		75,000	1989	\$32 M	P	Two small open pits — heap leach. Due on stream early 1989. Site 6 miles north of Bingham Canyon Cu mine. All permits now received.
GEXA Gold Corp.	Mother Lode	Beatty, Nevada	258,000 oz	324,000	25,000	1989	\$12.5 M	P	Deposit amenable to heap leaching. JV with US Precious Metals, NA Degerstrom Inc.
Santa Fe Southern Mining	Rabbit Creek	Nevada	3.6 Moz		100,000	1990	\$75 M	P	Production expected to start in second half 1990.

Company	Property	Location	Reserves	Treatment Rate (t/y)	Output (oz/y)	Start Date	Capital	Type	Remarks
<b>U.S.A. (continued)</b>									
Minven Gold Corp	Gilt Edge	S Dakota	1.5 Moz		200,000 est (2nd phase)	1993		P	1st phase development will entail heap leaching of oxide ore. 2nd phase — sulphide ore.
Nevada Goldfields (50%)	Empire	Empire, Colorado	62,000 oz			1989		P	Development of open pit heap leach project, subject to permits.
Viceroy Resources	Castle Mountain	California	1.3 Moz	2.6 M	150,000 (est)	1989	\$35 M	P	Further reserves found on property (12.2 Mt/1.6 g/t). JV with Hemlo Gold which can earn 50%.
Echo Bay Mines	Kettle River	Ferry County, Washington	683,000 oz	500,000 (e)	110,000	1990	\$47 M	U	Production of 110,000 oz/y Au expected over first two years of operation. Output of around 85,000 oz/y thereafter. JV with Crown Resources, Gold Texas Resources.
BP Minerals America	Barney's Canyon	Oquirrh, Utah	—		80,000	1990	\$32 M	P	Company could be absorbed by RTZ. Heap leaching — mine life 8 years.
Minven Gold Corp.	Stibnite	Idaho	139,000 oz	800,000 st/y	30,000			P	Increase in reserves from 800,000 t.
CoCa Mines	Sunbeam	Idaho	268,000 oz				\$10 M	P	Environmental permits issued, but are subject to review. JV with Geodome Resources.
Goldenbell Resources	Pine Tree	California	—		130,000	1989	\$51.8 M	P/U	Due on stream in 1989.
Echo Bay Mines (see separate McCoy & Cove entries)	McCoy/Cove	Nevada	3.2 Moz	16,000	330,00 Au, 6.5 M ag	1990	\$220 M	P	Tripling gold output by 1990 — about 14 year mine life.
Athena Gold	Talapoosa	Reno, Nevada	66,000 oz			1990	\$31 M	P	Orebody is open in two directions.
<b>Central and South America</b>									
<b>Brazil</b>									
TRV Mineracao	Anicuns	Goias	2.65 Moz					U	Anglo can earn 50% stake and be operator by spending \$2M on project. JV with Anglo American Corp do Brazil.
Novo Astro	Salamangone		—	100,000		1989	\$20 M	U/Cn	Novo Astro is a subsidiary of Companhia de Mineracao do Amapa (CMA). JV with Amapa.
Mineracao Santa Martha	Cabacal I		—		64,200	1988	\$50 M	U/Cn	JV-Cobem (52%), BP Mineracao (48%). JV with Mato Grosso.
CVRD	Igarape	Bahia	2.1 Moz		65,000	1991		U/Cn	This project is part of the Carajas project. CVRD has Capex of \$250 M to become a major gold producer.
Mineracao Jenipapa SA (WMC 75%, Garra Participacoes 25%)	Jenipapo	Aurilandia, Goias	80,000 oz	130,000	20,000	1989		U	CIL plant under construction.
<b>Chile</b>									
Cominco Resources International	Lobo	Maricunga	2.19 Moz					P	Substantial increase in resources. A mine is likely in due course. JV with Anglo American Chile.
Placer Dome Inc 50%	La Coipa	Atacama	2.1 Moz	4.9 M	650,000 g Au, 150 t/y Ag	1989	\$165 M	P	JV with Companhia Nacional de Mineracao (CNM). Consolidated TVS Mining Corp can earn 49%.
Codelco	El Hueso	Atacama	850,000 oz		129,000	1990	\$20 M	P	Homestake appears to have been successful in international tenders for right to develop project. Homestake has a mine in production since 6/88.
Shell Chile (42%)	Choquelimpie (Vilacollo)	Atacama	811,000 oz	1.0 M	300,000 Au, 4.75 M Ag	1988	\$42 M	P/Cn	Exploration of nearby mineralized zones started at end 1988. JV with Westfield (35%), Citibank (23%).
Anglo American Chile	Marte	Atacama	1.2 Moz	2.88 Moz	80,000	1989	\$35 M	P/Cn	6 km south of Marte, Anglo American is drilling the Lobo deposit. (30 Mt, 1.5 g/t). Construction in progress. JV with Cominco.
Inversiones Minera del Inca	San Cristobal		431,000 oz		24,000	1990		P/Cn	Initial output in 1989.
Cia Minera Osos del Salado (100% subsidiary of Phelps Dodge)	Copiapo	Atacama	694,000 oz					P	Final feasibility study expected by end 1989.
Total Erickson Resources	Dome Mountain		127,000 oz	108,000		1989		U	Total Erickson has a right to acquire a 44% interest.
Cluff Mineral Exploration Ltd	La Pepa	Atacama			30,000			U	Full feasibility study in view. Exploration continues. JV with Bridger Resources.
<b>Colombia</b>									
Greenstone Resources	Oronorte	Antioquia	56,000 oz	13,600		1989		U	Inferred reserves at 36 g/t are 272,000 t. Much higher production levels anticipated.
<b>Costa Rica</b>									
Greenstone Resources	El Recio	Abangares	148,000 oz		18,400 (P), 21,840 (U)	1989		U/P	Open pit potential reserves — 1.23 Mt U/g 600,000 t — 13.4 g/t.

Company	Property	Location	Reserves	Treatment Rate (t/y)	Output (oz/y)	Start Date	Capital	Type	Remarks
<b>Ecuador</b>									
Companhia Mineraria Internacional (IMINCO)	Lorena	Province of NAPO	675,000 oz			1991		A	25,000 t/month plant under construction.
<b>Honduras</b>									
Companhia Minerarias de Copan	San Andres	Northwest Region	128,000 oz	162,000		1989		Cn	Expansion of mill from 230 t/d to 450 t/d — serving heap leach ops. Owned 25.5% by Madeleine Mines and 25.5% by Milner Consolidated Silver Mines.
<b>Panama</b>									
Government	Remance	San Francisco de Veragus	260,000 oz		63,900 (est)	1989	\$2.5 M (initial)		Reserves reported to be 260,000 oz of contained Au.
<b>Peru</b>									
Resources Sundust Inc of Canada (30%)	Aurifera el Sol	Madre de Diosurandih	1.88 Moz	1.8 M m <sup>3</sup> /y	10,450	1989	\$3.0 M (plus)	A	Company was formerly Texasgulf Peru.

## Australasia

<b>Australia</b>									
Reynolds Boddington Mines	Boddington	Western Australia	—	4.5 M	250,000	1989	SA15 M	P	Expansion programme achieved to 4.5 Mt/y. New expansion to 6 Mt/y in 89.
Renison Gold Fields	Lucky Draw	N.S.W.	550,000 oz		37,000	1986	SA20 M	P	Started 12/88. Four year mine life expected, yielding 145,000 oz.
Placer Pacific	Granny Smith	Laverton, W.A.	735,000 oz	3 Mt/y	150,000	1990		P	Placer Pacific has a 60% stake in venture. JV with Delta Gold. Construction started.
Aztec Exploration	Bounty	Mt Hope, W.A.	—	450,000	30,000	1989		P/Cn	CIP plant nearly complete. JV with Forrestania Gold.
Placer Pacific	Big Bell	Cue, W.A.	—	2.5 M	150,000	1989		P/Cn	Production reached 02/89. JV with Australian Consolidated Minerals.
Peko Gold	Golden Valley	W.A.	—	350,000	40,000	1989	SA7.5 M	P/Cn	Trial heap leaching under way. JV with Delta Gold.
Kalbara Mining	Kundana	W.A.	94,000 oz	300,000	40,000	88/89	SA7.0 M	P/Cn	Project part of the White Flag JV with Tern Minerals.
Hill Minerals	Cork Tree Well	W.A.	—	500,000		1989	SA7.0 M	Cn	Purchased from Austwhim Resources for \$A7 M. Expansion from 300,000 t/y.
Renison Goldfields	Pine Creek	N.T.	—	1.4 M		1988	SA9 M	Cn	Mill capacity has been increased to 1.5 Mt/y.
Paragon Resources	Temora	N.S.W.	—	700,000	55,000	1989	SA20 M	Cn	Mill capacity has been raised to 700,000 t/y.
Paragon Resources	Comet	W.A.	98,000 oz	150,000	30,000	1989	SA80 M	P	Ore treated at Brunswick's Galtee More plant.
Central Kalgoorlie Gold Mines	Bullabulling	W.A.	47,000 oz	1.2 M		1989		P/Cn	Plans to heap leach 1.0 Mt of low grade ore over a 30 month period.
Whim Creek	Paddys Flat (Meekatharra)		—	700,000	70,000	1988	SA16 M	Cn	Concentrator project. Ore from Phar Lap and Prohibition open cuts.
Whim Creek	Labouchere	W.A.	165,000 oz	450,000		1989	SA13 M	P/Cn	Mine construction started in 1988.
Cyprus Gold Australia	Moline	N.T.	291,000 oz	500,000	47,000 (e)	1989	SA21 M	P	Cyprus Gold managing. Mine life about 4 years. JV with Greenbushes, Arimco.
Ballarat Goldfields	Ballarat East	Victoria	—				SA7 M	U	Shaft sinking underway.
Cyprus Gold	Starra	Queensland	31,000 oz	750,000	64,000	1989		P	
North Kalgurli Mines	Jubilee	W.A.	—	1.25 M	75,000	1990		P	Expanding ore throughput to 1.25 Mt/y and gold output from 40,000 oz/y.
North Kalgurli Mines/ Newmont Australia	New Celebration	W.A.	—	1.6 M	162,000	1989	SA15.5 M	P/Cn	Capital programme to expand milling capacity.
North Kalgurli Mines	Big Pit	Fimiston/Paringa Lease, W.A.	—	2.0 M	260,000	1989	SA104 M	P/Cn	Rationalization of existing ops. \$A104 Capex for mill only.
BHP Gold	London/Victoria	Parkes, N.S.W.	100,360 oz		20,000 to 25,000	1989		P	Alkane Exploration has a 40% stake in project at present. On stream Dec '88.
Dominion Mining	Cosmo Howley	N.T.	13,000 oz	1.0 M		1989		P	New 1.0 Mt/y CIL plant.
Dominion Mining	Woolwonga	N.T.	452,000 oz	1.5 M	100,000	1989	SA6.2 M	P/Cn	Further expansion to reach 1.5 Mt/y capacity by March 1989. JV with Geopeko (36%).
Golconda	Duketon	Laverton, W.A.	—	200,000	200,000	1989	SA7 M	P/Cn	Development of three deposits as a single project under construction. JV with Duketon Exploration.
Worsley Alumina	Boddington	W.A.	—	6.0 M	25,000++	1989	SA30 M	P/Cn	Second expansion programme. Latest expansion will allow low grade ore treatment to provide additional 80,000 oz/y.
MIM	Pacific Precious Metals	Sydney	—			89/90		Rf	Refinery under construction to treat primary and secondary gold. JV with Noranda (40%), Tolltreck (20%).
Pan Australian Mining Ltd	Mount Leyshon	Charters Towers, Queensland	647,000 oz	2.75 M	150,000	1989	\$29 M	Cn	New CIP plant will increase output from current 8,000 oz/y Au.
Elders Resources	Red Dome	N. Queensland	505,000 oz		75,000	1989		U/P	Expansion of open pit and new u/g mine (Stage two). JV with NZFP.
Mount Arthur Molybdenum	Minnie Moxham	Queensland	167,000 oz	90,000	25,000	1989	SA40 M	P	Rehabilitation of former project. Financing for 90,000 t/y CIL plant.

Company	Property	Location	Reserves	Treatment Rate (t/y)	Output (oz/y)	Start Date	Capital	Type	Remarks
<b>Australia (continued)</b>									
BHP Gold	Telfer	W.A.	—	3 M (oxide ore)				Cn	Assessing methods and economics of raising oxide ore milling capacity from 2 to 3 Mt/y. JV with Newmont Australia.
Delta Gold	Golden Valley	Kanowa, W.A.	150,000 oz		35,000	1989		P	Full scale output expected early in 1989. JV with Peko Gold.
Metana	Rothsay	W.A.	158,000 oz		35,000	1989	\$A13 M	U/P	Combined open pit/underground operation.
Sandhurst Mining NL Western Mining Corp Holdings (WMCH)	Trafalgar Emu	Kalgoorlie, W.A. W.A.	59,000 oz 213,000 oz	750,000 t/y 1.0 Mt/y	20,000 70,000 (est)	1988 1989		P P	Heap and vat leach project. Expansion programme from 700,000 t/y ore to give 53,000 oz/y Au. JV with Great Boulder Holdings.
Hill 50 Gold Mine	Hill 50	Mt Magnet, W.A.	—	1.2 Mt/y		89/90		U/P	Expansion project, (including iron plant), from 360,000 t/y. JVC with WMCH (96%).
Homestake Gold of Australia	Super Pit (Big Pit)	Kalgoorlie, W.A.	—	2.0 M	800,000	1991		U	20 year life for pit. Underground ops possible eventually. JV with North Kalgoorlie Gold Mines of Kalgoorlie.
Enterprise Gold	Union Reefs	Pine Creek, N.T.	395,000 oz	1.25 Mt/y	30,000	1990		P	Awaiting go-ahead from N.T. Government.
<b>New Zealand</b>									
Cyprus Minerals	Golden Cross	North Island	—		80,000	1990		P	Cyprus has 80% stake. Mining permits being sought.
BHP Gold Mines (NZ)	Round Hill	Macraes Flat, Otago	438,000 oz	500,000	32,000	1990	\$A30 M	P	Ongoing development. After two years output should rise to 48,000 oz/y. Milling 750,000 t/y ore.
Golden Shamrock Mines	Blackwater	Reefton, South Island	—		25,000			U	Produced until 1951. On closure had produced 680,000 oz Au at 14 g/t (recovered grade). Drilling of old workings to be examined. JV with CRA Exploration (51%).
<b>Papua New Guinea</b>									
Newmex Exploration NL	Laloki	Port Moresby district	42,000 oz	100,000	10,000		\$A6 M	U/Cn	Joint venture project. Ore to be processed in Sirosmeit plant. JV with Chase Minerals NL.
Placer Pacific	Misima	Misima Island	2.4 Moz		200,000 Au, 2.1 M Ag	1991	\$A270 M	U/P/ Cn	Placer Pacific has arranged a 400,000 oz Au multi-option credit facility with 9 financial institutions.
Placer Pacific	Porgera	Papua New Guinea	12.7 Moz	2.88 M	800,000	89/90	\$420 M	P/U/ Cn	JV partners have delivered feasibility study to government of PNG. JV with Renison Goldfields, MIM Holdings.
BP Minerals America (80%)	Lihir	Lihir Island	25.45 Moz	5.0 M		1995		P	Metallurgical testwork completed. Assessed as one of the world's largest undeveloped gold deposits. JV with Niugini Mining 20%.
CRA CRA	Hidden Valley Mount Kare	Wau Porega	— 328,000 oz	3.0 M 1.0 Mt		1991	\$A200 M	P P	Medium tonnage low grade deposit. Small scale development with view to expansion to about 1 Mt/y later.
<b>Europe</b>									
<b>Finland</b>									
Outokumpu Oy	Kittila	Lapland	109,000 oz	30,000 (e)	24,000 (e)	1989		P	Three year life. Will be Finland's only gold mine. Output will be treated at Rautaruikki.
<b>France</b>									
Prouits Chimiques de Salsigne Co	Salsigne	Aude	—	1.0 M	42,880	1989	FF50 M	A/Cn	Agreement reached with the Rich Group (Switzerland) for tailings retreatment project.
<b>Spain</b>									
Glamis Gold	Salave	Oveido	106,000 oz		3,000		\$6.75 M (partial)	P	The Glamis/Biomet partnership (65/45) will manage project and can earn 50% interest for expenditure of \$6.75 M. Heap leach ops. JV with Biomet Technology Charter Explorations.
Filon Sur SA	Filon Sur	Huelva Province	—	300,000	12,000 Au, 110,000 Ag	1988		P	Recovering gold/silver by heap leach methods from gossan ores on Tharsis property.
<b>Sweden</b>									
Boliden Mineral	Akerberg	Akerberg	94,000 oz		20,000	1989	£2.3 M (start up)	P	Project part of £154 M investments covering 16 mining projects.
<b>UK</b>									
Ennex International	Sperrin Mountains	Ulster	—						Exploration phase.

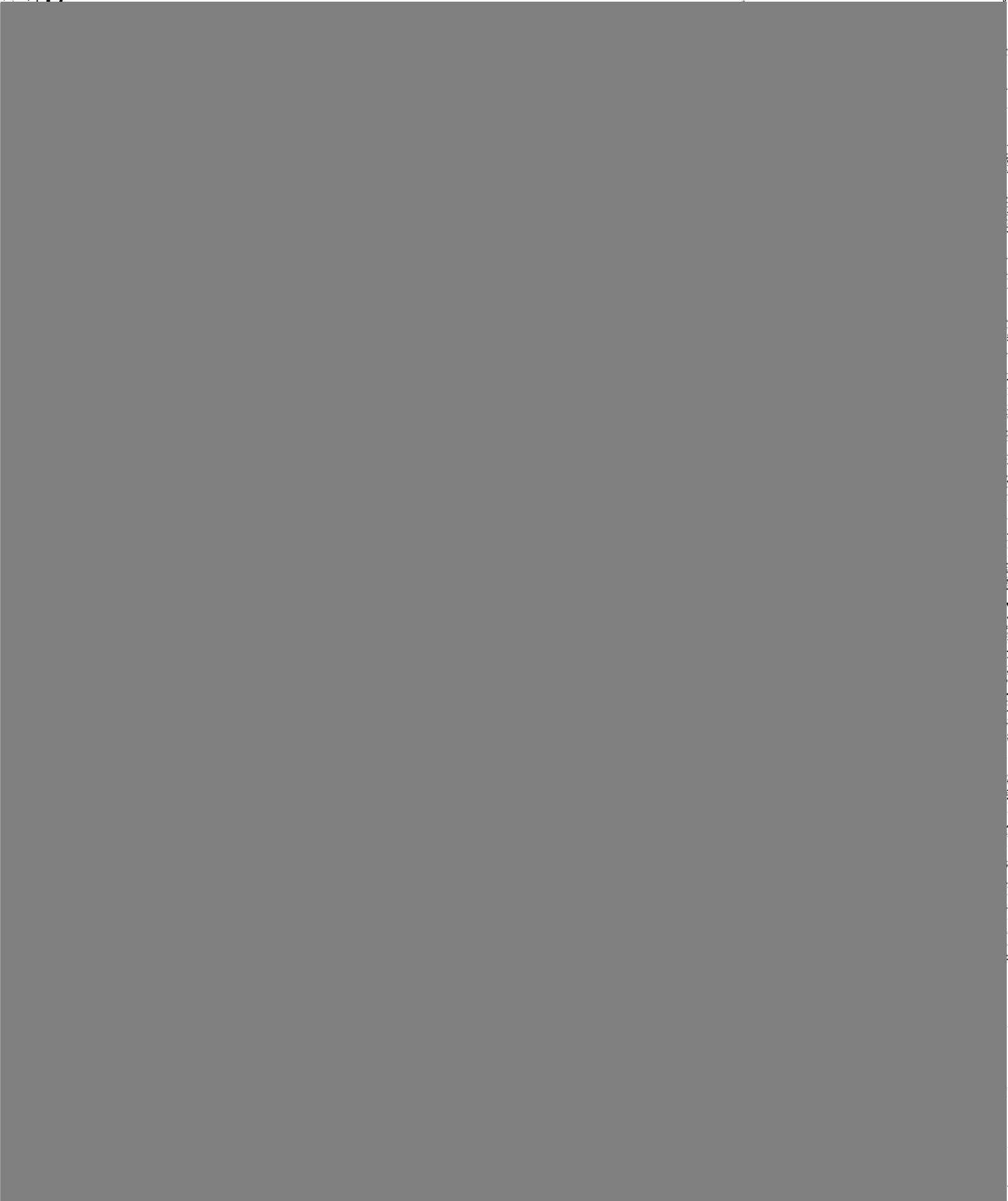


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**Replacement of BP Minerals by Kennecott is Completed**







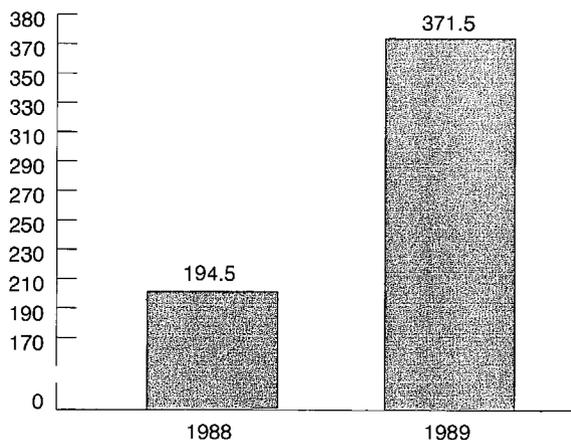
*WPK* *JDS*

**Highlights**

	2nd Quarter		Six Months	
	1989	1988	1989	1988
Net income (\$000)	27,828	24,548	44,356	43,729
Average gold price (\$)	375	453	385	455
Ounces of gold sold (000)	371.5	194.5	643.1	334.4
Cash cost/ounce sold (\$):				
Production costs	161	163	168	160
Royalties	43	54	45	55
Other	5	9	7	10
Costs applicable to sales	209	226	220	225
General & administrative costs	19	17	19	16
Total cash cost per ounce	228	243	239	241
DD&A per ounce sold (\$)	43	32	46	33
Total cost/ounce sold (\$)*	271	275	286	274
Tons mined (000 wet, including waste)**	32,301	25,628	60,335	44,845
Ore placed on leach pads (000 dry tons)	8,780	4,803	14,901	8,105
Ore milled (000 dry tons):				
Mill Number 1	393	346	719	642
Mill Number 2	847	768	1,580	1,600
Mill Number 3	231	—	433	—
Mill Number 4	101	—	101	—
Mill Number 5	1,449	—	2,676	—
Total tons milled	3,021	1,114	5,509	2,242

Notes: \* Exclusive of financing costs, exploration expense, other income and federal income taxes  
 \*\* Including equivalent wet tons of material mined by Barrick Goldstrike Mines, Inc. on behalf of the Company relating to the material processed during the period (6,020 tons in 1989).

**Second Quarter Gold Sales (000 oz.)**



**To The Shareholders**

Newmont Gold Company had its strongest operating quarter in history as mining, milling and leaching of ore and sales of gold reached record levels. The record performance was the result of a \$478 million expansion program commenced by the company in 1987 and virtually completed in the second quarter with the successful startup of Mill Number 4, one of three new mills, three leach plants and various support facilities added during the last two years at the company's operations on the Carlin Trend in Nevada.

Net income for the second quarter was \$27.8 million, or 27 cents per share, compared with \$24.5 million, or 23 cents per share in the second quarter of 1988. The increase came in spite of the decline in the price of gold to \$375 an ounce in the 1989 quarter from \$453 an ounce in the second quarter last year. Gold sales increased to 371,500 ounces in the quarter, up 91 percent from the 194,500 ounces sold in the second quarter of 1988, and 37 percent ahead of the 271,600 ounces sold in this year's first quarter. Cash costs of production in the second quarter declined to \$228 per ounce compared with \$243 per ounce in the same period last year. The lower cash cost per ounce was primarily due to lower royalty expense per ounce, mainly resulting from the lower gold price received during 1989. In addition, higher-than-planned output from previously-leached material during the second quarter of 1989 favorably impacted the company's cost per ounce.

Material mined during the quarter rose to 32.3 million tons compared with 25.6 million tons in last year's second quarter. Tons of ore milled during the quarter nearly tripled to 3.0 million from 1.1 million tons last year. Ore placed on leach pads also rose, reaching 8.8 million tons compared with 4.8 million placed on pads in last year's second period.

**Six Months Results**

For the first six months of 1989, net income was \$44.4 million, or 42 cents per share, compared with \$43.7 million, or 42 cents per share in the comparable 1988 quarter. Gold production for the first six months was 643,100 ounces, compared with 334,400 ounces in the comparable 1988 period. The production in the first half of 1989, boosted by the expansion program, was more than the production for the entire year of 1987.

**Expansion Program**

Newmont Gold Company's two-year expansion program has increased its total milling capacity to

40,000 tons per day in 1989 from 13,000 tons per day in 1987 and leaching capacity in the same period increased to the current annual rate of 32 million tons from 9.2 million tons two years ago. As a result, the company's production of gold will reach 1.4 million ounces in 1989, a 56 percent increase from 1988 production of 895,500 ounces and 138 percent higher than the 589,000 ounces produced in 1987.

Mill Number 4, the last of the three new mills built since 1987—to give Newmont Gold a total of five mills—began operations on June 1, one month ahead of schedule. Some 4,900 ounces of gold were produced in the new mill during June. It is anticipated that the mill will process more than one million tons of ore and produce approximately 80,000 ounces of gold in 1989. The new mill processes ore from the Post deposit and will also treat ore from the Capstone/Bootstrap deposit when operations commence there in 1990.

Following the construction of two additional leach pads covering 190 acres, leach production of gold more than doubled at the South Area during the first half of the year. Leach output from the South Area rose to 182,700 ounces of gold in the first half of 1989 from the 84,100 ounces produced in the first six months of 1988.

Capital expenditures in the second quarter were \$45 million, down from \$76 million in the second quarter of 1988. With the virtual completion of the current expansion program, capital expenditures in the second half of 1989 are expected to be much lower than in the first half.

**Exploration**

Exploration and deposit definition drilling resumed on the company's Carlin Trend properties in late March after the winter slowdown. In the second quarter, 279 holes were drilled, totalling 256,925 feet.

A high-grade occurrence of gold mineralization was encountered in an area named Deep Star some 500 yards north of Newmont Gold's Genesis deposit in the North Area of operations. Preliminary results from one hole show a 350-foot-long interval that averaged 0.768 ounces of gold per ton between 1,300 and 1,650 feet from surface. The interval encountered is comparable to all but the best high-grade holes at the Post deposit. The record hole at Post averaged 0.93 ounces per ton over an interval of 470 feet.

The Deep Star hole is very encouraging because it is the latest indication of further mineralization in the North Area, which contains more than 4.5 million ounces of proven and

probable minable reserves out of an overall geological resource of approximately 12 million ounces of gold.

Although there is no evidence of continuity with Post, the geological setting of the Deep Star drill hole is very similar to that observed in the Deep Post area, and some relationship ultimately may be demonstrated. The drill results announced are preliminary assays based on 25-foot composites from conventional rotary drilling with mud circulation. Diamond drilling is in progress in the Deep Star area and more conclusive results will be available from this program in mid-September.

Approximately \$8 million is being spent this year on exploration in the North Area of Newmont Gold's property, representing about half of what the company will spend on drilling in Nevada this year. The company's exploration drilling on the Carlin Trend currently is averaging 100,000 feet per month using a total of 25 core, reverse circulation and rotary drills.

**Legislation**

As anticipated, the Nevada State Legislature passed legislation raising to 5 percent from approximately 1.5 percent the tax on the net proceeds of the state's mining industry. Also, during the quarter, Nevada's Governor signed into law the state's first program for reclamation of mined lands. The law requires that all public and private lands disturbed by mining or exploration activities be reclaimed in an economically and technically practical manner to a safe, stable condition capable of supporting a productive post-mining land use.

Both of these laws will increase Newmont Gold's expense of doing business, but are responsible and should not affect the long-term outlook for our company or the mining industry in Nevada.

**Board of Directors**

Antony P. Hichens, managing director and chief financial officer of Consolidated Gold Fields PLC, resigned August 18, 1989 as a Newmont Gold Company director. He had served since January 1989 as a director.

*Gordon R. Parker*

Gordon R. Parker  
Chairman and  
Chief Executive Officer

*T. Peter Philip*

T. Peter Philip  
President and  
Chief Operating Officer

August 21, 1989



Second  
Quarter  
Report

SS

June 30, 1989

Newmont Gold Company  
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Denver, Colorado 80203

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\*Effective June 1, 1989, Morgan Shareholder Services  
changed its name to First Chicago Trust Company of  
New York as a result of being acquired by First  
Chicago Corporation.

Newmont Gold Company has the largest announced  
North American gold reserves—16.3 million ounces at  
the end of 1988. Operating in the Carlin Trend in  
northern Nevada, Newmont Gold is the largest  
producer on the continent. The shares of Newmont  
Gold, 90-percent-owned by Newmont Mining  
Corporation, are traded on the New York Stock  
Exchange under the symbol NGC.

**FINANCIAL HIGHLIGHTS**

	<i>Third Quarter</i>		<i>Nine Months</i>	
	<i>1989</i>	<i>1988</i>	<i>1989</i>	<i>1988</i>
Revenues (000s)	\$21,745	\$27,298	\$59,926	\$81,711
Exploration expenses (000s)	3,391	4,441	8,821	8,972
Net income (000s)	531	6,589	4,301	24,534
Net income per share	.01	.16	.10	.59
<b>Costs per ounce:*</b>				
Production	\$206.46	\$154.61	\$194.31	\$149.63
State taxes	10.64	9.30	13.35	10.31
Freight and handling	.41	.31	.40	.34
Depreciation and amortization	78.41	58.69	69.27	58.02
General and administrative	33.92	31.54	39.33	31.63
Management and tolling fees	(15.77)	(3.80)	(10.84)	(4.17)
Total costs, excluding exploration	<u>\$314.07</u>	<u>\$250.65</u>	<u>\$305.82</u>	<u>\$245.76</u>
Average realized price per ounce	<u>\$366.59</u>	<u>\$423.42</u>	<u>\$377.11</u>	<u>\$440.78</u>

\*Includes FAU's 70 percent share of the Jerritt Canyon joint venture and FAU's 60 percent share of the Big Springs joint venture. For the nine-month period ended September 30, 1989, revenues and operating expenses relating to the sale of 8,900 ounces were capitalized in connection with the start-up of the Big Springs mill/roaster facility. Also, for the three and nine-month periods ended September 30, 1989, revenues and operating expenses relating to the sale of 3,900 ounces were capitalized in connection with the start-up of the Jerritt Canyon roaster facility.

**OWNERSHIP AT SEPTEMBER 30, 1989**

	<i>Shares</i>	<i>Percent</i>
Freeport-McMoRan Inc.	25,193,225	60.9
Public	16,219,292	39.1
	<u>41,412,517</u>	<u>100.0</u>

## OPERATING HIGHLIGHTS

	Third Quarter		Nine Months	
	1989	1988	1989	1988
Total ounces produced <sup>1</sup> (FAU's share)	67,900	64,600	175,000	187,000
Total ounces sold <sup>1</sup> (FAU's share)	61,300	64,500	168,800	185,400
<b>JERRITT CANYON</b>				
Ore milled (tons)	522,000	401,000	1,244,100	1,202,300
Ore milled (tons per day)	5,700	4,400	4,600	4,400
Average grade (ounce per ton)	.172	.207	.187	.209
Recovery rate (%)	90.2	90.4	90.6	91.7
Ounces produced <sup>2</sup> (100%)	82,100	77,600	212,600	235,700
Ounces produced <sup>2</sup> (FAU's 70% share)	57,500	54,300	148,900	165,000
<b>BIG SPRINGS<sup>3</sup></b>				
Ore milled (tons)	80,500	—	218,700	—
Ore milled (tons per day)	875	—	800	—
Average grade (ounce per ton)	.168	—	.180	—
Recovery rate (%)	89.0	—	83.6	—
Ounces produced <sup>2</sup> (100%)	17,400	17,200	43,500	36,700
Ounces produced <sup>2</sup> (FAU's 60% share)	10,400	10,300	26,100	22,000

<sup>1</sup>Includes FAU's 70 percent share of the Jerritt Canyon joint venture and FAU's 60 percent share of the Big Springs joint venture. For the nine-month period ended September 30, 1989, revenues and operating expenses relating to the sale of 8,900 ounces were capitalized in connection with the start-up of the Big Springs mill/roaster facility. Also, for the three and nine-month periods ended September 30, 1989, revenues and operating expenses relating to the sale of 3,900 ounces were capitalized in connection with the start-up of the Jerritt Canyon roaster facility.

<sup>2</sup>Includes heap-leach production.

<sup>3</sup>Mill production began in November 1988.

designed to treat approximately 3,500 TPD of highly refractory ore. The balance of the ore, being less refractory, can continue to be processed through the mill's existing chlorination treatment system, also developed and patented by Freeport-McMoRan Inc. Jerritt Canyon's existing gold recovery and processing facilities have also been upgraded and new mine equipment purchased to support the mill's higher throughput level.

*JERRITT CANYON GOLD PRODUCTION*  
(ounces)

<i>Third Quarter</i>		<i>Nine Months</i>	
<i>1989</i>	<i>1988</i>	<i>1989</i>	<i>1988</i>

*JOINT VENTURE (100%)*

Mill	80,600	77,600	209,600	234,200
Heap leach	1,500	—	3,000	1,500
Total	<u>82,100</u>	<u>77,600</u>	<u>212,600</u>	<u>235,700</u>

*FAU'S SHARE (70%)*

Mill	56,400	54,300	146,800	164,000
Heap leach	1,100	—	2,100	1,000
Total	<u>57,500</u>	<u>54,300</u>	<u>148,900</u>	<u>165,000</u>

*Big Springs:* FAU's share of third-quarter 1989 gold production from Big Springs totaled 10,400 ounces, with 7,000 ounces produced by a new fluid-bed roasting facility that became operational in the second quarter. During the year-ago quarter, all Big Springs production came from its heap-leaching operations. A conventional mill with a rated design capacity of 1,000 TPD began processing nonrefractory ore in late 1988 and is now providing ore feed for the new roasting equipment. During the three months ended September 30, 1989, the new mill and roasting facility processed 875 TPD, operating at 88 percent of its rated capacity. The gold recovery rate at Big

Springs during the 1989 period was 89 percent, up from 83 percent during the previous quarter, confirming the successful start-up of these new facilities.

*BIG SPRINGS GOLD PRODUCTION*  
(ounces)

	<i>Third Quarter</i>		<i>Nine Months</i>	
	<i>1989</i>	<i>1988</i>	<i>1989</i>	<i>1988</i>
<i>JOINT VENTURE (100%)</i>				
Mill*	11,900	—	33,200	—
Heap leach	5,500	17,200	10,300	36,700
Total	<u>17,400</u>	<u>17,200</u>	<u>43,500</u>	<u>36,700</u>

*FAU'S SHARE (60%)*

Mill*	7,000	—	19,900	—
Heap leach	3,400	10,300	6,200	22,000
Total	<u>10,400</u>	<u>10,300</u>	<u>26,100</u>	<u>22,000</u>

\*Mill production began in November 1988.

*EXPLORATION*

FAU's exploration program intensified during the traditionally busy third quarter as the company continued its efforts to increase reserves in the Jerritt Canyon joint-venture area. During the quarter, FAU also evaluated other areas both within and outside North America.

At Jerritt Canyon, more than 500 holes were drilled during the third quarter of 1989. Approximately two-thirds of this drilling involved ore bodies in the predevelopment stage adjacent to the Jerritt Canyon mine complex. Approximately 100 holes were also drilled on five outlying target areas, with encouraging results.

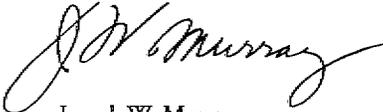
Outside the Jerritt Canyon area, FAU continues to generate exploration prospects in highly competitive areas. During the third quarter, 64 test holes were drilled on 12 projects, and five new prospects were acquired in the western United States. At the end of the quarter, FAU controlled 30 active exploration properties.

With the completed expansion of the Jerritt Canyon and Big Springs facilities and through its ongoing exploration program, Freeport-McMoRan Gold Company is strengthening its standing as a major, lower-cost North American gold producer.

Respectfully yours,



Milton H. Ward  
*Chairman and Chief Executive Officer*



Joseph W. Murray  
*President and Chief Operating Officer*

November 2, 1989

facilities that became operational in September. Ore grade at Jerritt Canyon averaged .172 ounce of gold per ton during the three months ended September 30, 1989, compared with .207 ounce per ton during the year-ago period. The decrease in ore grade was anticipated and was one reason for the construction of the new roasters. Recovery rates at Jerritt Canyon were 90.2 percent and 90.4 percent for the third quarters of 1989 and 1988, respectively. This sustained rate during the third quarter of 1989 reflects the metallurgical efficiency of the new fluid-bed roasters.

FAU's share of third-quarter 1989 Jerritt Canyon heap-leach production totaled 1,100 ounces of gold. During the comparable 1988 quarter, no heap-leach production occurred at Jerritt Canyon, where a new bleach heap-leaching operation was being constructed, which prevented any production during that period. During the third quarter of 1989, FAU suspended further crushing, stacking, and bleaching of ore on the Jerritt Canyon heap-leach pads, while leaching continues. The company is currently evaluating the operational and financial viability of this process.

During September, FAU's new fluid-bed roasters at Jerritt Canyon treated approximately 2,900 TPD, operating at 83 percent of their rated capacity. The new facilities are increasing the mill's rated production capacity from 4,000 TPD to 7,000 TPD and are enabling the processing of larger amounts of more refractory and lower-grade ore, thus increasing gold production while reducing unit production costs from what would otherwise be incurred. The roasters, certain aspects of which were developed and are being patented by the research and engineering group of Freeport-McMoRan Inc., have been

December 18, 1989

FILE NOTE

Atlas Gold Company  
Mineable Reserves

I was talking to Dave Shaddrick, consulting geologist who was in on the Atlas discoveries of Gold Bar(s) and Grassy Mountain, and we began discussing same.

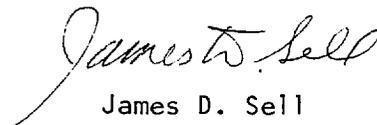
Dave's opinion:

Gold Bar I. Reserves & mineable about as published

Gold Bar II, III, IV. Accumulative one million ounces of gold with about half mineable.

Grassy Mountain. One million ounces of gold in inventory with about 700,000 ounces mineable.

JDS:mek

  
James D. Sell

cc: F.T. Graybeal  
W.L. Kurtz

WLK 988 Library

*We should subscribe to this  
too.*

# Western Minerals Activity Report

AS 1700 1277

DEC 20 1989

Published by  
Lumac  
Marketing  
Services, Inc.  
Frank L. Ludeman  
11 Robin Crest Lane  
Littleton, CO 80123  
(303) 798-9365

DECEMBER 1989      TIMELY NEWS OF MINING & EXPLORATION ACTIVITY IN THE WESTERN U.S.      VOL. 3 NO. 12



# AGI—AMAX's Golden Opportunity

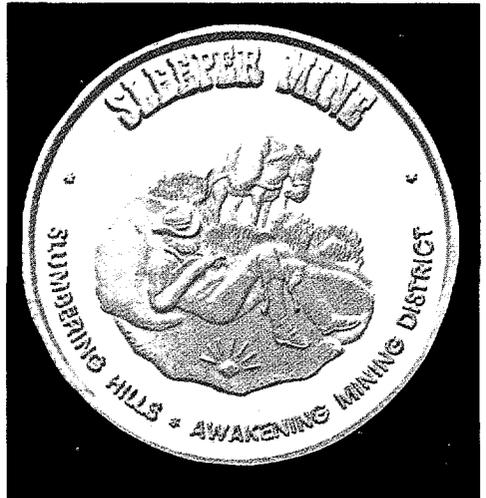
Amax Gold Inc. (AGI) celebrated its second anniversary in July. In its two-plus years as a public company, AGI's production climbed from 43,200 ounces of gold in the third quarter of 1987 to 84,500 ounces in the 1989 third quarter, a 100 percent increase in two years. In 1989, AGI will produce in excess of 300,000 ounces, a remarkable feat considering AMAX was not a primary gold producer as recently as 1984. In 1986, while still a wholly owned subsidiary of AMAX Inc., AGI had \$43 million in sales, \$25 million in operating earnings and \$22 million in assets. At year-end 1988, these numbers had grown to \$104 million, \$44 million and \$146 million, respectively. Amax Gold's properties also multiplied in this two-year period. They now include the Sleeper and Wind Mountain mines, both in Nevada, the new Hayden Hill gold venture (60 percent owned) in California, the Waihi mine (28.35 percent owned) in New Zealand and a 43.5 percent interest in Canamax Resources Inc. of Canada, which operates the Bell Creek, Kremzar and Ketz River mines.

The first of AGI's assets to come on stream was the Sleeper mine, situated 28 miles northwest of Winnemucca, Nevada. Sleeper, one of the richest deposits in the history of Nevada gold mining, was discovered in 1984 and has been producing gold since 1986.

There have been three expansions at Sleeper since the mine began operations. The most recent, completed in 1988, resulted in an increase in total tons of ore processed from 1.3 million in 1987 to 5.2 million in 1988. Mill recovery rates during 1988 were 94.5 percent. A big plus at Sleeper is cash production costs, which averaged \$109 per ounce for the first nine months of 1989, among the lowest of the North American producers. Reserves at year-end 1988 totaled 2.02 million contained ounces of gold.

The Wind Mountain mine, approximately 75 air miles northeast of Reno, is an open-pit, heap leach operation that began production in the second quarter of this year. The AGI Board of Directors approved the project in early 1988; final permits were obtained in December of that year. Then in just 84 days, from January to April—during which time temperatures could fall to minus 20°F—Wind Mountain became an operating mine. The first doré pour took place in mid-April and production by the end of the second quarter amounted to close to 4,000 ounces of gold; annual production is estimated at 42,000 ounces. As a cost saving, materials from the mine are shipped to Sleeper for refining; this eliminates the need for refinery facilities at

Wind Mountain. Although its ore reserves are of a lower grade than Sleeper, the mine's low stripping ratio and high silver content help make it profitable. In addition, 70 percent of its production has been sold forward for four years. Reserves at Wind Mountain stand at 316,000 ounces of contained gold.



## Worth Its Weight In Gold

AGI President and CEO Timothy J. Haddon presented a commemorative gold coin to the Colorado State Historical Society and the American Numismatic Association in October. The 18-karat coin commemorates the Sleeper mine's successful start-up, operation and expansion and is made from precious metals mined exclusively from Sleeper.

The coin is 1.06 inches in diameter and weighs .5 troy ounce (.375 troy ounce of gold and .125 troy ounce of silver). The obverse side of the medallion depicts a sleeping miner with a gold nugget literally at his feet. The reverse indicates the date of the initial public offering of Amax Gold Inc.—July 29, 1987.

An Amax Gold geologist discovered the Sleeper ore deposit, one of the richest in the history of Nevada gold mining, in 1984. The first gold doré was poured and shipped in March 1986. By the end of 1989 total production from the mine will be approximately three-quarters of a million ounces of gold and silver.

serve the interests of AMAX shareholders to increase that offer or to get caught up in a bidding war where the winner can really end up a loser later on.

AMAX's renewed financial strength gives it the ability to take advantage of other quality business opportunities that may arise. However, I want to assure you that any acquisition we decide to pursue will have very specific characteristics. We will concentrate on businesses that we know and can operate well, and in which we can obtain a quality position at a price that builds real value for the Company and its shareholders. This is the same focus we follow in internal growth.

The Company's objectives for the long term remain clear. We aim at balance in our businesses to enhance the stability of earnings throughout the economic cycle. We will continue to grow our productive capacity and asset base to improve the level and quality of recurring earnings. We will work toward these goals by constant improvement in our competitive positions.

### **A Strategy for Every Business**

In aluminum we are working hard to improve profit margins through stringent cost containment and selective investment in low-cost hydro-based primary capacity. The expansion of the Becancour smelter in Quebec will add 33,000 tons of competitively priced capacity in 1991 and the new Lauralco facility in Deschambault. Quebec will add another 237,000 tons in 1992. Together they will represent a 36 percent increase from current levels by 1992 and result in a marked improvement in AMAX's production costs.

Alumax's balance of primary aluminum and aluminum products businesses has enabled it to achieve the best earnings performance in the industry based on return on investment. This balance will be maintained and enhanced in the future.

Hurricane Hugo hit Alumax's Mt. Holly, South Carolina primary aluminum facility on September 22, took out the plant's power supply, which froze the pot lines, and caused other damage. Plant personnel have done a fine job in rebuilding operations and full production is expected by year-end 1989. We expect insurance proceeds will be sufficient to cover property damage and we are negotiating with our insurers regarding reimbursement for business interruption losses.

In gold, we have challenging production, growth and profitability objectives. AMAX will produce more than 300,000 ounces this year and looks to increase production through the early 1990s while remaining a low-cost pro-



*Chairman and CEO Allen Born*

ducer. To achieve that end, we expect to go ahead with the Hayden Hill mine in California, have sharpened our exploration focus and are looking at other prospects and acquisition opportunities.

In energy, our intention is to significantly increase stable operating income from coal and natural gas to provide a better earnings balance against the cyclical nature of metals. In coal, we are seeking to enlarge the earnings base by selective acquisitions of quality coal properties. We also are maintaining coal's earnings base through improved productivity performance and new technology. In natural gas we are seeking to add to our long-lived natural gas reserves in the United States and thereby develop a strong medium-sized natural gas company.

### **Season's Greetings**

Despite the clear slowing of the national economy that is being reflected in weaker metals prices, as this is written AMAX is well set for another very good year in 1989. We have quality leadership and efficient operations in our metals and energy businesses. We know how to enhance and build the value of your investment and expect to remain on course toward this objective in 1990.

Since this will be my last report before the end of 1989, let me extend best wishes, on behalf of the employees, management and directors of AMAX for the upcoming holiday season and the new year.

Allen Born

A handwritten signature of Allen Born, consisting of stylized initials 'A' and 'B' followed by a long, sweeping horizontal line.

*Chairman, CEO and President*

*November 17, 1989*

## AGI's Newest Venture

Amax Gold's newest development project is the Hayden Hill gold venture in Lassen County, California. It is a joint venture between AGI, which has a 60 percent operating interest, and U.S. Gold (40 percent), a Denver-based gold-mining company with producing mines in Nevada and gold properties in other Western states. In October of this year, the Boards of Directors of both companies agreed in principle to proceed with development. Construction will begin in early 1991, pending completion of environmental impact studies, receipt of permits and negotiation of financing arrangements. Initial production should start in 1992, with annualized production from the project estimated at approximately 145,000 ounces of gold. The development will include an open-pit mine, a 3,500 ton-per-day mill and a cyanide heap leach processing facility. Amax Gold's share of reserves at Hayden Hill amounts to 880,000 ounces of contained gold.

Amax Gold's 28.35 percent-owned mine in New Zealand, 80 miles southeast of Auckland is located in the town of Waihi. The first doré was poured in May 1988, and AGI's share of production was approximately 9,500 ounces of gold for the year. Amax Gold's reserves at Waihi total 184,000 ounces of contained gold.

Canamax Resources Inc., Amax Gold's 43.5 percent-owned Canadian affiliate, explores for, develops and operates gold properties.

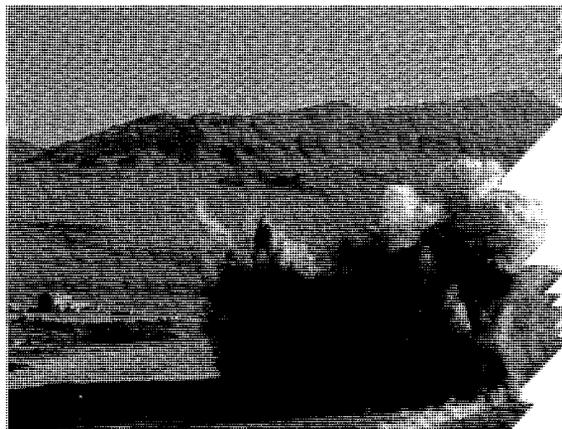
## Plans to Grow

Exploration is an essential part of Amax Gold's growth plans, and the company has accelerated its efforts to generate additional reserves. In 1988 the AGI exploration team evaluated over 530 property submittals and 30 advanced stage properties in 21 states.

The exploration budget for 1989 was increased 64 percent over 1988 levels to \$23 million. This increase emphasizes the company's commitment to increasing its reserves through examination of both grass roots and advanced stage properties.

## Utilizing New Technology

In addition to exploration, Amax Gold is committed to technological advances. Because of technology, gold is a viable mineral today, although it is often present in minute quantities in the ore being mined. Processes such as heap leaching and carbon-in-pulp have made mining more economical. However, the possibility exists that sources of easily mined and easily recovered gold deposits will run out. That is where the use of technological tools—such as geostatics for determining re-



*The Lake range in the background frames blasting during construction of the Wind Mountain mine, which began producing gold in the second quarter of this year.*

serves of low-grade ore or erratic deposits—will make development and processing from deeper mines more feasible.

Historically the price of gold has been subject to wide fluctuations and the profitability of Amax Gold's operations is directly related to the price of gold. Since becoming a public company, AGI has employed a number of precious metals hedging techniques—forward sales and gold loans—to ensure strong profitability while at the same time maintaining the potential rewards of higher future metals prices. As a result AGI realized an average gold price some \$36 per ounce above the average Comex closing price during the first nine months of 1989. This boosted pretax earnings by about \$7 million over this period.

The future of Amax Gold looks bright. In 1989, production should increase 25 percent over the previous year. While production rises, the company still aims to maintain average cash production costs well below industry averages. It will also keep using market mechanisms such as AGI's hedging program to protect profitability by limiting downside price risk while preserving upside potential.

Amax Gold's objective is to substantially increase production while remaining a low-cost producer. In addition to exploration, acquisition is a key strategy to reach this goal, but only acquisition of properties with quality reserves at the right price. AGI is also open to joint ventures, but in such a venture, the key word is "quality". The overall objective is always to increase the value of the company through quality assets and quality earnings and thereby benefit its shareholders.

# Unaudited Consolidated Statements of Current Earnings

For the three and nine months ended September 30

AMAX Inc.

In thousands (except per share)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	<u>1989</u>	<u>1988</u>	<u>1989</u>	<u>1988</u>
<b>Sales</b> .....	<b>\$928,400</b>	<b>\$997,900</b>	<b>\$2,988,800</b>	<b>\$2,945,300</b>
Costs applicable to sales				
Costs and operating expenses .....	<b>619,400</b>	645,200	<b>2,006,400</b>	1,990,700
Selling and general .....	<b>72,800</b>	73,600	<b>218,700</b>	214,900
Depreciation and depletion .....	<b>58,800</b>	49,700	<b>168,300</b>	145,100
Taxes other than income taxes .....	<b>21,500</b>	20,400	<b>65,600</b>	60,200
Exploration and research .....	<b>8,300</b>	8,500	<b>33,600</b>	22,400
	<b>780,800</b>	797,400	<b>2,492,600</b>	2,433,300
	<b>147,600</b>	200,500	<b>496,200</b>	512,000
Loss of equity affiliates before income taxes ...	<b>(1,200)</b>	(1,000)	<b>(2,000)</b>	(1,600)
<b>Earnings from operations</b> .....	<b>146,400</b>	199,500	<b>494,200</b>	510,400
Interest expense, net .....	<b>(28,400)</b>	(41,900)	<b>(91,800)</b>	(91,100)
Share repurchase expense .....	<b>(41,700)</b>	—	<b>(41,700)</b>	—
Other income (expense), net .....	<b>4,100</b>	(500)	<b>38,100</b>	(6,000)
Earnings before income taxes .....	<b>80,400</b>	157,100	<b>398,800</b>	413,300
Income taxes (benefit) .....	<b>23,600</b>	24,600	<b>96,900</b>	(39,400)
<b>Net earnings</b> .....	<b>56,800</b>	132,500	<b>301,900</b>	452,700
Less preferred dividends .....	<b>(200)</b>	(200)	<b>(600)</b>	(1,500)
Earnings available to common shares .....	<b>\$ 56,600</b>	<b>\$132,300</b>	<b>\$ 301,300</b>	<b>\$ 451,200</b>
<b>Primary earnings per common share<sup>(1)</sup></b> .....	<b>\$ 0.66</b>	<b>\$ 1.61</b>	<b>\$ 3.52</b>	<b>\$ 5.03</b>
<b>Common dividends declared per share</b> .....	<b>\$ 0.20</b>	<b>\$ 0.05</b>	<b>\$ 0.60</b>	<b>\$ 0.10</b>

(1) The average number of shares used in determining primary earnings per share for the three and nine months was 86,310 (1988—82,000) and 85,620 (1988-89,600) respectively.

## STATISTICAL SUMMARY<sup>1</sup>

Homestake Mining Company and Subsidiaries

1008  
LSEK

month of mining with no lost-time accidents, a superb record.

Doe Run produces refined lead, primarily used in automobile batteries and also in leaded glass for television and computer screens, protective shielding, ammunition and a variety of other applications. Although lead is the major product, Doe Run also produces significant quantities of copper and zinc concentrates in addition to minor by-products such as silver and sulphuric acid.



Top: Underground mining at Doe Run

Above: Molten lead being poured into molds at Doe Run's Herculaneum Smelter

(Quantities in thousands)

### GOLD OPERATIONS

#### Tons of Ore Processed

	Three Months Ended September 30		Nine Months Ended September 30	
	1989	1988	1989	1988
Homestake	656.7	607.1	1,903.3	1,830.8
McLaughlin	426.8	267.7	1,523.0	789.2
Round Mountain	1,534.4	773.8	3,382.8	2,408.2
El Hueso	311.6	507.2	1,664.2	507.2
HGAL	557.1	199.7	1,221.5	649.6
Wood Gulch	341.7	—	377.5	—
Mineral Hill	12.0	—	12.0	—
<b>Total</b>	<b>3,840.3</b>	<b>2,355.5</b>	<b>10,084.3</b>	<b>6,185.0</b>

#### Ounces Produced

Homestake	91.1	99.0	288.5	299.0
McLaughlin	66.7	45.5	204.7	151.8
Round Mountain	22.1	15.1	54.5	42.6
El Hueso	17.2	12.9	51.0	12.9
HGAL	44.2	21.8	109.4	68.8
Wood Gulch	7.3	—	8.2	—
Mineral Hill	.1	—	.1	—
<b>Total</b>	<b>248.7</b>	<b>194.3</b>	<b>716.4</b>	<b>575.1</b>

#### Cash Production Cost—per ounce

Homestake	\$306	\$294	\$302	\$288
McLaughlin	238	288	218	241
Round Mountain	249	237	266	226
El Hueso	304	326	301	326
HGAL	284	309	255	278
Wood Gulch	188	—	187	—
Mineral Hill	247	—	247	—
<b>Weighted Average</b>	<b>275</b>	<b>292</b>	<b>267</b>	<b>271</b>

### BASE METALS

#### Tons of Concentrate Produced

Lead	35	37	104	104
Zinc	6	5	18	15
Copper	7	11	26	27

#### Tons of Production

Refined Lead Products	27	18	80	68
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### URANIUM

Tons of Ore Processed	9	8	25	22
Production U <sub>3</sub> O <sub>8</sub> (lbs.)	109	128	349	374

<sup>1</sup>Includes Homestake's proportionate share of ownership: Homestake 100%, McLaughlin 100%, Round Mountain 25%, El Hueso 100%, HGAL 40% (effective April 15, 1989, 38.4% in prior periods), Wood Gulch 100%, Mineral Hill 50%, Doe Run (base metals) 42.5% and Uranium 100%.

### Reclassification of Financial Statements.

Results for 1989 and 1988 have been reclassified as a consequence of the decision to sell the oil and gas operations of Felmont Oil Corporation. Felmont's results, including the \$14.2 million gain on the sale of its 20% interest in Eugene Island 108 and 109, are reported as discontinued operations.

On April 14, HGAL became 50% owner of Kalgoorlie Consolidated Gold Mines (KCGM). This management entity combines various operations in the Kalgoorlie district under one company structure. Homestake now uses pro-rata consolidation on the KCGM information and has also reclassified prior results.

### Stock Reinvestment Plan

To assist shareholders in increasing their investment in Homestake, an Automatic Reinvestment Plan is provided by our Agent, Bank of America NT & SA. The plan affords the opportunity, and allows a simple and automatic way, for you to use your cash dividends to purchase additional shares of Homestake stock. If you wish, you also may purchase Homestake shares with cash payments through the plan. Inquiries should be addressed to Bank of America NT & SA, Corporate Agency Service Center, P.O. Box 37002, San Francisco, CA 94137, or by calling (415) 624-4100.

## FINANCIAL SUMMARY

Homestake Mining Company and Subsidiaries

See note on prior page regarding reclassification of financial statements.

### STATEMENTS OF CONSOLIDATED INCOME

(In thousands, except per share amounts)

	Three Months Ended September 30		Nine Months Ended September 30	
	1989	1988	1989	1988
Revenues	\$ 110,380	\$ 105,368	\$ 323,175	\$ 305,679
Expenses:				
Product and administration expenses	99,124	74,909	274,231	209,504
Mineral exploration	6,555	9,605	20,239	24,757
Interest expense	2,051	1,333	7,045	2,379
Total	107,730	85,847	301,515	236,640
Income from continuing operations before income taxes and minority interest	2,650	19,521	21,660	69,039
Income tax provision	1,898	5,832	8,764	18,371
Minority interest	(240)	(87)	100	954
Income from continuing operations	992	13,776	12,796	49,714
Income (loss) from discontinued operations	1,021	(2,564)	17,275	(2,255)
Cumulative effect of change in accounting for income taxes				3,125
<b>Net income</b>	<b>\$ 2,013</b>	<b>\$ 11,212</b>	<b>\$ 30,071</b>	<b>\$ 50,584</b>
Per share amounts:				
Income from continuing operations	\$ .01	\$ .14	\$ .13	\$ .51
Income from discontinued operations	.01	(.02)	.18	(.02)
Cumulative effect of change in accounting				.03
<b>Net income per share</b>	<b>\$ .02</b>	<b>\$ .12</b>	<b>\$ .31</b>	<b>\$ .52</b>
Average shares used in the computation	97,773	97,398	97,644	97,357

### CONSOLIDATED BALANCE SHEETS

(In thousands)

	September 30, 1989	December 31, 1988
<b>Assets</b>		
Cash and equivalents	\$ 86,457	\$ 92,930
Short-term investments	63,176	130,448
Other current assets	95,597	79,976
Net assets of discontinued operations	53,623	67,480
Property, plant & equipment—net	619,891	507,758
Other assets	90,476	100,598
<b>Total</b>	<b>\$1,009,220</b>	<b>\$979,190</b>
<b>Liabilities and Shareholders' Equity</b>		
Current liabilities	\$ 59,395	\$ 67,208
Long-term liabilities	107,461	86,704
Deferred income taxes	59,249	58,168
Minority interest in consolidated subsidiaries	9,928	10,067
Shareholders' equity	773,187	757,043
<b>Total</b>	<b>\$1,009,220</b>	<b>\$979,190</b>

### STATEMENTS OF CONSOLIDATED CASH FLOWS

(In thousands)

	Nine Months Ended September 30	
	1989	1988
Net income	\$ 30,071	\$ 50,584
Depreciation, depletion and amortization	63,112	42,569
Cumulative effect of change in accounting for income taxes		(3,125)
Deferred income taxes and other	(7,111)	(3,143)
Effect of changes in operating working capital items	(10,596)	(48,140)
<b>Net cash provided by operations</b>	<b>75,476</b>	<b>38,745</b>
Decrease in short-term investments	67,271	46,055
Capital additions and acquisitions of mining properties	(183,042)	(147,536)
Other	25,913	(6,004)
<b>Net investment activities</b>	<b>(89,858)</b>	<b>(107,485)</b>
Dividends paid	(14,650)	(14,613)
Proceeds from long-term debt—net	21,997	35,000
Other	4,220	1,626
<b>Net financing activities</b>	<b>11,567</b>	<b>22,013</b>
Effect of exchange rate changes on cash	(3,658)	(2,795)
<b>Net increase (decrease) in cash and equivalents</b>	<b>\$ (6,473)</b>	<b>\$ (49,522)</b>



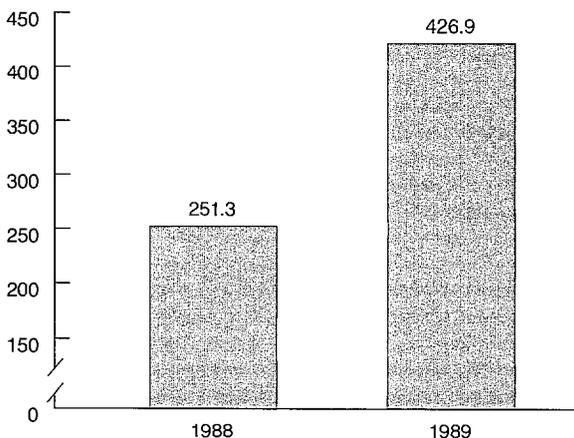
**Highlights**

	3rd Quarter		Nine Months	
	1989	1988	1989	1988
Net income (\$000)	33,489	27,153	77,845	70,882
Average gold price (\$)	368	430	378	444
Ounces of gold sold (000)	426.9	251.3	1,070.0	585.8
Cash cost per ounce sold (\$)				
Production costs	150	159	161	159
Royalties	33	49	40	52
Other	11	6	9	9
Costs applicable to sales	194	214	210	220
General & administrative costs	16	13	18	15
Total cash cost per ounce	210	227	228	235
DD&A per ounce sold (\$)	44	42	45	37
Total cost per ounce sold (\$)*	254	269	273	272
Tons mined (000 wet, including waste)**	39,597	28,350	99,933	73,195
Ore placed on leach pads (000 dry tons)	8,374	6,586	23,275	14,691
Ore milled (000 dry tons):				
Mill Number 1	401	364	1,120	1,005
Mill Number 2	922	904	2,502	2,504
Mill Number 3	205	171	638	171
Mill Number 4	457	—	558	—
Mill Number 5	1,736	—	4,412	—
Total tons milled	3,721	1,439	9,230	3,680

Notes: \*Exclusive of financing costs, exploration expense, other income/expense and federal income taxes.

\*\*Including equivalent wet tons of material mined by Barrick Goldstrike Mines, Inc. on behalf of the Company relating to the material processed during the period.

**Third Quarter Gold Sales (000 oz.)**



**To The Shareholders**

Newmont Gold Company posted strong earnings during the third quarter despite a 14 percent decline in the price of gold from the prior year. During the quarter the company also encountered additional high-grade gold intercepts in the vicinity of Deep Star in the North Area of its property on the Carlin Trend in Nevada.

Net income for the third quarter was \$33.5 million, or 32 cents a share, compared with \$27.2 million, or 26 cents a share, in the third quarter of 1988. The price received for gold in the quarter was \$368 an ounce, or 14 percent lower than the \$430 an ounce received in the third quarter of 1988. Production of gold was 426,900 ounces in the quarter, up 70 percent from the 251,300 ounces produced in the third quarter of 1988. The cash cost of production in the 1989 quarter benefited from the planned record level of production, even though lower grades of ore were treated. At \$210 an ounce, compared with \$227 an ounce in the 1988 quarter, the third quarter's cash cost is expected to be the lowest achieved in the year due to the quarter having the highest production, and is consistent with the company's projected annual cost of approximately \$230 an ounce in 1989.

Tons of ore milled during the quarter rose to 3.7 million from 1.4 million tons in last year's third period while ore placed on leach pads increased to 8.4 million tons from 6.6 million tons last year. Mill Number 4 had its first full quarter of operation, raising North Area mill production to just over 850,000 tons in the quarter, up sharply from 326,000 tons in the first quarter. Total material mined during the quarter, including waste, was 39.6 million tons, up from 28.4 million tons in last year's third quarter.

Newmont Gold Company reached a production milestone by pouring a million ounces of gold by early September, marking the first time that a gold company has produced a million ounces of gold within a single calendar year in North America. The record pace of production is continuing and by year-end the company expects to have produced more than 1.4 million ounces of gold. Last year, the company produced a record 895,500 ounces, up from 589,000 ounces produced in 1987.

Increased production has been possible due to a \$500 million two-year expansion program which added three mills, three leach pads and various support facilities. Next year, as well as in 1991 and 1992, Newmont Gold plans to produce 1.5 million ounces of gold annually.

*YPLK*

*JRS*

# Newmont Gold Company

Newmont Gold Company  
One United Bank Center  
1700 Lincoln Street  
Denver, Colorado 80203

## Third Quarter Report

September 30, 1989

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# STATISTICAL SUMMARY<sup>1</sup>

Homestake Mining Company and Subsidiaries

~~10/23~~  
10/23

(Quantities in thousands)	Three Months Ended June 30		Six Months Ended June 30	
	1989	1988	1989	1988
<b>GOLD OPERATIONS</b>				
<b>Tons of Ore Processed</b>				
Homestake	655.0	615.8	1,246.6	1,223.7
McLaughlin	558.4	262.3	1,096.2	521.5
Round Mountain	971.4	819.5	1,848.4	1,634.4
El Hueso	626.3	—	1,352.6	—
HGAL	438.2	254.5	664.4	449.9
Wood Gulch	35.8	—	35.8	—
Total	<u>3,285.1</u>	<u>1,952.1</u>	<u>6,244.0</u>	<u>3,829.5</u>
<b>Ounces Produced</b>				
Homestake	105.3	103.6	197.4	200.0
McLaughlin	74.9	52.9	137.9	106.3
Round Mountain	17.4	14.9	32.4	27.5
El Hueso	14.9	—	33.9	—
HGAL	39.7	28.6	65.2	47.0
Wood Gulch	.9	—	.9	—
Total	<u>253.1</u>	<u>200.0</u>	<u>467.7</u>	<u>380.8</u>
<b>Cash Production Cost — per ounce</b>				
Homestake	\$283	\$274	\$300	\$285
McLaughlin	188	223	208	221
Round Mountain	279	220	278	220
El Hueso	367	—	301	—
HGAL	260	274	269	263
Wood Gulch	164	—	164	—
Weighted Average	255	256	267	260
<b>BASE METALS</b>				
<b>Tons of Concentrate Produced</b>				
Lead	34	35	69	67
Zinc	6	6	12	10
Copper	9	9	19	16
<b>Tons of Production</b>				
Refined Lead Products	26	25	53	50
<b>URANIUM</b>				
Tons of Ore Processed	7	7	16	14
Production U <sub>3</sub> O <sub>8</sub> (lbs.)	114	131	240	246

<sup>1</sup>Includes Homestake's proportionate share of ownership: Homestake 100%, McLaughlin 100%, Round Mountain 25%, El Hueso 100%, HGAL 40% (effective April 15, 1989, 38.4% in prior periods), Wood Gulch 100%, Doe Run (base metals) 42.5% and Uranium 100%.

# FINANCIAL SUMMARY

Homestake Mining Company and Subsidiaries

See note on prior page regarding reclassification of financial statements.

## STATEMENTS OF CONSOLIDATED INCOME

(In thousands, except per share amounts)

Three Months End

1989

Revenues	<u>\$ 114,188</u>
Expenses:	
Product and administration expenses	95,624
Mineral exploration	<u>7,791</u>
Total	<u>103,415</u>
Income from continuing operations before income taxes and minority interest	10,773
Income tax provision	4,016
Minority interest	<u>250</u>
Income from continuing operations	6,507
Income (loss) from discontinued operations	14,413
Cumulative effect of change in accounting for income taxes	
<b>Net income</b>	<u><b>\$ 20,920</b></u>
Per share amounts:	
Income from continuing operations	\$ .07
Income from discontinued operations	.15
Cumulative effect of change in accounting	
<b>Net income per share</b>	<u><b>\$ .22</b></u>
Average shares used in the computation	<u>97,636</u>

## CONSOLIDATED BALANCE SHEETS

(In thousands)

### Assets

Cash and equivalents
Short-term investments
Other current assets
Net assets of discontinued operations
Property, plant & equipment—net
Other assets
<b>Total</b>

### Liabilities and Shareholders' Equity

Current liabilities
Long-term liabilities
Deferred income taxes
Minority interest in consolidated subsidiaries
Shareholders' equity
<b>Total</b>

## STATEMENTS OF CONSOLIDATED CASH FLOWS

(In thousands)

Net income

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Bolivia. The Company repaid all amounts outstanding under its committed revolving credit agreement and its \$15 million uncommitted, revolving credit agreement during the first half of 1993. As of September 30, 1993, approximately \$121 million remained available under the committed agreement, which is scheduled for quarterly reductions of \$9.4 million through December 31, 1996.

**Note 5. Convertible Preferred Share Offering**

On May 20, 1993, the Company issued 2.3 million shares of convertible preferred stock. The proceeds from this offering totaled approximately \$111 million, net of issuance costs. Each share of preferred stock pays annual cumulative dividends of \$3.25 per share, is convertible at any time at the option of the holder into 4.762 shares of Battle Mountain Gold Company common stock and has a liquidation preference of \$50. The shares are also redeemable at the option of the Company solely for shares of the Company's common stock beginning May 15, 1996. A portion of the proceeds have been used to repay bank debt. The remainder will be used for working capital and for general corporate purposes, which may include capital expenditures and potential future acquisitions relating to the businesses in which the Company currently engages.

*Battle Mtn Gold Co.*  
**STATISTICAL INFORMATION**  
*(Unaudited)*

	Three Months Ended		Nine Months Ended	
	September 30,	1992	September 30,	1992
	1993		1993	1992
<b>Battle Mountain Complex</b>				
Production Statistics				
Gold recovered (000s oz)	10	35	50	124
Silver recovered (000s oz)	18	84	94	310
Cost Per Equivalent Gold Ounce				
Cash production costs	\$ 326	\$ 280	\$ 365	\$ 219
Taxes, other than income	10	12	14	11
DD&A	77	56	41	40
Total operating costs	\$ 413	\$ 358	\$ 420	\$ 270
<b>San Luis</b>				
Production Statistics				
Gold recovered (000s oz)	19	15	52	41
Silver recovered (000s oz)	7	7	21	21
Cost Per Equivalent Gold Ounce				
Cash production costs	\$ 236	\$ 349	\$ 240	\$ 310
Taxes, other than income	12	14	13	18
DD&A	83	142	83	150
Total operating costs	\$ 331	\$ 505	\$ 336	\$ 478
<b>Pajingo</b>				
Production Statistics				
Gold recovered (000s oz)	9	12	26	36
Silver recovered (000s oz)	27	69	95	165
Cost Per Equivalent Gold Ounce				
Cash production costs	\$ 209	\$ 110	\$ 193	\$ 127
Taxes, other than income	2	1	2	1
DD&A	49	34	45	40
Total operating costs	\$ 260	\$ 145	\$ 240	\$ 168
<b>Kori Kollo</b>				
Production Statistics				
Gold recovered BMGC share (000s oz) <sup>(1)</sup>	49	12	128	34
Silver recovered BMGC share (000s oz) <sup>(1)</sup>	338	73	932	209
Gold recovered (000s oz)	59	14	151	40
Silver recovered (000s oz)	397	86	1,096	246
Cost Per Equivalent Gold Ounce				
Cash production costs	\$ 175	\$ 142	\$ 166	\$ 143
Taxes, other than income	0	2	1	1
DD&A <sup>(2)</sup>	99	122	110	127
Total operating costs	\$ 274	\$ 266	\$ 277	\$ 271
<b>San Cristobal</b> <sup>(1)</sup>				
Production Statistics				
Gold recovered BMGC share (000s oz) <sup>(3)</sup>	6	9	19	25
Silver recovered BMGC share (000s oz) <sup>(3)</sup>	20	29	58	77
Gold recovered (000s oz)	12	16	34	44
Silver recovered (000s oz)	34	51	102	136
Cost Per Equivalent Gold Ounce				
Cash production costs	\$ 362	\$ 266	\$ 376	\$ 272
Taxes, other than income	0	0	0	0
DD&A	86	82	82	84
Total operating costs	\$ 448	\$ 348	\$ 458	\$ 356
<b>Red Dome</b> <sup>(1)</sup>				
Production Statistics				
Gold recovered BMGC share (000s oz) <sup>(3)</sup>	5	15	22	42
Silver recovered BMGC share (000s oz) <sup>(3)</sup>	38	83	156	173
Copper recovered BMGC share (000s lbs) <sup>(3)</sup>	1,547	2,092	4,082	4,970
Gold recovered (000s oz)	10	27	42	75
Silver recovered (000s oz)	68	146	275	305
Copper recovered (000s lbs)	2,740	3,704	7,229	8,801
Cost Per Equivalent Gold Ounce				
Cash production costs	\$ 193	\$ 177	\$ 187	\$ 216
Taxes, other than income	0	0	0	0
DD&A <sup>(4)</sup>	2	52	11	50
Total operating costs	\$ 195	\$ 229	\$ 198	\$ 266

(1) Reflects BMG's 85 percent equity interest only.

(2) Information for 1992 is restated to reflect revision in amortization expense resulting from a deferred tax charge capitalized in connection with the Company's acquisition of Westworld Resources, Inc., a U.S. natural resources company (Westworld) which held a 24.5 percent interest in Inti Raymi.

(3) Reflects the Company's 56.5 percent equity interest only.

(4) For 1993 period, reflects increase in reserve base resulting from Red Dome expansion.

UNAUDITED STATEMENT

CONDENSED CONSOLIDATED  
BALANCE SHEET (Unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	1992	1993	1992	1993
<i>(Expressed in thousands except per share amounts)</i>				
271	\$ 46,039	\$ 155,390	\$ 137,594	
247	3,079	10,903	7,108	
324	42,960	144,487	130,486	
934	10,951	29,250	29,519	
719	19,967	68,312	55,970	
336	10,331	29,200	28,288	
348	3,711	7,108	12,391	
-	32,600	-	32,600	
501	4,922	13,987	14,753	
501	594	2,100	2,681	
539	83,076	149,957	176,202	
485	(40,116)	(5,470)	(45,716)	
377	350	3,168	1,407	
388	(283)	(6,522)	(1,128)	
437	(2,037)	4,543	(1,060)	
911	(42,086)	(4,281)	(46,497)	
495	(10,176)	(3,627)	(11,647)	
520	(185)	(3,304)	(130)	
796	(32,095)	(3,958)	(34,980)	
-	-	-	(1,462)	
796	\$ (32,095)	\$ (3,958)	\$ (36,442)	
369	\$ -	\$ 1,869	\$ -	
(73)	\$ (32,095)	\$ (5,827)	\$ (36,442)	
(.00)	\$ (0.40)	\$ (0.07)	\$ (0.44)	
-	-	-	(0.02)	
(.00)	\$ (0.40)	\$ (0.07)	\$ (0.46)	
025	\$ .025	\$ .025	\$ .075	
189	79,957	80,095	79,889	

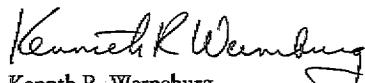
Financial statements.  
Revenue, sales and expenses of BMG and its consolidated

concerns about potential international currency crisis leads many analysts to make the case for higher gold prices late in 1993 and 1994. We remain optimistic about the 50 percent production growth profile contained in our five year plan and our ability to first lower, compared with today, and then hold steady our cash production and total operating costs during that time frame.

Sincerely,



Karl E. Elers  
Chairman of the Board and  
Chief Executive Officer



Kenneth R. Werneburg  
President and Chief Operating Officer

	September 30, 1993	December 31, 1992
<i>(Expressed in thousands)</i>		
<b>Assets</b>		
Current assets		
Cash and cash equivalents	\$103,724	\$ 45,377
Accounts receivable	35,031	16,297
Inventories - product	2,462	11,182
Material and supplies, at average cost	23,104	11,764
Other current assets	1,639	1,488
<b>Total Current Assets</b>	<b>165,960</b>	<b>86,108</b>
Investments	27,108	23,833
Net property, plant and equipment	456,573	457,243
Non-current receivables	143	3,143
Other assets	5,917	7,157
<b>Total Assets</b>	<b>\$655,701</b>	<b>\$577,484</b>

**Liabilities And Shareholders' Equity**

Current liabilities		
Current maturities of long-term debt	\$ 13,507	\$ 6,818
Short-term debt	-	10,000
Accounts Payable	9,345	18,878
Payroll and related benefits accrued	2,878	3,487
Accrued interest	6,224	6,788
Other current liabilities	3,546	4,147
<b>Total Current Liabilities</b>	<b>35,500</b>	<b>50,118</b>
Long-term debt	185,682	198,593
Other liabilities	23,555	22,858
<b>Total Liabilities</b>	<b>244,737</b>	<b>271,569</b>
Minority interest	38,713	36,136
Shareholders' equity	372,251	269,779
<b>Total Liabilities and Shareholders' Equity</b>	<b>\$655,701</b>	<b>\$577,484</b>

The accompanying notes are an integral part of these financial statements.

**AGGREGATE OPERATING HIGHLIGHTS**

	Three Months Ended September 30,		Nine Months Ended September 30,	
	1993	1992	1993	1992
<b>Ounces Recovered (000s)</b>				
Gold - BMG net	98	98	297	302
Consolidated	119	119	355	360
Silver- BMG net	448	345	1,356	955
Consolidated	551	443	1,683	1,183
<b>Ounces Sold (000s)</b>				
Gold - BMG net	104	97	312	296
Consolidated	125	119	378	351
Silver- BMG net	479	310	1,449	880
Consolidated	601	389	1,840	1,067
Copper-Consolidated (000s lbs)	3,686	3,296	10,494	6,866
<b>Average price realized</b>				
Gold (\$/oz)	\$ 376	\$ 344	\$ 363	\$ 358
Silver (\$/oz)	\$ 4.72	\$ 4.16	\$ 4.22	\$ 4.14
Copper (\$/lb)	\$ .92	\$ 1.09	\$ 1.00	\$ 1.07
<b>Weighted Average Cost</b>				
Per Equivalent Gold Ounce <sup>(1)</sup>				
Cash production costs	\$ 216	\$ 229	\$ 227	\$ 215
Taxes, other than income	\$ 3	\$ 6	\$ 5	\$ 7
DD&A	\$ 81	\$ 75	\$ 77	\$ 68
<b>Total operating costs</b>	<b>\$ 300</b>	<b>\$ 310</b>	<b>\$ 309</b>	<b>\$ 290</b>

(1) Represents operating costs incurred which, because of changes in inventory, may not be reflected in operating results for the period. 1992 has been adjusted for revisions in amortization expense resulting from a deferred tax charge capitalized in connection with the Company's acquisition of Westworld.

*Financial Summary*  
Homestake Mining Company and Subsidiaries  
(Unaudited)

See note on prior page regarding acquisition of Corona.

**Condensed Statements of Consolidated Operations**

(In thousands, except per share amounts)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	1993	1992	1993	1992
<b>Revenues:</b>				
Product sales	\$ 180,597	\$ 169,154	\$ 528,237	\$ 499,959
Interest and other	(157)	10,775	9,287	27,593
	<u>180,440</u>	<u>179,929</u>	<u>537,524</u>	<u>527,552</u>
<b>Costs and Expenses:</b>				
Production costs	110,684	117,373	344,556	364,401
Depreciation, depletion and amortization	25,828	31,061	78,645	91,203
Administrative	9,837	13,490	30,659	36,476
Exploration	4,306	8,145	12,454	21,681
Interest expense	2,572	2,606	5,986	7,875
Restructuring and business combination expenses	6,148	44,376	8,001	48,442
Write-downs of mining properties and investments	-	102,506	-	118,506
Other	754	2,170	4,308	5,526
	<u>160,129</u>	<u>321,727</u>	<u>484,609</u>	<u>694,110</u>
<b>Income (Loss) Before Taxes and Minority Interest</b>	20,311	(141,798)	52,915	(166,558)
<b>Income and Mining Taxes</b>	3,825	21,198	(11,544)	17,392
<b>Minority Interest</b>	(1,397)	(114)	(1,777)	711
<b>Net Income (Loss)</b>	<u>\$ 22,739</u>	<u>\$ (120,714)</u>	<u>\$ 39,594</u>	<u>\$ (148,455)</u>
<b>Net Income (Loss) Per Share</b>	<u>\$ 0.16</u>	<u>\$ (0.89)</u>	<u>\$ 0.28</u>	<u>\$ (1.11)</u>
<b>Average Shares Used in the Computation</b>	<u>137,191</u>	<u>136,511</u>	<u>136,959</u>	<u>134,707</u>

**Condensed Statements of Consolidated Cash Flows**

(In thousands)

	Nine Months Ended September 30,	
	1993	1992
<b>Cash Flows from Operations</b>	\$ 121,112	\$ 27,750
Capital additions	(41,516)	(45,567)
Proceeds from sale of assets	5,565	8,285
Decrease in investments	14,161	87,335
Other	-	3,477
<b>Total Investment Activities</b>	<u>(21,790)</u>	<u>53,530</u>
Dividends paid - Homestake	(10,274)	(16,786)
Debt borrowings (repayments) - net	(41,153)	(33,001)
Redemption of HCl preference shares	(15,810)	(4,727)
Common stock issued	6,643	429
Other	6,938	(2,921)
<b>Total Financing Activities</b>	<u>(53,656)</u>	<u>(57,006)</u>
<b>Net Increase in Cash and Equivalents</b>	<u>\$ 45,666</u>	<u>\$ 24,274</u>

**Condensed Consolidated Balance Sheets**

(In thousands)

	September 30,	December 31,
	1993	1992
<b>Assets</b>		
Cash and equivalents and short-term investments	\$ 103,590	\$ 71,064
Other current assets	106,701	108,288
Property, plant and equipment - net	846,759	911,588
Other assets	52,933	54,229
Total	<u>\$1,109,983</u>	<u>\$1,145,169</u>
<b>Liabilities and Shareholders' Equity</b>		
Current liabilities	\$ 112,799	\$ 155,894
Long-term liabilities	289,986	293,176
Deferred income taxes	162,139	162,587
Minority interest	51,761	68,074
Shareholders' equity	493,298	465,438
Total	<u>\$1,109,983</u>	<u>\$1,145,169</u>



# Statistical Summary<sup>1</sup>

Homestake Mining Company and Subsidiaries

	Mines	% Ownership	Production (Ounces in Thousands)				Cash Operating Costs (Dollars per Ounce)			
			1993		1992		1993		1992	
			3rd Quarter	Year to Date	3rd Quarter	Year to Date	3rd Quarter	Year to Date	3rd Quarter	Year to Date
United States	Homestake	100	111.6	341.3	102.0	291.5	\$267	\$259	\$312	\$332
	McLaughlin	100	78.8	232.4	75.1	221.3	192	190	196	205
	Round Mountain	25	24.6	67.4	21.7	60.4	225	236	236	261
	Santa Fe	100	13.9	42.2	11.9	47.0	280	263	312	257
	Marigold	33	7.6	23.4	8.0	19.6	225	221	227	255
	Mineral Hill	50	4.9	16.5	5.1	14.8	305	268	282	299
	Pinson	26	3.4	9.5	3.5	9.9	259	278	271	290
	Dec	44	2.6	9.1	4.8	13.2	393	374	307	354
Canada	Williams	50	63.7	194.3	60.1	190.4	186	192	195	200
	David Bell	50	28.1	78.8	32.3	85.4	146	158	122	145
	Quarter Claim	25	0.7	8.2	9.6	14.1	250	140	112	123
	Nickel Plate	100	17.2	52.9	20.4	63.9	329	312	224	305
	Golden Bear	100	-	28.5	12.3	43.3	-	229	380	297
	Snip	22	8.2	25.5	8.1	21.4	148	142	138	155
Australia	Kalgoorlie	41	71.2	201.1	72.4	213.3	227	239	269	271
	Fortnum	82	-	-	-	8.9	-	-	-	443
Chile	El Hueso	100	13.3	54.4	14.0	48.4	343	282	288	302
Mexico	Torres	30	2.8	9.9	4.1	11.7	339	304	356	354
Total Homestake			452.6	1,395.4	465.4	1,378.5	230	229	243	258
Minority Interest			23.1	66.9	16.3	49.9				

		1993		1992	
		3rd Quarter	Year to Date	3rd Quarter	Year to Date
Gold Price (\$/oz.)	Realized	\$376	\$355	\$351	\$351
	Other Costs (\$/oz.)				
Other Costs (\$/oz.)	Non-Cash <sup>2</sup>	\$52	\$51	\$56	\$57
	Corporate Administrative	22	22	29	31
	Exploration	9	8	17	27

<sup>1</sup> On July 22, 1992, Homestake acquired International Corona Corporation. The business combination was accounted for as a pooling of interests.

<sup>2</sup> Includes depreciation, amortization and reclamation accruals.

### Stock Reinvestment Plan - Stock Transfers - Address Changes

To assist shareholders in increasing their investment in Homestake, an Automatic Reinvestment Plan is provided by our Agent, The First National Bank of Boston. The plan affords the opportunity, and allows a simple and automatic way, for you to use your cash dividends to purchase Homestake stock. If you wish, you also may purchase Homestake shares with cash payments through the plan. Inquiries should be addressed to the transfer agent, The First National Bank of Boston, Shareholder Services Division, P.O. Box 644, MS 45-02-09, Boston, MA 02102-0644 or by calling (800) 442-2001 or (617) 575-2900. Questions regarding stock transfers, non-receipt of dividend checks, address changes, etc. should be directed to the transfer agent.

# Canyon Resources

Lewistown, Montana

## KENDALL MINE OPERATIONS – THIRD QUARTER

PRODUCTION	1993	1992	1991	1990	1989 <sup>1</sup>
Tons Mined (waste and ore) (000)	1,609	2,073	1,445	1,093	2,120
Tons Ore Mined (000)	470	499	531	526	426
Gold Grade of Ore (oz/ton)	0.051	0.058	0.051	0.054	0.049
Strip Ratio (tons waste/tons ore)	2.4:1	3.2:1	1.7:1	0.1:1	4.0:1
Gold Production (oz)	13,224	16,927	24,021	6,022	12,796
Silver Production (oz)	6,857	5,148	3,199	2,225	8,886
Recoverable Gold Inventory (oz) (unleached gold in heap and ore stockpile)	15,793	17,755	21,088	29,468	19,961

FINANCIAL (Net to Canyon) <sup>2</sup>	1993	1992	1991	1990	1989 <sup>3</sup>
Ounces of Gold Sold <sup>3</sup>	15,827	16,636	22,520	7,730	5,344
Average Gold Price Realized (\$/oz)	349	384	383	398	367
Revenue From Mine Operations (\$000)	5,530	6,558	3,619	3,076	1,961
Operating Cost/Gold Ounce Sold (\$) <sup>4</sup>	229	208	191	341	259
Operating Earnings (\$000)	1,908	3,100	4,313	441	579
Capital Expenditures (\$000)	359	415	1,632	818	230

1 First full year of production

2 Canyon owned 40% of the Kendall Mine during 1989 and acquired 100% ownership on January 26, 1990

3 Gold production net to Canyon after payment in kind of 5% royalty

4 Includes royalty, severance and property taxes, overhead, and reclamation reserve

gold deposit continues. Early indications from the environmental review process are that the Briggs project will have no critical impacts on the environment with appropriate engineering and careful operating practices. The Draft Environmental Impact Statement on the project is scheduled to be published near year end. The Company expects to contract an outside engineering firm to conduct a "bankable" feasibility study on the Briggs project during the fourth quarter of 1993. Canyon remains optimistic that the Briggs project can be permitted so that mine

construction could start during the second quarter of 1994.

### *McDonald (27.75% Canyon)*

A comprehensive feasibility study of the McDonald gold deposit has been submitted by Davy International to Canyon and Phelps Dodge Mining Company. The owners are reviewing the study in anticipation of filing permit applications near year end. Environmental studies, hydrologic investigations, and other engineering studies are continuing on the project.



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about 20%. Many of the companies reported improved earnings but earnings didn't seem to have much influence on stock price.

### Smaller Golds

With few exceptions, the smaller golds also followed gold price, more than recovering from August's losses. Atlas, Canyon, Equinox, and Sunshine were the big gainers. There was no news from Sunshine, nor from Atlas, except the management reorganization in August. Canyon announced a new gold discovery, Alta made two acquisitions, the Equinox/Hecla merger was announced after our month-end.

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## VIEWPOINTS

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### **Off The Record . . .**

. . . The trouble with many hardcore environmentalists is that they have forgotten that other people have as much right to their various pursuits as they do. It was William Safire who said: we are all environmentalists now, but we are not all planetists. An environmentalist realizes that nature has its pleasures and deserves respect. A planetist puts earth ahead of the earthlings.

. . . if you're keeping track, Alta Gold is paying \$21 per ounce for the Cominco/USMX Kinsley gold property. That's high for an exploration project and low for a development project.

. . . Teck is paying \$5 per ounce for Cominco's Lobo deposit and exploration concessions in Chile. This is slightly low compared to other exploration projects, but probably about right given its location.

. . . Great Lakes is paying \$33 per ounce for 20% of Hecla's Grouse Creek project. That's just about right for a development project.

. . . the Equinox merger with Hecla comes out at about \$60.2 MM or \$55 per ounce gold. For reserves plus production and a development project that's not unreasonably high.

. . . that Cyprus/Amex merger is going to trigger some mighty fine "change of control" clauses for execs at both companies. The Denver Post reported Milt Ward will take down a cool \$6.3 MM, Allen Born nearly \$9 MM plus his 200,000 shares of Amex stock will become unrestricted. Other execs will also get benefits.

. . . Newmont Mining is thought to be recovering 84% in three weeks from the Yanacocha HL. The only problem they've had so far is that condemnation drilling keeps hitting ore.

. . . that troglodyte, Bruce The Arrogant, has the West pretty stirred up with his attack on the grazing fees and mining. Perhaps he is beginning to overstep his bounds.

The Oracle

## TAILINGS

### New PC System For Gem & Mineral Collectors

If you own a mineral or gem collection, or are responsible for organizing one, you shouldn't be without MINLOG, the new Windows-based information manager developed by Jim Beaver of Beaver Software (see ad on page 10).

From our view, MINLOG provides a simplified yet powerful way for collectors, curators, and dealers to catalog, classify, and inventory gem and mineral collections. The system uses a predefined database system for entry of specimen information, so no programming is required for constructing or organizing the database.

Once specimen information has been entered, users can select from any of 330 output formats: from spreadsheets, to highly detailed reports, and index cards. The system can also produce financial summaries, inventory reports, database queries for over 100 chemical and crystallographic parameters, and specimen display labels in four popular fonts.

Classification information is provided for more than 1,000 varieties of minerals and gems. MINLOG also features several look-up databases and tables to which users can add their own information.

Every collector knows that good documentation enhances a collection's value, but it always has been the most tedious part of the process. MINLOG takes out the drab manual process and offers collectors a streamlined way to make the administrative side of collecting not only more enjoyable, but more profitable.

Contact: Jim Beaver, Beaver Software Development Inc., PO Box 1608, Marietta, GA 30061, (404)419-7348.

### Canadians In Cuba

There are no restrictions on Canadian companies in Cuba. Metall Mining, Sherritt, Miramar, and Joutel are a few the MB Digest knows about. No U.S. companies or U.S. subsidiaries of Canadian companies can participate in Cuba because of the U.S. embargo.

As reported in previous issues, Miramar Mining signed two joint agreements to explore and develop a copper and a gold deposit in Cuba. Joutel signed an agreement to explore 1.2 MM acres in the central and eastern portions of the island. Joutel plans to invest \$1.3 MM in the first year and expects to begin a drilling program.

Some companies say they can't pass up the opportunity to move into Cuba now. Should the U.S. trade embargo one day be lifted, as some analysts have predicted, U.S. mining companies are sure to move in. It's a matter of getting in on the ground floor.

Another attraction is Cuba's skilled work force. The country has about 2,000 geologists and much of the preliminary exploration work has been done with the financial support of the Soviets. Source: file information, Dow Jones News Service.

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Mining Business Digest  
11 Robin Crest Lane  
Littleton, CO 80123-6513

SECOND  
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**NEWS RELEASE**

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FEB 7 1994

EXPLORATION DEPARTMENT

**FOR IMMEDIATE RELEASE: February 1, 1994**

**McDONALD GOLD PROJECT PERMITTING TO BE INITIATED IN EARLY 1994**

**GOLDEN, CO--**Canyon Resources Corporation (NASDAQ:CYNR), a Colorado-based mining company, today announced that the Seven-Up Pete Joint Venture will submit permit applications in early 1994 for an open-pit mining and heap-leaching operation at its McDonald gold property near Lincoln, Montana. The decision to commence permitting activities was based on a definitive feasibility study, conducted by Davy International, which confirms the viability of the proposed operation. Canyon Resources Corporation owns a 27.75 percent interest in the Seven-Up Pete Joint Venture, while Phelps Dodge Mining Company is the majority owner and operator of the project.

The McDonald deposit contains 8.2 million ounces of gold within 414 million tons of rock with an average grade of 0.020 ounce of gold per ton. The feasibility study has determined the mineable reserves that could be mined economically from the deposit at different gold prices (shown in the table below).

Mineable Reserves					
Gold Price (\$/oz)	Tons (millions)	Grade (oz/t)	Contained Gold (millions of ounces)	Recoverable Gold (millions of ounces)	Strip Ratio
\$375	205.1	0.025	5.20	3.75	2.13:1
400	254.9	0.024	5.99	4.23	1.71:1
450	287.8	0.023	6.64	4.62	2.03:1
525	329.3	0.022	7.11	4.95	1.83:1

At a gold price of \$375 per ounce, the feasibility study contemplates the production of 3.75 million ounces of gold and approximately 8.0 million ounces of silver from the McDonald deposit over a 12 year time period, with an average production of 308,000 ounces of gold per year (85,000 ounces of gold each year attributable to Canyon Resources).

The feasibility study indicates that the McDonald project is expected to have an initial construction and pre-stripping capital requirement of \$188 million prior to initial gold production. The project would require an additional \$74 million of capital for equipment replacement and pad expansions during the life of the mine operations. The overall cash operating costs, including severance taxes, royalty, and reclamation reserve, and excluding management fee, are expected to be approximately \$231 per ounce of recovered gold. The management fee, according to contract, is designed to reimburse the operator for home office expenses related to the project. The project occurs entirely on state and private lands and will be subjected to state permitting and reclamation requirements, with minimal impact from the anticipated federal mining law changes.

"Canyon Resources is quite pleased that the definitive feasibility study demonstrates economic viability of the McDonald gold project. Upon completion of permitting, the project will be developed using state-of-the-art technology to meet the strict environmental standards established by the Joint Venture. Development of the McDonald gold mine, along with the Briggs gold project in California, will allow Canyon to triple its current level of gold production to approximately 160,000 ounces per year," said Richard H. De Voto, President.

####

**FOR FURTHER INFORMATION, CONTACT:**

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# NEWS RELEASE

*FOR IMMEDIATE RELEASE: February 28, 1994*

## CANYON RESOURCES ANNOUNCES 1993 FINANCIAL RESULTS

**GOLDEN, CO**--Canyon Resources Corporation (NASDAQ:CYNR) today reported net income in 1993 of \$920,700, or \$0.04 per share, compared to a net loss in 1992 of \$14,277,000, or \$0.61 per share. Revenues in 1993 were \$19,879,600, a 12% decrease compared to \$22,506,400 in 1992. Operating earnings for 1993 were \$1,710,400, the highest ever recorded by the Company. The 1993 results include lower depreciation and amortization charges related to 1992 writedowns, \$1.3 million expenses for abandoned mineral properties, and a higher net interest expense resulting from the \$22 million of convertible debentures sold mid-year. The 1992 results included a charge of \$14.1 million to write-down certain assets. The lower revenues in 1993 reflected lower gold production, due to lower grade ores mined in 1993, and the lower sales price of gold during the year relative to 1992.

The Company's cash balance at December 31, 1993 was \$20,166,400. During 1993, the Company raised \$27.9 million in two financings, repaid \$4.5 million in debt, and converted an additional \$1.5 million of debt into shares. At year end, the Company's debt consisted of \$22.0 million in convertible debentures due in 1998 and \$2.3 million of gold loan scheduled to be repaid by the end of 1994.

Canyon produced 54,203 ounces of gold from the Kendall Mine in 1993, a 9% decrease from the 59,857 ounces produced in 1992. Direct cash operating costs of gold production at the Kendall Mine in 1993 were \$178 per ounce. Total operating costs, including royalty, severance and property taxes, and reclamation reserve, were \$223 per ounce, 7% higher than the \$209 per ounce total operating costs of 1992. The lower production and higher operating costs in 1993 were due to the lower grade ores mined during the year.

Cash provided by operations was \$5.2 million in 1993. The Company's capital expenditures in 1993 totaled \$7.6 million, the major components of which included \$3.1 million on environmental, metallurgical, and engineering work at the Briggs project; \$2.0 million for Canyon's share of costs on the McDonald project; and \$1.2 million at the Kendall Mine, mainly for final leach pad expansion.

In addition to producing gold and silver at the Kendall Mine in Montana, Canyon Resources also produces and sells industrial mineral products from a Nevada diatomite facility. Canyon is also progressing with permitting activities on the Briggs gold project in California and the McDonald gold project in Montana.

**\* Table \***

### **FOR FURTHER INFORMATION, CONTACT:**

Gary C. Huber  
Vice President-Finance  
(303) 278-8464

or

Richard T. Phillips  
Treasurer

**CANYON RESOURCES CORPORATION & SUBSIDIARIES**  
**SUMMARIZED FINANCIAL AND PRODUCTION INFORMATION**

	Year Ended December 31,	
	1993	1992
<b>STATEMENT OF OPERATIONS</b>		
Revenue	\$19,879,600	\$22,506,400
Cost of Sales	12,534,100	12,634,600
Selling, General & Administrative	2,058,200	2,169,500
Depreciation, Depletion & Amortization	1,956,700	7,144,800
Writedown of Assets	--	14,075,400
Interest Expense	1,217,400	437,900
Net Income (Loss)	920,700	(14,277,000)
Net Income (Loss) Per Share	0.04	(0.61)
Weighted Average Shares Outstanding	24,636,100	23,526,700

**CASH FLOW**

Net Cash Provided by Operating Activities	\$5,150,700	\$7,644,500
Proceeds from Gold Loan and Debentures (Net)	24,436,600	--
Issuance of Stock (Net)	619,900	4,565,900
Purchases of Property and Equipment	(7,578,400)	(5,932,200)
Payments on Debt	(4,606,000)	(5,025,500)
Net Cash & Cash Equivalents, End of Period	20,166,400	3,551,300

**BALANCE SHEETS**

	Dec. 31, 1993	Dec. 31, 1992
Total Current Assets	\$24,264,500	\$6,615,800
Total Assets	53,235,700	29,143,500
Current Liabilities:		
Notes Payable	2,299,300	3,000,000
Other	2,663,600	1,769,100
Long-Term Notes Payable	22,000,000	1,500,000
Other Noncurrent Liabilities	846,300	1,050,400
Total Liabilities & Stockholders' Equity	\$53,235,700	\$29,143,500

**PRODUCTION DATA - Kendall Mine**

	1993	1992
Gold Production (oz)	54,203	59,857
Silver Production (oz)	29,218	18,229
Total Operating Costs Per Ounce of Gold*	\$223	\$209
Average Sales Price Per Ounce of Gold	\$353	\$376
Average Gold Market Price (COMEX) Per Ounce of Gold	\$360	\$344

\* Includes Royalty; Severance and Property Taxes; and Reclamation Reserve.



GEOLOGICAL SOCIETY OF AMERICA  
**BULLETIN**

ISSN 0016-7606

Volume 99 Number 6 December 1987

BULLETIN



GSA Data Repository Item # 8735

Title of article The crustal heritage of silver and gold ratios in  
Arizona ores

Author(s) S. R. Titley

See Bulletin v. 99, p. 814 - 826

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## SILVER AND GOLD IN PROTEROZOIC-AGED ORES IN ARIZONA

DIST/MINE	DOMAIN	Ag g/T	Au g/T	Ag/Au	LOGAg/Au
Old Dick	II	13.30	0.07	190.00	2.28
Hualapai	II	21.08	0.15	140.53	2.15
Sierra Ancha	I	228.50	2.28	100.22	2.00
Turkey Creek	II	999.00	10.97	91.07	1.96
Tuscumbia	II	999.00	20.16	49.55	1.70
Big Bug	II	92.74	2.55	36.37	1.56
Verde	II	54.30	1.50	36.20	1.56
New River	II	14.11	0.50	28.22	1.45
Mayer	II	43.00	1.72	25.00	1.40
Antelope	I	17.14	0.71	24.14	1.38
Kay	II	35.60	1.98	17.98	1.25
Agua Fria	II	42.85	2.67	16.05	1.21
Zonia	II	0.02	.00	16.00	1.20
Finch	II	68.57	6.85	10.01	1.00
Spring Creek	II	228.50	22.85	10.00	1.00
Mazatzal Mtn	II	85.71	10.55	8.12	0.91
Green Valley	II	23.29	6.15	3.79	0.58
Minnehaha	II	48.00	13.71	3.50	0.54
Cottonwood	II	15.25	7.62	2.00	0.30
Cherry Creek	II	30.36	19.59	1.55	0.19
Mineral Pt.	II	22.85	17.14	1.33	0.12
Hillside	II	28.60	30.47	0.94	-0.03
Bronco Cr	II	5.71	6.85	0.83	-0.08
Yarber Wash	II	5.71	10.28	0.56	-0.26
Kirkland	II	7.62	17.14	0.44	-0.35
Richinbar	II	1.61	5.14	0.31	-0.50
Thumb Butte	II	3.81	13.71	0.28	-0.56

## SILVER AND GOLD IN LARAMIDE-AGED ORES IN ARIZONA

DIST/MINE	DOMAIN	Ag g/T	Au g/T	Ag/Au	LOGAg/Au
Gunsight	I	715.16	0.50	1430.32	3.16
C. Colorado	I	999.00	0.70	1427.14	3.15
Tyndall	I	199.02	0.17	1170.71	3.07
Montezuma	I	339.42	0.34	998.29	3.00
Waterman	I	83.43	0.11	758.45	2.88
Ivanhoe	I	876.00	2.29	382.53	2.58
Brownell	I	189.96	0.50	379.92	2.58
Washington C	I	176.15	0.54	326.20	2.51
Marble Peak	I	25.78	0.08	322.25	2.51
Diamond Joe	II	171.43	0.57	300.75	2.48
Quien Sabe	I	5.71	0.02	285.50	2.46
Richmond Bas	I	999.00	3.80	262.89	2.42
Palmetto	I	240.24	0.95	252.88	2.40
Papago	I	183.35	0.75	244.47	2.39
Tombstone	I	372.24	1.53	243.29	2.39
Summit	I	13.60	0.06	226.67	2.36
Cochise	I	15.05	0.07	215.00	2.33
Empire	I	215.79	1.01	213.65	2.33
Saddle Mtn	I	51.50	0.25	206.00	2.31
Pinal Mtns	I	345.71	1.71	202.17	2.31
Hackberry	II	750.00	3.71	202.16	2.31
Mine Canyon	I	21.09	0.13	162.23	2.21
Owl Head	I	171.43	1.07	160.21	2.20
Hartford	I	257.14	1.71	150.37	2.18
Boriana	II	1.79	0.02	119.33	2.08
Quijotoa	I	109.71	1.03	106.51	2.03
Squaw Pk	II	210.90	2.10	100.43	2.00
Jackson	I	171.43	1.71	100.25	2.00
Oro Blanco	I	169.09	1.69	100.05	2.00
Ripsey	I	647.90	6.86	94.45	1.98
Amole	I	37.71	0.51	73.94	1.87
Wrightson	I	205.70	2.86	71.92	1.86
Patagonia	I	257.00	4.00	64.25	1.81
Little Hills	I	0.62	0.01	62.00	1.79
Red Rock	I	205.71	3.43	59.97	1.78
Greaterville	I	287.99	5.14	56.03	1.75
North Star	I	8.57	0.17	50.41	1.70
Mansfield	I	428.50	8.57	50.00	1.70
Turquoise	I	45.30	0.93	48.71	1.69
Cuprite	I	58.97	1.23	47.94	1.68
Saginaw Hill	I	47.39	1.01	46.92	1.67
Oracle	I	565.70	13.71	41.26	1.62
Salero	I	364.50	9.02	40.41	1.61
Las Guijas	I	7.62	0.19	40.11	1.60
Keystone	I	102.86	2.57	40.02	1.60
Mildred Peak	I	217.35	6.47	33.59	1.53
Quercies	I	24.76	0.76	32.58	1.51
Mascot	I	142.13	4.46	31.87	1.50
Silver Camp	I	139.85	5.41	25.85	1.41
Cottonwood	I	244.90	9.80	24.99	1.40
Cababi	I	354.60	14.69	24.14	1.38
Coyote	I	7.34	0.34	21.59	1.33
Pajarito	I	514.28	24.49	21.00	1.32
Riverside	I	31.92	1.77	18.03	1.26

## SILVER AND GOLD IN LARAMIDE-AGED ORES IN ARIZONA

Austerlitz	I	377.10	21.43	17.60	1.25
CLARKE x 10		0.70	0.04	17.50	1.24
Durham-Suizo	I	9.14	0.57	16.04	1.21
Walker	II	140.20	10.46	13.40	1.13
Tiger	II	141.58	15.49	9.14	0.96
Ticonderoga	II	160.70	19.29	8.33	0.92
Frisco	II	45.71	11.43	4.00	0.60
Golden Rule	I	16.44	10.59	1.55	0.19
La Posa	II	13.71	34.29	0.40	-0.40
Laguna	II	4.29	12.86	0.33	-0.48
Fortuna	II	3.25	29.36	0.11	-0.96
Yuma	II	0.69	6.86	0.10	-1.00

SILVER AND GOLD IN LARAMIDE PORPHYRY DISTRICTS AND MINES: SILVER AND GOLD IN NEVADAN DISTRICTS AND MINES

Laramide Ores

	DOMAIN	Ag(g/T)	Au(g/T)	Ag/Au	Log Ag/Au
Pima District	I	61.02	0.01	8717.14	3.94
Pima Mine		2.07			
Mission Mine		2.29			
Sierrita Mine		1.03			
Twin Buttes Mine		3.41			
Esperanza Mine		1.37			
Silver Bell District	I	6.80	0.001	6800.00	3.83
Silver Bell Mine		2.39			
Globe Miami District(1)	I	23.31	0.10	228.53	2.36
Miami-Inspiration		0.42	0.01	60.00	1.78
Banner District(1)	I	23.99	0.38	63.63	1.80
Christmas Mine		2.95	0.08	38.82	1.59
Eureka District	II	140.54	6.17	22.78	1.36
Bagdad Mine		1.14	0.02	57.00	1.75
Wallapai District(1)	II	149.10	4.01	37.18	1.57
Mineral Park Mine		2.26	0.003	753.33	2.88
Copper Basin District(2)	II	4.39	0.24	18.29	1.26
Copper Basin Deposit		no data			
Vekol District	I	342.80	0.14	2448.57	3.39
Harshaw District	I	110.40	0.07	1577.14	3.20
Red Mountain Deposit		no data			
Rosemont District	I	28.55	0.10	279.90	2.45
Rosemont Deposit		no data			
Bunker Hill District	I	13.37	0.07	196.62	2.29
Ray District	I	0.91	0.01	130.00	2.11
Morenci District (Mine)	I	1.21	0.02	50.42	1.70
Sacaton Mine	I	1.28	0.03	42.67	1.63
San Manuel Mine	I	0.83	0.04	19.30	1.29
New Cornelia (Ajo)	I (II?)	1.57	0.13	12.56	1.10
San Juan District	I	0.47	0.04	13.43	1.13
Dos Pobres(3)	I	2.76	0.156	17.61	1.24

Nevadan Ores

Bisbee District (4)	I	20.95	0.57	36.63	1.56
Bisbee District (5)	I	24.5	0.87	28.39	1.45
Nogales District(6)	I	442.58	31.76	13.93	1.14
Turquoise District	I	45.29	0.93	48.56	1.68

(Notes: (1) Figures for districts exclude production from porphyry ores. Eureka and Wallapai district data from Elsing and Heinemann, 1936.  
 (2) data include some placer gold.  
 (3) Dos Pobres grades from area averages of maps of Jackson and Langton (1982)  
 (4) Values include Lavender pit:  
 (5) Values are pre-Lavender pit, estimated from data by Hogue and Wilson (1950)  
 (6) Data from Keith (1975).  
 All other data from Keith and others (1983a,b.), Keith and others (1978), and Titley (1982).

## SILVER AND GOLD IN MID- AND LATE-TERTIARY DISTRICTS

DIST/MINE	DOMAIN	Ag g/T	Au g/T	Ag/Au	LOGAg/Au
Silver	II	431.06	0.02	18741.74	4.27
McCracken	II	132.58	0.02	6629.00	3.82
*Randolph	I	462.57	0.10	4471.51	3.65
Silver Reef	I	360.37	0.19	1896.68	3.28
Martinez Can	I	238.57	0.14	1704.07	3.23
New Water	II	1076.55	0.69	1560.22	3.19
Wood Camp Ca	I	100.83	0.07	1482.79	3.17
California	I	157.14	0.11	1428.55	3.15
Baboquivari	I	79.03	0.11	750.79	2.88
*Rucker Can.	I	785.02	1.17	670.96	2.83
Cave Creek	I	142.11	0.27	526.33	2.72
Ben Nevis	I	13485.00	26.09	516.86	2.71
Ash Peak	I	228.45	0.88	259.60	2.41
Middle Pass	I	45.95	0.18	255.28	2.41
Shea	II	1100.27	4.70	234.10	2.37
*Owl Head	I	172.76	0.86	200.88	2.30
Tip Top	II	2309.03	11.89	194.20	2.29
Walnut Grove	II	171.00	1.10	155.45	2.19
Slate	I	16.12	0.11	146.55	2.17
*Crescent	I	805.69	5.73	140.61	2.15
Oro Blanco	I	168.54	1.68	100.32	2.00
Owens	II	447.00	4.56	98.03	1.99
Pearce	I	286.77	2.93	97.87	1.99
Aravaipa	I	44.13	0.53	83.26	1.92
Rawhide	II	393.42	4.85	81.12	1.91
Swansea	II	2.09	0.03	69.67	1.84
Turkey Cr.	II	188.12	2.74	68.66	1.84
Swisshelm	I	249.59	4.05	61.63	1.79
Peck	II	113.71	2.00	56.86	1.75
Stanley	I	167.82	3.61	46.49	1.67
Copper Butte	I	1.03	0.03	34.33	1.54
Arivaca	I	293.66	8.94	32.85	1.52
Greenback	I	137.14	4.29	31.97	1.50
Black Canyon	II	122.78	4.14	29.66	1.47
C.de Fresnal	I	342.85	13.71	25.01	1.40
Twin Peaks	I	180.00	8.57	21.00	1.32
Cinnabar	II	68.57	3.42	20.05	1.30
Groom Creek	II	196.00	11.89	16.48	1.22
Mineral Hill	I	5.95	0.37	16.07	1.21
White Hills	II	106.97	6.85	15.62	1.19
Minnesota	II	79.12	5.27	15.01	1.18
Osborne	II	77.74	5.18	15.01	1.18
Castle Dome	II	56.64	3.97	14.27	1.15
YellowJacket	II	61.78	4.41	14.01	1.15
Rattlesnake	I	171.90	13.58	12.66	1.10
Neversweat	II	220.14	18.45	11.93	1.08
Mt. Union	II	188.00	16.40	11.46	1.06
Black Rock	II	94.28	8.31	11.35	1.05
Mineral Mtn	I	28.57	2.86	9.99	1.00
Painted Rock	II	154.62	16.11	9.60	0.98
Cedar Valley	II	174.06	18.46	9.43	0.97
Hassayampa	II	148.60	17.50	8.49	0.93
Artillery	II	45.35	5.49	8.26	0.92

## SILVER AND GOLD IN MID- AND LATE-TERTIARY DISTRICTS

Moon Mtns.	II	91.44	11.42	8.01	0.90
*La Cholla	II	330.16	41.28	8.00	0.90
Cleopatra	II	21.65	3.61	6.00	0.78
Ellsworth	II	34.28	5.75	5.96	0.78
**Plomosas	II	102.85	18.70	5.50	0.74
Sheep Tanks	II	67.16	12.30	5.46	0.74
Humbug	II	67.80	13.90	4.88	0.69
Mammoth	I	10.72	2.25	4.76	0.68
Rincon	I	82.62	19.50	4.24	0.63
Alamo	II	16.15	4.01	4.03	0.61
Lead Pill	II	48.98	12.24	4.00	0.60
Teviston	I	109.71	27.42	4.00	0.60
Webb	II	16.62	4.70	3.54	0.55
Chemhuevis	II	68.57	22.86	3.00	0.48
*Aguila	II	37.37	13.61	2.75	0.44
Harquahala	II	11.92	4.57	2.61	0.42
Superstition	I	27.43	10.52	2.61	0.42
Pikes Peak	II	28.57	14.28	2.00	0.30
Clara	II	1.37	0.70	1.96	0.29
Bullard	II	12.10	7.26	1.67	0.22
Silver Mtn	II	62.50	38.12	1.64	0.21
Pilgrim	II	8.78	5.86	1.50	0.18
Buck Mtns	II	13.33	11.43	1.17	0.07
Cave Creek	II	18.04	16.24	1.11	0.05
Martinez	II	16.10	15.00	1.07	0.03
Castle Creek	II	20.57	20.40	1.01	.00
Apache Pass	I	34.29	34.29	1.00	0.00
San Domingo	II	20.57	20.57	1.00	0.00
Topok	II	1.63	1.63	1.00	0.00
Virginia	II	7.68	8.00	0.96	-0.02
Crosby	II	16.44	17.50	0.94	-0.03
Rich Hill	II	8.70	9.30	0.94	-0.03
Middle Camp	II	8.74	9.46	0.92	-0.03
El Dorado P	II	11.43	14.29	0.80	-0.10
Goldfield	II	5.96	7.60	0.78	-0.11
Harcuvar	II	7.44	9.53	0.78	-0.11
*Midway	II	5.62	7.20	0.78	-0.11
Vulture	II	9.33	12.37	0.75	-0.12
Salt R. Mtns	II	11.43	16.00	0.71	-0.15
Oceanic	I	9.14	13.70	0.67	-0.18
Cunningham P	II	9.90	15.24	0.65	-0.19
Little Harq.	II	19.41	30.83	0.63	-0.20
Greenwood	II	10.29	17.14	0.60	-0.22
Catman	II	9.66	16.54	0.58	-0.23
French Gulch	II	5.50	11.00	0.50	-0.30
McConnico	II	2.68	5.36	0.50	-0.30
Planet	II	0.01	0.02	0.50	-0.30
Mammon	II	4.29	8.60	0.50	-0.30
Bouse	II	10.15	21.56	0.47	-0.33
Kofa	II	5.43	12.04	0.45	-0.35
Kirkland	II	7.62	17.14	0.44	-0.35
La Paz	II	2.18	4.99	0.44	-0.36
Laguna	II	4.80	11.72	0.41	-0.39
Winifred	II	3.43	8.57	0.40	-0.40
Red Picacho	II	9.40	25.70	0.37	-0.44
Red Picacho	II	9.35	25.71	0.36	-0.44

## SILVER AND GOLD IN MID- AND LATE-TERTIARY DISTRICTS

Big Horn	II	2.86	8.00	0.36	-0.45
Sunrise	II	6.86	20.57	0.33	-0.48
Cienega	II	2.89	21.65	0.13	-0.87
Mammon	I	5.59	48.86	0.11	-0.94
Union Pass	II	0.63	6.23	0.10	-1.00
Relief	II	0.86	11.14	0.08	-1.11
Fine Peak	II	1.14	16.51	0.07	-1.16

Note: \* Data from Welty and others, 1985

\*\* Plomosas District combination of N and S. Plomosas: Data from  
Elsing and Heinemann (1936), Welty and others (1985)

**Precious Metals**

**H**omestake's total share of gold production in 1986 rose to 669,594 ounces, 18 percent greater than last year's 566,417 ounces. This was principally due to having a full year's production from the McLaughlin mine in northern California. As a result, gold sales increased to 669,321 ounces, compared with 1985 sales of 595,539 ounces. This and higher gold prices increased gold revenues to \$203.6 million in 1986 from \$156.0 million in the prior year.

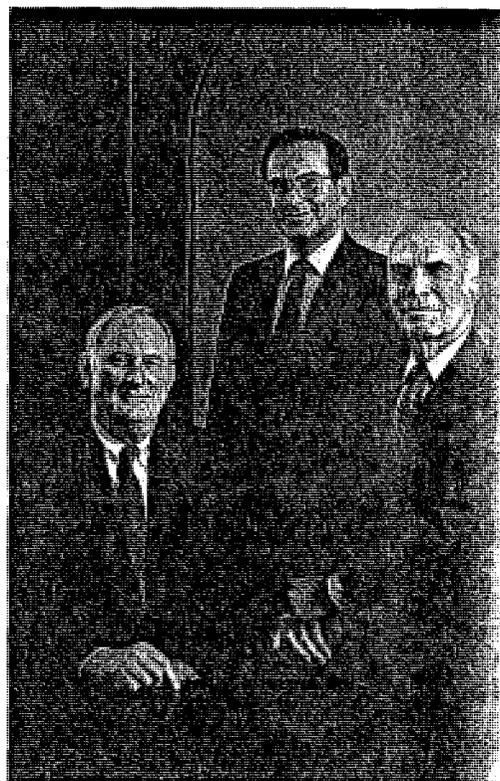
Operating earnings from gold more than doubled to \$47.7 million. This represented 78 percent of total operating earnings, compared with \$18.8 million, or 46 percent of operating earnings in 1985. The Homestake mine in Lead, South Dakota provided \$25.0 million, or 41 percent of total operating earnings, compared with \$13.9 million, or 34 percent, in the prior year. The McLaughlin mine provided \$0.2 million, compared with an operating loss of \$7.8 million in its start-up year of 1985. The 25 percent interest in the Round Mountain open-pit gold mine in Nevada provided \$5.6 million, or 9 percent of total operating earnings, compared with \$1.9 million, or 4 percent, last year.

Homestake's share of operating earnings from its 48 percent interest in Kalgoorlie Mining Associates in Western Australia was \$16.8 million, or 28 percent of the total, compared with \$10.8 million, or 27 percent, in 1985.

*Homestake Mine*

1986 gold production at the Homestake mine was 341,647 ounces, slightly lower than its 1985 production of 343,103 ounces. Ore milled from underground, at 1,872,479 tons, was down 3 percent, while surface ore milled increased 3 percent to 431,866 tons. During 1986 the average grade of ore from underground operations remained unchanged at 0.174 ounces per ton. Overall grade of ore milled improved 1 percent and mill recovery increased slightly to 94.7 percent because of the higher head grade. The average cost of production increased to \$298 per ounce from \$294 in 1985. Mine efficiency improved 2 percent in 1986 and was a major contributor to cost containment.

Mining and exploration work continued below the 6800-foot level. Major development work occurred on the 6950, 7100, 7250, 7550, 7700 and 8000-foot levels. Sinking of the No. 4 Winze from the 6950 to the 7450-foot level commenced late



*(left to right) Executive Vice Presidents Lynn Walker, James A. Anderson and William A. Humphrey.*

<i>Homestake Mine</i>	1986	1985	1984	1983	1982
<i>(Quantities in 000s)</i>					
Tons of ore milled	2,304	2,346	1,897	1,773	1,160
Recovered grade (oz/ton)	0.148	0.146	0.156	0.173	0.160
Recovery of gold (percent)	94.7	94.6	95.9	96.1	94.4
Ounces of gold recovered	342	343	296	307	185
Underground ore reserves (tons)	18,869	18,602	19,267	19,990	17,518
Underground grade (oz/ton)	0.212	0.219	0.220	0.221	0.220
Open Cut ore reserves (tons)	6,151	6,517 <sup>1</sup>	—	—	—
Open Cut grade (oz/ton)	0.127	0.124 <sup>1</sup>	—	—	—

<sup>1</sup>Based on feasibility studies completed in 1985.

in the year. Long range exploration drilling continued below 8000 feet.

The Open Cut project is proceeding ahead of schedule. Stripping of waste to expose ore was accelerated to reduce unit costs and advance the ore delivery schedule to the mill. Ore and waste removed from the project totaled 13,123,371 tons, from which 31,663 ounces of gold were recovered. Installation of a crusher and pipe conveyor from the Open Cut to the mill was substantially completed at year-end, with start-up scheduled early in 1987. The main ore body will be exposed for mining in March 1987, when the project becomes fully operational.

A new three-year labor contract signed during the year was extended to May 31, 1989.

#### *McLaughlin Mine*

Gold production during the first full year of operation at the McLaughlin mine increased to 173,401 ounces in 1986, versus the 1985 start-up production of 83,836 ounces. The average cost of production decreased to \$364 per ounce from \$422 in 1985. During 1986 the average grade of ore milled was 0.192 ounces per ton, compared with 0.152 last year. As discussed in the Letter To Shareholders, ore reserve grades have been reduced, with the result that the total recoverable gold

reserves have been reduced by approximately 135,000 ounces.

A significant reduction in power costs, a major cost item, was achieved during the year. The mine/mill complex, which began operation in April 1985, achieved its design tonnage throughput on a consistent basis late in the year.

During the year the McLaughlin mine received the California Chapter Soil Conservation Society of America Merit Award for its success in identifying, assessing and mitigating the effects of mining on the environment.

#### *Round Mountain Mine*

Gold production at Round Mountain increased 21 percent to 167,649 ounces in 1986 from 138,749 ounces in 1985. The mine production rate increased to an average of 65,000 tons per day of ore and waste in 1986 from 46,000 tons in 1985.

A further increase in the production rate is planned in 1987 in preparation for a mine and processing plant expansion that is expected to be completed over the next two years. This should provide a significant increase in gold production starting in 1989.

#### *Kalgoorlie Mining Associates*

1986 gold production at the Kalgoorlie Mining Associates' Mt. Charlotte and Fimiston gold mines was 234,653 ounces, compared with 218,311 ounces in 1985. Homestake's share was 112,633 ounces, compared with 104,790 ounces in 1985.

<i>McLaughlin Mine</i>	1986	1985 <sup>1</sup>	1984	1983	1982
<i>(Quantities in 000s)</i>					
Tons of ore milled	1,022	660	—	—	—
Recovered grade (oz/ton)	0.170	0.119	—	—	—
Recovery of gold (percent)	88.5	78.5	—	—	—
Ounces of gold recovered	173	84	—	—	—
Ore reserves (tons)	17,964 <sup>2,3</sup>	18,576	19,273	19,273	19,273
Grade (oz/ton)	0.138 <sup>2,3</sup>	0.152	0.152	0.152	0.152

<sup>1</sup>For the start-up period April through December 1985.

<sup>2</sup>Includes 2,293 tons of stockpiled ore at a grade of 0.085 ounces per ton.

<sup>3</sup>Revisions are based on actual mining experience.

<i>Round Mountain Mine<sup>1</sup></i>	1986	1985	1984	1983	1982
<i>(Quantities in 000s)</i>					
Tons of ore leached	1,666	1,339	1,143	894	685
Recovered grade (oz/ton)	.022	.026	.027	.026	.027
Recovery of gold (percent)	69.0	72.9	66.7	64.1	65.2
Ounces of gold recovered	42	35	30	23	18
Ore reserves (tons)	48,567 <sup>4</sup>	43,800 <sup>3</sup>	5,750 <sup>2</sup>	—	—
Grade (oz/ton)	0.035 <sup>4</sup>	0.039 <sup>3</sup>	0.037 <sup>2</sup>	—	—

<sup>1</sup>Homestake's 25 percent share.

<sup>2</sup>Ore reserves reported prior to the acquisition of Felmont in 1984 included tonnages for which the economic potential had not been fully evaluated by Homestake.

<sup>3</sup>Includes tonnages added to reserves as a result of feasibility studies completed in 1985.

<sup>4</sup>Ore reserves used a different methodology, new information and different pit design than the 1985 estimate.

### *Mt. Charlotte Mine*

Gold recovery at Mt. Charlotte was 104,339 ounces from 949,541 tons milled, a 9 percent increase in ounces over 1985. The increase reflects higher ore grades.

Waste hoisting commenced from the newly completed Cassidy Shaft, and a new underground crusher for ore handling was installed and commissioned. Ore hoisting from the Cassidy Shaft will commence in early 1987 and will result in lower costs.

### *Fimiston Mine*

Production from Fimiston in 1986 was 130,314 ounces of gold, comprised of 74,631 ounces from underground ore, 47,880 ounces from open-pit ore and 7803 ounces from plant clean-up. This is a 6 percent increase over the mine's 1985 production.

Both underground development and exploration proceeded satisfactorily on the eastern leases, and more limited underground development advanced normally from the Chaffers Shaft on the western leases. Work also began on the installation of an underground crusher on the No. 23 Level at Chaffers. Development commenced on an underground transport drift that will connect the Chaffers Shaft to the main producing eastern leases to facilitate increased exploitation of ore resources from those leases.

Open-pit ore tonnage increased by 21 percent in 1986 and is expected to be maintained at an annual rate of 380,000 tons in 1987. Lower overall recovered grade at Fimiston reflects

increased production from lower grade open-pit ore sources.

### *Bulldog Mine*

The Bulldog silver mine in Creede, Colorado, has been on standby since operations were suspended in January 1985 because of low prices.

The mine remains on a care and maintenance basis and may be reopened when silver prices increase sufficiently to justify resumption of operations. Bulldog mineral resources are 1.2 million tons containing 14.2 ounces of silver per ton and 1.9 percent lead. The nearby North Amethyst exploration project is described on page 16.

### Energy

**H**omestake's energy sector is comprised of a fossil fuel segment and a mineral segment.

Felmont Oil Corporation, a wholly-owned subsidiary, manages all of the Company's oil and gas operations, which are principally located in the Gulf Coast region, the Appalachian Basin and certain western states.

Homestake's uranium operations consist of production from low-cost solution mining and mining of high-grade reserves at its Grants, New Mexico, facility.

<i>Mt. Charlotte Mine</i> <sup>1</sup>	1986	1985	1984	1983	1982
<i>(Quantities in 000s)</i>					
Tons of ore milled	456	447	434	450	497
Recovered grade (oz/ton)	0.110	0.102	0.123	0.130	0.130
Recovery of gold (percent)	88.8	88.8	89.2	89.5	89.4
Ounces of gold recovered	50	46	54	58	65
Ore reserves (tons)	4,603	4,414	4,048	3,862	4,286
Grade (oz/ton)	0.124	0.126	0.129	0.129	0.131

<sup>1</sup>Homestake's 48 percent share.

<i>Fimiston Mine</i> <sup>1</sup>	1986	1985	1984	1983	1982
<i>(Quantities in 000s)</i>					
Tons of ore milled	371	339	283	194	181
Recovered grade (oz/ton)	0.159	0.174	0.172	0.170	0.164
Recovery of gold (percent)	88.4	91.4	89.8	88.8	87.2
Ounces of gold recovered	63	59	53	33	30
Ore reserves (tons)					
Underground (tons)	2,222	1,701	1,640	1,862	688
Grade (oz/ton)	0.218	0.241	0.225	0.231	0.239
Open-pit (tons)	1,228	1,076	651	—	—
Grade (oz/ton)	0.129	0.143	0.145	—	—

<sup>1</sup>Homestake's 48 percent share.

Sales of uranium concentrate in 1986 increased to 1,045,000 pounds from 940,000 pounds in 1985. Sales prices during 1986 averaged \$47.54 a pound, down from \$49.65 a pound in the prior year.

The Grants mine and mill in New Mexico continued to operate on reduced schedules in 1986 in response to decreasing uranium sales volumes under contracts expiring by the end of 1987.

### Base Metals

#### *Lead & Zinc*

Homestake accomplished a major restructuring of its lead and zinc business during 1986. In May Homestake acquired AMAX Inc.'s 50 percent interest in the jointly-owned Buick mine, mill and smelting facilities at Boss, Missouri for \$10.0 million, plus certain net working capital items of approximately \$3.0 million. The operation was placed on standby status by AMAX in mid-May. While it remained on standby, Homestake evaluated various operating plans and business alternatives.

On November 1 Homestake and Fluor Corporation's St. Joe Lead unit formed a new jointly-managed partnership called The Doe Run Company. The new company, in which Homestake holds a 42.5 percent interest and St. Joe a 57.5 percent interest, includes our lead/zinc operations and St. Joe's Herculeum smelter, five mines, and three mills in the Viburnum, Missouri area. Formation of The Doe Run Company enhances operating flexibility to respond to varying

market conditions, improves the ore reserve position and provides new opportunities to reduce cost.

During November and December Doe Run produced 27,126 tons of refined lead metal products at the Herculeum smelter. Doe Run management will continue working to maximize profits by reducing costs and optimizing concentrate/metal production. Homestake reported operating earnings of \$1.9 million from its interest in Doe Run for the months of November and December.

However, Homestake's overall lead/zinc operations incurred an operating loss of \$3.4 million in 1986, compared with an operating loss of \$4.1 million in 1985. The 1986 results include The Doe Run profits which partially offset charges of \$5.7 million for severance, stand-by and other costs.

### Exploration

#### *Minerals*

To maintain Homestake's position as the leading gold producer in North America, the Company continues to emphasize precious metals exploration, principally in the United States. The Company also conducts exploration programs in Australia and Canada and seeks attractive opportunities on a worldwide basis.

Exploration expenditures are set at levels that are projected to produce successful results. The 1986 expenditure level was \$17.7 million, up from \$16.8 million in 1985.

In 1986 Homestake screened more than 1180 prospects and conducted field examinations on more than 630 prospects. Preliminary drilling was conducted on 42 properties with results that advanced four

<i>Base Metals Operations</i> <sup>1</sup>	1986	1985	1984	1983	1982
<i>(Quantities in 000s)</i>					
Tons of ore milled	576	1,141	750	1,062	1,132
Lead content (percent)	6.9	6.9	8.1	7.9	7.6
Zinc content (percent)	1.4	1.4	1.8	1.8	2.0
Copper content (percent)	1.0	—	—	—	—
Lead concentrate (tons)	49	98	76	106	110
Zinc concentrate (tons)	12	24	20	28	34
Copper concentrate (tons)	4	—	—	—	—
Refined lead products (tons)	41	66	58	40	31
Ore reserves (tons)	30,175	10,032 <sup>2</sup>	18,043	18,952	19,676
Lead content (percent)	5.5	8.0 <sup>2</sup>	5.6	5.7	5.8
Zinc content (percent)	1.0	2.2 <sup>2</sup>	1.4	1.4	1.5
Copper content (percent)	0.4	—	—	—	—

<sup>1</sup>Statistics represent Homestake's share of Buick prior to the formation of Doe Run and its share of Doe Run starting November 1, 1986.

<sup>2</sup>Decreased to reflect lower lead prices and therefore higher reserve cut-off grade.

properties to the target exploration stage. Negative results led to the abandonment of 16 properties.

Target exploration continued on four projects at year-end. One quality target that did not meet Homestake's advancement criteria was farmed out.

Underground exploration continues on the North Amethyst project in the Creede District of Colorado. Construction of the underground access by decline, initiated in August 1984, has been extended to the 10,250 Level, a distance of 6500 feet. Drifting on-vein has partially evaluated the North Amethyst structure on several levels. Ore grade mineralization in gold and silver veins of mineable thickness has been identified. At year-end 2200 feet of on-vein drifting had been completed. The decline is being extended to the 10,000 Level to further confirm vertical continuity of the mineralization. The predevelopment program is scheduled for completion in mid-1987. If the project is successful in delineating sufficient precious metal ore reserves for commercial operations, the ore would be processed at Homestake's Bulldog mill, six miles south of the project area.

Homestake International Minerals Ltd., formed in 1985, continues to search on a worldwide basis for precious metal properties in advanced stages of exploration, development or operation, with emphasis on the U.S., Canada and Australia.

Exploration is also focused on areas in or near Homestake's existing mine operations. An accelerated program

is ongoing within the Homestake mine, as well as the surrounding Black Hills district. This effort is aimed at ensuring a continuing, long-term base of operations for this important mine complex. Exploration efforts are testing new geologic models and structural interpretations.

#### *Oil & Gas*

Because of the precipitous decline in oil and gas prices, Felmont adopted a number of measures during the first quarter of 1986 to protect its profitability. Among the measures taken were a 20 percent staff reduction, deferral of nonessential maintenance and well workovers to reduce operating costs, and a reduction of the capital budget from \$35.4 million to \$14.7 million. Most high risk and high cost exploratory drilling projects were eliminated or delayed, and reduced capital funds were spent on low-cost, lower risk development drilling.

The reduced exploratory drilling activities did not add sufficient reserves to replace production during the year. Lower prices at year-end also required downward revisions of economically recoverable reserves in accordance with existing Securities and Exchange Commission rules and regulations. As a result, oil reserves declined by 27 percent to 3.1 million barrels, while natural gas reserves declined 18 percent to 72.9 billion cubic feet.

A total of six exploratory wells, including two which were drilling at year-end 1985, were completed in 1986. One of the six was successful, compared with 11 successful out of 27 exploratory wells in 1985. Of

two additional exploratory wells drilling at year-end 1986, one was unsuccessful and the other is a significant new discovery.

Felmont acquired prospective onshore lease blocks in Wyoming, west and south Texas, Louisiana, Kentucky and Pennsylvania. The largest is in Pennsylvania, where Felmont acquired a 100 percent interest in 31,157 net acres.

Felmont is also actively generating prospects in the Gulf of Mexico, the Texas and Louisiana Gulf Coast, west Texas and the Appalachian Basin.

Total 1986 exploration expenses for dry holes, amortization of unproved properties and geological and geophysical costs were \$9.6 million in 1986, compared with \$18.1 million in 1985.

#### Occupational Health & Safety

**H**omestake continues to emphasize the importance of safety and health performance to protect our most important resource: our skilled and experienced employees.

Management believes that a safe, healthful workplace and good work practices not only reduce injuries, but also improve productivity and reduce operating costs.

Homestake employees worked over 3.7 million hours in 1986, 62 percent of these hours in underground operations, and achieved a 9 percent reduction in injury rates compared with last year.

September 11, 1986

FILE MEMO

GOLD - SILVERPRODUCTION-CONSUMPTION TRENDS

According to an article in the June '86 issue of Precious Metals, '85 mine production of gold in market economy countries increased 3% over '84, while industrial demand increased 8%. No appreciable change is believed to have occurred in Communist countries. Mine production of silver, including Communist countries, is estimated to have declined 230 metric tons (1.8%) in the same period, while consumption increased 300 metric tons (2.2%).

The tabulation on page 3 (attached) for market economy countries shows surpluses per year ('83 thru '85) as tonnage figures for "net aggregate growth of industrial, private and Government stocks" (footnote 2). However, if export-imports from Communist countries are not included ('84 gold coinage figure used for '85), a better measure of the actual surplus is obtained by simply subtracting consumption from production and converting to percentages, as follows:

Gold Surplus

'83 - 13%

'84 - 7%

'85 - 1.6%

Silver Surplus

'83 - 10%

'84 - 7%

'85 - 3%

These trends would appear to be favorable for producers of either metal; however, in the August issue of Precious Metals, it is stated that the intermediate and long term outlook for the silver market is not particularly promising. The main points supporting this forecast are:

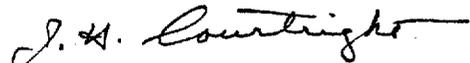
(1) Industrial consumption has been poor relative to economic activity

FILE MEMO

September 11, 1986

in recent years; (2) secondary recovery (old scrap) has not been drastically curtailed in response to unattractive prices; (3) investment demand declines in '85 and is forecast to be down again this year.

The forecast for gold is, however, somewhat optimistic, bullish factors cited being: (1) increase in fabrication demand; (2) Central Banks switching from being sellers to buyers recently; (3) sharp decrease in secondary (old scrap) supply the past 3 years. The concluding paragraph says in part: "...the bull market of 1982 ---- which carried the price of gold to over \$500 an ounce early in the next year ---- was touched off as the Fed responded to Mexico's financial crises by lowering interest rates and printing money. It can ---- and, indeed, is already happening again."

  
J. H. Courtright

JHC:mek

cc: R. L. Brown  
W. L. Kurtz  
J. D. Sell

# PRECIOUS METALS

Table 1. —Salient Statistics on Precious Metals, metric tons

	Gold			Silver			Platinum-Group Metals		
	1983	1984	p/1985	1983	1984	p/1985	1983	1984	p/1985
<b>Market economy countries:</b>									
Mine production	995	1,030	1,081	9,816	10,000	9,950	90	108	115
Secondary (old scrap) 1/	364	324	280	2,885	2,480	2,338			
Net imports from centrally planned economy countries	84	121	187	[600]	[600]	[31]			
Fabrication, arts and industry	1,039	1,129	1,219	10,874	11,287	11,830			
Fabrication, coinage	177	128	NA	610	271	271			
➤ Surplus (deficit) 2/	227	218	NA	2,488	1,458	1,325			
Government stocks, yearend	35,552	35,521	35,583	10,087	8,834	10,087			
<b>United States:</b>									
Mine production	62	85	75	1,350	1,382	1,308			
Secondary (old scrap) 1/ 3/	43	41	38	795	748	807			
Imports, refined	112	189	188	5,014	2,810	4,274	9	11	7
Fabrication, arts and industry	95	88	92	3,822	3,572	3,698	87	122	107
Fabrication, coinage	—	—	—	66	83	11	60	77	75
Exports	98	155	124	984	780	770	—	—	—
Surplus (deficit) 2/	[20]	14	2	1,180	[388]	1,018	38	36	28
Government stocks, yearend	8,180	8,180	8,180	5,355	5,279	5,306	5	[12]	[12]
Industry stocks, yearend	20	24	20	545	659	505	64	54	54
Futures exchange stocks, yearend	78	73	88	4,704	4,281	5,385	20	23	30
Volume of futures trading	38,050	28,740	24,728	1,089,980	1,108,280	783,870	10	12	11
Price, average [\$/troy ounce]	\$424.00	\$380.56	\$317.86	\$11.44	\$8.14	\$8.14	2,388	1,383	1,483
							4/ \$475.00	4/ \$475.00	4/ \$475.00

p/ Preliminary.

1/ Includes coin melt.

2/ Equal to net aggregate growth [liquidation] of industrial, private, and Government stocks.

3/ For platinum-group metals, includes some new scrap.

4/ Platinum.

Sources: U.S. Bureau of Mines, Consolidated Gold Fields, PLC., J. Aron/Goldman Sachs, and Handy & Harman.

Table 2. —Use of Precious Metals in Industry, metric tons

	Gold			Silver			Platinum-Group Metals		
	1983	1984	p/1985	1983	1984	p/1985	1983	1984	p/1985
<b>Market economy countries:</b>									
Dental-medical	53	56	59						
Electronic-electrical	103	115	124						
Jewelry	837	918	992						
Other	47	37	37						
Total 1/	1,040	1,126	1,212	10,874	11,287	11,830			
<b>United States:</b>									
Braze-solders	3/	3/	3/	182	183	175	3/	3/	3/
Catalysts	—	—	—	75	76	78	30	43	45
Dental-medical	11	11	12	48	48	46	11	11	8
Electronic-electrical 2/	32	34	32	905	880	881	13	17	13
Glassmaking	—	—	—	—	—	—	1	5/	1
Jewelry	52	51	48	214	180	178	1	1	1
Mirrors	—	—	—	38	30	30	—	—	—
Photographic	—	—	—	1,612	1,721	1,801	—	—	—
Silverware	—	—	—	317	223	232	—	—	—
Other 4/	5/	5/	5/	240	230	226	5	4	7
Total 1/	95	96	92	3,822	3,572	3,698	80	77	75

p/ Preliminary.

1/ Data may not add to totals shown because of independent rounding.

2/ For gold, includes miscellaneous industrial uses.

3/ Included in other categories.

4/ Includes investment and commemorative products, such as small bars and medallions.

5/ Less than 1/2 unit.

Sources: U.S. Bureau of Mines, Consolidated Gold Fields, PLC., J. Aron/Goldman Sachs, and Handy & Harman.

NEW U.S. GOLD MINES

1984-1985-1986

NAME	STATE	OWNER	Tons * x 10 <sup>6</sup>	Grade Oz/Au	W/O	Mill	% REC	Mill T/day	Oz/Yr	Capital X 10 <sup>6</sup>	Cash Cost** per Oz	Other	Reserve Oz's.
<u>1984</u>													
Buckhorn	NV	Cominco	3.2	.048	--	HLAG	70	2,000	30,000	12	200		
Dee	NV	Lancana, et al	3.6	.09	6	CIP	83	1,000	42,000	21.5	200	Mill .11 Leach .025	- 153,600
Fortitude	NV	Battle Mt.	7.0	.23	5	CIP	96	3,600	220,000	50	179	Total Current Costs	324,000
Manhattan	NV	Tenneco	4.0	.036	1.6	FLOT	85	3,000	30,000	--	228		1,610,000
Relief	NV	Pegasus	8.0	.035	2	HLAG	70	3,000	24,500	6.7	300		<del>144,000</del> 280,000
<u>1985</u>													
Cannon (1)	WA	ASAMERA	6.65	.23	--	FLOT	86	2,000	170,000	60	225		1,529,500
Gold Quarry	NV	Newmont	144.0	.049	6.7	CIP;HL	--	7,000	170,000	130	300	Mill .077 Leach .034	7,056,000
Halle	SC	Piedmont	.7	.065	.55	HLAG	94.5	500	10,000	1.2	--		<del>45,500</del>
McLaughlin	CA	Homestake	18.5	.152	5.2	CIP	78	3,000	200,000	285	320	Plus Autoclave Total Costs	2,812,000
Ropes (1)	MI	Callahan	2.1	.10	--	FLOT	92	2,000	60,000	16.1	280		<del>210,000</del>
Tonkin Springs	NV	Silver State	2.4	.05	1 ?	HLAG	70	--	30,000	1.9	122	Total Costs	<del>120,000</del>
<u>1986</u>													
Austin	NV	Inspiration/FMC	1.2	.16	--	--	--	1,000	55,000	--	--		192,000
Carson	CA	Grandview	16.0	.046	1.86	HL	72	5,000	63,000	12.2	246		731,000
Florida Canyon	NV	Pegasus	17.8	.025	1.05	HLAG	--	5,700	37,500	13.5	221		445,000
Jamestown	CA	Sonora	30.0	.066	3.4	FLOT	89.5	6,000	212,500	82.2	235	Plus 13MT ug @ .14 4 Yr. Leach Life	1,980,000
McCoy	NV	Tenneco	6.0	.055	3	HL	--	4,500	50,000	--	--		330,000
Mesquite	CA	Gold Fields	53.0	.05	2.5	HLAG	85	12,000	120,000	70	200		2,650,000
Paradise Pk.	NV	FMC	12.0	.097	1.5	CYNL	90	4,000	100,000	100	--	3.5 oz. Ag 70% REC	1,144,000
Robinson	NV	Silver King	1.8	.13	--	CIP	93	1,000	40,000	4.2	140	Total Costs \$170; Also 40,000 oz. Ag 234,000	814,000
Sleeper	NV	AMAX	3.7	.22	10	CIP	90	500	53,000	25	125		740,000
Summitville	CO	Galactic	16.1	.046	1.67	HLAG	70	3.2MT/Yr	100,000	46	175		176,000
Thunder Mt.	ID	C'd A	1.8	.095	3.5	HL	75	3,800	25,000	10.2	225		<del>176,000</del>
TOP	NV	Placer	2.5	.099	--	HL	--	2,000	50,000	12	--		247,500

\* Reserve as of January 1986

\*\* 1985 Costs or anticipated costs

(1) Underground Mine

## PREFACE

The 70 gold projects included in this study are either currently producing gold or are slated for start-up later this year. We have restricted the scope of our investigation to non-placer gold mines, although a multitude of small placer producers exist in many parts of the western United States and Alaska.

Our aim has been to report on all non-placer projects that produced gold as a primary product during 1985, as well as all those that plan to begin production in 1986. Although some very small mines have probably gone undetected, we would be very surprised to find that we omitted any gold mines that produce over a thousand ounces per year.

In collecting the data for this study, we began with a thorough review of all available company reports and media coverage. Since this level of information always leaves a good many questions unanswered, we contacted almost all of the companies involved in order to fill in the gaps. The company spokespersons that we contacted have been extremely helpful within the limits of their individual corporate policies concerning the release of information. In some cases, where the companies involved have been unable to answer our questions, we have obtained information from government officials and others knowledgeable about gold mining in various parts of the country. We would like to thank the many men and women who have aided us in providing this service for the U.S. gold mining industry.

*Metals Economic Group  
July 1986*

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## OVERVIEW

U.S. primary gold production in 1985 increased about 15% from 1984 levels and over 25% from 1983 levels to over 2.1 million ounces, maintaining the United States as the non-communist world's third largest gold producer after South Africa and Canada.

Table 1 summarizes known 1985 and estimated 1986 gold production from the same mines by state; Table 2 lists the top twelve gold-producing companies in 1985; and Table 3 lists the mines by the amount of gold produced from each in 1985.

Table 4 lists an additional 1.2 million ounces of production capacity that is not included in the previous tables because of late 1985 or expected 1986 start-ups. Actual 1986-87 new production will probably be less than this total because of delayed start-ups, mining and recovery difficulties, and other factors. As announced, the new 1986 capacity represents an addition of over 57% of actual 1985 production.

**TABLE 1**  
**U.S. Gold Production by State**

<u>State</u>	<u>Number of Mines in 1985</u>	<u>Ounces Produced in 1985</u>	<u>Estimated Production in 1986</u>
Nevada	22	1,203,927	1,367,500
South Dakota	3	377,083	394,000
Montana	2	157,400	192,000
California	4	152,669	239,000
Utah	1	80,000	111,000
Washington	2	70,502	160,000
Idaho	1	28,000	28,000
Colorado	1	5,954	N/A
South Carolina	<u>1</u>	<u>5,500</u>	<u>10,000</u>
<b>TOTAL</b>	<b>36</b>	<b>2,081,035</b>	<b>2,501,500</b>

Table 1 shows that Nevada is by far the leading gold producer in the United States, accounting for over 50% of production in 1985. It is expected to retain its position for the next few years. South Dakota is next, since it hosts the largest single U.S. gold producer, the Homestake mine at Lead. Montana and California both indicate increasing production, as does Washington, which is expected to double its gold output in 1986 to 160,000 when the Cannon mine attains full production. With Sunnyside and Summitville in production, and a possible restart of the Victor mine, Colorado could produce over 150,000 ounces in 1986.

**TABLE 2**  
**Top Twelve Gold-Producing Companies**

<u>Owner</u>	<u>Number of Mines</u>	<u>1985 Production (Oz)</u>	<u>Estimated 1986 Production (Oz)</u>
Homestake	4	483,600	594,750
Battle Mountain	1	222,000	222,000
Carlin (Newmont)	2	190,284	290,000
Freeport-McMoRan	1	178,739	188,300
Placer U.S.	3	119,198	155,200
American Barrick	2	84,284	111,991
Tenneco	3	79,671	97,000
FMC Minerals	2	76,602	126,000
Echo Bay	2	69,374	81,874
Nerco	4	68,454 *	72,000 *
Noranda	1	42,986	N/A**
Gold Fields	2	37,000 ***	127,000

\* Includes 11,000 oz Au from the Candelaria silver mine

\*\* The Grey Eagle is expected to be mined out in mid-July, 1986

\*\*\* Estimate based on 1983 Ortiz production

#### **Homestake Remains the Largest Producer in the United States**

Homestake Mining produced 483,600 ounces of gold in 1985, including its 25% stake in the Round Mountain mine in Nevada. Battle Mountain Gold was the next largest producer with 222,000 ounces produced from the Fortitude mine.

Carlin (Newmont) was next with 190,284 ounces, which is expected to increase to 290,000 in 1986 after a full year's production from Gold Quarry.

Freeport-McMoRan's 70% share of Jerritt Canyon was 178,739 ounces of gold. Placer's interests in the Golden Sunlight and Horse Canyon mines totaled almost 120,000 ounces, and its 1986 output should increase to over 155,000 with the addition of full production from the Top mine, which produced 7,000 ounces from test production in 1985.

The above list of the top twelve gold-producing companies in the United States is based on the available 1985 production figures. Galactic Resources could be added to this list for 1986 production if its Summitville mine produces the announced 120,000 ounces.

#### **Five Mines Produced Over 50% of the Gold**

The Homestake mine at Lead was the largest producing mine in 1985, with 343,000 ounces, followed by Jerritt Canyon with 255,341 ounces, Fortitude with 222,000 ounces, Round Mountain with 138,748 ounces, and Carlin with 112,713 ounces.

These five mines totaled almost 1.1 million ounces or over 50% of total U.S. production.

Estimated 1986 production indicates that four more mines will produce over 100,000 ounces this year and an additional four new mines starting in 1986 will have production capacity of greater than 100,000 ounces.

Table 3 below lists the 1985 gold producers in order of production, plus their estimated 1986 output.

TABLE 3  
CURRENT U.S. GOLD PRODUCTION (Ounces)

MINE NAME	STATE	OWNER(S)	1985 PRODUCTION	1986 EST. PRODUCTION
HOMESTAKE MINE	SD	HOMESTAKE	343000	340000
JERRITT CANYON MINE	NV	FREEPORT-MCMORAN FMC MINERALS	255341	269000
FORTITUDE	NV	BATTLE MOUNTAIN DUVAL	222000	222000
ROUND MOUNTAIN MINE	NV	ECHO BAY HOMESTAKE	138748	139000
CARLIN MINE	NV	CARLIN (NEWMONT)	112713	120000
GOLDEN SUNLIGHT	MT	PLACER U S	97000	97000
MCLAUGHLIN	CA	HOMESTAKE BILL WILDER	83836	200000
MERCUR MINE	UT	AMERICAN BARRICK GOLD STANDARD	80000	111000
GOLD QUARRY	NV	CARLIN NEWMONT	77571	170000
PINSON/PREBLE	NV	PINSON MINING RAYROCK	61584	67000
ZORTMAN/LANDUSKY	MT	PEGASUS GOLD ZORTMAN MINING	60400	95000
HORSE CANYON MINE	NV	CORTEZ GOLD PLACER U S	56000	56000
BOREALIS MINE	NV	TENNECO	51368	40000

MINE NAME	STATE	OWNER(S)	1985 PRODUCTION	1986 EST. PRODUCTION
ALLIGATOR RIDGE	NV	AMSELCO NERCO	49000	68000
DEE MINE	NV	DEE GOLD LACANA GOLD	47647	45000
GREY EAGLE	CA	NORANDA SISKON	42986	0
KNOB HILL MINE	WA	HECLA MINING	39192	40000
GOLD STRIKE	NV	WESTERN STATES PANCANA MINERALS	39000	39000
CANNON MINE	WA	ASAMERA BREAKWATER RESOURCES	31310	120000
MANHATTAN MINE	NV	TENNECO	28303	32000
DELAMAR MINE	ID	NERCO DELAMAR	28000	28000
PICACHO	CA	CHEMGOLD (GLAMIS)	24847	26000
OPEN CUT	SD	HOMESTAKE MINING	22083	20000
BUCKHORN MINE	NV	COMINCO WESTERN DECALTA PETROLEUM	16842	34000
RELIEF CANYON MINE	NV	PEGASUS GOLD LACANA GOLD	12573	---
ANNIE CREEK	SD	WHARF RESOURCES	12000	24000
HAYWOOD-SANTIAGO	NV	NEVEX GOLD	7587	5000
TOP MINE	NV	PLACER U S	7000	---
GETCHELL HEAP LEACH	NV	FRM MINERALS	6500	6500

MINE NAME	STATE	OWNER(S)	1985 PRODUCTION	1986 EST. PRODUCTION
VICTOR MTNE	CO	NERCO SILVER STATE	5954	---
HAILE	SC	PIEDMONT	5500	10000
GOOSEBERRY MINE	NV	ASAMERA ICAN RESOURCES	5000	0
LITTLE BALD MOUNTAIN MOUNTAIN	NV	WX SYNDICATE NORTHERN DYNASTY	4000	5000
WINDFALL MINE	NV	WINDFALL VENTURE	2200	0
TONKIN SPRINGS	NV	SILVER STATE PRECAMBRIAN	2050	30000
MORNING STAR	CA	CACTUS HILL VANDERBILT GOLD	1000	1000
AURORA GOLD MINE	NV	PACIFIC NORTHWEST (ELECTRA NORTH WEST) GLOBAL RESOURCES RECOVERY	900	---

## ANNOUNCED NEW 1986 CAPACITY

### **New 1986 Gold Capacity Could Top One Million Ounces**

A total of 1,164,500 ounces of new gold production capacity has been announced for 1986 start-up, although some of this capacity will undoubtedly be delayed or will encounter start-up problems. Table 4 (below) lists the projects, the expected start-up periods, and the announced yearly capacity.

About half of the new production will be from heap-leach projects, compared to 22% of 1985 production that came from heap-leach projects.

All of the projects listed are from five states, with announced production in California indicating 440,500 ounces of new gold per year from six new mines, the largest by far being the 200,000-ounce-per-year Jamestown project.

In addition, annual gold production capacity at six new mines in Nevada could total 393,000 ounces; six mines in Colorado could produce 206,000 ounces; the Ropes mine in Michigan is rated at 75,000 ounces; and two Idaho mines could produce 50,000 ounces.

TABLE 4  
NEW GOLD CAPACITY ANNOUNCED FOR 1986 STARTUP

MINE NAME	STATE	OWNER(S)	EXPECTED START-UP	ANNOUNCED OZ/YEAR
JAMESTOWN	CA	SONORA MINING PATHFINDER (COGEMA)	4th QUARTER 1986	200000
MESQUITE	CA	GOLD FIELDS	1st QUARTER 1986	120000
SUMMITVILLE	CO	GALACTIC RESOURCES REYNOLDS	2nd QUARTER 1986	120000
PARADISE PEAK	NV	FMC MINERALS	2nd QUARTER 1986	100000
ROPES GOLD	NI	CALLAHAN ARCADIAN	4th QUARTER 1985	75000
CARSON HILL	CA	GRANDVIEW GOLDIE MINES	2nd QUARTER 1986	75000
AUSTIN GOLD VENTURE	NV	INSPIRATION MINES FMC CORP	3rd QUARTER 1986	55000
SLEEPER	NV	AMAX	1st QUARTER 1986	53000
MCCOY MINE	NV	TENNECO	2nd QUARTER 1986	50000
TOP MINE	NV	PLACER U S	1st QUARTER 1986	50000
ROBINSON	NV	SILVER KING PACIFIC SILVER	3rd QUARTER 1986	40000
FLORIDA CANYON	NV	PEGASUS AUROTECH	3rd QUARTER 1986	35000
CACTUS GOLD	CA	COCA MINES VENTURESTRIDENT	2nd QUARTER 1986	30000
WEST END MINE	ID	PIONEER METAL MFC-MINING FINANCE	MAY REOPEN 1986	25000

MINE NAME	STATE	OWNER(S)	EXPECTED START-UP	ANNOUNCED OZ/YEAR
SUNNYSIDE MINE	CO	ECHO BAY STANDARD METALS	2nd QUARTER 1986	25000
THUNDER MOUNTAIN	ID	COEUR D'ALENE THUNDER MOUNTAIN	3rd QUARTER 1986	25000
SULTAN MOUNTAIN	CO	INT'L N. AMERICAN P&G MINING	3rd QUARTER 1986	25000
CRIPPLE CREEK DUMP PROJECT	CO	TEXASGULF MINERALS  GOLDEN CYCLE GOLD	4th QUARTER 1985	20000
BRUSH CREEK	CA	CONSOLIDATED GOLD MINING AREAS BRUSH CREEK MINING AND DEVELOPMENT	3rd QUARTER 1986	13000
CASH MINE	CO	CHARLES A STEEN FAMILY COSMOS RESOURCES	3RD QUARTER 1986	12000
BUFFALO VALLEY	NV	HORIZON P A B OIL AND MINING	2nd QUARTER 1986	10000
CROSS MINE	CO	HENDRICKS MINING INTERNATIONAL NORTH AMERICAN	3rd QUARTER 1986	4000

## U.S. GOLD RESERVES

Table 5 (below) lists the 19 largest U.S. gold reserves of the mines included in this study, based on ounces of gold in the ground.

Table 6 (following) lists the reserves of all of the projects in this study for which gold reserves are available.

**TABLE 5**  
**The Largest Gold Reserves of Producing Mines**

<u>Mine Name</u>	<u>Owner</u>	<u>Million St</u>	<u>Oz Au/St</u>	<u>Contained Gold (oz)</u>
Gold Quarry	Carlin	144.0	0.049	7,089,000
Round Mountain	Echo Bay	175.6	0.039	6,850,000
Homestake	Homestake	8.6	0.22	4,092,000
Jamestown	Sonora	42.7	0.087	3,700,000
McLaughlin	Homestake	18.6	0.152	2,824,000
Jerritt Canyon	Freeport-McMoRan	16.0	0.174	2,791,000
Mesquite	Gold Fields	53.0	0.05	2,650,000
Cannon	Asamera	6.65	0.23	1,589,000
Mercur	American Barrick	25.5	0.057	1,460,000
Golden Sunlight	Placer	23.9	0.051	1,219,920
Paradise Peak	FMC	12.0	0.097	1,164,000
Fortitude	Battle Mountain	7.0	0.23	1,161,000
Carlin	Carlin	6.4	0.13	832,756
Sleeper	Amax	3.7	0.22	814,000
Open Cut	Homestake	6.52	0.124	808,000
Pinson/Preble	Pinson	9.74	0.079	774,000
Summitville	Galactic	16.2	0.046	744,900
Carson Hill	Grandview	16.0	0.046	736,000
Annie Creek	Wharf	14.8	0.043	636,000

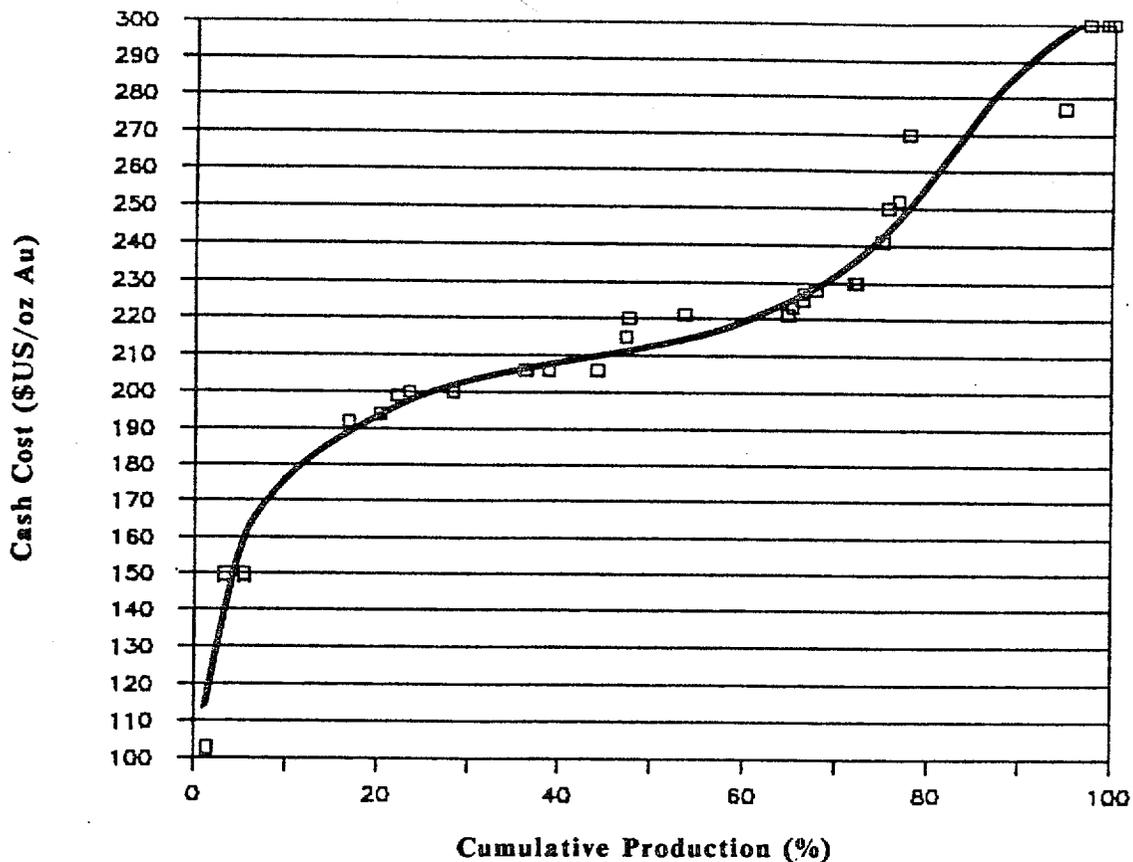
TABLE 6  
GOLD RESERVES OF ACTIVE U.S. MINES

MINE NAME	OWNER(S)	ORE (ST)	GOLD (OZ/ST)	CONTAINED GOLD (OZ)
ALLIGATOR RIDGE	AMSELCO	1,791,000	0.064	114,560
ANNIE CREEK	WHARF RESOURCES	14,800,000	0.043	636,000
AUSTIN GOLD VENTURE	INSPIRATION MINES	1,750,000	0.16	280,000
BRUSH CREEK	CONSOLIDATED GOLD MINING AREAS	250,000	0.05	12,500
BUCKHORN MINE	COMINCO	3,215,000	0.048	154,320
BUCKSKIN MINE	PACIFIC SILVER	300,000	0.25	75,000
BUFFALO VALLEY	HORIZON	333,000	0.09	29,970
CACTUS GOLD	COCA MINES	235,200	0.83	195,000
CANNON MINE	ASAMERA	6,650,000	0.23	1,589,000
CARLIN MINE	CARLIN (NEWMONT)	6,400,000	0.13	832,756
CARSON HILL	GRANDVIEW	16,000,000	0.046	736,000
CASH MINE	CHARLES A STEEN FAMILY	128,356	0.51	65,462
CRIPPLE CREEK DUMP PROJECT	TEXASGULF MINERALS	3,500,000	0.055	193,000
CROSS MINE	HENDRICKS MINING	593,750	0.186	110,719
DEE MINE	DEE GOLD	3,617,000	0.09	324,287
DELAMAR MINE	NERCO DELAMAR	11,089,000	0.023	255,047
FLORIDA CANYON	PEGASUS	17,800,000	0.025	445,000
FORTITUDE	BATTLE MOUNTAIN	7,000,000	0.23	1,161,000
FRANKLIN MINE	FRANKLIN CONSOLIDATED	72,000	0.40	28,800

MINE NAME	OWNER(S)	ORE (ST)	(OZ/ST)	GOLD (OZ)
GETCHELL HEAP LEACH	FRM MINERALS	600,000	0.07	42,000
GLADIATOR	NOR-QUEST	81,136	0.58	47,058
GOLD QUARRY	CARLIN	144,000,000	0.049	7,089,000
GOLD STRIKE	WESTERN STATES	8,700,000	0.049	423,000
GOLDEN SUNLIGHT	PLACER U S	23,920,000	0.051	1,219,920
GOLDSTRIPE	CALGOM (SUNBELT)	2,200,000	0.064	140,800
GOOSEBERRY MINE	ASAMERA	216,505	0.209	45,248
GREY EAGLE	NORANDA	138,000	0.16	19,200
HAILE	PIEDMONT	700,000	0.065	45,500
HOMESTAKE MINE	HOMESTAKE	18,602,000	0.22	4,092,000
HORSE CANYON MINE	CORTEZ GOLD	2,100,000	0.075	157,500
JAMESTOWN	SONORA MINING	42,772,000	0.087	3,700,000
JERRITT CANYON MINE	FREEPORT-MCMORAN	16,023,000	0.174	2,791,000
KNOB HILL MINE	HECLA MINING	300,000	0.80	240,000
KRAMER HILLS	BEAVER RESOURCES	500,000	0.05	25,000
MANHATTAN MINE	TENNECO	4,000,000	0.036	144,000
MCCOY MINE	TENNECO	6,000,000	0.055	330,000
MCLAUGHLIN	HOMESTAKE	18,576,000	0.152	2,824,000
MERCUR MINE	AMERICAN BARRICK	25,500,000	0.057	1,460,000
MESQUITE	GOLD FIELDS	53,000,000	0.05	2,650,000
MORNING STAR	CACTUS HILL	3,000,000	0.061	183,000
NORTHUMBERLAND MINE	WESTERN STATES	773,000	0.07	54,110
OPEN CUT	HOMESTAKE MINING	6,517,000	0.124	808,000
PARADISE PEAK	FMC MINERALS	12,000,000	0.097	1,164,000
PICACHO	CHEMGOLD (GLAMIS)	9,722,000	0.044	428,768
PINSON/PREBLE	PINSON MINING	9,737,000	0.079	774,000

MINE NAME	OWNER(S)	ORE (ST)	(OZ/ST)	GOLD (OZ)
RELIEF CANYON MINE	PEGASUS GOLD	8,000,000	0.035	280,000
ROBINSON	SILVER KING	1,800,000	0.13	234,000
ROPES GOLD	CALLAHAN	2,100,000	0.1	210,000
ROUND MOUNTAIN MINE	ECHO BAY	175,630,000	0.039	6,849,570
SLEEPER	AMAX	3,700,000	0.22	814,000
SOUTH PENN	GLAMIS GOLD	205,000	0.075	15,375
SULTAN MOUNTAIN	INT'L N. AMERICAN	456,000	0.24	109,440
SUMMITVILLE	GALACTIC RESOURCES	16,194,000	0.046	744,900
SUNNYSIDE MINE	ECHO BAY	473,000	0.245	115,885
THUNDER MOUNTAIN	COEUR D'ALENE	1,788,000	0.095	169,860
TONKIN SPRINGS	SILVER STATE	4,900,000	0.07	343,000
VICTOR MINE	NERCO	2,777,000	0.041	114,000
WINDFALL MINE	WINDFALL VENTURE	1,600,000	0.048	76,800
ZORTMAN/LANDUSKY	PEGASUS GOLD	22,800,000	0.021	478,800

## U.S. GOLD PRODUCTION COSTS

1985 GOLD CASH COST CURVE FOR 29 U.S. PRODUCERS**50% of 1985 Production Below \$215/oz**

The cash cost curve above focuses exclusively on U.S. gold production in 1985. We had cash cost figures for 29 mines that collectively produced over 2 million oz in 1985, representing at least 90% of the total U.S. gold production. We concentrated on mines that produced at least 10,000 oz during the year.

The majority of projects lie between \$190/oz and \$230/oz on the curve. These 18 projects include nine of the ten largest producers and represent 1.3 million oz of gold (67% of our total). A cluster of seven mines falls at the upward break in the curve (from \$220/oz to \$230/oz), the largest of which are Fortitude (225,000 oz at \$221/oz) and Round Mountain (120,000 oz at \$221/oz).

The lowest cost producers include two heap-leach projects, Picacho (28,000 oz at \$103/oz) and Aurora (42,000 oz at \$150/oz). Knob Hill's recent discovery of high-grade underground reserves also placed that mine in the low-cost category in 1985 (39,000 oz at about \$150/oz). The curve's rise to the \$190/oz level represents the large Jerritt Canyon open-pit, CIP operation (230,000 oz at \$192/oz), with similar operations -- Pinson (69,000 oz at \$194/oz), Dee (38,000 oz at \$199/oz), and Golden Sunlight (97,000 oz at \$204/oz) -- following in the same cost range.

Twenty-five percent of the U.S. 1985 gold production represented here was produced at cash costs of over \$240/oz. The largest of these mines is Homestake (343,000 at \$277/oz). The maximum cash cost, largely a function of the gold price itself, was \$300/oz. Operations with costs above that level were closed at or before the start of the year, and one project included in the curve, the Relief Canyon open-pit, heap-leach operation (15,000 oz at \$300/oz), closed down in mid-year.

A few substantial producers came onstream toward the end of 1985 and were not included in the curve. Three of the new mines, Cannon, McLaughlin, and Gold Quarry, are expected to add a total of 540,000 oz to annual U.S. production, an increase of 27% over what is presented here.

Of the projects included in this analysis, only three are underground mines (Homestake, Knob Hill, and Sterling) and two are placers (Valdez Creek and Yuba). Of the open-pit projects, 13 (45%) process ore by heap leaching alone. Eleven of the open pits (40%) employ some other form of cyanidation processing (including those with CIP and CIL circuits). Of these, close to half include an additional heap-leach circuit for lower grade ore.

Table 7 (below) lists the producing or soon-to-be producing U.S. gold mines and their operating cost per ounce of gold produced. The details of what each company includes in its cost is explained in the Operating Costs section of the deposit profiles, if known.

An explanation of the codes used in the Tables can be found at the end of this section.

TABLE 7

## 1985 OPERATING COSTS FOR U.S. GOLD PRODUCERS

MINE NAME	OWNER(S)	STATUS	MINE TYPE	MILL TYPE	CAPACITY/YR (OZ AU)	MILL RATE ST/DAY	GRADE (OZ/ST)	OPERATING COST
ALLIGATOR RIDGE	AMSELCO	PRD	OPPT	HPLH	60000	2500	0.064	\$215.00/OZ
ANNIE CREEK	WHARF RESOURCES	PRD	OPPT	HPLH	24000	2400	0.043	\$150.00/OZ
BOREALIS MINE	TENNECO	PRD	OPPT	HPLH	60000	2500	0.071	\$225.00/OZ
BUCKHORN MINE	COMINCO	PRD	OPPT	HPLH	30000	2000	0.048	\$200.00/OZ
BUFFALO VALLEY	HORIZON	PRD	OPPT	HPLH	10000	1000	0.09	\$155.00/OZ
CANNON MINE	ASAMERA	PRD	UGRD	FLOT	170000	2000	0.23	\$225.00/OZ
CARSON HILL	GRANDVIEW	PRE	OPPT	HPLH	63000	5000	0.046	\$246.00/OZ
DEE MINE	DEE GOLD	PRD	OPPT	CRIP	42000	1000	0.09	\$200.00/OZ
DELAMAR MINE	NERCO DELAMAR	PRD	OPPT	ACYL	1200000	2200	0.023	\$204.00/OZ
FLORIDA CANYON	PEGASUS	PRE	OPPT	HPLH	37500	5700	0.025	\$221.00/OZ
FORTITUDE	BATTLE MOUNTAIN	PRD	OPPT	CRIP	220000	3600	0.23	\$221.00/OZ
GLADIATOR	NOR-QUEST	PRD	UGRD		18000	100	0.58	\$170.00/OZ
GOLD QUARRY	CARLIN	PRD	OPPT	CRIP	170000	7000	0.049	\$300.00/OZ
GOLD STRIKE	WESTERN STATES	PRD	OPPT	HPLH	40000	3000	0.049	\$205.00/OZ

MINE NAME	OWNER(S)	STATUS	MINE TYPE	MILL TYPE	CAPACITY/YR (OZ AU)	MILL RATE ST/DAY	GRADE (OZ/ST)	OPERATING COST
GOLDEN SUNLIGHT	PLACER U S	PRD	OPPT	CRIP	97000	5000	0.051	\$260.00/OZ
GOLDSTRIPE	CALGOM (SUNBELT)	PRD	OPPT	HPLH	12000	1600	0.064	\$260.00/OZ
GREY EAGLE	NORANDA	PRD	OPPT	FLOT	40000	850	0.16	\$235.00/OZ
HOMESTAKE MINE	HOMESTAKE	PRD	UGRD	CRIP	340000	5270	0.22	\$294.00/OZ
HORSE CANYON MINE	CORTEZ GOLD	PRD	OPPT	CYCL	56000	1900	0.075	\$241.00/OZ
JAMESTOWN	SONORA MINING	PRE	OPPT	FLOT	212500	6000	0.087	\$235.00/OZ
JERRITT CANYON MINE	FREEPORT-MCMORAN	PRD	OPPT	CRIL	270000	4000	0.174	\$164.00/OZ
KNOB HILL MINE	HECLA MINING	PRD	UGRD	FLOT	40000	170	0.80	\$160.00/OZ
LITTLE BALD MOUNTAIN	WX SYNDICATE	PRD	OPPT	HPLH	5000	---	0.147	\$227.00/OZ
MANHATTAN MINE	TENNECO	PRD	OPPT	FLOT	30000	3000	0.036	\$228.00/OZ
MCLAUGHLIN	HOMESTAKE	PRD	OPPT	CRIP	200000	3000	0.152	\$320.00/OZ
MERCUR MINE	AMERICAN BARRICK	PRD	OPPT	CYCL	100000	4000	0.057	\$188.00/OZ
MESQUITE	GOLD FIELDS	PRD	OPPT	HPLH	120000	12000	0.05	\$200.00/OZ
PICACHO	CHEMGOLD (GLAMIS)	PRD	OPPT	HPLH	25000	3000	0.044	\$103.00/OZ
PINSON/PREBLE	PINSON MINING	PRD	OPPT	CRIP	65000	1500	0.079	\$182.00/OZ
RELIEF CANYON MINE	PEGASUS GOLD	PRD	OPPT	HPLH	24500	3000	0.035	\$300.00/OZ
ROBINSON	SILVER KING	PRE	OPPT	CRIP	40000	1000	0.13	\$140.00/OZ

MINE NAME	OWNER(S)	STATUS	MINE TYPE	MILL TYPE	CAPACITY/YR (OZ AU)	MILL RATE ST/DAY	GRADE (OZ/ST)	OPERATING COST
ROPES GOLD	CALLAHAN	PRD	UGRD	FLOT	60000	2000	0.1	\$280.00/OZ
ROUND MOUNTAIN MINE	ECHO BAY	PRD	OPPT	HPLH	140000	15000	0.039	\$213.00/OZ
SLEEPER	AMAX	PRD	OPPT	CRIP	53000	500	0.22	\$125.00/OZ
THUNDER MOUNTAIN	COEUR D'ALENE	PRE	OPPT	HPLH	25000	---	0.095	\$225.00/OZ
TONKIN SPRINGS	SILVER STATE	PRD	OPPT	HPLH	30000	---	0.07	\$85.00/OZ
VICTOR MINE	NERCO	PRD	OPPT	VTLH	8000	1000	0.041	\$160.00/OZ
ZORTMAN/LANDUSKY	PEGASUS GOLD	PRD	OPPT	HPLH	70000	15000	0.021	\$250.00/OZ

## CAPITAL COSTS

Table 8 (below) lists the total capital costs for 41 U.S. gold projects for which the information was obtainable. Of these, 33 are in full production, two are in development with limited production, and six are not yet in production, but are expected to come onstream this year.

Costs range from \$285 million for the complex McLaughlin project to under \$2 million for the much smaller Tonkin Springs and Haile open-pit, heap-leach projects. More detail, as available, including the sources of financings, is included in the Capital Cost section of the individual deposit profiles.

TABLE 8  
CAPITAL COSTS OF U.S. GOLD MINES

MINE NAME	OWNER(S)	STATUS	MINE TYPE	MILL TYPE	CONTAINED OZ AU	CAPITAL COSTS (U.S. MILLIONS)
MCLAUGHLIN	HOMESTAKE BILL WILDER	PRD	OPPT	CRIP	2,824,000	\$285.0
GOLD QUARRY	CARLIN NEWMONT	PRD	OPPT	CRIP	7,089,000	\$130.0
MERCUR MINE	AMERICAN BARRICK GOLD STANDARD	PRD	OPPT	CYCL	1,460,000	\$100.0
PARADISE PEAK	FMC MINERALS	PRD	OPPT	CYCL	1,164,000	\$100.0
JERRITT CANYON MINE	FREEPORT-MCMORAN FMC MINERALS	PRD	OPPT	CRIL	2,791,000	\$95.0
GOLDEN SUNLIGHT	PLACER U S	PRD	OPPT	CRIP	1,219,920	\$88.0
JAMESTOWN	SONORA MINING PATHFINDER (COGEMA)	PRE	OPPT	FLOT	3,700,000	\$82.2
MESQUITE	GOLD FIELDS	PRD	OPPT	HPLH	2,650,000	\$70.0
CANNON MINE	ASAMERA BREAKWATER RESOURCES	PRD	UGRD	FLOT	1,589,000	\$60.0
FORTITUDE	BATTLE MOUNTAIN DUVAL	PRD	OPPT	CRIP	1,161,000	\$50.0
SUMMITVILLE	GALACTIC REYNOLDS	PRD	OPPT	HPLH	744,900	\$40.0
ALLIGATOR RIDGE	AMSELCO NERCO	PRD	OPPT	HPLH	114,560	\$30.0
GREY EAGLE	NORANDA SISKON	PRD	OPPT	FLOT	19,200	\$30.0

MINE NAME	OWNER(S)	STATUS	MINE TYPE	MILL TYPE	CONTAINED OZ AU	CAPITAL COSTS (U.S. MILLIONS)
SLEEPER	AMAX	PRD	OPPT	CRIP	814,000	\$25.0
DEE MINE	DEE GOLD LACANA GOLD	PRD	OPPT	CRIP	324,287	\$21.5
PINSON/PREBLE	PINSON MINING RAYROCK	PRD	OPPT	CRIP	774,000	\$21.2
ROPES GOLD	CALLAHAN ARCADIAN	PRD	UGRD	FLOT	210,000	\$16.1
ORTIZ MINE	GOLD FIELDS	PRD	OPPT	HPLH		\$14.9
BOREALIS MINE	TENNECO	PRD	OPPT	HPLH		\$14.5
FLORIDA CANYON	PEGASUS AUROTECH	PRE	OPPT	HPLH	445,000	\$13.5
SULTAN MOUNTAIN	INT'L N. AMERICAN P&G MINING	PRD	UGRD	FLCY	109,440	\$12.8
CARSON HILL	GRANDVIEW GOLDIE MINES	PRE	OPPT	HPLH	736,000	\$12.2
BUCKHORN MINE	COMINCO WESTERN DECALTA PETROLEUM	PRD	OPPT	HPLH	154,320	\$12.0
TOP MINE	PLACER U S	DLP	OPPT	HPLH		\$12.0
THUNDER MOUNTAIN	COEUR D'ALENE THUNDER MOUNTAIN	PRE	OPPT	HPLH	169,860	\$10.2
WEST END MINE	PIONEER METAL MFC-MINING FINANCE	PRD	OPPT	HPLH		\$10.0
RELIEF CANYON MINE	PEGASUS GOLD LACANA GOLD	PRD	OPPT	HPLH	280,000	\$6.7
ANNIE CREEK	WHARF RESOURCES	PRD	OPPT	HPLH	636,000	\$6.5

MINE NAME	OWNER(S)	STATUS	MINE TYPE	MILL TYPE	CONTAINED OZ AU	CAPITAL COSTS (U.S. MILLIONS)
CACTUS GOLD	COCA MINES VENTURESTRIDENT	PRD	OPPT	HPLH	195,000	\$6.5
VICTOR MINE	NERCO SILVER STATE	PRD	OPPT	VTLH	114,000	\$6.0
HORSE CANYON MINE	CORTEZ GOLD PLACER U S	PRD	OPPT	CYCL	157,500	\$5.5
BUCKSKIN MINE	PACIFIC SILVER	PRD	UGRD	FLCY	75,000	\$5.0
CROSS MINE	HENDRICKS MINING INTERNATIONAL NORTH AMERICAN	DLP	UGRD	FLOT	110,719	\$5.0
ZORTMAN/LANDUSKY	PEGASUS GOLD ZORTMAN MINING	PRD	OPPT	HPLH	478,800	\$5.0
CASH MINE	CHARLES A STEEN COSMOS RESOURCES	PRE	UGRD	GRFL	65,462	\$4.5
ROBINSON	SILVER KING PACIFIC SILVER	PRE	OPPT	CRIP	234,000	\$4.2
LEWIS MINE	STANDARD SLAG	PRD	OPPT	HPLH		\$3.3
BUFFALO VALLEY	HORIZON P A B OIL AND MINING	PRD	OPPT	HPLH	29,970	\$2.3
WINDFALL MINE	WINDFALL VENTURE	PRD	OPPT	HPLH	76,800	\$2.0
TONKIN SPRINGS	SILVER STATE PRECAMBRIAN	PRD	OPPT	HPLH	343,000	\$1.9
HAILE	PIEDMONT	PRD	OPPT	HPLH	45,500	\$1.2

## GOLD RECOVERY RATES

Table 9 (below) lists the rates of gold recovery for 43 projects included in this study. Recoveries range from 50% at the Cripple Creek Dump leach project to 95% at the Homestake mine at Lead. Not included in the Table is the Relief Canyon mine which was closed in late 1985 due to a recovery of only 48% attributed to the clay content of the ore.

Generally, heap-leach projects have much lower recoveries (averaging about 70%) than carbon-in-pulp or flotation mills, which average about 90% recovery.

TABLE 9

## GOLD RECOVERY RATES FOR U.S. GOLD MINES

MINE NAME	STATE	OWNER(S)	MINE TYPE	MILL TYPE	ST/D	% GOLD RECOVERED
ALLIGATOR RIDGE	NV	AMSELCO NERCO	OPPT	HPLH	2500	75.0
ANNIE CREEK	SD	WHARF RESOURCES	OPPT	HPLH	2400	70.0
AURORA GOLD MINE	NV	PACIFIC NORTHWEST (ELECTRA NORTH WEST) GLOBAL RESOURCES RECOVERY	OPPT	HPLH	---	65.0
BRUSH CREEK	CA	CONSOLIDATED GOLD MINING AREAS BRUSH CREEK MINING AND DEVELOPMENT	UGRD	GRAV	100	90.0
BUCKHORN MINE	NV	COMINCO WESTERN DECALTA PETROLEUM	OPPT	HPLH	2000	70.0
BUFFALO VALLEY	NV	HORIZON P A B OIL AND MINING	OPPT	HPLH	1000	72.5
CANNON MINE	WA	ASAMERA BREAKWATER RESOURCES	UGRD	FLOT	2000	86.0
CARSON HILL	CA	GRANDVIEW GOLDIE MINES	OPPT	HPLH	5000	72.5
CRIPPLE CREEK DUMP PROJECT	CO	TEXASGULF MINERALS  GOLDEN CYCLE GOLD	DUMP	HPLH	---	50.0
CROSS MINE	CO	HENDRICKS MINING INTERNATIONAL NORTH AMERICAN	UGRD	FLOT	100	92.0
DEE MINE	NV	DEE GOLD LACANA GOLD	OPPT	CRIP	1000	83.0

MINE NAME	STATE	OWNER(S)	MINE TYPE	MILL TYPE	ST/D	% GOLD RECOVERED
DELAMAR MINE	ID	NERCO DELAMAR	OPPT	ACYL	2200	80.5
FORTITUDE	NV	BATTLE MOUNTAIN DUVAL	OPPT	CRIP	3600	92.0
GETCHELL HEAP LEACH	NV	FRM MINERALS	TLGS	HPLH	---	60.0
GLADIATOR	AZ	NOR-QUEST LIMITED PARTNERSHIP	UGRD		100	95.0
GOLD STRIKE	NV	WESTERN STATES PANCANA MINERALS	OPPT	HPLH	3000	75.0
GOLDSTRIPE	CA	CALGOM (SUNBELT) NCA MINERALS	OPPT	HPLH	1600	75.0
GOOSEBERRY MINE	NV	ASAMERA ICAN RESOURCES	UGRD	FLOT	350	85.0
GREY EAGLE	CA	NORANDA SISKON	OPPT	FLOT	850	90.0
HAILE	SC	PIEDMONT	OPPT	HPLH	500	94.5
HAYWOOD-SANTIAGO	NV	NEVEX GOLD	OPPT	HPLH	---	67.5
HOMESTAKE MINE	SD	HOMESTAKE	UGRD	CRIP	5270	95.0
JAMESTOWN	CA	SONORA MINING PATHFINDER (COGEMA)	OPPT	FLOT	6000	89.5
JERRITT CANYON MINE	NV	FREEMPORT-MCMORAN FMC MINERALS	OPPT	CRIL	4000	87.5
KNOB HILL MINE	WA	HECLA MINING	UGRD	FLOT	170	90.0
KRAMER HILLS	CA	BEAVER RESOURCES AGEAN INTERNATIONAL	OPPT	HPLH	---	80.0
MANHATTAN MINE	NV	TENNECO	OPPT	FLOT	3000	85.0

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MINE NAME	STATE	OWNER(S)	MINE TYPE	MILL TYPE	ST/D	% GOLD RECOVERED
MERCUR MINE	UT	AMERICAN BARRICK GOLD STANDARD	OPPT	CYCL	4000	82.0
MESQUITE	CA	GOLD FIELDS	OPPT	HPLH	12000	85.0
ORTIZ MINE	NM	GOLD FIELDS	OPPT	HPLH	3000	85.0
PARADISE PEAK	NV	FMC MINERALS	OPPT	CYCL	4000	90.0
PINSON/PREBLE	NV	PINSON MINING RAYROCK	OPPT	CRIP	1500	85.0
RELIEF CANYON MINE	NV	PEGASUS GOLD LACANA GOLD	OPPT	HPLH	3000	70.0
ROBINSON	NV	SILVER KING PACIFIC SILVER	OPPT	CRIP	1000	93.0
ROUND MOUNTAIN MINE	NV	ECHO BAY HOMESTAKE	OPPT	HPLH	15000	72.9
SLEEPER	NV	AMAX	OPPT	CRIP	500	90.0
SULTAN MOUNTAIN	CO	INT'L N. AMERICAN P&G MINING	UGRD	FLCY	300	92.5
SUMMITVILLE	CO	GALACTIC RESOURCES REYNOLDS	OPPT	HPLH	---	70.0
THUNDER MOUNTAIN	ID	COEUR D'ALENE THUNDER MOUNTAIN	OPPT	HPLH	---	75.0
TONKIN SPRINGS	NV	SILVER STATE PRECAMBRIAN	OPPT	HPLH	---	70.0
WEST END MINE	ID	PIONEER METAL MFC-MINING FINANCE	OPPT	HPLH	3000	85.0
WINDFALL MINE	NV	WINDFALL VENTURE	OPPT	HPLH	1500	80.0
ZORTMAN/LANDUSKY	MT	PEGASUS GOLD ZORTMAN MINING	OPPT	HPLH	15000	67.0

## CODES USED IN TABLES 1-9

## STATUS

DLP	Development and Limited Production
PRE	Preproduction
PRD	Production
TPR	Test Production

## MINE TYPE

OPPT	Open Pit
UGRD	Underground
TLGS	Tailings

## MILL TYPE

ACYL	Agitation Cyanide Leach
CRIL	Carbon-in-leach
CRIP	Carbon-in-pulp
CYCL	Cyanide Leach
FLOT	Flotation
FLCY	Flotation and Cyanidation
GRAV	Gravity
GRFL	Gravity and Flotation
HPLH	Heap Leach
VTLH	Vat Leach

HOW TO USE THE PROJECT PROFILESProject Name

The project name at the top of each report is the name most commonly used to identify the property. The "also known as" category contains all other names known to be associated with the property, including names of old mines, vein systems, zones, tunnels, adits, etc.

Ownership Designation

The ownership category contains the names of the companies with an interest or an option to acquire an interest in the project. In the case of a joint-venture agreement, the primary partner is listed first, followed by lesser partners and royalty holders. If two or more companies control equal percentages of the project, the operating company is listed first. The name of the joint-venture partnership itself is supplied following the names of the participating companies. If the project is held under a lease agreement, the lessee is listed first, followed by the lessor. In cases in which the project is held by a subsidiary company, the name of the parent company appears in parentheses after the subsidiary name.

In cases in which the project is held by a subsidiary company, the name of the parent company appears in parentheses after the subsidiary name.

Following the company name is a description of the company's current involvement in the project. This category will include one or more of the following designations:

Carried	Carried interest
Control	Controlling interest
NPI	Net profit interest
NSR	Net smelter return royalty
Owner	Claim owner
Royalty	Royalty holder
Venture	Joint venture
Venturer	Joint-venture partner

Status

Preproduction:	A go-ahead decision has been made and the deposit is being readied for production.
Development and Limited Production:	This designation indicates that the project is being mined as part of the development effort, and ore is being processed to generate cash flow.
Test Production:	Mining and ore processing are taking place on a trial basis in order to evaluate the chosen processing method and to determine the feasibility of progressing to full-scale production.

Activity Status

- Active: The property is being explored, developed, or mined.
- Care and Maintenance: The property is being kept secure, and legally current.
- Inactive: All activity concerning the project has come to an end.
- On hold Awaiting Metals Prices: The project is inactive until metals prices improve.
- On Hold Awaiting Financing: The project is inactive until funding for further work is received.
- Temporarily on Hold: The project is temporarily inactive.

Reserves Certainty

The "Certainty" category in this section is provided to specify the degree to which reserves have been proven. Our approach to this information is to report it as given. If a reputable company reports its reserves as "Proven," "Probable," "Possible," "Drill inferred," "Estimated," or an equivalent, we report them as such. If it is not possible to determine how reserves estimates were arrived at, i.e., if there is no qualifier attached to the statement of reserves figures, we report the certainty as "Unknown."

Bibliography and Source Abbreviations

A list of our sources of information on each project appears in the bibliography section at the end of each report.

Information in the text is followed by an abbreviation in parentheses that refers to the source of the data contained in that section. The key to those abbreviations appears in the appendices.

Abbreviations Used in the Text

Some words, phrases, names of government agencies, measurements, etc., are abbreviated. The key to those abbreviations is provided in the appendices.