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REPORT ON PERUVIAN MINING

REPORT ON PERUVIAN MINING
1991

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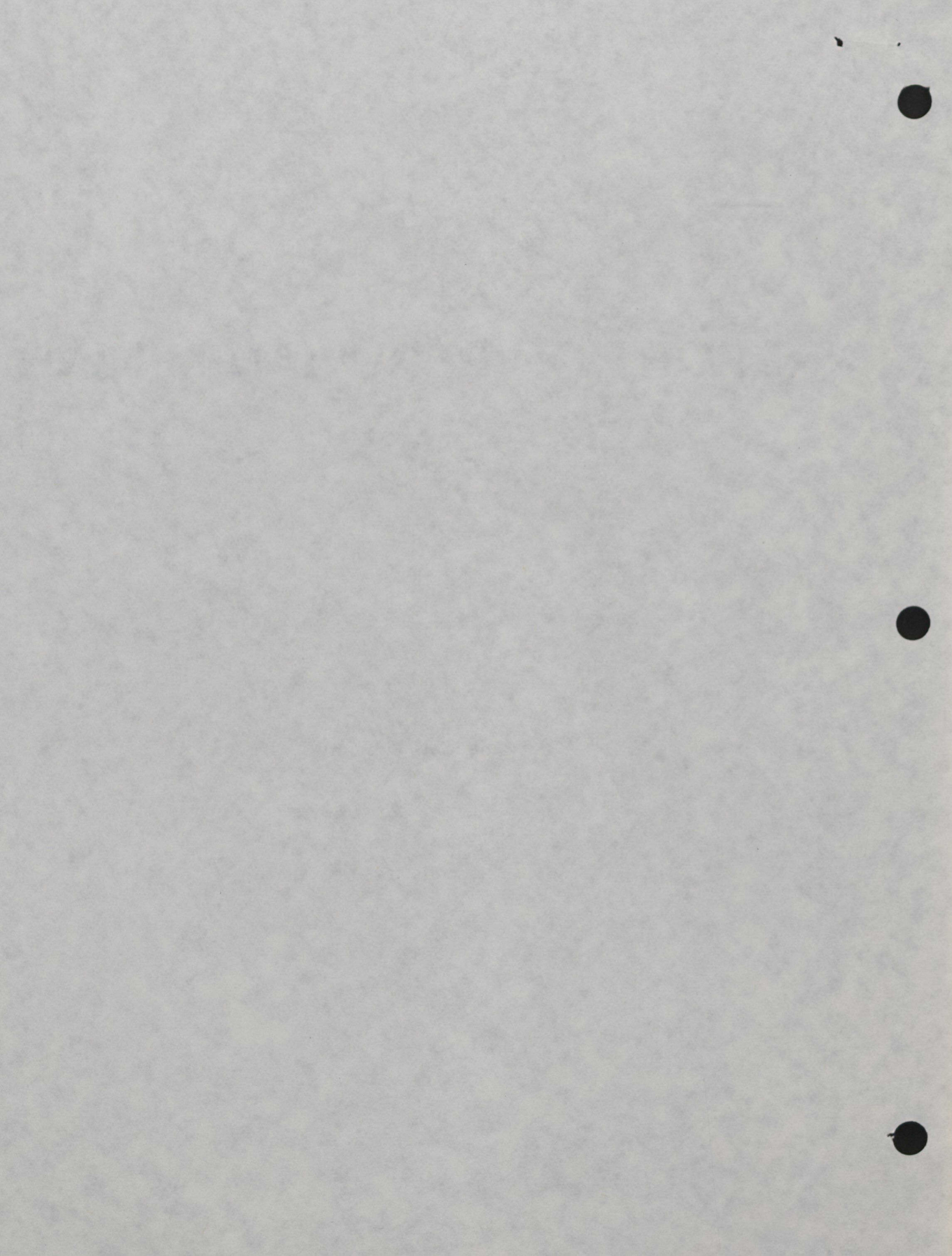


TABLE OF CONTENTS

Geology

Early History of Peruvian Mining

Mining in the 1880's

1981: The Present **REPORT ON PERUVIAN MINING**

Structure of the Peruvian Mining Industry 1991

Mining Methods

Results for 1990, Outlook for 1991

Copper Production

Copper Refining

Zinc Production

Zinc Refining

Lead Production

Lead Refining

Silver Production

Silver Refining

Iron Ore Production

Gold and Other Metals

Canadian Embassy

Lima, Peru

March, 1991

Present and Future Opportunities for Canadian Exporters

Appendix: Production Tables, 1989 - 1990

Copper

Zinc

Lead

Silver

REPORT ON PERUVIAN MEETING

1991

Canadian Embassy

Lima, Peru

March, 1991

REPORT ON PERUVIAN MINING

TABLE OF CONTENTS

Geology	1
Early History of Peruvian Mining	2
Mining in the 1980's	3
1991: The Present Situation	4
Structure of the Peruvian Mining Industry	8
Mining Methods	9
Results for 1990, Outlook for 1991	9
Copper Production	9
Copper Refining	10
Zinc Production	11
Zinc Refining	12
Lead Production	13
Lead Refining	13
Silver Production	13
Silver Refining	14
Iron Ore Production	14
Gold and Other Metals	15
Present and Future Opportunities for Canadian Exporters	15
Appendix: Production Tables, 1989 - 1990	18
Copper	18
Zinc	19
Lead	20
Silver	21

TABLE OF CONTENTS

1	Geology
2	Early History of Canadian Mining
3	Mining in the 1850's
4	1951: The Present Situation
5	Structure of the Canadian Mining Industry
6	Mining Methods
7	Results for 1950, Outlook for 1951
8	Copper Production
9	Copper Refining
10	Zinc Production
11	Zinc Refining
12	Lead Production
13	Lead Refining
14	Silver Production
15	Silver Refining
16	Iron Ore Production
17	Gold and Other Metals
18	Present and Future Opportunities for Canadian Exporters
19	Appendix: Production Tables, 1953 - 1950
20	Copper
21	Zinc
22	Lead
23	Silver

REPORT ON PERUVIAN MINING

Geology

The dominant geologic structure in Peru is the Andean Cordillera, which was formed throughout the Hercynian and Andean Cycles of sedimentation and tectonics over Precambrian substrata. The rock is mainly a derivative of calco-alkaline magmatism. This structure runs from north to south, and geographically divides the country of Peru into three different regions, which from west to east are: Coast, Highlands and Jungle.

Peru has two different metallogenic provinces: the Western province, related to the Andean tectonic cycle and an Eastern province, related to an earlier tectonic cycle.

The Western Metallogenic Province has a cupriferous sub-province located along the Western sector of the Andes, characterized by important cupriferous deposits and a coastal iron belt in the South. One area has auriferous mineralization overlaying the copper with eastward extensions. A polymetallic sub-province of lead/zinc/silver is clearly defined between the northern and central parts of Peru. This type of mineralization does not occur outside of this area. In the South of the country, there are iron, copper and silver deposits with the silver being related to Tertiary volcanics, whereas in the North segment, there are vulcanogenic massive sulphide deposits with pyrite, copper, zinc and silver.

The Eastern Metallogenic Province comprises Precambrian nickel sulphides and chrome deposits and vein deposits of gold and antimony (in the South), related to the Eohercynian tectonic cycle. A mineralization of Cu-Ni-Co-Ag, with some uranium, followed to the southeast by Cu-Sn-Bi or Cu-W deposits with some Mo and rare earths, is related in part to the fini-Hercynian granitoids and in part to micene intrusives. This seems to be the extension of the Bolivian Sn-W belt into Peruvian territory. In addition, there are important Quaternary vein Hercynian deposits.

In the Western Metallogenic Province, the transverse and longitudinal changes in mineralization seem to be related to the subduction of the Nazca plate under the continent and to the inclination changes of this plate. It is assumed that the source of the metals is related both to the subducted mantle and crust and to the removal of the minerals contained in the rocks of the continental lithosphere.

Early History of Peruvian Mining

Peru is a mineral rich country with one of the world's richest mining traditions. The use of gold and silver for jewellery during the Inca era was discovered by the Spanish, who in the sixteenth century quickly settled in Peru to exploit the vast mineral wealth. Even today, some of the original Inca and Spanish mines are still being profitably worked.

The Inca culture, which started around the twelfth century and collapsed with the onset of the Spanish Conquest, gave a prominent position to mining and metallurgical development, working gold, silver and copper on a large scale. The Incas knew how to use mercury and produced alloys such as bronze and others, using lead, zinc and platinum.

The wealth found by the Spaniards in Peru halted development of the mining industry during the early colonial years - it was undoubtedly easier to sack temples and palaces. Additional reasons for the stagnation of mining were power struggles, lack of administrative organization and possibly the passive resistance of the Incas, who removed traces of the veins they had worked.

The chronology of colonial mining operations begins in 1537 with gold and silver being worked in Lucanas and Parinacochas, followed by Jauja and Huancayo in 1539. Gold was exploited in Jaen and Carabaya from the 1540's, and later in Sandia. It is said that Charles V received as a present from Peru a gold nugget found in San Gaban, which weighed more than 46 kilos and was in the shape of a horse's head.

The expansion of the country's railway network in the late 19th century facilitated access to potential mining operations. By 1978 there were 1512 mines in operation, 870 of which were silver mines, 176 coal and 118 copper, and 53 oil deposits. The copper industry, so active in the Inca period and then almost non-existent in the Colonial period, began to recover during Republican times. The Pacific War of 1879 to 1883, fought by Peru and Bolivia against Chile, left the country in financial bankruptcy. Mining played a key role in the reconstruction process.

In 1919 the Cerro de Pasco Copper Corporation began construction of a large and modern smelter in La Oroya. Cerro, as it was known, continued to prosper and grow in Peru until the early 1970's, when it was expropriated by the state and renamed Centromin. In the decades following the 1929 to 1932 economic crisis, Peru established itself as a leading world producer of copper, lead, zinc, vanadium, bismuth, gold, silver and iron.

Mining in the 1980's

As in the past, mining remained the single most important economic sector in Peru, accounting for some 3 percent of employment, 11 percent of GDP and 50 percent of export revenues. The influence of mining in economic development has been equally impressive. Since some 75% of its inputs are domestically sourced, mining has served to fuel industrial growth. Due to the remote locations of most mines, their development has contributed greatly to infrastructure expansion, bringing rail, roads and power into the extensive central highlands of Peru, where there is virtually no other economic activity but subsistence agriculture. Mining companies have also contributed to development by providing housing, schools, and hospitals for workers and dependents. Many mines also have had to build their own hydro plants, many of which have also served surrounding communities. A recent government estimate indicated that the indirect benefits of mining may contribute an additional 20% to Peru's GNP.

In the 1980's, Peru, perhaps due in part to the dominance of the state in mining, was unable to expand its supply of minerals in a manner comparable to other producing countries, such as neighbouring Chile. Only three large new mines, Southern Peru Copper Corporation's Cuajone pit, the state sector's Tintaya pit (partially financed by Canada), and Minero Peru's Cerro Verde, all copper operations, came on stream in the last decade. In the same period there were only two large expansions, at Centromin's Cobriza pit in 1980-81, and at Andaychagua in 1988. Some private mines were also able to expand their production. Almost all of these projects began to be planned and implemented prior to 1985.

Ownership aside, the basic productive structure of the industry remained essentially as it was in the early 1970's, before Cerro de Pasco Corporation and Marcona were expropriated by the state to form Centromin and Hierroperu. Many analysts point to nationalization as one of the main reasons for Peru's prolonged recession, since government companies have lacked the financial, entrepreneurial and risk taking ability to expand production in response to market conditions, even though they have a large inventory of potentially excellent projects. In fact, most miners believe that Peru has considerably better deposits than Chile to the south.

New projects would now be costly to develop. Financing for major developments will be found only when investors and bankers are convinced that the probability of longer-term stability is sufficient to justify risking their capital. For this reason, the emphasis in the late 1980's was on smaller investments aimed at achieving greater efficiency and cost per ton reductions at small and medium mines. Local capital resources have been severely restricted in recent times, and access to foreign equity or loan

finance has been constrained by a history of unfavourable government policies and attitudes toward foreign capital.

1991: The Present Situation

Mining in Peru remains an industry in distress as the second quarter of 1991 begins.

The Peruvian mining industry continues to face serious problems, some apparently intractable, some addressable in the medium term, none simple. A legacy of economic ruin (wrought in good measure by the policies of the previous government), severely restricted access to credit, and guerrilla attacks have in recent times been much more important than simple prices in determining the industry's health.

Two important and related consequences of this situation are the following. First, the industry was unable to draw full advantage from generally strong metals prices which prevailed through 1989 and 1990. Second, the situation has been so bad that progress toward resolution of any of the major problems currently constraining the industry could have significant recuperative influence, even, it might be cautiously suggested, in a context of moderately softening markets.

The Fujimori government, after taking office in mid-1990, moved quickly to reverse some of the worst aspects of previous economic policies. A highly distorted and unfavourable multiple exchange rate system, which had in effect served to siphon wealth out of the mining sector, was eliminated. Market forces now largely determine the official exchange rate, which quite closely approximates street rates.

Strict monetary policy was imposed to arrest hyperinflation which had reached five digits. Recent monthly rates have been below 20 percent, still not ideal but a vast improvement on the previous situation. Nonetheless, tight money policy has meant that credit from the domestic banking sector has been very much restricted. Banco Minero, a state sector institution lending to the mining sector, is effectively bankrupt. The immediate effects of restricted credit have been compounded by the influence of money supply on the exchange rate; insufficient availability of domestic currency has contributed to what many consider an overvalued inti. (The presence on the local market of very large quantities of dollars generated by illegal coca exports also tends to prevent the local currency depreciation for which exporters have been hoping.) In consequence, export earnings fail to be fully insulated from local inflation. Without sufficient offsetting devaluation, local unit mining production costs rise relative to unit export value.

External sources of credit are practically unavailable, as the Peruvian government has not yet reached agreement on the terms of full re-establishment of relations with the international financial community. Thus, neither foreign commercial banks nor such sources as the World Bank or the EDC are at present willing offer financing in Peru.

Some relief has come via dramatic reductions in import tariffs. Protectionism is being abandoned; in October 1990, the tariff structure was reduced and simplified, resulting in a three-tiered scheme with rates of 15 percent, 25 percent and 50 percent.

Further changes in March 1991 further simplified the system, leaving just two tiers of 15 percent and 25 percent, with an overall average tariff of 17 percent. (Assorted other taxes totalling about 16 percent also apply.) While some manufacturing interests have been vociferously opposed to tariff reduction, the mining industry generally applauded these moves.

As part of a process of transferring resources to new regional administrations, ownership of certain national mining operations and properties was transferred to regional authorities. This was the case with Tintaya, for example, which now belongs to the Inca Region, with its administrative centre in Cuzco. In the case of the San Antonio de Poto goldfields, Minero Peru retained two thirds of shares, while the balance were given to the local region. Certain problems of ownership and jurisdiction have arisen, as exemplified by a recent dispute between Minero Peru and Region Grau, in the north, over the latter region's announcement (invalid, according to Minero Peru) of a public tender for development of the important Bayovar phosphate property.

Fears that Centromin and Minero Peru could have been dismembered through this policy have been allayed for the time being by governmental declarations of national interest in the maintenance of these enterprises intact, under central control and ownership.

Early in 1991, Minister of Energy and Mines Sanchez Albavera clearly indicated in public statements that the government could not undertake any more large investments, and called on the private sector to take the initiative in developing new enterprises and attempting to attract foreign investment.

While the philosophy of large-scale state participation in industrial production would seem to have been abandoned, the fact of major state involvement remains.

The promotional as opposed to operational role of Minero Peru has been reemphasized, amid rumours of ongoing negotiations with potential private sector joint venture development partners. The Swedish firm Boliden has been involved in discussions with the Peruvian government regarding the possibility of purchasing

Centromin through debt-equity conversion, a process with which Peru has as yet had little or no experience. A figure of US\$630 million has been cited frequently in media reporting, although Boliden has stated that this may not necessarily reflect their actual position. To date the government has rejected Boliden's offer, although discussions apparently have continued.

On the subject of privatization of public mining enterprises the government has been issuing rather mixed signals. The intention has been announced to privatize a range of smaller state enterprises, although explicit identification still is lacking. It cannot be stated at the moment that any clear intention exists to privatize mining sector operations. Nonetheless, while the major state companies have been incurring very substantial losses, it remains true that the state controls many rich properties which could be quite attractive to private operators, assuming sufficient access to capital and the necessary administrative freedom to operate efficiently. In the longer term, it is possible that the general tendency of government policy and the influence of the international lending community will support the logic of privatization.

One current concern of government that would be shared by any potential sources of renewed credit among international financial institutions is that of environmental regulation. While implementation of a new environmental code has been delayed pending clarification of penalties, designation of authority and other matters, the trend of the future is clear. The near-total disregard for environmental effects which prevailed in the past will not continue. While this will be interpreted as a problem and an obstacle by some, advantages may very well accrue to those who can most readily adapt to more progressive norms. While much improvement can be obtained simply through implementation of more modern processes and replacement of old, worn out equipment, it can be predicted that many serious environmental problems will prove more long-lasting.

In recent years, problems of inadequate maintenance and replacement of equipment, plant and infrastructure have been compounded in some cases by the necessity to accelerate removal of high-grade reserves just to cover short term obligations. While there is clearly great need, it has not been possible as yet, given financial realities, to translate a large proportion of the need for new equipment into effective demand.

The consequence of recent problems, in the case of small producers, has been almost uniform paralysis. Some medium producers as well have been forced to suspend operations. One result of this reality has been that a large number of small property holders and former operators are engaged in a rather desperate and in some cases probably hopeless search for sources of finance and/or joint venture partners and/or outright

purchasers. Under current circumstances, it is belabouring the obvious to suggest that it is difficult to attract new investors to Peru.

While recent Presidential statements have promised a broad liberalization of restrictive regulations currently limiting the participation of foreign capital in Peru, as yet little concrete legislative action has followed. One very recent development, however, is the abandonment of certain restrictive articles of the Acuerdo de Cartagena, articles which Peru is for all practical purposes alone among Acuerdo members in continuing to apply. (The Acuerdo de Cartagena groups Peru, Venezuela, Colombia, Ecuador and Bolivia in a preferential trade arrangement.)

The problem of politically-motivated violence is perhaps the most daunting and least tractable difficulty currently facing the Peruvian mining industry, at least from the point of view of trying to attract foreign partners. Attacks on mine sites, vehicles, etcetera, caused the deaths of some 62 persons directly related to the mining sector, and resulted in significant damage to production between 1980 and 1990. No less than 14 of the deaths occurred in December 1990. The Canadian Embassy's strong advice against overland travel in some areas of the Sierra, unfortunately including important mining zones, remains in effect.

In view of the foregoing considerations, it is perhaps surprising to see that any investment is taking place at all. The fact that some new projects are contemplated and that some foreign investors have recently demonstrated clear interest is testament to some of the underlying strengths of the Peruvian industry. Diamond drilling for confirmation of reserves has commenced at the Iscaycruz zinc project, a joint venture involving the Buenaventura interests and two Brazilian partners. Iscaycruz has shown zinc values of 19 percent, among the highest in Peru; mine development is slated to begin by the end of 1991. Elsewhere, two German companies, Metall-U Farbwerke GMBH and a subsidiary of Reiner Kossman International, are proceeding in a joint venture project with Centromin to build a US\$2 million zinc oxide plant at Pisco. Other planned investments include smelter improvements and concentrator expansions, both private and public sector.

There is also a large inventory of potentially profitable projects, both public and private, which await improved circumstances for their implementation. The Association of Mining Engineers of Peru has been assembling for promotional purposes a database summarizing details of over one hundred of these projects. Development of many of the projects will occur only if foreign equity participation is available and when investment stability can be assured.

A few privately financed projects either underway or in final planning stages at some of the medium mines, including expansions,

new development, exploration and refining. (See below, in the section titled "Results for 1990, Outlook for 1991".)

Structure of Mining in Peru

Mining in Peru is dominated by five large scale mining companies which account for approximately 70 percent of total production, about 45 percent of employment in mining and 40 percent of total mineral exports. These companies - Centromin (silver, lead, zinc, copper), Southern Peru Copper Corporation (copper), Tintaya (copper), Mineró Perú (copper), and Hierro Perú (iron ore) are all state-owned, with the exception of Southern Peru Copper Corporation (SPCC). Centromin is by far the largest. Centromin operates six main mines and the La Oroya metallurgical complex. Centromin has had annual sales in the range of US \$400 million. In addition to processing its own minerals, Centromin also purchases a great deal of concentrates from small mines. In all, the large scale mining enterprises have 13 concentration plants, 4 smelters and 7 refineries.

Peru has about 50 to 60 medium-sized mining companies (with production levels between 350 and 5,000 tpd) which account for some 25 to 30 percent of total Peruvian production and 40 percent of the mining workforce. Almost all of these companies are privately owned. They produce a wide variety of minerals, but copper, lead, zinc and silver predominate. There are also two important tin and tungsten mines. Some companies sell concentrates to the state-owned refineries and smelters; however, many market their concentrates internationally. Minpeco, the state sector mineral trading agency, has had a major role in the marketing of private Peruvian production, although other international buyers are also active.

The one thousand or more "small scale" mines, operating at levels of below 350 tpd, account for the balance of production. These companies range from sophisticated high grade underground mines, to placer operations, to crude open pit or near surface mines which depend almost entirely on manual labour -literally pick and shovel operations. Most of their concentrate is sold to Centromin and Mineroperu for smelting and refining. Recently, virtually all small mining activity has been paralyzed.

Peru's top individual exports are copper, zinc, lead and silver; Peru is among the top ten world producers of all of these metals. It also produces 35 other mineral and metallic products including significant amounts of iron, gold, tin, tungsten, antimony, cadmium, molybdenum, bismuth, selenium and tellurium. It is estimated that only 12 percent of Peru's known reserves and only 3 percent of potential reserves are currently under exploitation.

Mining Methods

Most mines use cut and fill and shrinkage mining methods. The few open pits have been operated exclusively by the large companies. The majority of medium-sized mines are becoming more efficient. Jumbos and alimaks are gradually replacing jacklegs and stopers and some mines use raise borers. The majority of mines still uses rail equipment with 1 to 5 ton locomotives, but trackless equipment is becoming more popular. Backfill is usually waste rock, although hydraulic backfill is used in some mines. Blasting is done using gelatine dynamite with conventional fuses and detonators. Progressive mines are switching to more sophisticated explosives and electrical detonation.

Many qualified analysts suggest that after the US-owned Cerro Corporation was expropriated in the early 1970's, the clock stopped in terms of technological development. There are some private mines, however, which are at the forefront of technology and innovation using continuous mining systems, in-the-mine computers and sophisticated engineering. The ingenuity, quality and knowledge of miners here should not be underestimated.

RESULTS FOR 1990, OUTLOOK FOR 1991

The total value to the Peruvian economy of mining and mineral processing is roundly estimated at US\$4 billion annually, or about 13 percent of GDP. Mining exports represent about 50 percent of total Peruvian exports by value.

Copper, silver and iron production fell in 1990 by 13 percent, 15 percent and 20 percent respectively; lead and zinc output levels continued about even, but may conceivably be bedeviled by falling prices as 1991 begins. Production results for 1989 and 1990, broken down by leading producers, are displayed in Appendix I,

Copper Production:

National copper production, 317,706 fmt (fine metric tons) in 1989, is projected to rise by some 15 percent to 346,749 fmt in 1991 - this figure would still be 15 percent below 1987 production. Production in 1990 was down 13 percent from 1989.

The biggest copper producer is Southern Peru Copper Corporation (SPCC); the company's copper production in 1990 was an

estimated 194,012 fmt, down 17 percent from 1989, primarily due to a strike which ran from March to May 1990. 1991 projections call for 235,000 fmt. Ore grades have been dropping off: content at the Toquepala pit, at 0.85 percent in 1980, are now reported at 0.82 percent; values at the Cuacone pit, 1.15 percent in 1980, now are reported at 0.86 percent.

Empresa Regional Tintaya, transferred from national to regional ownership in 1990, is the number two copper producer. Production in 1990 was estimated at 40,713 fmt, down 2 percent from 1989, with projections of a further drop in 1991 to 36,580 fmt. The company is moving to strip a large volume of waste with a small fleet of new Soviet trucks; inadequate maintenance on the old Wabco trucks reportedly contributed to waste removal delays. Tintaya is hoping for increased production in 1992.

Centromin has projected a one third increase in copper output from 1990's estimated 33,761 fmt to 47,000 fmt in 1991. (1989 output was reported at 36,058 fmt.)

Compañía Minera Pativilca (of the Hochschild Group) is reported to be planning a 20 percent boost in copper production for 1991 with completion of concentrator capacity expansion from 1100 mt/day to 1400 mt/day. This US\$3 million expansion was financed with advances on future production sales. Pativilca's reported 1990 output of 5,727 fmt represented a 14 percent rise over 1989 production.

Copper Refining:

National refined copper output in 1990 was estimated at 181,790 mt, 19 percent below 1989 output; 1991 projections call for 245,000 mt. (For comparison, 1985 production was 226,787 mt.)

The Peruvian copper refiners are Centromin and Minero Peru. Minero Peru is the biggest refiner, with the Ilo refinery producing an estimated 115,926 mt of cathode in 1990, 26 percent below 1989 production; 175,000 mt output is projected for 1991. Results were poor in 1990 due to strikes at Ilo in August-September and at SPCC in March-April. SPCC's smelter at Ilo is the sole supplier of blister copper to Minero Peru's Ilo refinery. SPCC reported blister output of 195,539 mt in 1990, down 19 percent from 1989. Under a tolling contract binding to 2001, SPCC must provide sufficient blister for the Ilo refinery to run at capacity; however, SPCC has been exporting surpluses (see below).

Minero Peru has been studying the possibility of installing an oxygen plant at Ilo to increase production by 20,000 to 30,000 mt/year while cutting oil consumption in half.

Cerro Verde II: Minero Peru is projecting 11,200 fmt production of copper concentrates at Cerro Verde in 1990, one third of which

would come from the Cerro Verde II concentrator. Plans exist to expand the capacity at the Cerro Verde II concentrator from 2,500 fmt to 5,000 fmt. If private joint venture capital could be drawn in, capacity could be increased to between 10,000 and 20,000 fmt.

Meanwhile, there are projections of 17,500 fmt copper cathode production from Cerro Verde I electrowinning plant in 1991, up from an estimated 16,307 fmt in 1990 (which represented a 17 percent decline from 1989 levels). Full plant capacity is 33,000 fmt/year, but declining oxides reserves have slowed production. Four million mt of oxide reserves remain at Cerro Verde, enough for two more years production.

Minero Peru has been studying the possibility of establishing a refinery unit near the electrowinning plant; the intention would be to process surplus SPCC blister copper which is currently exported.

Centromin's La Oroya metallurgical complex produces copper, zinc and lead. Refined copper production in 1990 was estimated at 49,557 mt, up 2 percent from 1989; an increase to 53,000 mt is projected for 1991 as a result of the installation of new equipment by later in the year. Copper circuit capacity could be increased from 58,000 mt to 68,000 mt with the proposed installation of an oxygen plant, which could also reduce oil consumption by one half.

Zinc production:

Total national zinc production in 1990 was estimated at 585,119 mt, down 2 percent from 1989. In 1991 zinc production is projected to increase by 11 percent over 1990 levels, to 636,378 mt. (The past record was 612,447 mt.) Softening prices could possibly modify this projection.

Centromin is the leading zinc producer with 1990 production estimated at 204,169 fmt, down 6 percent from 1989. Production in 1991 is projected at 240,411 fmt.

The leading private zinc producers are SIMSA (San Ignacio de Morococha, S.A.) and PERUBAR. Production declines are predicted for 1991 due to falling ore grades. Production by SIMSA in 1989 was estimated at 80,080 fmt; production fell 19 percent to a reported 65,251 fmt in 1990. Projections call for production of 74,000 fmt in 1991. SIMSA has contracted local consultants to conduct studies for a 26.6 MW hydro plant to exploit the Tarma, Palca and Yananga Rivers. The project would take an estimated three years to complete and would allow an increase in mine and concentrator production from 3,000 mt/day to 5,000 mt/day. PERUBAR's 1990 zinc production was estimated at 57,359 fmt (down 9 percent from 1989), with 46,800 fmt output projected for 1991.

The following private zinc producers are reported to be envisioning expansions:

- Compañía Minera Raura, a zinc/lead producer, is planning a 10 percent increase in production to a projected 24,141 fmt in 1991; an open pit is being prepared near underground operations; the site opened in June 199. Concentrator capacity is being increased from 1500 mt/day to 1750 mt/day.

- Compañía Minera Atacocha planned to spend US\$4.5 million to increase mine capacity and to increase concentrator capacity from 6,600 mt/day to 8,000 mt/day. Completion is scheduled for March 1991; the work will permit mining of the zinc vein at lower levels. Production in 1990 was an estimated 22,465 fmt (down 9 percent from 1989); 1991 output of 32,285 fmt has been projected.

- Minas de Arcata (of the Hochschild group) has indicated plans to increase zinc production by 16 percent to a 1991 production level projected at 13,127 fmt. A lead/zinc circuit was installed in November 1989, after the ore body showed a slight decrease in silver content accompanied by an increase in zinc/lead content.

Private miner Compañía Mineral de Madrigal, a lead/zinc/silver producer in Arequipa, shut down in November 1990. Fresh capital would be required to resume operations.

Zinc Refining:

Zinc refining is conducted at Centromin's La Oroya complex and Minero Peru's Cajamarquilla refinery. National refined output in 1990 was an estimated 117,634 mt, down seven percent from 1989 production; 1991 output was projected to be 125,000 mt. (Record production occurred in 1985, at 162,746 mt.)

Projections call for Centromin's La Oroya refined zinc production to increase from an estimated 60,964 mt in 1990 to a projected 65,000 mt in 1991.

An increase in zinc output is planned at Minero Peru's Cajamarquilla refinery from an estimated 56,670 mt in 1990 to a projected 60,000 mt in 1991. This represents production at a little over one half of refinery capacity; in 1990, severe power shortages caused by a combination of drought and sabotage depressed production. Drought conditions ended with the return of rains in autumn 1990, but it is expected that only 70 percent of power requirements will be met in 1991. The refinery consumes about 55 MW of electricity, roughly 10 percent of Lima's total consumption.

Lead production:

A 12 percent increase in lead production is projected for 1991, with output of 203,917 mt. This would be equal to 1987 production, and close to the record 207,798 mt produced in 1985. The leading producer is the state operator Centromin, with 1990 output estimated at 66,830 fmt (down 7 percent from 1989), and projected 1991 production of 83,857 fmt.

The top private lead producer, MILPO, plans to increase concentrator capacity from 2,000 mt/day to 3,350 mt/day. New capacity is scheduled to be on stream in 1993. MILPO reportedly produced 23,469 mt of lead in 1990, down perhaps 1 percent from 1989.

Compañía Minera Raura projects a one fourth increase in lead production to 9,000 fmt from 1990's estimated 7,689 fmt. PERUBAR envisions a reduction in output from 1990's estimated 7,708 fmt to a projected 4,080 fmt in 1991.

Lead Refining:

Repairs are urgently necessary at Centromin's 87,000 mt/year lead refinery at La Oroya. In the past, Centromin refined all of its own concentrates and bought from other local producers. Since 1988, Centromin has been exporting a surplus of 25,000 mt/year of lead concentrate.

Total national refined lead output in 1990 was estimated at 69,305 mt. (While this reflected a three percent increase over Centromin's 1989 production, it was down 6 percent from national production in 1989; this was due to the closure of a private smelter late in 1989 - see below.) With repairs to Centromin's lead circuit, 1991 production is projected at 85,000 mt, slightly above 1985's record 81,891 mt.

FUNDECONSA, the only other lead smelter in Peru and the only private operation, seems unlikely to resume production in 1991. This smelter ceased production in late 1989 following a legal dispute with MINPECO, the state minerals trader. FUNDECONSA used to process for MINPECO under a tolling contract. Installed output capacity is 17,000 mt lead and 3.7 million troy ounces silver.

Silver production:

In late 1990 it was projected that national production of silver, 57.3 million fine troy ounces equivalent in 1990, would increase in 1991 to 59 million troy ounces. This would be just under the record 62 million troy ounces produced in 1986.

Centromin is the leading silver producer; the company projected a 10 percent increase from 1990's estimated 11.2 million troy ounces to a projected 14.9 million troy ounces in 1991.

The leading private silver producer is Compañía de Minas Buenaventura, with 1990 production estimated at 5.2 million troy ounces. The number two private producer, Compañía de Minas Orcopampa (a Buenaventura subsidiary), also produced an estimated 5.2 million troy ounces in 1990. Both companies expected to maintain similar production levels through 1991.

The number three private silver producer, Compañía Minera de Caylloma, projected a decline in production from 1990's estimated 2.1 million troy ounces to 1.9 million troy ounces in 1991, due to a slight decline in ore grade.

Silver Refining:

Total national refined silver output was estimated at 19,144,359 troy ounces in 1990, down ten percent from 1989 results. Centromin produced a reported 18,030,209 troy ounces of refined product, processing its own input as well as that of other mine operators. Minero Peru produced the balance, some 1,114,150 troy ounces.

Refined silver volume could possibly increase in 1993 if Compañía Minera Buenaventura proceeds with a gold/silver refinery project currently under study. The study, due for completion in 1991, was financed with US\$250,000 from the International Financial Corporation (IFC). A US\$30 to 40 million investment would be required for a refinery to treat 120 mt/day of gold and silver concentrates. This would equal the current combined output of Buenaventura and its Orcopampa subsidiary. There is interest in identifying foreign or domestic partners both to share costs and to allow greater production capacity.

Iron Ore Production:

Hierro Peru, the state iron producer with works at Marcona, had the worst year in its history in 1990. The company's future appears bleak at present. Kobe Steel of Japan and Siderca of Argentina have been approached, but efforts to identify potential partners prepared to salvage the operation have so far met with failure. It is estimated that an investment on the order of US\$100 million would be required to restore the company to competitive operating condition. Total 1990 production was 2,146,970 fine long tons, primarily in the form of pellets and sinter. Competitive operation would require production at three times this level.

Gold and Other Metals:

Gold production, excluding gold contained in concentrates, fell by 20 percent compared to 1989. A reported 110,856 troy ounces was produced in 1990, down from 139,052 troy ounces the year before, and from 163,518 troy ounces in 1988.

Declining gold production resulted from a variety of causes, many of which are well illustrated by the case of San Antonio de Poto, an alluvial gold field in the remote southeastern jungles to the north of Puno. Development by Minero Peru of a dragging project which could increase national gold production by 20 percent has been delayed by Minero Peru's financial weakness, lack of parts and equipment, geographical remoteness, electrical shortages and insecurity.

Relatively minor quantities of tungsten, molybdenum, tin and cadmium are also produced by the Peruvian mining industry. Tungsten production of 1,372 mt in 1990 represented an increase of 23 percent over 1989 output. Minera Regina is the principal producer. Molybdenum production fell by 22 percent in 1990, with production of 2,501 mt. Southern Peru Copper Corporation, the principal producer, has predicted a recovery to previous levels if labour difficulties experienced in 1990 are not repeated. Tin production totalled 5,134 mt in 1990, a 2 percent increase over 1989. The sole tin producer, San Raphael, a unit of Minsur, has been confronting financial problems which could imply a fall in production in 1991. Cadmium production stood at 378 mt in 1990, down 20 percent from 1989.

PRESENT AND FUTURE OPPORTUNITIES FOR CANADIAN EXPORTERS

The Peruvian mining industry must import from 20 to 25 percent of inputs, ranging from new or used heavy equipment, to spare parts, drills and steel, tires and chemicals. Total annual mining sector imports of goods and services are estimated to be in the range of US\$150 million.

Although Canadian companies have been active in Peru and the Canadian government has been very supportive of these efforts through a series of missions, fairs and promotional activities, Canadian exports still garner only a relatively small portion of this substantial market, perhaps between ten and fifteen percent. Nonetheless, Canada enjoys an outstanding profile and reputation in Peruvian mining.

Major competition comes from Japan, the United States, Sweden, Germany, Finland and Brazil. Producers in the industrialized world all face similar market access conditions. Some South America

competitors enjoy preferential treatment under ALADI and Andean pact agreements. Some foreign companies maintain permanent offices in Lima (as is the case for companies such as Caterpillar, Gould or Dresser from the U.S.A, major Japanese firms, as well as several European and Brazilian firms) and at times may have access to credit obtainable in other South American countries.

If our estimates are correct, Canadian sales account for little more than 10 percent of the Peruvian market, and we believe that this share could be increased. As an example, in 1988 Peru imported almost US\$ 790,000 of drill bits. The United States supplied almost 38 percent of the total, Canada less than 11 percent. Similarly, in 1988 Peru imported an estimated US\$495,000 worth of integral bars (steels); Canadian sales accounted for about 14 percent while Austria and Germany shared over 60 percent of sales. The same pattern is repeated for most products, with certain exceptions such as trackless equipment where Canada supplies almost one half of the market.

There are some large, essentially dormant projects in the state companies that would require international bidding. More potential however, lies in the sale to individual firms of "consumables" and small equipment, often in limited quantities. While each sale may not be impressive, the potential client base is very large and overall sales may be rewarding. The biggest markets will continue therefore to be for items such as trackless equipment, drills, steels and bits, consulting services, diamond drilling equipment, some winches, tires, and spare parts. Good potential also lies in hydraulic cylinders, specialty items, air compressors, pumps, alimaks, locomotives and other products suitable to small scale mining. Canada has not very been active in the supply of plant equipment and flotation chemicals, which represent potentially large markets.

Peruvian miners tend to keep their capital spending down by keeping equipment running longer. Canadian companies, however, have to some extent failed to capitalize on this to capture a greater portion of the replacement parts market.

In the past, local manufacturers enjoyed "closed border" protection against imports. As a result, local capability is substantial and some foreign-made products cannot easily be sold here. A cross section of local production would include conveyor systems, scales, slushers, rebuilt locomotives, most explosives and blasting caps, small generators and hydro centrals, safety equipment, railcars, cables, small flotation cells, milling balls, small mills, some drill bits (including diamond), filters, hydraulic hoses, electric motors and controls, small ventilation fans, crushers, transformers, etc.

Perhaps the best way to enter the market is via the services of a good agent. Companies are cautioned to be careful in the

selection of a representative as they will be your company's daily link to the market, and the agent's ability to understand you and your company's objectives in Peru is essential. We strongly recommend face to face meetings in Lima as an essential part of market evaluation and agent selection. The Embassy can provide a list of well known and established commercial representatives.

Repeated visits to the market are also essential not only to meet clients but also to keep agents motivated. Companies interested in exporting mining equipment to Peru should be prepared to make a long term commitment to the market which will allow for several visits to Peru to become acquainted with the mining community. Although important under normal circumstances, we do not encourage Canadian companies to visit some of the mine sites due to present guerilla activities.

After sales service is a traditional weakness when doing business in this manner and miners are well aware of its disadvantages. Having seen examples of success in Peru, we are convinced that companies which can offer immediate service and spare parts sales are likely to benefit a great deal for taking the risk of maintaining a local spares inventory and of training local service personnel. This can be accomplished through an agent, although such a commitment must of course be based on a solidly informed appraisal of sales potential. Local offices and facilities have proved their worth for a wide variety of foreign suppliers of mining goods and services.

Joint-venture or licenced manufacturing can be excellent options. The capability of local manufacturers is quite sophisticated and their capabilities as partners should not be underestimated. Most are still quite limited in product range and many have been actively seeking partners to help them expand to new products. With inexpensive labor and quite good technical capability, it may also be possible to consider manufacturing all or part of your product here to supply other clients in the region and to meet foreign competition.

The essential element of doing business here is to show the clients that you are willing to work with them and not, as it is sometimes perceived, to be dictating sales terms which sometimes work to their detriment. Patience and ample good faith can be required of both sides; letter of credit costs and complications, occasional delays and hitches in import clearance and similar problems arise from time to time which often are not really the fault of anyone but "the system". Where possible, practices such as the maintenance of local inventories can be helpful.

PERUVIAN COPPER PRODUCTION, 1989 - 1990

(quantities in fine metric tons)

Source	1989	1990	Percent Change
Southern Peru			
Tintaya	232,832	194,012	-17
Centromin	41,401	40,713	-2
Minero Peru	36,058	33,761	-6
Pativilca	25,799	25,633	-1
Condestable	5,002	5,727	+14
Pacococho	3,510	3,353	-4
Sayapullo	1,558	1,625	+4
Minsur	1,417	1,495	+6
Perla	1,767	1,286	-27
Raura	1,065	1,257	+18
Catrovirreyna	2,547	1,021	-60
Huaron	913	1,005	+10
	1,373	983	-28
Others	8,909	5,835	
Total	364,151	317,706	-13

PERUVIAN ZINC PRODUCTION, 1989 - 1990

(quantities in fine metric tons)

Source	1989	1990	Percent Change
Centromin	216,982	204,169	-6
San Ignacio	80,088	65,251	-19
Perubar	63,139	57,359	-9
Milpo	28,179	37,435	+33
Santa Luisa	25,958	27,619	+6
Volcan	21,543	25,126	+17
Raura	22,607	23,936	+6
Atacocha	24,703	22,465	-9
El Brocal	15,859	20,442	+29
Norperu	15,757	15,327	-3
Chungar	14,270	14,620	+2
Santander	11,220	11,711	+4
Huaron	11,705	10,964	-6
Austria Duvaz	5,468	5,823	+6
Others	40,671	42,872	
Total	598,149	585,119	-2

PERUVIAN LEAD PRODUCTION, 1989 - 1990

(quantities in fine metric tons)

Source	1989	1990	Percent Change
Centromin	71,828	66,830	-7
Milpo	23,750	23,469	-1
Atacocha	15,185	13,252	-13
Santa Luisa	10,864	11,170	+3
El Brocal	8,449	9,835	+16
Perubar	7,411	7,708	+4
Raura	7,740	7,689	-1
Huaron	6,648	5,634	-15
Norperu	5,021	4,916	-2
Pachapaqui	1,453	3,763	+159
Chungar	2,984	3,450	+16
Arcata	1,924	3,340	+74
Buenaventura	1,953	2,906	+49
Yauli	2,258	2,552	+13
Carolina	1,204	2,402	+100
San Ignacio	3,930	1,959	-50
Others	20,491	18,062	-9
Total	193,093	188,937	-2

PERUVIAN SILVER PRODUCTION, 1989 - 1990

(quantities in equivalent fine troy ounces)

Source	1989	1990	Percent Change
Centromin	11,263,194	11,222,234	+0
Buenaventura	4,480,457	5,163,692	+15
Orcopampa	5,228,540	5,161,891	-1
Arcata	3,851,461	3,890,556	+1
Milpo	2,955,067	3,184,720	+8
Norperu	2,631,824	2,428,728	-8
Huaron	2,399,439	2,299,804	-4
Caylloma	2,323,756	2,152,779	-7
Southern Peru	2,434,708	2,018,067	+17
Carolina	1,226,324	1,975,564	+61
Raura	1,297,538	1,636,985	+26
Atacocha	1,703,376	1,505,103	-12
Santa Luisa	1,600,301	1,482,597	-7
El Brocal	1,194,077	1,367,466	+15
Castrovirreyña	831,578	1,197,839	+44
Others	14,138,060	10,585,287	
Total	59,559,700	57,273,312	-4

КРУПНАЯ ЛЕПКА ПРОИЗВОДСТВА, 1960 - 1980

(quantities in fine metric tons)

	20'228'300 1960	23'517'317 1980	Percent Change
Одесская обл.	74'138'080	10'205'381	-7
Львов	21'750	23'869	-1
Смолонская обл.	83'2385	1'161'9382	+443
Львовская обл.	1'184'8354	1'161'1400	+133
Винницкая обл.	1'608'3619	1'485'9833	-116
Черновицкая обл.	1'101'3121	1'202'3708	-134
Киевская обл.	1'591'2380	1'610'2809	+591
Смолонская обл.	1'359'8388	1'312'9284	+81
Волынская обл.	3'434'1681	5'018'9816	+112
Смолонская обл.	3'353'1283	5'125'8187	+112
Смолонская обл.	3'182'4984	5'598'8040	+246
Смолонская обл.	3'031'8944	5'476'1387	+244
Смолонская обл.	3'022'1033	1'181'3307	+89
Смолонская обл.	3'821'2408	3'820'1200	+1
Смолонская обл.	2'558'1204	2'701'807	+137
Смолонская обл.	4'480'1920	2'162'985	+120
Итого	11'563'104	11'555'334	+0
	20'401	23'869	
	1960	1980	

(quantities in metric tons) (исчислено в тоннах)

КРУПНАЯ ЛЕПКА ПРОИЗВОДСТВА, 1960 - 1980



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