

A Minerals Information Contract Report
September 1985

U.S. DEPARTMENT OF LABOR MSHA



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REPORT OF II MEETING ON THE DEFINITION AND SCOPE OF NONFUEL MINERAL PRODUCTION STATISTICS IN AMERICA

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Contract J0145048
ORGANIZATION OF AMERICAN STATES

**BUREAU OF MINES
UNITED STATES DEPARTMENT OF THE INTERIOR**



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16. Abstract (Limit 200 words) The purpose of the meeting described in this paper is to improve understanding of statistics on mineral production and processing collected and/or published by the participating countries--Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Mexico, Peru, United States, and Venezuela. This report, a summary of the deliberations of the 2d Meeting on the Definitions and Scope of Nonfuel Mineral Production Statistics in America, held September 16-21, 1984, in Buenos Aires, Argentina, consists of two major sections. The first provides data for each participating country for 12 commodities, iron ore, manganese, copper, lead, zinc, gold, silver, molybdenum, tin, tungsten, fluorspar, and phosphate rock, as provided at the conference. The second part presents the data on each commodity into one or more summary tables, each on as nearly a standard basis as is possible. Explanatory text describes differences in definitions as necessary for understanding of the tabular material.				
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FOREWORD

This report was prepared by the Department of Scientific and Technological Affairs of the Organization of American States, Washington, D. C., under USBM Contract number J0145048. It was administered under the technical directions of U. S. Bureau of Mines with Charles L. Kimbell acting as Technical Project Officer. Sharon Henderson was the contract administrator for the Bureau of Mines. This report is a summary of the work recently completed as a part of this contract during the period June 1984 to September 1985. This report was submitted by the authors in September 1985.

REPORT OF II MEETING OF THE DEFINITION
AND SCOPE OF NONFUEL MINERAL
PRODUCTION STATISTIC IN AMERICA
Buenos Aires, Argentina
September 16-21, 1984

by the
Department of Scientific and Technological Affairs
Organization of American States
Washington, D.C. 20006

Contract No. J0145048

Technical Project Officer

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U.S. BUREAU OF MINES
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September 1985

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II Meeting on the Definitions and Scope of
Nonfuel Mineral Production Statistics in America
Buenos Aires, Argentina
September 16-21, 1984

Under the auspices of the Organization of American States (OAS), the II Meeting on the Definitions and Scope of Nonfuel Mineral Production Statistics in America was held in Buenos Aires, Argentina, September 16-21, 1984 with the participation of the following:

ARGENTINA	César E. Massaccesi
	Mirta N. May de Cardini
BOLIVIA	Armando Ergueta Arana
BRAZIL	Frederico Lopes Meira Barboza
	Petaín Avila de Souza
COLOMBIA	Olga Escobar Molano
CHILE	Juan Williams
UNITED STATES	Donald S. Colby
	Charles L. Kimbell
MEXICO	Carlos Muñoz Hernandez
PERU	Alfredo Saldivar Martinelli
VENEZUELA	Nereida Brito
CANADA	John T. Brennan (Observer)
O.A.S.	Antonio Quesada Estevez

SESSIONS

Inaugural Sessions

The II Meeting began on September 16, 1984 at 10:00 a.m. in the conference room of the National Directorate of Mineral Economics, Secretariat of Mines, in the Economics Ministry.

Ing. Juan Eduardo Barrera, Mining Secretary of the Argentina Republic, presided over the opening session, emphasizing the need of the participating countries to produce mineral production statistics that are more standardized so as to facilitate comparison and analysis of data from each country with that of other countries and with that of the whole region.

Working Sessions

Following the presentation of the Mining Secretary, the Meeting agenda was approved and the working sessions were held according to schedule.

HISTORY AND OVERVIEW

The Second Organization of American States Conference on definitions and scope of nonfuel mineral production statistics had its inception in the meeting held in Washington D.C., April 19-23, 1982. At that time, representatives from Argentina, Bolivia, Brazil, Colombia, Chile, the United States, Mexico, Peru, Venezuela, and Canada (observer status) convened for exchange of general information on a variety of subjects relating to the collection, processing and ultimate publication of production statistics relating to nonfuel minerals. The results of the meeting, basically a summary of the individual country discussions and of the question and answer period that followed each presentation, were published in 1982. The discussions at the first session were conducted on a more-or-less theoretical basis, without specific references to actual statistics prepared in each country. There were certain advantages to this method at the initial session, but following that, it was felt that a shift from abstract concepts to a format involving review of actual statistical data might be advantageous in future sessions. With this thought in mind, those countries represented at the 1982 meeting were contacted and a general outline for a second meeting was proposed, in which each participant would present as much detailed information as possible relating to production of a mutually-agreed list of commodities. The concept of the meeting was approved by the participating countries, and based upon a questionnaire sent to each participant, a group of twelve commodities was selected for detailed examination.

Between the time of the first OAS meeting in Washington and the second OAS meeting in Buenos Aires, the United Nations convened a panel of experts in the field of international mineral commodity production and consumption statistics to draft a report summarizing recommendations regarding definitions and selection of appropriate measurement points for mineral and metal production and consumption. The results of this meeting, held in January 1983, were utilized to some extent in planning for the second OAS conference and in the preparation of this report.

For the second OAS conference, the format followed was for each participating country to present its statistics relating to a single commodity, with a question and answer period following each commodity presentation. Then, another commodity was taken up in a similar fashion until all twelve had been covered. This provided each participant, it is hoped, with a more clear understanding of the methodology used by others with regard to each of the selected commodities, as well as with a more precise understanding of just what each published number represents: This latter information often is not absolutely clear to the user of published statistical data working strictly from publications. These presentations and ensuing discussions provided the basis for the compilation of the separate commodity tables included in this report, which, to the best of knowledge of the compiler, represent the closest approximation to absolutely conformable data from country to country that is possible on the basis of the data arrays presented by each participating country.

Quite clearly, the data collection and processing activities of each participating country have developed independently, and as a result, there is not flawless conformity to a single standard. However, in most instances, the difficulties that might arise in preparing aggregates of these data and resulting differences in precise meaning of figures from country to country are not regarded as substantial, at least when viewed in the context of worldwide non-fuel mineral production data.

It should be stressed that comments made in this report regarding the comparability of the various national data should in no way be construed as either favorable to or critical of any national reporting program. From the discussions in Buenos Aires, as well as from careful examination of the statistics provided there and in publications of the various organizations represented, it is fully evident that no single data system and the resultant actual statistics can possibly meet all possible demands. Every participating country clearly has reasons for utilizing the system that it employs; reasons that take into account not only technical aspects such as availability of raw data and possible questions that the agency may be required to answer in the official discharge of its duties, but that also must consider administrative aspects such as the legal responsibilities of and restraints upon the agency, the ever present problem of the level of funding available for such studies, and the problems of protecting company proprietary data while at the same time providing maximum possible data to users. In view of these concepts, it appears that it is not so essential to strive for absolute conformity to a single set of goals for international reporting as it is to insure that to the extent possible, every statistical entry and/or series be clearly identified as to precisely what it represents. Armed with such knowledge, any user can make effective use of data from any of the national reporting systems discussed.

RECOMMENDATIONS

The participants in the Second OAS conference, in the course of their general and commodity-specific deliberations, generally reached agreement on a number of points that are itemized below in three groups of recommendations. The first group deal with possible future activities, the second group relate to reporting concepts that are not specific to any single commodity, and the final group relate to reporting of specific commodities.

General Recommendations Relating to Future Activities

1. Reiterating a recommendation made at the First Meeting (April 19-23, 1982, in Washington D.C.), the participants in the Buenos Aires Meeting endorsed a continued direct interchange of mineral statistics information between the responsible organizations in the participating countries.
2. The participants in the Second OAS Meeting, considering the usefulness of that session to the participants and the agencies that they represent, recommended that similar discussion sessions be organized every two years under the auspices of the Organization of American States.
3. The participants in the Second OAS Meeting recommended that a working group, consisting of Delegates of Brazil, Canada, the United States and the OAS (Frederico Lopes Meira Barboza, John T. Brennan, Charles L. Kimbell, and Antonio Quesada Estevez, respectively) conduct the basic planning for the proposed Third Meeting.
4. The participants in the Second OAS Meeting recommended that consideration be given to inviting to the proposed Third Meeting, if their commodities are being discussed, representatives of international commodity organizations involved in the compilation and publication of mineral statistics. Organizations specifically recommended for such consideration included the Tungsten Committee of UNCTAD, the International Tin Council, The International Lead and Zinc Study Group, and The Council of Copper Exporting Countries.

General Recommendations Relating to Statistical Compilations

1. Participants are urged to report using metric system units.
2. For those commodities that enter international trade in the form of ore, concentrate or some other form than pure or nearly pure metal, it is recommended that data on both gross weight and elemental content of material produced be reported.
3. When information is presented on both gross weight and content, it is recommended that the reporting reflect whether the analysis is on a wet or dry basis and that particulars be given as to the moisture content.

4. In reporting so-called "mine production", it is recommended that this be measured in terms of the first marketable stage of production, generally (although not always) a concentrate, and that in measuring this stage of production, information on metal content be given in terms of actual analytic content, rather than a computed so-called "recoverable" content basis.
5. In reporting smelter and/or refined metal production, it is recommended that all participants include not only metal produced from newly mined materials (primary production), but also that produced from scrap (secondary production). In the case of the latter, it is regarded as important to distinguish between output derived from so-called "old scrap" and "new scrap". The former is that scrap obtained by collection from consumers of metal products, as for example copper wire used for power lines or copper pipes and lead in automobile batteries. The latter is scrap originating within a manufacturing plant that is simply remelted, and is present within any metal-producing and processing facility. For comparative international studies, secondary recovery from new or recycled scrap should not be included; or, if included, the data should be clearly identified as including this material.
6. In the cases of gold and silver whenever possible, secondary recovery should include that reclaimed from photographic materials and jewelry, but such secondary production should be reported separately from production from ores and concentrates.

Commodity-Specific Recommendations

1. Iron Ore:
 - a. The most useful production figure that can be reported for purposes of international comparative studies is the sum of: 1) production of direct-shipping grade ore, and 2) production concentrates made from ores of national origin;
 - b. When production of pellets, briquets or other forms of agglomerates is accomplished from direct-shipping ores and/or concentrates that are not counted under 1.a. above, then the production of such materials should also be added to the reported total of iron ore produced;
 - c. When possible, information on production and/or sales of pellets, briquets or other agglomerates should be identified as being included, and the amount of such production should be recorded separately.

2. Manganese Ore: As with iron ore; the most useful number that can be reported for purposes of international comparative studies is the sum of: 1) production of direct-shipping grade ore, and 2) production of concentrates made from ores of national origin.
3. Copper:
 - a. The weight of copper recovered as metal from solutions produced from ores should be included as a component in the weight of copper contained in copper concentrates (first marketable stage of production, or mine production);
 - b. The problem of the proper statistical treatment of so-called "copper cement" should be studied by a special group at the next meeting;
 - c. The problem of proper statistical treatment of the production of copper chemicals directly from ores and/or concentrates, although not specifically mentioned during the meeting's deliberations, requires further study.
4. Lead and Zinc: In the next meeting, the methodology for treating statistical information relating to production of pharmaceutical, other chemical, and ceramic commodities directly from ores and/or concentrates of these metals should be examined in detail.
5. Molybdenum: Weight of the molybdenum content of molybdenum-bearing materials should be expressed in elemental weight (Mo content), or if expressed in other terms such as MoS_2 content, it should be very prominently identified as such.
6. Tin: In studies showing production of tin in the form of impure bars, data should reflect the tin content of such bars, instead of, or in addition to the gross weight of the bars.
7. Tungsten: Weight of the tungsten content of tungsten-bearing materials should be expressed in elemental weight (W content), or if expressed in terms of WO_3 content, it should be very prominently identified as such. There has been such confusion in historical literature regarding the use of the term "wolfram" (sometimes used to denote W and other times to denote WO_3) that it would be advisable to use the chemical symbol rather than this word. In contrast, use of the term "wolframite" to denote the mineral by that name, just as the use of the term "scheelite" to identify the other common tungsten mineral, is entirely acceptable. However, it should be understood that these terms should be used in connection with gross weight figures, unless it is clearly specified as "W content" of wolframite or scheelite.

8. Fluorspar: In reporting on the composition of fluorspar, it would be highly desirable that in addition to indicating the CaF_2 content, information should also be provided on the SiO_2 content, particularly for acid and ceramic grades of material.

GENERAL REMARKS-COUNTRY SECTIONS

The first ten sections of this report provide comments on mineral production and processing statistics for the ten participating countries for each of the twelve commodities selected in advance by the participants. In these sections, the data has been only slightly altered from the format in which it was presented to the conference in Buenos Aires. The alterations have consisted only of: 1) arranging the data for each country into a standard commodity sequence (iron ore, manganese, copper, lead, zinc, gold, silver, molybdenum, tin, tungsten, fluorspar (fluorite), and phosphate rock); 2) arranging the data within each commodity to insure so far as possible that the least-processed form is reported first and the most highly processed form reported last, and so that actual production data precedes shipments data when both are available; and 3) to correct a few typographical errors noted in the original compilations. All data provided by each participating country for each commodity has been included within this section, whether or not that data is utilized subsequently in the commodity oriented summaries.

DATA PROVIDED BY ARGENTINA

Official Argentine Department of Mines statistics are available for ten of the twelve commodities selected for detailed study by the conference. There is no evidence of production of molybdenum raw materials, and production of phosphatic materials in Argentina, if they continue at all, are restricted to the recovery of phosphatic slag (so-called Thomas slag or basis slag) as a byproduct of steel production. The latter material is not within the scope of operations of the participating Argentine agency. Data presented by Argentina to the conference are fully adequate to meet the suggested reporting goals of the United Nations for all commodities except manganese ore, in which case it would be preferable to have information on production of concentrate, which seems most precisely to meet the description of the first marketable stage of production. However, inasmuch as complete data are available on crude manganese ore production, the use of this data, including as it does both gross weight and manganese content figures, can serve as an adequate substitute for the concentrate data that is not publishable because it is company proprietary information. Statistics on Argentina's production of the commodities covered by the conference are provided in table 1.

DATA PRESENTED BY BOLIVIA

Of the twelve commodities selected for coverage by the conference, Bolivia reports the production of nine. Information on the production of crude ores of iron, manganese, copper, lead, zinc, tin, and tungsten are not collected, but the absence of such data in no way impairs the compilation of production statistics for these commodities in accordance with the recommendations of the United Nations. Similarly, although detailed information on production of gold and silver by its source (placer, precious metal ore, as a byproduct of nonferrous metal production etc.) are not available, this does not affect the overall comprehensive nature of the data provided. It perhaps should be noted that the production of iron and manganese concentrates from the vast Mutun deposit is thus far restricted to more-or-less test quantities of ore. Bolivian data provided to the conference is shown in table 2.

DATA PRESENTED BY BRAZIL

Brazil records the production of each of the twelve commodities covered by the conference except for molybdenum, and statistical coverage provided at the conference was complete for the remaining eleven commodities. The detailed statistics supplied are incorporated in table 3.

DATA PROVIDED BY CANADA

Canada records the production of nine of the commodities selected for detailed study; iron ore, copper, lead, zinc, gold, silver, molybdenum, tin and tungsten. Data provided directly to participants at the time of the Buenos Aires meeting has been supplemented by additional materials from published Canadian reports with the approval of the Canadian representative.

Official Canadian reporting has long been directed more toward data reporting shipments and/or sales of materials than toward actual production, but this seems to present no major problem in utilizing such figures in the compilation of regional or world totals, since for the most part, shipments and/or sales do rather closely correspond over time. Nonetheless there are some differences, as can be seen by comparing information presented on actual production and shipments of iron ore.

Regarding nonferrous metals as a group, it is noteworthy that Canada has altered its reporting to the International Lead and Zinc Study Group so as to provide mine production figures that correspond to the suggested pattern of the United Nations, while continuing traditional reporting in their own publications. While this may be outwardly confusing to the uninitiated, it represents a significant shift by a major world producer in bringing consistent data before the world from an official source, without sacrificing traditional reporting, with the attendant problem of either 1) altering the definition for figures in a long-term data series, or 2) compiling a lengthy historical data series.

Official Canadian data are presented in table 4.

DATA PRESENTED BY COLOMBIA

Colombia produces one or more forms of eight of the twelve commodities covered by the conference. Detailed production statistics shown in table 5 are those provided at the sessions.

In addition to the data provided in table 5, the following information has been provided relative to the average content of the specified commodities: iron ore --42% Fe; manganese ore --30% Mn; copper concentrate --32% Cu; lead concentrate --52% Pb; zinc concentrate --60% Zn; gold --100% Au; silver --100% Ag; and phosphate rock --20% P₂O₅. Use of these factors makes it possible to provide comparable data to that supplied for other countries in the commodity tables of the second section of this report.

There are indications that in addition to the mine production of lead for which data has been provided, Colombia also may produce refined lead, this production being derived entirely from scrap, chiefly automobile and truck batteries. For a number of years, estimates of such production have been included in a number of published compilations of world refined lead production. These estimates could not be verified prior to the preparation of this report, but the Colombian representative to the conference has suggested that these estimates, as published in the U.S. Bureau of Mines Minerals Yearbook, based primarily upon information supplied by the International Lead and Zinc Study Group, be included in this report, with the understanding that there is an ongoing investigation in Colombia to ascertain the validity and reliability of this information. Estimated output of secondary refined lead for the past six years was as follows, in metric tons: 1978--2,000; 1979--2,500; 1980--3,000; 1981--3,000; 1982--3,000; 1983--3,000.

DATA PROVIDED BY CHILE

Of the twelve commodities selected for study by conference participants, Chile produces nine -- iron ore, manganese ore, copper, lead, zinc, gold, silver, molybdenum, and phosphate materials. Chilean crude iron ore production data were not provided, but inasmuch as no direct shipping ore is produced, the information on concentrates provided fully meets the United Nation's proposed reporting pattern. Reporting on manganese ore, which is evidently produced as a direct-shipping product, meets the United Nation's suggested standard. The data provided for copper, which represents the non-duplicative total of the various marketable stages of production (ranging from direct-smelting ores through concentrates and other intermediate products to refined copper), although not fully comparable to United Nations' recommended measurement point for mine production (which would be copper content of direct-smelting ores plus copper content of concentrates), presumably fairly closely approximates that recommended measurement point. Moreover, the data clearly includes copper recoverable as a byproduct from other mining operations.

The accounting of lead and zinc is fully adequate to provide data corresponding to the United Nations' suggested measurement points, and the data provided for gold and silver is more than sufficient and clearly shows the comprehensive nature of the coverage. Information on molybdenum and phosphate rock are adequate.

The bulk of the data provided by Chile has been included in table 6; some additional details relating to copper, gold and silver that represents specific figures for some but not all sectors of these industries have been included in a supplemental table, table 7.

DATA PROVIDED BY THE UNITED STATES

The United States records at least some production of each of the twelve commodities selected for detailed study at the conference. For most of the commodities published data might be best described as more than adequate to meet or closely approximate the United Nations' suggested reporting standards.

They place some emphasis on "more than adequate", because to the untrained user, some of the more elaborate published data presentations tend to be confusing and outwardly contradictory. A serious effort is underway to simplify these without producing a loss in information.

It is notable that as in the case of Canada, the United States has started supplying the International Lead and Zinc Study Group with mine production figures for lead and zinc that conform to the United Nations'

recommended standards for such reporting. However, as yet, this information is not available for all the years covered in the accompanying table, and publishable details, beyond the national total, have not yet been approved for release. Thus, in order to provide maximum detail as well as a consistent series, the traditionally published data set has been extended through 1983 for use in this report. Conversion of other commodities to this format is still under consideration and probably will remain so until the alteration of lead and zinc data is completed and means are established to rectify any problems that may result.

United States published reporting on two commodities is less than might be desired ideally because of the long-standing policy of avoiding disclosure of individual company proprietary data. Lacking any significant authority for mandatory reporting, it is essential for the U.S. Bureau of Mines to avoid disclosure of such data since to publish it would presumably result in the affected company terminating its reporting to the Bureau. This condition affects the reporting on tin and fluorspar, as noted in the appropriate section of the U.S. data table (table 8).

DATA PROVIDED BY MEXICO

Mexico produces each of the twelve commodities selected for detailed study by the conference participants. The national reporting system employed by Mexico for the ten metals included for study provides information on the metallic content of each marketable stage of production, insuring no duplication between successive stages. Thus for copper, lead, zinc, gold, silver, molybdenum, tin and tungsten, the resulting national figures representing total mine output differ somewhat from the United Nations' recommended measurement points, but for the most part the resultant differences are modest in magnitude. For iron and manganese ores, for which the United Nations suggested measurement of both the gross weight and the metal content, the Mexican data collection system provides only the figures on content. While estimates of gross weight may be made from unofficial data available, the diverse nature of the marketable products (direct-shipping ore, concentrates and pellets in the case of iron ore, and direct shipping ore and concentrates in the case of manganese ore) make such estimates only of broad general value, and it would be hoped that in the future, the collection of data for these commodities, which are essentially marketed on the basis of their gross weight (and content too, to be sure), will be expanded to provide gross weight data as a supplement.

In the case of tin, it is difficult to ascertain just what the precise level of national mine production is, because of the smelting of imported materials. This could present a problem in the case of other

metals should Mexico import significant quantities of concentrates or other source materials for smelter and/or refinery production.

For the two nonmetals covered, fluorspar and phosphate rock, data provided was fully adequate to meet the United Nations' recommended standards.

The full array of information provided to conference participants by Mexico appears in table 9.

DATA PROVIDED BY PERU

Peru produces ten of the twelve commodities selected for detailed study by the conference participants, having no record of production only for the two nonmetals, fluorspar and phosphate rock. The array of data provided to the conference was wholly adequate to precisely match or closely approximate the suggested reporting format of the United Nations' conference in all cases except manganese, where the absence of data on the gross weight of production left an unimportant gap. This is noted as unimportant owing to the small scale of production as well as to the fact that output is reported for only two years. The total array of data presented by Peru, slightly rearranged in format, is presented in table 10.

DATA PROVIDED BY VENEZUELA

Venezuela officially reports production of only three of the twelve commodities covered in conference deliberations, iron ore, gold and phosphate rock. Data on these commodities is wholly adequate to meet the reporting targets suggested by the United Nations. Additionally, it is believed that the country produces secondary lead, chiefly from scrap batteries and other such domestic secondary raw materials.

Production of such material is not normally within the scope of coverage of the Ministry of Energy and Mines, and thus official data are not available, but in lieu of such official information, it was suggested that the estimates of such output made by the International Lead and Zinc Study Group be included in the summary tables, and this has been done with appropriate citation of the source of the figures.

Official Venezuelan statistics provided to the conference appear in table 11.

GENERAL REMARKS - COMMODITY SECTIONS

The twelve sections that follow summarize the production of each of the selected commodities by all conference participants, each section dealing with one or more stages of processing of the subject commodity. In these sections, an attempt has been made to select from the data presented by each participant for each commodity, those figures that come nearest to representing the measurement points suggested by the United Nations based on the recommendations of their panel of experts convened in January 1983. (It might be noted that four of the participants in the Organization of American States Conferences also participated in the United Nations' panel: Antonio Quesada Estevez, Frederico Lopes Meira Barboza, John T. Brennan, and Charles L. Kimbell).

Because of differences in format in the official reporting of the OAS conference participating countries, it has not been possible in case of each measured stage of processing for each commodity to achieve absolute conformity across the spectrum of countries in these summary tables. Differences in definitions, however have been noted, either in footnotes to the table or in the accompanying text, or in both these places. It is believed that in most, if not all instances, differences in definitions between the various countries are so modest that they do not impair the use of these data for inter-country comparisons. There are very few instances where a total absence of data of a certain type for a specific country creates a problem for inter-country comparisons, and these have been noted. Hopefully when each country finds it possible to expand their collection of mineral production statistics, these omissions will be considered.

IRON ORE

A review of data presented on iron ore production and processing by the participating countries, together with the United Nations' recommendations suggests that the single most useful compilation of iron ore production would be one that would aggregate, without duplication, the sum of production of 1) direct shipping grade iron ore, 2) iron ore concentrate, and 3) pellets or other agglomerated ores; including under 2 and 3 only those materials produced from ores originating within the reporting country. This aggregate is selected as the single most useful data series not only because it conforms to the United Nations' suggestion that production be measured at the first marketable stage of production, but also because this is the data series that can be used most effectively with foreign trade and consumption statistics in assessing any country's supply-demand situation.

Because of the variability in iron content between the three categories just mentioned, as well as between any of these categories between countries, it appears in order that measurement of the weight of iron contained is desirable. Also however, because of the large quantity of material involved on a gross weight basis, and because international trade and consumption statistics for most countries are expressed in terms of the gross weight of ore, it seems that ideally, the corresponding gross weight figures should also be made available. Thus, the first table in this section (table 12) comprises two sections, the first providing data on gross weight of marketable ore as defined above, the second providing data on the iron content of the same material. In this table, each of the components of so-called marketable production (i.e. direct shipping ore, concentrate, and pellets) have been itemized just as they appear in the foregoing country sections wherever possible, and they have then been totaled to provide inter-country comparable totals.

Considering first the portion of table 12 providing gross weight statistics, the one significant data gap is that for Mexico, which does not routinely collect production data on a gross weight basis. A series of estimated figures for the Mexican total of gross weight has been included, the estimates being based on the assumption that the average grade of marketable iron ore for Mexico is about 66 percent Fe. This, however, is only a very general approximation, establishing the general order of magnitude of the gross weight of Mexican production of marketable material, and it would not be too surprising if actual results fell with ± 10 percent of these figures.

Considering next the portion of table 12 providing iron content statistics, the only significant data gap is that of detail by each of the three component parts of the total for the United States.

In both sections of the table, data presented by Bolivia and reported as production of concentrate are identical to those for sales of concentrate for each year, and as such are subject to question. However inasmuch as the material in question represents essentially only test production from the vast Mutun deposit, it is possible that production and sales are equal, there being no accumulation of or withdrawals from stocks. In any event, the magnitude of the numbers is so modest that a small difference would be unimportant in terms of hemispheric or world totals.

It should be noted that in the case of Brazil, marketable production has been calculated as the sum of sales of direct-shipping ore and output of concentrates, rather than the sum of 1) output direct-shipping ore, 2) output of concentrates not agglomerated and 3) output of agglomerates because no figures are available regarding actual production of direct-shipping ore, nor regarding the distribution of concentrates

between those sold directly and those subsequently agglomerated. This presents only a relatively minor problem because of the rather modest difference between concentrate used for agglomerate production and the agglomerate produced, at least insofar as their iron content is concerned.

In the case of Argentina, sales of direct-shipping ore and of concentrate have been added to production of agglomerate but this use of sales data rather than actual production is not regarded as a significant departure from the United Nations' proposed standard.

A second table dealing with iron ore production has been included in this report, this (table 13) summarizing data presented at the conference on the gross weight of crude iron ore actually mined. Two participants (Chile and Mexico) do not collect this data as a part of normal mineral production data collection. Comparison of the entries for each country in tables 12 and 13 clearly shows the vast differences between crude production and marketable production for countries such as Argentina, Canada, the United States and Peru, in sharp contrast with the modest differences between crude output and marketed output for Brazil and Venezuela. This focuses attention on the need for the use of marketable ore production figures when making international comparisons. For example, in 1983, although U.S. crude iron ore production was only 2.8 percent higher than that of Brazil, Brazilian marketable production was 138 percent greater than that of the United States.

Subsequent to the conference in Buenos Aires, one point was raised in discussions within the U.S. Bureau of Mines relating to the U.S. data presented at the meeting, a point which may suggest the need for additional future study of iron ore data for all countries. It was pointed out that the figures presented for production of direct-shipping ore for the United States included a small, but significant share of the total that was not directed to the iron and steel industry as a raw material for steelmaking, but rather was destined for the cement industry, essentially as a fluxing agent. The question raised is whether or not such production should be regarded as iron ore production in the strictest sense (although the presence of iron is essential for the cement industry process), since such material does not contribute to the availability of iron to world metal supplies.

MANGANESE

As in the case of iron ore, review of data presented at the conference and reference to the United Nations' suggestions regarding reporting indicates that the single most useful data series on manganese ore would be one that accounted both gross weight and manganese content of the non-duplicative sum of direct shipping ore and concentrates. The compilation of such data from the materials provided at the conference

presents no problems except in the case of the United States, which, being deficient in standard manganese ores, produces ferruginous manganese ore and manganiferous iron ore (materials having low manganese content that are thus not strictly equatable to the output of other participating countries) and Mexico and Peru, who do not collect figures on gross weight of the material produced. Apart from the physical difference between material produced in the United States and that produced elsewhere, the U.S. figures differ in that they represent shipments, not actual production, but this is true for each year's figures, and thus over time, differences should be inconsequential. Moreover, the U.S. output is so low in terms of world total that differences between production and shipments would be inconsequential.

The data gaps in gross weight for Mexico and Peru have been filled by estimates, made on the basis that marketable Mexican output grades 36 percent manganese while that of Peru contains 30 percent manganese. Inasmuch as these content figures are in themselves only approximations, the estimates based upon them must be regarded as reflecting only a general order of magnitude, subject to changes of ± 10 percent or more.

The use of shipments data rather than actual production for direct shipping ore for several countries is necessary because of the lack of data on actual production of such ores, but this substitution is not regarded as a serious problem.

As with iron ore, a summary table on the gross weight of crude manganese ore mined has also been provided (table 15), but as the reader can see, the amount of available information, even in terms of gross weight alone, is not so great as for iron ore. Nonetheless, for those countries for which both data sets are available, it is evident that there is a substantial difference for some countries between marketable and crude production.

COPPER

Nine of the conference participants mine copper, six of these process mined copper into refined metal, and a seventh produces refined copper wholly from scrap. This production has been summarized in three tables: table 16 showing mine production in terms of the copper content of the first marketable product or the nearest equivalent thereto; table 17 showing what has been termed "smelter" production; and table 18 showing refined output. The portrayal of metal at two stages of processing departs somewhat from the recommendations of the United Nations' conference, but the reason for this is explained subsequently; as is the precise definition of what has been included in the "smelter production" table.

Regarding the mine output table, it should be noted that data for five of the nine countries shown differs in some respect from the convention of measuring output in terms of the content of concentrates. In the case of Argentina, this departure is explained simply by the fact that ores mined are sold directly and thus no concentrate figure is available. For Canada, no series is available reflecting analytical content of total concentrate production; the data presented are those traditionally published in Canadian sources, and in effect correspond to recoverable production, although for any single year, the actual content of concentrate produced for domestic production of blister (and anode) copper may not equal the quantity of such copper actually recovered. Similarly, the figures for Chile and Mexico differ from results that would be obtained if content of concentrates (and ores leached) were counted, but again these data are the results traditionally published by the respective countries, and as such seem appropriate for inclusion here. For the United States, the data entered does represent a summation of content of first marketable stage of output by each producer, but rather than being analytic contents; they are expressed as recoverable contents, with suitable reductions applied for smelting/refining losses. Although the U.S. Bureau of Mines is now considering revising the series to an analytic content basis, this has not, as yet, been done, and the data presented here, therefore, represent the traditional data series for the United States, one which also departs from the United Nations' recommendation.

Concerning the two metals tables (17 and 18), it should first be made clear that the table captioned "smelter" production does not simply show the quantity of blister copper produced. Rather it represents, as best it can be calculated, the amount of impure copper, equivalent to blister and anode copper, that is produced in each country, including amounts used to produce refined copper in that country or elsewhere. This table then contains quantities that represent the amount of material that is either refined (thermally or electrolytically) in the producing country, or that is ultimately exported for such processing. It was decided to summarize this data, in addition to providing figures on refined production, because a significant amount of copper is processed to the stage of an impure metal and shipped elsewhere for refining, with a significant expenditure of energy in so processing the crude mineral forms, and with a substantial reduction in the volume of product shipped (comparing impure metal to concentrates). It should be noted however, that mattes are not regarded as a smelter product, despite the fact that they have been thermally treated, and thus they are not included here.

Examining specific entries, it should be noted, in addition to the comments in the table's footnotes, that for Brazil, the primary refined copper figure has been used as an approximation of "smelter" production

because actual figures are not available, but losses in the refining of impure copper are generally considered to be not so large as to require the use of an adjusting factor.

For the refined copper table (table 18), again there is little comment required, except to note that because of the increasingly important role of secondary materials in overall world supply of copper, it is hoped that in future years, some distribution of total refined production between primary and secondary source materials would be provided by Canada and Mexico. It also perhaps should be noted that the estimate for Argentina's secondary output as originally provided, was stated as varying between 13,000 and 15,000 tons annually, but those figures were not related to specific years; the average (14,000 tons) was thus included for each year.

LEAD

As in the case of copper, three tables have been prepared to summarize lead production for the participating countries: table 19, which provides mine output data for the nine countries producing lead from mines, this measured in terms of the lead content of the first marketable stage of production; table 20, which summarizes smelter production; and table 21, which gives refined lead production. As with copper, two stages of metal production have been shown rather than one because of the production of modest but nonetheless significant amounts of impure metal for export sale as such.

Regarding table 19, it should be noted that both Argentina and Brazil record the production of ores that are sold directly, and in the case of these countries, to report only the lead content of concentrates produced would be to omit a small part of total output. Further, as in the case of copper, the data presented for the United States represents the recoverable content of concentrates rather than the analytical content of concentrates, and thus the actual quantity would be slightly higher (by the amount of smelter/refinery losses) if the United States was reported on the basis recommended by the United Nations. Again, as with copper, the United States is contemplating converting to the United Nations' recommended series, but to provide consistency, the traditional series is included here. Canadian data presented for lead, unlike that for copper, does represent the analytic content of concentrates, and as such differs from the series which they normally issue in their own publications. The Mexican data series represents an intermediate point between the United Nations' suggested measurement point and that used for the United States, in that in part it represents analytic content of concentrate, but for the balance (that share of the total based on smelter and refinery output), it represents recoverable material.

Considering tables 20 and 21, it is first important to point out that for most of the producers represented, the entries in the smelter lead table (table 20) are in reality the same numbers that appear in the refined lead table (table 21). This indicates one of two possibilities with regard to primary lead: 1) all lead recovered as impure metal from ores within the country is also refined there, or 2) there is a degree of incompleteness in reporting. There should be a difference between these figures (smelter lead and refined lead) if a country either: 1) exports impure lead (such as bullion) for refining elsewhere, or 2) imports impure lead for refining. With regard to secondary lead, if the two figures are equal, it indicates that all scrap is sufficiently impure as to make it advisable to both resmelt as well as to re-refine the scrap. If refined secondary lead exceeds smelter secondary lead consistently, then it suggests that either: 1) not all domestic scrap is resmelted prior to refining, or 2) scrap lead is imported and simply refined; or 3) some combination of the first two alternatives is in effect. Thus far in our experience, the reverse situation (i.e. that secondary smelter output significantly exceeds secondary refined output) has not been encountered, but if it were, it would suggest that a country is producing lead from scrap in an impure form for export.

Another comment seems in order, indicating a situation that will require further investigation. In the case of Mexico, figures provided for refined lead have tentatively been captioned "Probably primary only", based solely upon the fact that there is no evidence of the inclusion of secondary lead. On this basis, the International Lead and Zinc Study Group supplements the figures shown in this table with an additional estimated quantity for secondary output. This should be thoroughly investigated, and if necessary, an addition should be made for such secondary output.

Finally, it should be noted that figures presented in table 21 for refined lead include International Lead and Zinc Study Group estimates for secondary production in Colombia and Venezuela, because official figures are not available. This is apparently because the mining agencies of those countries do not have responsibility for collection of data on secondary metal production. It was recommended that these estimates be included so as to provide an indication of at least the apparent order of magnitude of such production.

ZINC

The summarization of zinc production is somewhat simpler than that of lead, in that generally speaking, the preparation of impure zinc metal for export is for less significant, thus no "extra" metal table has been

prepared. Further, the recovery of secondary zinc is much lower in proportion to total metal production figures than it is the cases of copper and lead. Comments on mine zinc production shown in table 22, measured in terms of the zinc content of the first marketable stage of production, are identical, from country to country, with those just made above under lead and those indicated in the footnotes. Similarly, the zinc metal production statistics table (table 23) seemingly requires no explanations beyond those given in the table's footnotes.

GOLD

The foremost problem with gold statistics is the problem that is inherent with any material of so high a unit value; that is, the problem of illicit production, and this is a problem for every country producing the metal, particularly in recent years with the very high prices that have prevailed. This, however, is apparently an insoluble problem that has existed so long as gold has been mined and will continue to exist so long as there is a human desire to possess it. Regardless of the problem however, and for the same reason as there is a problem (gold's high value), there is a demand for statistics on the commodity, and thus we include in table 24 a summary of gold production for the 10 countries participating in the conference, but no effort has been made, in general, to estimate illicit production.

Again, because of gold's high unit price, extensive efforts are made to maximize byproduct recovery, but for ores and concentrates of other metals (most notably, those of copper), information on analytical gold content is neither nearly so significant nor available as is information on the actual recoverable gold content from such materials. In table 24, the data presented for each country thus may not precisely conform to the United Nations' suggested reporting of "metal content of the first marketable product" but it apparently more nearly represents the amount of recoverable gold legally mined in each country. It was decided that rather than simply presenting a total for each country, it would be advisable to indicate a distribution of output by origin as reflected in national statistics. No attempt has been made here to compile data on the actual recovery of metallic gold within each country; for some countries, gold metal production may substantially exceed mine output because of recovery of primary gold from imported materials and of secondary gold from domestic and imported scrap.

SILVER

The comments made under "Gold" above with regard to illicit production, apply on a less-significant scale also to silver. Further, comments under "Gold" relating to byproduct recovery are perhaps even more important for silver than for gold, such recovery representing an even larger share of total output in many countries than is the case for gold. Nine of the conference participants record silver production, and this has been summarized in table 25, which, as with table 24 on gold, provides details for each country as to the origin of production. Again as in the case of gold, it appears that the table is more representative of recoverable silver output than of the analytic silver content of the first marketable stage of production, but this departure from the U.N. recommendation does not seem to be readily correctable, nor is there a clear indication of a need to correct it.

MOLYBDENUM

The availability of information on molybdenum is much less than in the case of most other commodities covered in the conference, but this could be anticipated, considering that the commodity in nature occurs often as a byproduct, rather than as the principal metal being sought in mining ventures. Particularly for this byproduct recovery, the relationship of gross weight of ores produced or processed is of significance only to individual mining/concentrating operations, and not in terms of national aggregates. As noted in table 26, which summarizes molybdenum production, the basis selected for inter-country comparison is that of the elemental molybdenum content of concentrates produced; figures presented for Canada and Mexico differ slightly in definition, but the definitional differences are not regarded as being likely to introduce any significant problem insofar as inter-country comparisons are concerned.

TIN

In the case of tin, in an effort to follow the recommendations of the United Nations, two tables have been prepared, the first (table 27) giving information on mine production, the second (table 28) giving data on smelter production of this important metal.

Table 27 on mine production however, comprises two sections, the first summarizing national figures on the tin content of ore actually mined (an item not recommended for collection by the United Nations' panel), and the second showing tin content of the first marketable stage

of production, that is, concentrates. This has been done despite the absence of data on crude ore for three countries (Bolivia, Canada and Mexico) and despite the fact that for the United States, the figure is only an order of magnitude estimate, because of the substantial differences in the figures provided.

In the cases of Argentina and Peru, very significant reductions are noted in content between the crude mine product stage and the concentrate stage; for the six year period shown in the table, Argentine-produced concentrates contained only about 54 percent of the tin mined, while Peruvian-produced concentrates contained only 67 percent of the tin mined. This is noted not to suggest undue losses in concentration, but rather to point out that reserves are depleted to the extent of the content of ore mined, and not to the extent of the content of the concentrate only. Thus, data on content of ore mined are an important element in the overall statistical study of a commodity. To be sure, materials not recovered by concentrators still exist in tailings at or near concentrators, and may some day be economically recoverable, but they are not immediately available to meet demand for the metal. Thus, just as content of concentrate figures may not be successfully used in calculating reserves remaining, content of crude ore figures may not be successfully used in computing additions to world supplies of tin, again demonstrating the need for compilation of data at multiple stages of processing. In this regard, the data provided by Brazil offers an interesting contrast to that provided by Argentina and Peru and raises a question regarding its interpretation. The reported tin content of concentrates produced during 1978-83 exceeds by 5 percent the content of ores mined. It is possible, of course that this is the result of the processing of ores mined prior to the six-year period covered, but if this is not the case, it suggests that there is a problem with the data being reported to the Brazilian Government, since there must be some loss in concentration.

Aside from these problems, figures provided by the United States and by Mexico also present difficulties. The United States' problem cannot be readily resolved, for it stems from the inability of the U.S. Bureau of Mines to publish mine output figures, since to do so would involve the disclosure of company proprietary information. This problem is not significant on a world basis at the present because the U.S. output is so small, but it could present a problem if production was to increase significantly (although this seems unlikely). Similarly, with the Mexican data, the modest level of production has little impact upon total world supplies, and thus can be regarded as unimportant so long as production does not increase. In the case of Mexico, the figures presented represent the tin content of impure bars produced, apparently from raw materials of domestic origin, but as such, the figure would be smaller than actual content of concentrate produced by that amount of material lost in the smelting process.

With regard to the smelter production data in table 28, there appears to be no need for comment except to note that tin metal production reported by Argentina that was recovered outside of Argentina from concentrates of Argentine origin is not included here, because international convention dictates that such material should be credited to the country that actually smelts the concentrate, even though the smelting operation is conducted on a toll basis, with the resultant metal being returned to its place of origin. It also might be noted that with the high unit value of tin, it might be worthy of investigating whether there may be any unreported secondary tin production in Brazil, Mexico, or other nations not recording any output (Canada, Colombia, Chile and Venezuela).

TUNGSTEN

Data presented on tungsten by the seven conference participants that produce this commodity was adequate for the purpose of compiling table 29, which represents mine production in terms of the elemental tungsten content of the first marketable stage product; that is of tungsten concentrate. It should be borne in mind that small scale producers of tungsten minerals often market a material that they term "ore", but such "ores" are the result of hand-picking of material that has been selectively mined, and as such represent a form of concentrate. In keeping with the recommendations of the U.N. conference on statistics, as well as the policy of The Tungsten Committee of UNCTAD, as expressed in its quarterly statistical volume on tungsten statistics, data in this table on metal content has been altered, where necessary, from figures reported in terms of tungsten trioxide (W03) content to elemental tungsten (W). The United Nations' recommendations for tungsten production statistics suggest compilation only of figures on tungsten content, but it seems noteworthy that since trade in tungsten is almost universally reported in terms of the gross weight of concentrates, it is essential to know the gross weight of marketable concentrates as well as their content in order to engage in really accurate studies of worldwide material flow, for it seems highly unlikely that publications showing trade data will alter their reporting pattern from the gross weight basis to the content basis. However, no table of gross weight figures has been included herein because such information is not available for all participants. The reader is referred to the original country-by-country tables for this information.

FLUORSPAR (FLUORITE)

Because fluorspar's applications are chiefly in the metallurgical and chemical industries, information relating to the CaF_2 content of production is equally important with data on the gross weight of material, unlike some other nonmetallic minerals for which chemical composition is not critical. For this reason, the tabular portrayal summarizing fluorspar production from the four conference-participant countries that presently extract this commodity provides both gross weight and CaF_2 content statistics for the first marketable stage of production. Moreover, this table (table 30) also provides as much detail as possible for each country on output by the traditional descriptive classification system that separates the material according to likely end-use: acid grade, ceramic grade, metallurgical grade and submetallurgical grade. It should be noted, however, that some degree of interchangeability with regard to use exists, particularly in instances where lower grade products are subjected to further processing. It should further be noted that regrettably, actual U.S. production is not available for publication, but shipments, which are believed to correspond rather closely, are included in lieu of actual production data. Finally, although the direct-shipping ore produced in Brazil is not officially so captioned, it appears that it corresponds to metallurgical or submetallurgical grades of concentrates.

PHOSPHATE RAW MATERIALS

The dominant world source of phosphate is sedimentary phosphate rock, followed by igneous phosphates (often reported as apatite). Other relatively minor sources of economic phosphates are slags derived from smelting phosphatic iron ores (Thomas slag or basis slag), and guano. A portion of the production of these materials is directly marketed without further treatment than simple crushing and/or grinding, but the great bulk of crude output in major phosphate-producing countries is beneficiated prior to sale. Thus to arrive at numbers that represent output at the first marketable stage of production, it is necessary to total production of: 1) direct-shipping crude ore, and 2) beneficiated ore or concentrate. Brazil and the United States report production of both crude rock sold directly and beneficiated ore; Mexico reports production of two grades of marketable product, one for use by the fertilizer and chemical industry that contains 31-33% P_2O_5 and a second used as an animal feed supplement that ranges between 18-22% P_2O_5 with not over 0.5% fluorine; Colombia, Chile and Venezuela report production of crude ore that is marketed without further treatment, and Chile additionally reports a marketed production of guano. In order to complete the table for the output of phosphate raw materials, figures have been entered for the reported production of Thomas slag in Argentina, although this commodity,

as a byproduct of steelmaking, is not within the scope of responsibility of the National Directorate of Mineral Economics, thus the figures entered for this material should not be regarded as official data of that organization.

Table 31 presents generally comparable data on production of marketable phosphate raw materials by conference participants, with data presented both in terms of gross weight and P_2O_5 content; it should be noted that the latter figures for Colombia and Venezuela have been derived by applying reported average grades of 20% P_2O_5 and 22% P_2O_5 respectively to the reported gross weight figures, while those for the two lines of Mexican data have been calculated using the averages of the reported ranges of grade: 32% P_2O_5 for that output to be used by the fertilizer and chemical industry, and 20% P_2O_5 for that output used as an animal feed supplement.

STATISTICAL TABLES

(It should be noted that although all figures presented in the following tables carry two figures to the right of the decimal, these should not be understood to imply accuracy to two decimal places in the case of data relating of weight)

TABLE I. ARGENTINA: Production of selected mineral commodities
(metric tons unless otherwise specified)

	1978	1979	1980	1981	1982	1983
<u>IRON ORE:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore mined:</u>						
Gross weight	1,055,224.00	768,252.00	1,294,367.00	983,146.00	778,260.00	889,004.00
<u>Iron content:</u>						
Percent Fe	% 49.60	47.26	51.23	51.70	51.96	49.31
Weight of Fe	523,340.00	363,078.00	663,062.00	508,301.00	404,412.00	438,405.00
<u>Crude ore sold directly:</u>						
Gross weight	4,541.00	3,519.00	3,065.00	3,839.00	3,252.00	3,021.00
<u>Iron content:</u>						
Percent Fe	% 66.70	70.09	66.57	63.36	70.00	70.00
Weight of Fe	<u>1/</u> 3,052.00	<u>1/</u> 2,466.00	<u>1/</u> 2,040.00	<u>1/</u> 2,433.00	<u>1/</u> 2,346.00	2,115.00
<u>Crude ore concentrated:</u>						
Gross weight	261,319.00	1,147,943.00	974,161.00	837,014.00	1,212,118.00	1,296,660.00
<u>Iron content:</u>						
Percent Fe.	% 32.96	49.77	49.95	51.12	52.94	51.00
Weight of Fe.	86,139.00	571,378.00	486,582.00	427,892.00	641,657.00	661,341.00
<u>PRODUCTION OF CONCENTRATE:</u>						
<u>Concentrate produced:</u>						
Gross weight	115,134.00	433,198.00	418,390.00	395,743.00	583,460.00	605,436.00
<u>Iron content:</u>						
Percent Fe.	% 47.87	63.42	63.22	60.31	60.60	64.07
Weight of Fe.	<u>1/</u> 50,514.00	274,745.00	264,514.00	<u>1/</u> 245,054.00	388,582.00	387,900.00
<u>Concentrate sold:</u>						
Gross weight	115,134.00	85,784.00	80,871.00	102,926.00	64,006.00	117,334.00
<u>Iron content:</u>						
Percent Fe	% 47.86	42.27	42.03	41.94	48.74	45.60
Weight of Fe	<u>1/</u> 50,514.00	36,265.00	33,989.00	43,176.00	31,198.00	53,507.00
<u>PRODUCTION OF AGGLOMERATE:</u>						
<u>Agglomerate produced:</u>						
Gross weight	--	300,000.00	365,374.00	373,662.00	616,173.00	546,152.00

		1978	1979	1980	1981	1982	1983
<u>IRON ORE:</u>							
Iron content:							
Percent Fe.	%	--	68.00	68.00	68.00	68.00	68.00
Weight of Fe.		--	204,400.00	248,454.00	254,090.00	418,998.00	371,383.00
<u>Agglomerate sold:</u>							
Gross weight		--	80,000.00	133,683.00	298,667.00	656,490.00	603,474.00
Iron content:							
Percent Fe.	%	--	68.00	68.00	68.00	68.00	68.00
Weight of Fe.		--	54,400.00	90,904.00	203,094.00	446,413.00	410,362.00
<u>MANGANESE ORE:</u>							
<u>MINE PRODUCTION:</u>							
<u>Crude ore mined:</u>							
Gross weight		30,756.00	38,982.00	49,557.00	57,238.00	79,826.00	96,484.00
Manganese content:							
Percent Mn.	%	16.66	16.26	12.55	10.85	9.17	7.61
Weight of Mn.		5,124.00	6,338.00	6,220.00	6,209.00	7,319.00	7,343.00
<u>Crude ore sold directly:</u>							
Gross weight		10,625.00	7,159.00	5,840.00	1,136.00	3,700.00	4,084.00
Manganese content:							
Percent Mn.	%	24.71	29.95	26.78	18.74	20.29	18.99
Weight of Mn.	<u>1/</u>	2,442.00	2,144.00	1,564.00	213.00	749.00	775.00
<u>Crude Ore concentrated:</u>							
Gross weight and Mn content		--	W	W	--	--	--
Concentrate produced:							
Gross weight and Mn content		--	W	W	--	--	--
<u>COPPER:</u>							
<u>MINE PRODUCTION:</u>							
<u>Crude Ore mined:</u>							
Gross weight		6,665.00	3,665.00	2,180.00	914.00	2,570.00	2,776.00
Copper content:							
Percent Cu.	%	4.05	2.42	8.34	8.39	1.69	1.48
Weight of Cu.	<u>1/</u>	319.00	89.00	182.00	<u>1/</u> 80.00	<u>1/</u> 43.00	41.00

	1978	1979	1980	1981	1982	1983
<u>Crude ore sold directly:</u>						
Gross weight	6,131.00	3,565.00	1,265.00	614.00	336.00	2,398.00
Copper content:						
Percent Cu. %	4.81	2.40	3.24	3.26	9.88	1.52
Weight of Cu.	<u>1/</u> 294.00	86.00	41.00	20.00	<u>1/</u> 33.00	<u>1/</u> 37.00
<u>LEAD:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore mined:</u>						
Gross weight	635,850.00	735,362.00	666,000.00	679,313.00	708,330.00	720,625.00
Lead content:						
Percent Pb. %	6.23	5.67	5.70	5.66	5.34	5.13
Weight of Pb.	39,636.00	<u>1/</u> 41,205.00	37,942.00	38,476.00	<u>1/</u> 37,718.00	36,985.00
<u>Crude ore sold directly:</u>						
Gross weight	1,340.00	5,074.00	6,802.00	9,797.00	4,620.00	10.00
Lead content:						
Percent Pb. %	16.74	3.13	2.01	2.50	1.70	68.00
Weight of Pb.	<u>1/</u> 224.00	<u>1/</u> 160.00	137.00	244.00	78.00	7.00
<u>Crude ore concentrated:</u>						
Gross weight	629,408.00	729,788.00	658,506.00	670,088.00	697,897.00	720,010.00
Lead content:						
Percent Pb. %	5.96	5.69	5.74	5.71	5.37	5.13
Weight of Pb.	37,507.00	41,523.00	37,790.00	38,240.00	37,459.00	36,957.00
<u>PRODUCTION OF CONCENTRATE:</u>						
<u>Concentrate produced:</u>						
Gross weight:	39,694.00	43,124.00	43,581.00	43,571.00	45,125.00	43,249.00
Lead content:						
Percent Pb. %	75.62	73.32	74.60	74.29	72.50	73.24
Weight of Pb.	<u>1/</u> 30,027.00	31,619.00	<u>1/</u> 32,469.00	32,367.00	<u>1/</u> 32,698.00	31,677.00

	1978	1979	1980	1981	1982	1983
<u>Concentrate sold:</u>						
Gross weight	39,079.00	38,660.00	38,544.00	33,748.00	39,142.00	39,571.00
Lead content:						
Percent Pb.	% 74.63	72.94	74.53	73.52	72.69	73.09
Weight of Pb.	29,164.00	28,198.00	28,727.00	<u>1/</u> 24,807.00	28,454.00	28,922.00
<u>Concentrate smelted:</u>						
Gross weight	NA	NA	NA	NA	NA	NA
Lead content:						
Percent Pb.	% NA	NA	NA	NA	NA	NA
Weight of Pb.	32,865.00	30,135.00	24,300.00	19,980.00	16,739.00	16,034.00
=====						
SMELTER PRODUCTION (refinery output):						
From primary materials	31,300.00	28,700.00	23,200.00	19,029.00	15,942.00	15,270.00
From secondary materials	24,000.00	24,500.00	18,500.00	15,600.00	14,617.00	16,070.00
TOTAL	55,300.00	53,200.00	41,700.00	34,629.00	30,559.00	31,340.00
<u>ZINC:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore mined:</u>						
Gross weight	632,618.00	728,865.00	661,798.00	669,916.00	687,519.00	703,605.00
Zinc content:						
Percent Zn.	% 6.72	6.31	5.71	6.15	6.07	6.02
Weight of Zn.	<u>1/</u> 42,691.00	<u>1/</u> 45,612.00	37,820.00	41,229.00	41,708.00	42,381.00
<u>Crude ore sold directly:</u>						
Gross weight	20.00	57.00	6,800.00	8,400.00	4,420.00	--
Zinc content:						
Percent Zn.	% 18.00	25.00	4.00	4.00	2.40	--
Weight of Zn.	3.60.	14.00	272.00	336.00	106.00	--
<u>Crude ore concentrated:</u>						
Gross weight	627,528.00	728,288.00	654,306.00	661,988.00	687,519.00	703,010.00
Zinc content:						
Percent Zn.	% 6.71	6.31	5.73	6.18	6.07	6.02
Weight of Zn.	<u>1/</u> 42,278.00	<u>1/</u> 45,579.00	37,517.00	40,916.00	41,708.00	42,313.00

		1978	1979	1980	1981	1982	1983
CONCENTRATE PRODUCTION:							
<u>Concentrate produced:</u>							
Gross Weight		74,637.00	75,731.00	67,614.00	71,350.00	74,213.00	73,485.00
Zinc content:							
Percent Zn.	%	49.00	49.26	49.43	49.22	49.36	49.79
Weight of Zn.		36,581.00	37,310.00	<u>1/</u> 33,409.00	<u>1/</u> 35,137.00	36,635.00	36,586.00
<u>Concentrate sold:</u>							
Gross weight		49,788.00	90,526.00	79,049.00	65,923.00	70,327.00	64,027.00
Zinc content:							
Percent Zn.	%	48.95	49.27	49.41	49.27	49.32	49.55
Weight of Zn		24,376.00	44,606.00	39,059.00	32,481.00	34,682.00	<u>1/</u> 31,735.00
<u>Concentrate smelted:</u>							
Gross weight		NA	NA	NA	NA	NA	NA
Zinc content:							
Percent Zn.	%	NA	NA	NA	NA	NA	NA
Weight of Zn		29,815.00	43,216.00	30,330.00	31,815.00	34,125.00	33,075.00
=====							
SMELTER PRODUCTION (refinery output):							
From primary materials		28,395.00	41,158.00	28,886.00	30,300.00	32,500.00	31,500.00
From secondary materials		2,500.00	2,800.00	2,800.00	3,000.00	3,000.00	3,000.00
=====							
TOTAL		30,895.00	43,958.00	31,686.00	33,300.00	35,500.00	34,500.00
=====							
GOLD:							
<u>MINE PRODUCTION:</u>							
In manganese minerals	Kg.	66.00	21.00	150.00	283.00	390.00	417.00
In lead minerals	Kg.	--	--	114.00	134.00	--	--
In polymetallic minerals	Kg.	--	--	--	--	202.00	250.00
In aluvial, placer and related materials	Kg.	108.00	294.00	77.00	42.00	40.00	60.00
=====							
TOTAL	Kg.	174.00	315.00	341.00	459.00	632.00	727.00

		1978	1979	1980	1981	1982	1983
<u>SILVER</u>							
<u>MINE PRODUCTION:</u>							
In copper minerals	Kg.	100.00	390.00	123.00	153.00	84.00	2,712.00
In tin minerals	Kg.	10,929.00	12,040.00	15,927.00	19,384.00	18,451.00	13,989.00
In manganese minerals	Kg.	734.00	2,006.00	2,071.00	1,362.00	1,864.00	2,509.00
In lead minerals	Kg.	51,703.00	54,338.00	55,187.00	57,426.00	63,090.00	58,557.00
TOTAL	Klgs.	63,466.00	68,714.00	73,308.00	78,325.00	83,489.00	77,765.00
=====							
<u>TIN:</u>							
<u>MINE PRODUCTION:</u>							
<u>Crude ore mined:</u>							
Gross weight		43,050.00	51,768.00	62,365.00	67,501.00	65,954.00	63,629.00
Tin content:							
Percent Sn.	%	1.92	1.25	1.11	0.97	0.92	0.84
Weight of Sn.		824.00	<u>1/</u> 607.00	695.00	656.00	606.00	537.00
<u>Crude ore sold directly:</u>							
Gross weight		--	--	--	1,626.00	.03	--
Tin content:							
Percent Sn.	%	--	--	--	2.70	.10	--
Weight of Sn.		--	--	--	44.00	003.00	--
<u>Crude ore concentrated:</u>							
Gross weight		33,707.00	51,768.00	62,365.00	65,875.00	65,554.00	63,612.00
Tin content:							
Percent Sn.	%	1.92	1.25	1.11	0.93	0.92	0.84
Weight of Sn		647.00	<u>1/</u> 607.00	695.00	612.00	606.00	537.00
<u>CONCENTRATE PRODUCTION:</u>							
<u>Concentrate produced:</u>							
Gross weight		2,591.00	3,427.00	5,142.00	5,153.00	4,984.00	4,245.00
Tin content:							
Percent Sn.	%	13.97	11.25	6.83	7.15	6.80	6.86
Weight of Sn.		362.00	<u>1/</u> 386.00	351.00	<u>1/</u> 369.00	<u>1/</u> 339.00	291.00

		1978	1979	1980	1981	1982	1983
<u>Concentrate sold:</u>							
Gross weight		2,591.00	3,327.00	5,472.00	5,153.00	2,480.00	5,128.00
Tin content:							
Percent Sn.	%	13.97	11.26	6.81	7.15	7.01	6.86
Weight of Sn.		362.00	<u>1/</u> 375.00	373.00	<u>1/</u> 369.00	<u>1/</u> 177.00	352.00
<u>METAL PRODUCTION:</u>							
<u>Impure metal in bars:</u>							
Gross weight		--	--	--	--	66.00	35.00
Tin content:							
Percent Sn.	%	--	--	--	--	30.00	30.00
Weight of Sn.		--	--	--	--	20.00	<u>1/</u> 14.00
<u>Refined metal:</u>							
<u>From primary materials:</u>							
Produced outside Argentina (returned after recovery overseas from Argentine concentrates)		190.00	202.00	541.00	194.00	107.00	--
=====							
<u>Produced in Argentina:</u>							
Electrolytic		--	--	--	--	--	119.00
Thermic		--	--	--	--	--	.05
TOTAL		--	--	--	--	--	124.00
=====							
From secondary materials <u>e/2/</u>		50.00	50.00	50.00	50.00	50.00	50.00
Total production in Argentina from primary and secondary materials, including content of impure bars <u>e/3/</u>		50.00	50.00	50.00	50.00	70.00	188.00
<u>TUNGSTEN: 4/</u>							
<u>CONCENTRATE PRODUCTION:</u>							
<u>Concentrate produced:</u>							
Gross weight	Kg.	187,403.00	114,701.00	66,378.00	21,934.00	32,695.00	77,212.00
Tungsten content:							
Percent W.	%	51.50	51.50	51.50	51.50	51.50	51.50
Weight of W.	Kg.	96,513.00	59,071.00	34,185.00	11,296.00	16,838.00	39,764.00

	1978	1979	1980	1981	1982	1983
<u>FLUORSPAR:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore produced (all grades):</u>						
Gross weight	26,746.00	38,076.00	15,468.00	20,755.00	23,727.00	NA
Calcium fluoride content:						
Percent CaF ₂ %	35.00	35.00	35.00	35.00	35.00	35.00
Weight of CaF ₂	9,361.00	13,327.00	5,414.00	7,264.00	8,304.00	NA
<u>Crude ore sold directly</u>						
<u>(Metallurgical grade):</u>						
Gross weight	8,046.00	5,863.00	4,829.00	4,248.00	3,048.00	NA
Calcium fluoride content:						
Percent CaF ₂ %	80.00	80.00	80.00	80.00	80.00	80.00
Weight of CaF ₂	6,437.00	4,690.00	3,863.00	3,398.00	2,438.00	NA
<u>Crude ore beneficiated, gross</u>						
<u>weight and content:</u>						
	NA	NA	NA	NA	NA	NA
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced and sold 5/</u>						
<u>(acid and ceramic grade):</u>						
Gross weight	6,100.00	4,365.00	6,154.00	5,582.00	5,110.00	4,951.00
Calcium fluoride content:						
Percent CaF ₂ %	92.97	92.97	92.97	92.97	92.97	92.97
Weight of CaF ₂	5,795.00	4,147.00	5,846.00	5,303.00	4,855.00	4,703.00
<u>PHOSPHATES</u>	<u>6/</u>	<u>6/</u>	<u>6/</u>	<u>6/</u>	<u>6/</u>	<u>6/</u>

e/ Estimated by Argentine representatives. NA not available. W. withheld to avoid disclosing company proprietary data.

1/ Figures given for gross weight and percent content do not calculate precisely to the figure for contained weight because of independent rounding.

2/ Incomplete.

3/ Including incomplete estimate for secondary production.

4/ Data on crude ore output, direct sales of crude ore (if any), and concentrate sales are not available for publication.

5/ Figures reported for sales are identical to those provided here for production.

6/ The only phosphate material production reported for Argentina is the recovery of Thomas slag as a byproduct of the steel industry, and this material is not within the range of commodities for which the National Directorate of Mineral Economics is responsible.

TABLE 2. BOLIVIA: Production of selected mineral commodities
(metric tons unless otherwise specified)

	1978	1979	1980	1981	1982	1983
IRON ORE:						
PRODUCTION OF CONCENTRATE:						
Gross weight	55,299.00	4,126.00	--	6,477.00	7,832.00	10,991.00
Iron content:						
Percent Fe. %	65.70	63.70	--	63.50	62.45	63.70
Weight of Fe	35,213.00	2,628.00	--	4,113.00	4,891.00	7,001.00
CONCENTRATE SOLD:						
Gross weight:						
Iron content	55,299.00	4,126.00	--	6,477.00	7,832.00	10,991.00
Percent Fe %	65.70	63.70	--	63.50	62.45	63.70
Weight of Fe	35,213.00	2,628.00	--	4,113.00	4,891.00	7,001.00
MANGANESE ORE:						
PRODUCTION OF CONCENTRATE:						
Gross weight	807.00	63.00	924.00	--	120.00	61.00
Manganese content:						
Percent Mn. %	46.00	46.00	46.00	--	46.00	46.00
Weight of Mn.	371.00	29.00	425.00	--	55.00	28.00
CONCENTRATE SOLD:						
Gross weight	807.00	63.00	924.00	--	120.00	61.00
Manganese content:						
Percent Mn. %	46.00	46.00	46.00	--	46.00	46.00
Weight of Mn.	371.00	29.00	425.00	--	55.00	28.00
COPPER:						
PRODUCTION OF CONCENTRATE:						
Gross weight	4,980.00	3,454.00	3,476.00	4,566.00	4,040.00	4,953.00
Copper content:						
Percent Cu. %	56.89	53.39	53.68	57.40	56.19	40.02
Weight of Cu.	2,833.00	1,844.00	1,866.00	2,621.00	2,270.00	1,982.00
CONCENTRATE SOLD:						
Gross weight	5,256.00	3,259.00	3,122.00	4,434.00	3,805.00	4,810.00
Copper content:						
Percent Cu. %	56.89	53.39	53.68	57.40	56.19	40.02
Weight of Cu.	2,990.00	1,740.00	1,676.00	2,545.00	2,138.00	1,935.00

	1978	1979	1980	1981	1982	1983
<u>LEAD:</u>						
<u>PRODUCTION OF CONCENTRATE:</u>						
Gross Weight	35,339.00	30,096.00	31,353.00	31,652.00	23,119.00	16,146.00
Lead content:						
Percent Pb. %	51.19	53.09	55.08	52.83	53.76	47.66
Weight of Pb.	18,039.00	15,978.00	17,269.00	16,722.00	12,429.00	7,675.00
<u>CONCENTRATE SOLD:</u>						
Gross Weight	32,198.00	29,446.00	28,932.00	29,553.00	21,497.00	19,601.00
Lead content:						
Percent Pb. %	51.19	53.09	55.08	52.83	53.76	47.66
Weight of Pb.	16,482.00	15,633.00	15,936.00	15,613.00	11,557.00	9,342.00
<u>ZINC:</u>						
<u>PRODUCTION OF CONCENTRATE:</u>						
Gross weight	115,293.00	94,545.00	97,407.00	92,039.00	90,305.00	94,928.00
Zinc content:						
Percent Zn. %	51.92	52.50	51.80	51.50	50.57	49.74
Weight of Zn.	59,619.00	49,636.00	50,457.00	47,395.00	45,667.00	47,317.00
<u>CONCENTRATE SOLD:</u>						
Gross weight	99,809.00	102,730.00	89,259.00	86,759.00	88,082.00	83,136.00
Zinc content:						
Percent Zn. %	51.92	52.50	51.80	51.50	50.57	49.74
Weight of Zn.	51,621.00	53,933.00	46,236.00	44,681.00	44,543.00	41,352.00
<u>GOLD:</u>						
Quantity of gold recovered						
from all sources grams	1,093,147.00	948,024.00	1,610,714.00	2,064,410.00	1,248,689.00	1,530,810.00
Quantity of gold exported grams	2,067,000.00	--	--	--	--	52,810.00
<u>SILVER:</u>						
Quantity of silver recovered						
from all sources	195.00	198.00	190.00	199.00	170.00	187.00
Quantity of silver exported	198.00	181.00	176.00	204.00	151.00	158.00

	1978	1979	1980	1981	1982	1983
<u>TIN:</u>						
PRODUCTION OF CONCENTRATE:						
Gross weight	100,356.00	92,011.00	96,132.00	99,129.00	101,854.00	124,953.00
Tin content:						
Percent Sn. %	31.18	30.28	28.57	27.90	23.90	20.23
Weight of Sn.	31,291.00	27,861.00	27,465.00	27,657.00	24,343.00	25,278.00
CONCENTRATE SOLD: <u>1/</u>						
Gross weight	44,317.00	37,332.00	29,097.00	19,803.00	13,548.00	12,402.00
Tin content:						
Percent Sn. %	31.18	30.28	28.57	27.90	23.90	20.23
Weight of Sn.	13,818.00	11,304.00	8,313.00	5,525.00	3,238.00	2,509.00
METAL PRODUCTION (impure bars):						
Gross weight	16,351.00	15,818.00	18,648.00	20,261.00	14,289.00	14,665.00
Tin content:						
Percent Sn. %	98.98	99.23	94.64	98.40	98.40	96.58
Weight of Sn.	16,184.00	15,696.00	17,642.00	19,937.00	18,980.00	14,163.00
<u>TUNGSTEN:</u>						
PRODUCTION OF CONCENTRATE:						
Gross weight	5,364.00	5,157.00	5,648.00	5,783.00	5,301.00	4,999.00
Tungsten content:						
Percent W. <u>2/</u> %	46.16	46.23	48.39	48.05	49.39	48.13
Weight of W. <u>2/</u>	2,476.00	2,384.00	2,733.00	2,779.00	2,618.00	2,406.00
CONCENTRATE SOLD:						
Gross weight	4,900.00	4,541.00	5,630.00	4,442.00	5,255.00	4,258.00
Tungsten content:						
Percent W. <u>2/</u> %	46.16	46.23	48.39	<u>3/</u> 48.05	49.39	48.13
Weight of W. <u>2/</u>	2,262.00	2,099.00	2,724.00	<u>3/</u> 2,134.00	2,595.00	2,049.00

1/ Not including materials smelted in Bolivia

2/ Converted to W. from reported W03 using W03 x 0.7931=W.

3/ Reported as 69.59% W03 and 3,091 tons W03, but comparison to production figures above suggests that this should be 60.59% W03 and thus 2,691 tons W03, which figures, on a W basis, become those shown in table.

TABLE 3. BRAZIL: Production of selected mineral commodities
(metric tons unless otherwise specified)

	1978	1979	1980	1981	1982	1983
IRON ORE:						
MINE PRODUCTION:						
Crude ore mined:						
Gross weight	103,896,097.00	117,502,304.00	139,696,561.00	122,709,149.00	119,939,149.00	114,190,190.00
Iron content:						
Percent Fe. %	60.86	60.26	58.38	58.34	58.90	58.48
Weight of Fe.	63,231,165.00	70,806,888.00	81,554,852.00	71,588,688.00	70,644,159.00	66,778,423.00
Crude ore sold directly:						
Gross weight	--	--	--	9,940.00	12,476.00	20,969.00
Iron content:						
Percent Fe. %	--	--	--	58.34	58.90	58.48
Weight of Fe.	--	--	--	5,799.00	7,348.00	12,262.00
Crude ore for concentration:						
Gross weight	105,392,054.00	116,683,099.00	139,393,191.00	121,636,424.00	117,426,171.00	112,795,143.00
Iron content:						
Percent Fe. %	60.86	60.26	58.38	58.34	58.90	58.48
Weight of Fe.	64,141,604.00	70,313,235.00	81,377,745.00	70,962,690.00	69,164,015.00	65,962,599.00
CONCENTRATE PRODUCTION:						
Concentrate produced:						
Gross weight	84,437,915.00	95,457,384.00	113,024,964.00	97,850,231.00	1/93,146,524.00	88,694,635.00
Iron content:						
Percent Fe. %	65.88	65.57	65.70	65.90	1/65.77	68.84
Weight of Fe.	55,627,698.00	62,591,407.00	74,257,401.00	64,983,302.00	1/61,262,459.00	61,057,387.00
Concentrate sales:						
Gross weight	83,612,498.00	93,399,926.00	104,409,937.00	97,262,556.00	89,459,030.00	89,737,667.00
Iron content:						
Percent Fe. %	65.88	65.57	65.70	65.90	65.77	68.84
Weight of Fe.	55,083,914.00	61,242,331.00	68,597,329.00	64,096,024.00	58,837,204.00	61,775,410.00

		1978	1979	1980	1981	1982	1983
AGGLOMERATE PRODUCTION:							
<u>Agglomerate produced:</u>							
Gross weight		13,400,000.00	19,800,000.00	21,600,000.00	17,800,000.00	15,500,000.00	16,000,000.00
Iron content:							
Percent Fe.	%	65.00	65.00	65.00	65.00	65.00	65.00
Weight of Fe.		8,710,000.00	12,870,000.00	14,040,000.00	11,570,000.00	10,075,000.00	10,400,000.00
<u>Agglomerate sold (Exports):</u>							
Gross weight		9,746,668.00	15,913,265.00	17,957,201.00	20,885,312.00	18,205,375.00	16,968,477.00
Iron content:							
Percent Fe.	%	65.00	65.00	65.00	65.00	65.00	65.00
Weight of Fe.		6,335,334.00	10,343,622.00	11,672,181.00	13,575,453.00	11,833,494.00	11,029,510.00
MANGANESE ORE:							
MINE PRODUCTION:							
<u>Crude ore mined:</u>							
Gross weight	1/	2,744,392.00	2,809,167.00	3,044,320.00	3,165,744.00	2,883,211.00	2,594,105.00
Manganese content:							
Percent Mn.	% 1/	39.45	35.95	39.92	37.55	36.86	30.88
Weight of Mn.	1/	1,082,544.00	1,009,895.00	1,215,292.00	1,188,736.00	1,062,751.00	801,059.00
<u>Crude ore sold directly:</u>							
Gross weight		266,838.00	308,530.00	237,031.00	206,689.00	116,046.00	193,152.00
Manganese content:							
Percent Mn.	%	39.45	35.95	39.92	37.55	36.86	30.88
Weight of Mn.		105,267.00	110,916.00	94,622.00	77,611.00	42,774.00	59,645.00
<u>Crude ore for concentration:</u>							
Gross weight		3,132,750.00	2,924,230.00	3,195,177.00	3,358,484.00	3,213,716.00	2,903,335.00
Manganese content:							
Percent Mn.	%	39.45	35.95	39.92	37.55	36.86	30.88
Weight of Mn.		1,235,869.00	1,051,260.00	1,275,514.00	1,261,110.00	1,184,575.00	896,549.00

	1978	1979	1980	1981	1982	1983
CONCENTRATE PRODUCTION:						
Concentrate produced:						
Gross weight	1,399,308.00	1,807,439.00	1,865,226.00	1,835,455.00	2,240,321.00	1,898,479.00
Manganese content:						
Percent Mn. %	41.10	40.80	42.45	45.41	39.07	39.13
Weight of Mn.	575,115.00	737,435.00	791,905.00	833,614.00	875,390.00	742,874.00
Concentrate sold:						
Gross weight	1,414,898.00	1,978,664.00	1,924,762.00	1,791,306.00	1,494,081.00	2,262,185.00
Manganese content:						
Percent Mn. %	41.10	40.80	42.45	45.41	39.07	39.13
Weight of Mn.	581,523.00	807,294.00	817,061.00	813,432.00	583,737.00	885,192.00
COPPER:						
MINE PRODUCTION:						
Crude ore mined:						
Gross weight	647.00	599,687.00	3,699,735.00	4,345,195.00	5,971,262.00	6,056,781.00
Copper content:						
Percent Cu. %	1.75	0.78	0.65	0.78	0.82	0.68
Weight of Cu.	7.00	4,677.00	24,048.00	33,892.00	48,964.00	41,186.00
Crude ore for concentration:						
Gross weight	--	--	52,000.00	1,883,400.00	3,017,507.00	5,026,274.00
Copper content:						
Percent Cu. %	--	--	0.65	0.78	0.82	0.68
Weight of Cu.	--	--	338.00	14,690.00	24,744.00	34,178.00
CONCENTRATE PRODUCTION:						
Concentrate produced:						
Gross Weight	--	--	1,403.00	47,065.00	72,005.00	96,892.00
Copper content:						
Percent Cu. %	--	--	28.66	29.63	33.86	33.11
Weight of Cu.	--	--	402.00	13,945.00	24,381.00	32,081.00

	1978	1979	1980	1981	1982	1983
<u>Concentrate sold:</u>						
Gross Weight	--	--	--	31,723.00	13,102.00	28,720.00
Copper content:						
Percent Cu. %	--	--	--	29.63	31.52	28.92
Weight of Cu.	--	--	--	9,399.00	4,129.00	8,306.00
<u>Concentrate smelted:</u>						
Gross weight	--	--	--	--	--	<u>1/</u> 167,699.00
Copper content:						
Percent Cu. %	--	--	--	--	--	<u>1/</u> 39.73
Weight of Cu.	--	--	--	--	--	<u>1/</u> 66,613.00
=====						
REFINERY PRODUCTION:						
Primary	--	--	--	--	4,812.00	63,083.00
Secondary	45,000.00	53,110.00	63,000.00	45,000.00	57,000.00	39,920.00
TOTAL:	45,000.00	53,110.00	63,000.00	45,000.00	61,812.00	103,003.00
=====						
<u>LEAD:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore mined:</u>						
Gross weight	345,931.00	328,561.00	327,515.00	334,450.00	305,953.00	371,696.00
Lead content:						
Percent Pb. %	8.30	8.20	8.00	7.30	6.20	6.34
Weight of Pb.	28,712.00	26,942.00	26,201.00	24,415.00	18,969.00	23,566.00
<u>Crude ore sold directly:</u>						
Gross weight	16,194.00	28,271.00	15,361.00	100.00	24,838.00	2,043.00
Lead content:						
Percent Pb. %	8.30	8.20	8.00	7.30	6.20	6.34
Weight of Pb.	1,344.00	2,318.00	1,229.00	0.07	1,540.00	130.00
<u>Crude ore for concentration:</u>						
Gross weight	329,163.00	295,795.00	334,840.00	333,444.00	261,179.00	366,481.00
Lead content:						
Percent Pb. %	8.30	8.20	8.00	7.30	6.20	6.34
Weight of Pb.	27,321.00	24,255.00	26,787.00	24,341.00	16,193.00	23,235.00

	1978	1979	1980	1981	1982	1983
CONCENTRATE PRODUCTION:						
<u>Concentrate produced:</u>						
Gross weight	31,140.00	35,924.00	35,317.00	36,252.00	32,106.00	<u>1/</u> 30,884.00
Lead content:						
Percent Pb. %	61.80	62.50	62.40	60.00	61.00	<u>1/</u> 60.70
Weight of Pb.	19,245.00	22,452.00	22,037.00	21,751.00	19,584.00	<u>1/</u> 18,743.00
<u>Concentrate sold:</u>						
Gross weight	--	37.00	47.00	2,636.00	3,923.00	2,174.00
Lead content:						
Percent Pb. %	--	38.00	39.00	45.00	42.00	45.00
Weight of Pb.	--	14.00	18.00	1,186.00	1,648.00	978.00
<u>Concentrate smelted:</u>						
Gross weight	80,100.00	81,500.00	72,600.00	55,000.00	40,321.00	38,176.00
Lead content:						
Percent Pb. %	62.00	63.00	62.40	61.80	61.00	60.80
Weight of Pb.	49,662.00	51,345.00	45,302.00	33,990.00	24,596.00	23,211.00
=====						
SMELTER (REFINERY) PRODUCTION:						
Primary	47,236.00	55,084.00	44,519.00	34,657.00	21,943.00	20,581.00
Secondary	33,220.00	43,999.00	40,431.00	31,029.00	27,407.00	28,939.00
TOTAL	80,456.00	99,083.00	84,950.00	65,686.00	49,350.00	49,520.00
ZINC:						
<u>MINE PRODUCTION:</u>						
<u>Crude ore mined:</u>						
Gross weight	498,264.00	545,142.00	1,153,114.00	721,041.00	738,958.00	861,965.00
Zinc content:						
Percent Zn. %	25.58	21.73	13.11	25.10	22.81	17.86
Weight of Zn.	127,456.00	118,459.00	151,173.00	180,981.00	168,556.00	153,947.00
<u>Crude ore sold directly:</u>						
Gross weight	44,186.00	--	--	--	--	--
Zinc content:						
Percent Zn. %	25.58	--	--	--	--	--
Weight of Zn.	11,303.00	--	--	--	--	--

	1978	1979	1980	1981	1982	1983
<u>Crude ore for beneficiation:</u>						
Gross weight	159,026.00	338,359.00	482,117.00	675,638.00	894,819.00	1,066,298.00
Zinc content:						
Percent Zn. %	25.58	21.73	13.11	25.10	22.81	17.86
Weight of Zn.	40,679.00	73,525.00	63,205.00	169,585.00	204,108.00	190,441.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced:</u>						
Gross weight	209,719.00	344,389.00	392,148.00	395,258.00	596,971.00	662,126.00
Zinc content:						
Percent Zn. %	36.56	28.70	26.59	24.09	18.52	17.91
Weight of Zn.	76,673.00	98,840.00	104,272.00	95,218.00	110,559.00	118,587.00
<u>Concentrate sold:</u>						
Gross weight	40,773.00	54,450.00	55,093.00	39,824.00	68,434.00	80,539.00
Zinc content:						
Percent Zn. %	23.00	26.00	26.60	26.13	26.07	25.45
Weight of Zn.	9,378.00	14,157.00	14,655.00	10,406.00	17,841.00	20,497.00
<u>Concentrate smelted:</u>						
Gross weight	159,046.00	283,909.00	464,370.00	443,182.00	641,069.00	649,323.00
Zinc content:						
Percent Zn. %	40.00	28.70	28.78	27.06	21.35	5/ 21.00
Weight of Zn.	63,618.00	81,482.00	133,646.00	119,925.00	136,868.00	136,362.00
=====						
<u>SMELTER PRODUCTION:</u>						
Primary	56,097.00	63,494.00	78,359.00	91,830.00	96,037.00	99,913.00
Secondary	12,200.00	15,327.00	17,666.00	19,000.00	14,397.00	11,045.00
TOTAL	68,297.00	78,821.00	96,025.00	110,830.00	110,434.00	110,958.00
<u>GOLD:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude gold ore from mines:</u>						
Gross weight	453,286.00	372,556.00	442,087.00	487,224.00	499,234.00	821,577.00
Gold content:						
Grams Au/Ton of ore Grams	8.40	8.49	8.53	8.68	8.88	7.54
Weight Kg.	3,807,600.00	3,163,000.00	3,771,000.00	4,229,100.00	4,433,200.00	6,191,190.00

		1978	1979	1980	1981	1982	1983
<u>Placer gold:</u>							
Gross weight of recovered materials		6,000,000.00	1,222,222.00	10,777,777.00	14,333,333.00	23,222,222.00	52,741,969.00
<u>Gold content:</u>							
Percent Au	%	90.00	90.00	90.00	90.00	90.00	90.00
Weight of Au.	Kg.	5,400,000.00	1,100,000.00	9,700,000.00	12,900,000.00	20,900,000.00	47,467,772.00
<u>By product gold from ores and concentrates other than gold mines, weight of Au</u>							
	Kg.	200,400.00	179,000.00	227,800.00	291,100.00	206,600.00	126,257.00
Total gold produced 2/	Kg.	9,408,000.00	4,442,000.00	13,698,800.00	17,420,200.00	25,539,800.00	53,790,219.00
=====							
<u>SILVER:</u>							
<u>MINE PRODUCTION:</u>							
Placer silver, weight of Ag	Kg.	--	440.00	1,475.00	4,480.00	3,822.00	7,684.00
<u>By product silver from ores and concentrates other than silver mines, weight of Ag.</u>							
	Kg.	15,723.00	33,139.00	22,919.00	19,300.00	19,803.00	15,426.00
Total silver produced 3/	Kg.	15,723.00	33,579.00	24,394.00	23,780.00	23,625.00	23,110.00
<u>TIN:</u>							
<u>MINE PRODUCTION:</u>							
<u>Crude ore mined:</u>							
Gross weight		21,428,616.00	28,020,000.00	30,996,372.00	39,808,947.00	40,537,707.00	48,110,254.00
<u>Tin content:</u>							
Percent Sn.	% 5/	0,029.00	0,025.00	0,017.80	0,022.70	0,022.30	0,024.79
Weight of Sn.		6,190.00	7,005.00	5,517.00	9,037.00	9,040.00	11,928.00
<u>Crude ore for beneficiation:</u>							
Gross weight		21,428,616.00	28,020,000.00	30,996,372.00	38,326,574.00	40,541,102.00	48,110,254.00
<u>Tin content:</u>							
Percent Sn.	% 5/	0,029.00	0,025.00	0,017.80	0,022.70	0,022.30	0,024.79
Weight of Sn.		6,190.00	7,005.00	5,517.00	8,700.00	9,041.00	11,928.00
<u>CONCENTRATE PRODUCTION:</u>							
<u>Concentrate produced:</u>							
Gross weight		10,569.00	11,691.00	13,119.00	14,166.00	15,250.00	1/ 22,769.00
<u>Tin content:</u>							
Percent Sn.	%	58.57	59.92	48.61	58.26	60.94	1/ 58.83
Weight of Sn.		6,190.00	7,005.00	6,377.00	8,253.00	9,293.00	1/ 13,418.00

	1978	1979	1980	1981	1982	1983
<u>Concentrate sold:</u>						
Gross weight	--	9,844.00	10,431.00	14,173.00	17,042.00	<u>1/</u> 22,762.00
<u>Tin Content:</u>						
Percent Sn.	%	59.92	48.61	58.26	60.94	<u>1/</u> 58.83
Weight of Sn.	--	5,899.00	5,071.00	8,257.00	10,385.00	<u>1/</u> 13,414.00
SMEILER PRODUCTION, PRIMARY AND TOTAL	9,329.00	10,132.00	8,796.00	7,789.00	9,298.00	12,741.00
<u>TUNGSTEN:</u>						
<u>MINE PRODUCTION: 8/</u>						
<u>Crude ore mined:</u>						
Gross weight	462,059.00	494,007.00	485,970.00	538,354.00	532,222.00	412,326.00
<u>Tungsten content:</u>						
Percent W	6/ %	0.27	0,272.00	0,28.00	0,30.00	0,28.00
Weight of W	<u>7/</u>	1,245.00	1,343.00	1,348.00	1,588.00	1,480.00
<u>Crude mineral for beneficiation:</u>						
Gross weight	459,330.00	484,324.00	531,480.00	525,809.00	535,924.00	410,028.00
<u>Tungsten content:</u>						
Percent W	6/ %	0.27	0,272.00	0,28	0,30	0,28
Weight of W	<u>7/</u>	1,238.00	1,317.00	1,475.00	1,551.00	1,487.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced by</u>						
<u>major mines: 9/</u>						
Gross weight	1,800.00	1,830.00	1,790.00	1,964.00	1,986.00	1,535.00
<u>Tungsten content:</u>						
Percent W	6/ %	59.30	59.70	58.82	58.79	58,322.00
Weight of W	<u>7/</u>	1,067.00	1,092.00	1,052.00	1,154.00	1,158.00
<u>Concentrate produced by</u>						
<u>garimpos: 9/</u>						
Gross weight	172.00	163.00	107.00	820.00	791.00	307.00
<u>Tungsten content:</u>						
Percent W	6/ %	48.00	48.00	48.00	52.00	52.60
Weight of W	<u>7/</u>	81.00	79.00	64.00	422.00	416.00

	1978	1979	1980	1981	1982	1983
<u>Total concentrate produced: 10/</u>						
Gross weight	1,972.00	1,993.00	1,897.00	2,784.00	2,777.00	1,842.00
Tungsten content:						
Percent W. %	58.22	58.76	58.83	56.61	56.68	57.33
Weight of W	1,148.00	1,171.00	1,116.00	1,576.00	1,574.00	1,056.00
<u>Concentrate sold:</u>						
Gross weight	1,876.00	1,972.00	1,923.00	2,668.00	2,341.00	2,134.00
Tungsten content:						
Percent W 6/ %	58.20	58.62	58.87	56.54	57,007.00	57.40
Weight of W 7/	1,091.00	1,155.00	1,131.00	1,508.00	1,333.00	1,225.00
<u>FLUORSPAR:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore produced:</u>						
Gross weight	126,232.00	163,179.00	86,347.00	174,665.00	201,971.00	239,522.00
Calcium fluoride content:						
Percent CaF2 %	61.82	67.38	44.77	42.73	40.61	39.22
Weight of CaF2	78,037.00	109,950.00	38,657.00	74,634.00	82,020.00	93,941.00
<u>Crude ore sold directly:</u>						
Gross weight	193.00	106.00	1,125.00	306.00	323.00	1,422.00
Calcium fluoride content:						
Percent CaF2 %	61.82	67.38	44.77	42.73	40.61	39.22
Weight of CaF2	119.00	71.00	504.00	131.00	131.00	558.00
<u>Crude ore for beneficiation:</u>						
Gross weight	119,886.00	145,569.00	150,918.00	138,088.00	205,217.00	214,905.00
Calcium fluoride content:						
Percent CaF2 %	61.82	67.38	44.77	42.73	40.61	39.22
Weight of CaF2	74,113.00	98,084.00	67,566.00	59,005.00	83,339.00	84,286.00

	1978	1979	1980	1981	1982	1983
CONCENTRATE PRODUCTION:						
Concentrates produced:						
Gross weight:						
Acid grade	31,174.00	38,323.00	32,729.00	37,980.00	35,581.00	43,059.00
Metallurgical grade	<u>1/</u> 30,161.00	36,468.00	22,640.00	18,253.00	21,467.00	26,148.00
TOTAL:	61,335.00	74,791.00	105,369.00	56,233.00	57,048.00	69,207.00
Calcium fluoride content:						
Percent CAF₂:						
Acid grade	% 97.30	97.10	96.90	97.40	97.00	96.70
Metallurgical grade	% <u>1/</u> 80.00	80.00	<u>1/</u> 80.00	83.50	83.30	62.70
TOTAL:	% 88.78	88.76	89.98	92.88	91.84	83.85
Weight of CaF₂:						
Acid grade	30,332.00	37,212.00	31,714.00	36,992.00	34,513.00	41,638.00
Metallurgical grade	<u>1/</u> 24,123.00	29,174.00	18,112.00	15,241.00	17,882.00	16,395.00
TOTAL:	54,455.00	66,386.00	49,826.00	52,233.00	52,395.00	58,033.00
Concentrates sold:						
Gross weight:						
Acid grade	26,350.00	46,389.00	60,969.00	39,443.00	52,148.00	44,845.00
Metallurgical grade	23,241.00	42,821.00	12,488.00	16,134.00	17,953.00	19,080.00
TOTAL:	49,591.00	89,210.00	73,457.00	55,577.00	70,101.00	63,925.00
Calcium fluoride content:						
Percent CaF₂:						
Acid grade	% 97.30	97.11	96.90	97.40	97.00	96.70
Metallurgical grade	% 80.00	80.00	80.00	83.50	83.30	62.70
TOTAL:	% 89.19	88.89	94.02	93.36	93.49	86.55
Weight of CaF₂:						
Acid grade	25,638.00	45,044.00	59,079.00	38,417.00	50,583.00	43,365.00
Metallurgical grade	18,593.00	34,257.00	9,990.00	13,472.00	14,955.00	11,963.00
TOTAL:	44,231.00	79,301.00	69,069.00	51,889.00	65,538.00	55,328.00

	1978	1979	1980	1981	1982	1983
<u>PHOSPHATIC MATERIALS:</u>						
<u>MINE PRODUCTION OF PHOSPHATE ROCK:</u>						
<u>Crude ore mined:</u>						
Gross weight	5,966,811.00	12,478,699.00	16,532,858.00	16,441,359.00	25,070,303.00	19,898,281.00
Phosphorus pentoxide content:						
Percent P_2O_5 %	9.52	9.24	9.47	8.75	9.38	9.67
Weight of P_2O_5	568,040.00	1,153,031.00	1,565,661.00	1,438,618.00	2,351,594.00	1,924,163.00
<u>Crude ore sold directly:</u>						
Gross weight	26,831.00	39,370.00	49,752.00	52,618.00	7,395,311.00	32,301.00
Phosphorus pentoxide content:						
Percent P_2O_5 %	9.52	9.24	9.47	8.75	9.38	9.67
Weight of P_2O_5	2,554.00	3,637.00	4,711.00	4,604.00	693,687.00	3,123.00
<u>Crude ore for concentration:</u>						
Gross weight	5,801,038.00	11,423,419.00	16,674,314.00	16,198,056.00	17,750,234.00	19,905,744.00
Phosphorus pentoxide content:						
Percent P_2O_5 %	9.52	9.24	9.47	8.75	9.38	9.67
Weight of P_2O_5	552,258.00	1,055,523.00	1,579,058.00	1,417,324.00	1,664,971.00	1,924,885.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced:</u>						
Gross weight	1,023,287.00 <u>1/</u>	1,588,823.00	2,561,889.00	2,657,986.00	2,767,017.00	3,208,303.00
Phosphorus pentoxide content:						
Percent P_2O_5 %	17.64 <u>1/</u>	13.90	15.37	16.41	15.59	16.12
Weight of P_2O_5	180,507.00 <u>1/</u>	221,005.00	393,762.00	436,175.00	431,377.00	517,178.00
<u>Concentrate sold:</u>						
Gross weight	1,070,666.00 <u>1/</u>	1,354,444.00	2,510,911.00	2,400,559.00	2,855,500.00	3,214,714.00
Phosphorus pentoxide content:						
Percent P_2O_5 %	17.64 <u>1/</u>	13.90	15.77	16.41	15.59	16.12
Weight of P_2O_5	188,865.00 <u>1/</u>	188,403.00	385,927.00	393,931.00	445,172.00	518,211.00

- 1/ Figures for gross weight and content on percentage basis to not calculate to content on weight basis shown.
- 2/ From gold mines, placer operations, and as a by product from ores and concentrates other than those of gold.
- 3/ From placer operations and as a by product from ores and concentrates other than those of silver.
- 4/ Figure includes an estimate for placer production.
- 5/ Percentage approximate.
- 6/ Percentage adjusted from reported % W03 basis to % W.
- 7/ As reported; multiplication of corresponding gross weight by corresponding modified (rounded) percentage will not yield these figures.
- 8/ Mine production data does not include figures for output by garimpos (small itinerent mine operations).
- 9/ Note that despite omission of data on crude mine output by garimpos (see footnote 8), concentrate production for these producers is reported, separately from concentrate output by major mines.
- 10/ Total of major mines and garimpos, not included in original data supplied, all figures calculated.
- 11/ Data furnished as 83%, but 80% apparently is correct.

TABLE 4. CANADA: Production of selected mineral commodities

	1978	1979	1980	1981	1982	1983
<u>IRON ORE:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore produced by type:</u>						
Gross weight:						
Hematite	108,325,264.00	117,765,197.00	105,590,440.00	104,469,776.00	71,361,894.00	62,414,832.00
Magnetite	18,278,512.00	14,953,441.00	14,569,310.00	14,559,398.00	11,525,266.00	10,034,811.00
Siderite	2,772,590.00	2,713,159.00	2,570,422.00	2,283,870.00	1,390,441.00	1,913,537.00
TOTAL	129,376,366.00	135,431,797.00	122,730,172.00	121,313,044.00	84,277,601.00	74,363,180.00
=====						
<u>Iron content:</u>						
Percent Fe:						
Hematite	37,51	39,69	36,78	36,50	36,30	36,30
Magnetite	24,51	24,13	24,70	24,46	24,02	23,70
Siderite	32,00	31,40	31,90	32,00	33,18	31,70
TOTAL	35,56	37,81	35,24	34,97	34,57	34,50
=====						
<u>Weight of Fe:</u>						
Hematite	40,632,807.00	46,741,007.00	38,836,164.00	38,131,468.00	25,904,367.00	22,656,584.00
Magnetite	4,480,063.00	3,608,265.00	3,598,620.00	3,561,229.00	2,768,369.00	2,378,250.00
Siderite	887,229.00	851,932.00	819,965.00	730,838.00	461,348.00	606,591.00
TOTAL	46,000,099.00	51,201,204.00	43,254,749.00	42,423,535.00	29,134,084.00	25,641,425.00
<u>Crude ore produced for direct consumption (all types of ore):</u>						
Gross weight	2,806,520.00	2,346,732.00	1,802,516.00	4,077,234.00	2,350,389.00	--
<u>Iron content:</u>						
Percent Fe	54.39	55.38	53.27	54.01	54.50	--
Weight of Fe	1,526,466.00	1,299,620.00	960,200.00	2,202,114.00	1,280,962.00	--
<u>Crude ore shipped for direct consumption (all types of ore):</u>						
Gross weight	3,080,233.00	4,104,850.00	3,340,920.00	2,833,307.00	1,675,898.00	1,369,646.00
<u>Iron content:</u>						
Percent Fe	54.30	53.83	53.27	54.01	54.50	53.04
Weight of Fe	1,672,567.00	2,209,641.00	1,779,708.00	1,530,269.00	913,364.00	726,460.00

	1978	1979	1980	1981	1982	1983
<u>Crude ore shipped for concentration</u>						
(all types of ore): 1/						
Gross weight	39,244,228.00	45,451,197.00	34,115,708.00	32,186,997.00	22,738,075.00	18,209,119.00
Iron content:						
Percent Fe	33.67	39.19	32.82	32.35	33.17	33.30
Weight of Fe	13,213,532.00	17,812,324.00	11,196,775.00	10,412,493.00	7,542,350.00	6,063,637.00
<u>Crude ore shipped for concentration and agglomeration</u>						
(all types of ore):						
Gross weight	87,499,096.00	87,633,867.00	86,479,651.00	86,168,783.00	59,189,137.00	56,154,061.00
Iron content:						
Percent Fe	35.83	36.62	35.81	35.27	34.56	34.80
Weight of Fe	31,350,926.00	32,091,522.00	30,968,363.00	30,391,730.00	20,454,793.00	19,541,613.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced:</u> 2/						
Gross weight	24,055,559.00	30,277,967.00	20,539,159.00	20,219,821.00	15,989,406.00	12,629,062.00
Iron content:						
Percent Fe	63.53	63.66	63.77	63.74	64.02	64.84
Weight of Fe	15,282,497.00	19,274,954.00	13,097,822.00	20,219,822.00	10,236,418.00	8,188,684.00
<u>Concentrate shipped:</u>						
Gross weight	21,039,555.00	24,210,733.00	20,722,093.00	21,124,315.00	15,466,166.00	12,792,730.00
Iron content:						
Percent Fe	63.56	64.25	63.78	63.89	64.96	64.81
Weight of Fe	13,372,741.00	15,555,396.00	13,216,551.00	13,496,325.00	10,046,821.00	8,290,968.00
<u>AGGLOMERATE PRODUCTION:</u>						
<u>Agglomerate produced:</u>						
Gross weight	30,775,448.00	27,263,037.00	26,412,533.00	27,687,873.00	17,252,079.00	17,693,500.00
Iron content:						
Percent Fe	62.80	62.76	63.40	63.22	64.45	62.68
Weight of Fe	19,326,981.00	17,110,282.00	16,745,546.00	17,504,273.00	11,118,965.00	11,090,286.00
<u>Agglomerate shipped:</u>						
Gross weight	31,528,851.00	32,596,723.00	26,370,264.00	26,989,542.00	16,406,632.00	19,370,575.00
Iron content:						
Percent Fe	62.87	63.05	63.43	63.20	63.90	62.92
Weight of Fe	19,822,189.00	20,552,234.00	16,726,658.00	17,057,391.00	10,483,838.00	12,187,966.00

	1978	1979	1980	1981	1982	1983
<u>COPPER:</u>						
MINE PRODUCTION (Blister copper produced from domestic primary materials plus recoverable copper in exported matte and concentrate),						
Weight of Cu	659,380.00	636,383.00	716,363.00	691,328.00	612,455.00	624,998.00
SMELTER PRODUCTION, primary and secondary, weight of Cu	--	398,642.00	492,710.00	456,401.00	350,382.00	336,917.00
REFINED PRODUCTION, primary and secondary, weight of Cu	446,278.00	397,263.00	505,238.00	476,655.00	337,780.00	464,333.00
<u>LEAD:</u>						
<u>MINE PRODUCTION:</u>						
Lead content of domestic ores and concentrates produced	365,782.00	341,777.00	296,641.00	322,045.00	341,212.00	251,383.00
Lead content of base bullion produced from domestic primary materials (concentrates, slags, residues etc.) plus estimated recoverable lead in domestic ores and concentrates exported	319,809.00	310,745.00	251,627.00	268,556.00	272,187.00	258,904.00
=====						
<u>REFINED METAL PRODUCTION:</u>						
Primary	194,054.00	183,769.00	162,463.00	168,450.00	174,310.00	178,043.00
Secondary	51,800.00	68,568.00	72,117.00	69,658.00	64,572.00	63,914.00
TOTAL	245,854.00	252,337.00	234,580.00	238,108.00	238,882.00	241,957.00
<u>ZINC:</u>						
<u>MINE PRODUCTION:</u>						
Zinc content of domestic ores and concentrates produced	1,245,248.00	1,202,635.00	1,058,714.00	1,095,958.00	1,189,129.00	1,069,947.00
Zinc content of new refined zinc produced from domestic primary materials (concentrates, slags, residues etc.) plus estimated recoverable zinc in domestic ores and concentrates shipped for export	1,066,902.00	1,099,926.00	883,697.00	911,178.00	965,607.00	970,803.00
SLAB ZINC PRODUCTION	495,243.00	580,449.00	591,565.00	618,650.00	511,870.00	617,033.00

	1978	1979	1980	1981	1982	1983
GOLD:						
Mine production by types of ore, weight of Au:						
Auriferous quartz	grams 36,339,934.00	33,794,332.00	31,928,594.00	35,876,992.00	47,865,658.00	53,416,000.00
Placer	grams 555,663.00	899,202.00	2,059,727.00	1,632,720.00	2,476,468.00	2,532,000.00
Base metal ores	grams 17,071,330.00	16,448,825.00	16,631,942.00	14,524,569.00	14,393,104.00	14,798,000.00
TOTAL	grams 53,966,927.00	51,142,359.00	50,620,263.00	52,034,281.00	64,735,230.00	70,746,000.00
SILVER:						
Mine production by type of ore, weight of Ag:						
Silver Ores	Kg. 41,007.00	22,870.00	33,000.00	199,412.00	299,000.00	387,000.00
Gold ores	kg. 8,200.00	6,685.00	5,000.00	10,582.00	20,000.00	77,000.00
Placer (gold)	kg. 134.00	167.00	1,000.00	4,502.00	1,000.00	--
Base metal ores	kg. 1,217,586.00	1,117,186.00	1,031,000.00	914,898.00	994,000.00	642,000.00
TOTAL	Kg. 1,266,927.00	1,146,908.00	1,070,000.00	1,129,394.00	1,314,000.00	1,106,000.00
MOLYBDENUM:						
Mine production, measured as molybdenum (Mo) content of producers shipments of molybdenum concentrates, molybdenum oxide and ferro-molybdenum						
	13,943.00	11,175.00	11,889.00	12,850.00	13,961.00	10,523.00
TIN:						
Mine production, measured as tin content of tin concentrates shipped, plus tin content of lead-tin alloys produced						
	360.00	337.00	243.00	239.00	135.00	141.00

		1978	1979	1980	1981	1982	1983
<u>TUNGSTEN:</u>							
Mine production, measured as tungsten trioxide (W03) content of sheelite concentrates shipped							
	kg.	2,885,619.00	3,254,000.00	4,007,000.00	2,515,000.00	3,030,000.00	1,538,000.00
Mine production as above, recalculated to tungsten (W) content basis							
	kg.	2,288,584.00	2,580,747.00	3,177,952.00	1,994,647.00	2,403,093.00	1,219,788.00

1/ Exclusive of that shipped for concentration and subsequently agglomerated.

2/ Exclusive of that produced and subsequently agglomerated.

TABLE 5. COLOMBIA: Production of selected mineral commodities

Commodity	Unit of measure	1978	1979	1980	1981	1982	1983 <u>1/</u>
Iron ore	m.t.	497,000.00	396,900.00	506,269.00	299,006.00	395,960.00	1,011,345.00
Manganese ore	m.t.	20,011.00	21,453.00	21,400.00	20,300.00	--	--
Copper concentrate	m.t.	400.00	336.00	442.00	315.00	293.00	540.00
Lead concentrate	m.t.	200.00	376.00	312.00	256.00	391.00	308.00
Zinc concentrate	m.t.	--	--	303.00	303.00	--	--
Gold <u>2/</u>	t.oz.	246,446.00	269,369.00	510,439.00	529,214.00	472,674.00	438,579.00
Silver <u>2/</u>	t.oz.	76,773.00	99,331.00	151,542.00	142,740.00	136,043.00	98,945.00
Phosphate rock	m.t.	1,320.00	6,776.00	6,370.00	17,329.00	20,393.00	16,944.00

1/ Provisional

2/ Smelter product basis.

TABLE 6. CHILE: Production of selected mineral commodities
(metric tons unless otherwise specified)

	1978	1979	1980	1981	1982	1983
IRON ORE:						
CONCENTRATE PRODUCED:						
Gross weight	7,813,314.00	8,225,089.00	8,834,577.00	8,514,176.00	6,469,670.00	5,973,672.00
Iron content: 1/						
Percent Fe %	61.57	61.49	60.49	60.96	59.88	60.30
Weight of Fe	4,810,657.00	5,057,607.00	5,344,027.00	5,190,270.00	3,873,867.00	3,601,943.00
MANGANESE ORE:						
CRUDE ORE PRODUCTION:						
Gross weight	23,243.00	24,969.00	27,701.00	25,557.00	16,111.00	26,050.00
Manganese content:						
Percent Mn. %	35.74	34.53	32.40	33.63	32.32	32.57
Weight of Mn.	8,306.00	8,623.00	8,974.00	8,596.00	5,207.00	8,485.00
COPPER: WEIGHT OF CU. CONTAINED IN LISTED PRODUCTS OF:						
=====						
LARGE COPPER MINES:						
Concentrates	88,351.00	106,855.00	109,867.00	117,580.00	161,975.00	145,496.00
Blister copper	151,632.00	141,941.00	115,751.00	145,166.00	167,398.00	200,994.00
Fire-refined copper	117,265.00	131,600.00	121,022.00	112,016.00	150,348.00	132,706.00
Electrolytic copper	519,247.00	534,122.00	557,872.00	518,849.00	553,199.00	532,859.00
TOTAL	876,495.00	914,518.00	904,512.00	893,611.00	1,032,920.00	1,012,055.00
=====						
MEDIUM COPPER MINES:						
Concentrates	57,838.00	57,654.00	64,365.00	102,250.00	106,300.00	115,635.00
Precipitates	45,099.00	46,372.00	44,765.00	53,688.00	46,015.00	49,063.00
Refined copper	29,460.00	29,504.00	29,727.00	28,143.00	30,566.00	31,380.00
Cathode copper	--	--	--	14,339.00	15,974.00	16,026.00
TOTAL	132,397.00	133,530.00	138,857.00	198,420.00	198,855.00	212,104.00
=====						
SMALL COPPER MINES:						
Direct smelting ores	1,568.00	2,428.00	1,825.00	597.00	510.00	662.00
Concentrates	17,073.00	13,437.00	14,129.00	10,790.00	11,484.00	11,964.00
Lixiviation product	1,629.00	3,399.00	2,685.00	253.00	1,584.00	1,900.00
TOTAL	20,270.00	19,264.00	18,539.00	11,640.00	13,578.00	14,526.00
=====						
	1,029,162.00	1,067,312.00	1,062,008.00	1,103,671.00	1,245,353.00	1,238,685.00

	1978	1979	1980	1981	1982	1983
GOLD MINES:						
Medium mines	71.00	108.00	482.00	1,366.00	9,411.00	16,026.00
Small mines	82.00	177.00	242.00	199.00	219.00	332.00
Total from gold mines	153.00	285.00	674.00	1,565.00	9,630.00	16,358.00
=====						
SILVER MINES:						
Medium mines	95.00	73.00	257.00	246.00	82.00	232.00
Small mines	46.00	61.00	39.00	55.00	36.00	99.00
Total from silver mines	141.00	134.00	296.00	301.00	118.00	331.00
=====						
Gran total of copper	1,029,456.00	1,067,731.00	1,062,978.00	1,105,537.00	1,255,101.00	1,255,374.00
LEAD:						
PRODUCTION OF LEAD CONCENTRATES:						
Gross weight	685.00	398.00	505.00	365.00	2,869.00	2,739.00
Lead content:						
Percent Pb. %	62.92	63.32	62.38	61.10	49.56	56.48
Weight of Pb.	431.00	252.00	315.00	223.00	1,422.00	1,547.00
PRODUCTION IN ZINC CONCENTRATES:						
Gross weight	3,497.00	3,612.00	2,478.00	2,984.00	10,532.00	11,240.00
Lead content:						
Percent Pb. %	--	--	--	--	1.23	1.17
Weight of Pb.	--	--	--	--	130.00	132.00
Total lead in lead and zinc concentrates	431.00	252.00	315.00	223.00	1,552.00	1,679.00
ZINC:						
PRODUCTION OF ZINC CONCENTRATES:						
Gross weight	3,497.00	3,612.00	2,478.00	2,984.00	10,532.00	11,240.00
Zinc content:						
Percent Zn. %	51.87	51.14	45.76	50.80	51.22	51.89
Weight of Zn.	1,814.00	1,847.00	1,134.00	1,516.00	5,394.00	5,832.00

		1978	1979	1980	1981	1982	1983
PRODUCTION IN LEAD CONCENTRATES:							
Gross weight		685.00	398.00	505.00	365.00	2,869.00	2,739.00
Zinc content:							
Percent Zn.	%	--	--	--	--	9.13	5.88
Weight of Zn.		--	--	--	--	262.00	161.00
Total zinc in zinc and lead concentrates		1,814.00	1,847.00	1,134.00	1,516.00	5,656.00	5,993.00
GOLD: OUTPUT OF FINE GOLD IN LISTED PRODUCTS OF:							
=====							
MEDIUM GOLD MINES:							
Crude ore exported	Kg.	--	--	2,242.80	6,526.00	6,678.30	5,633.30
Gold concentrates	Kg.	164.00	265.00	517.80	1,290.90	5,153.80	6,826.90
Gold amalgum	Kg.	47.00	20.00	16.80	38.00	53.40	57.10
Gold bars	Kg.	231.00	214.00	336.20	38.20	681.30	398.10
TOTAL	Kg.	442.00	499.00	3,113.60	7,893.10	12,566.80	12,915.40
=====							
SMALL GOLD MINES:							
Ore for concentration	Kg.	197.00	333.00	556.70	502.40	431.60	946.10
Ore for direct smelting	Kg.	59.00	70.00	150.80	315.80	112.90	110.30
Ore for cianidation	Kg.	--	--	--	--	--	50.70
Gold from washeries	Kg.	19.00	20.00	14.90	0.40	4.60	20.80
Gold content of	Kg.	12.00	12.00	12.11	12.30	5.20	6.00
TOTAL	Kg.	287.00	435.00	734.50	830.90	554.30	1,133.90
=====							
Total gold from gold mines	Kg.	729.00	934.00	3,847.50	8,724.00	13,121.11	14,049.30
=====							
LARGE COPPER MINES:							
In concentrates	Kg.	138.80	157.60	139.00	90.90	107.90	111.70
In blister copper	Kg.	206.80	115.90	119.10	--	48.00	51.70
In doré bullion	Kg.	368.50	353.40	385.00	465.20	537.50	678.30
In anode bars	Kg.	404.50	407.00	448.10	414.40	510.80	644.00
TOTAL	Kg.	1,118.60	1,073.90	1,091.20	970.50	1,204.20	1,485.70
MEDIUM COPPER MINES (ALL PRODUCTS)							
	Kg.	523.90	553.20	859.00	1,811.00	1,535.20	1,157.70
SMALL COPPER MINES (ALL PRODUCTS)							
	Kg.	692.00	801.00	870.10	581.10	719.70	618.50
=====							
Total gold from copper mines	Kg.	2,334.50	2,428.10	2,820.30	3,362.60	3,459.10	3,261.90

		1978	1979	1980	1981	1982	1983
MEDIUM SILVER MINES (ALL PRODUCTS)	Kg.	62.00	41.00	106.00	308.20	153.40	227.50
SMALL SILVER MINES (ALL PRODUCTS)	Kg.	56.00	62.00	55.40	61.50	24.20	111.20
Total gold from silvermines	Kg.	118.00	103.00	161.40	369.70	177.60	338.70
MEDIUM LEAD-ZINC MINES (ALL PRODUCTS)	Kg.	--	--	6.50	--	149.10	109.30
Grand total gold production	Kg.	3,181.50	3,465.10	6,835.70	12,456.30	16,906.90	17,759.20
SILVER:OUTPUT OF FINE SILVER IN LISTED PRODUCTS OF:							
MEDIUM SILVER MINES:							
Silver concentrates	Kg.	11,992.20	14,307.60	46,464.60	67,013.30	35,159.10	45,475.60
Metallic silver	Kg.	1,780.00	13,409.00	19,043.60	20,136.90	28,781.10	27,141.90
TOTAL	Kg.	13,772.20	27,716.60	65,508.20	87,150.20	63,940.20	72,617.50
SMALL SILVER MINES:							
Silver concentrates	Kg.	22,419.00	31,095.00	21,410.80	20,732.50	9,815.90	38,019.90
Ore for direct smelting	Kg.	964.00	3,341.00	1,316.20	1,514.40	762.10	1,348.80
TOTAL	Kg.	23,383.00	34,436.00	22,727.00	22,246.90	10,578.00	39,368.70
Total silver from silver mines		37,155.20	62,152.60	88,235.20	109,397.10	74,518.20	111,986.20
LARGE COPPER MINES:							
In concentrates	Kg.	23,555.50	25,130.90	24,972.10	35,502.40	65,415.70	62,579.40
In blister copper	Kg.	28,329.20	25,774.50	12,931.20	16,440.10	21,867.70	30,396.00
In doré bullion	Kg.	105,014.10	97,505.90	98,825.70	93,112.70	114,562.90	142,394.40
In anode bars	Kg.	12,824.00	10,926.10	12,852.50	12,855.00	10,509.50	10,757.10
TOTAL	Kg.	169,722.80	159,337.40	149,581.50	157,910.20	212,355.80	246,126.90
MEDIUM COPPER MINES (ALL PRODUCTS)	Kg.	34,703.30	38,002.40	45,747.30	80,553.30	69,383.30	68,962.90
SMALL COPPER MINES (ALL PRODUCTS)	Kg.	11,307.00	10,304.00	9,238.60	4,800.40	3,113.80	4,972.50
Total silver from copper mines	Kg.	215,733.10	207,643.80	204,567.40	243,263.90	284,852.90	320,062.30

		1978	1979	1980	1981	1982	1983
MEDIUM GOLD MINES	Kg.	687.00	602.00	2,484.00	6,067.20	20,092.10	32,570.70
SMALL GOLD MINES	Kg.	743.00	360.00	1,169.50	1,460.70	784.20	1,410.90
Total silver form gold mines	Kg.	1,430.00	962.00	3,653.50	7,527.90	20,876.30	33,981.60
MEDIUM LEAD-ZINC MINES	Kg.	1,055.30	1,077.20	2,089.00	918.50	1,940.40	2,245.90
=====							
Grand total silver production	Kg.	255,373.60	271,835.60	298,545.10	361,107.40	382,187.80	468,276.00
MOLYBDENUM:							
CONCENTRATE PRODUCED: 2/							
Gross weight		24,293.00	24,986.00	25,233.00	28,324.00	33,110.00	17,759.00
Molybdenum content:							
Percent Mo.	%	54.32	54.27	54.17	54.23	54.30	54.65
Weight of Mo.		13,196.00	13,560.00	13,668.00	15,360.00	17,979.00	9,707.00
TRIOXIDE PRODUCED:							
Gross weight		--	--	--	--	3,461.00	9,402.00
Molybdenum content:							
Percent Mo.	%	--	--	--	--	59.78	59.10
Weight of Mo.		--	--	--	--	2,069.00	5,557.00
TOTAL MOLYBDENUM PRODUCTION		13,196.00	13,560.00	13,668.00	15,360.00	20,048.00	15,264.00
PHOSPHATIC MATERIALS:							
APATITE:							
Gross weight		--	--	--	--	1,377.00	935.00
Phosphorus pentoxide content:							
Percent P2.O5.	%	--	--	--	--	+ .20	+ .20
Weight of P2.O5. e/		--	--	--	--	275.00	187.00
GUANO:							
Gross weight	3/	240.00	--	--	4/ 1,100.00	3/ 50.00	--
Phosphorus pentoxide content:							
Percent P2.O5.	%	9.50	--	--	9.50	9.50	--
Weight of P2.O5.		23.00	--	--	105.00	5.00	--

e/ Estimate.

1/ Dry basis.

2/ Does not include material used to produce molybdenum trioxide shown below.

3/ White guano.

4/ Red guano.

TABLE 7. CHILE: Supplemental data on copper, gold and silver production
(Metric tons unless otherwise specified)

		1978	1979	1980	1981	1982	1983
<u>COPPER-BEARING MATERIALS:</u>							
<u>MEDIUM COPPER MINES:</u>							
<u>Gross weight:</u>							
Concentrates		206,994.00	209,231.00	230,284.00	340,822.00	346,535.00	374,254.00
Precipitates		59,265.00	61,289.00	58,289.00	68,404.00	59,015.00	63,414.00
Refined copper		29,472.00	29,516.00	29,739.00	28,155.00	30,578.00	31,392.00
Cathodes		--	--	--	14,345.00	15,981.00	16,032.00
<u>Percent Cu:</u>							
Concentrates	%	27.94	27.56	27.95	30.00	30.68	30.90
Precipitates	%	76.01	75.66	76.80	78.49	77.97	77.37
Refined copper	%	99.96	99.96	99.96	99.96	99.96	99.96
Cathodes	%	--	--	--	99.96	99.96	99.96
<u>SMALL COPPER MINES:</u>							
<u>Gross weight:</u>							
Direct smelting ore		9,506.00	18,016.00	12,021.00	3,193.00	2,819.00	3,679.00
Concentrates		647,914.00	611,106.00	602,419.00	500,872.00	601,532.00	595,526.00
Lixiviation products		34,180.00	89,116.00	66,350.00	5,843.00	39,124.00	53,749.00
<u>Percent Cu:</u>							
Direct smelting ore	Grams Au/ton	16.49	13.48	15.18	18.70	18.09	17.99
Concentrates	Grams Au/ton	2.64	2.20	2.35	2.15	1.91	2.01
Lixiviation products	Grams Au/ton	4.77	3.81	4.05	4.33	4.05	3.53
<u>GOLD-BEARING MATERIALS:</u>							
<u>MEDIUM GOLD MINES:</u>							
<u>Gross weight:</u>							
Crude ore exported		--	--	8,567.00	26,068.00	24,115.00	24,558.00
Gold concentrates		1,529.00	2,228.00	6,758.00	18,224.00	43,567.00	73,768.00
<u>Gold content:</u>							
Crude ore exported	Grams Au/ton	--	--	261.73	250.35	276.94	229.39
Gold concentrates	Grams Au/ton	107.26	118.94	76.62	70.84	118.30	92.55

	1978	1979	1980	1981	1982	1983
<u>SMALL GOLD MINES:</u>						
<u>Gross weight:</u>						
Ore for concentration	19,522.00	41,028.00	69,014.00	73,734.00	65,789.00	158,527.00
Ore for direct smelting	890.00	1,387.00	2,405.00	4,830.00	1,865.00	2,069.00
Ore for cianidation	--	--	--	--	--	10,712.00
<u>Gold content:</u>						
Ore for concentration Grams Au/ton	10.01	8.12	8.07	6.81	6.56	5.97
Ore for direct smelting Grams Au/ton	66.29	50.47	62.70	65.38	60.54	53.31
Ore for cianidation Grams Au/ton	--	--	--	--	--	4.73
<u>SILVER BEARING MATERIALS:</u>						
<u>MEDIUM SILVER MINES:</u>						
<u>Gross weight:</u>						
Silver concentrates	1,890.00	2,801.00	10,068.00	16,110.00	8,809.00	13,684.00
<u>Silver content:</u>						
Silver concentrates Grams Ag/ton	6,345.08	5,108.03	4,615.08	4,159.73	3,991.27	3,323.27
<u>SMALL SILVER MINES:</u>						
<u>Gross weight:</u>						
Ore for concentration	80,149.00	107,625.00	78,601.00	77,792.00	35,089.00	160,137.00
Ore for direct smelting	452.00	1,065.00	648.00	1,079.00	340.00	635.00
<u>Silver content:</u>						
Ore for concentration Grams Ag/ton	279.72	288.92	272.40	266.51	279.74	237.42
Ore for direct smelting Grams Ag/ton	2,132.74	3,137.09	2,031.17	1,403.52	2,241.47	2,124.09

TABLE 8. UNITED STATES: PRODUCTION OF SELECTED MINERAL COMMODITIES
(Metric tons unless otherwise specified)

	1978	1979	1980	1981	1982	1983
<u>IRON ORE:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore mined:</u>						
Gross weight thousand tons	238,191.00	259,929.00	215,465.00	230,644.00	108,273.00	117,388.00
Iron content						
percent Fe and weight of Fe	-NA	NA	NA	NA	NA	NA
<u>Crude ore mined for direct shipping:</u>						
Gross weight thousand tons	<u>1/</u> W	<u>1/</u> W	1,208.00	197.00	274.00	42.00
Iron content						
percent Fe and weight of Fe	<u>1/</u> W	<u>1/</u> W	NA	NA	NA	NA
<u>Crude ore mined for concentration and/or agglomeration:</u>						
Gross weight thousand tons	W	W	214,257.00	230,447.00	107,999.00	117,346.00
Iron content						
percent Fe and weight of Fe	W	W	NA	NA	NA	NA
<u>Crude ore shipped for direct consumption:</u>						
Gross weight thousand tons	1,982.00	1,757.00	1,310.00	1,028.00	380.00	169.00
Iron content:						
Percent Fe <u>2/</u> %	54.07	54.01	51.60	55.16	54.21	52.66
Weight of Fe thousand tons	1,072.00	949.00	676.00	567.00	206.00	89.00
<u>Crude ore shipped for concentration and/or agglomeration:</u>						
Gross weight thousand tons	236,984.00	257,837.00	215,733.00	NA	NA	NA
Iron content						
percent Fe and weight of Fe	NA	NA	NA	NA	NA	NA
<u>Total crude ore shipped:</u>						
Gross weight thousand tons	238,966.00	258,837.00	215,733.00	NA	NA	NA
Iron content						
percent Fe and weight of Fe	NA	NA	NA	NA	NA	NA
<u>CONCENTRATE PRODUCTION <u>3/</u></u>						
<u>Concentrates produced:</u>						
Gross weight thousand tons	<u>1/</u> W	<u>1/</u> W	3,732.00	3,078.00	2,164.00	1,218.00
Iron content						
percent Fe and weight of Fe	<u>1/</u> W	<u>1/</u> W	NA	NA	NA	NA
<u>Concentrate shipped:</u>						
Gross weight thousand tons	7,789.00	5,747.00	4,251.00	4,354.00	2,227.00	2,185.00
Iron content:						
Percent Fe <u>2/</u>	54.58	53.82	55.30	55.88	55.59	54.00
Weight of Fe thousand tons	4,251.00	3,093.00	2,351.00	2,433.00	1,238.00	1,180.00

	1978	1979	1980	1981	1982	1983
AGGLOMERATE PRODUCTION:						
<u>Agglomerates produced:</u>						
Gross weight thousand tons	72,420.00	79,449.00	65,790.00	71,075.00	33,563.00	36,904.00
Iron content						
percent Fe and weight of Fe	NA	NA	NA	NA	NA	NA
<u>Agglomerates shipped:</u>						
Gross weight thousand tons	74,771.00	80,098.00	65,149.00	67,959.00	33,722.00	42,958.00
Iron content:						
Percent Fe <u>2/</u> %	63.07	63.22	63.49	63.85	64.15	63.92
Weight of Fe thousand tons	47,159.00	50,641.00	41,362.00	43,389.00	21,634.00	27,459.00
=====						
PRODUCTION OF USEABLE ORE: <u>4/</u>						
Gross weight:						
Crude ore mined for direct shipment <u>5/</u> thousand tons		<u>6/</u>	<u>6/</u>	1,208.00	197.00	274.00
42.00						
Concentrate produced <u>5/</u> thousand tons	<u>6/</u> 10,472.00	<u>6/</u> 7,643.00	3,732.00	3,078.00	2,164.00	1,218.00
Agglomerate produced <u>5/</u> thousand tons	72,420.00	79,449.00	65,790.00	71,075.00	33,563.00	36,904.00
TOTAL thousand tons	82,892.00	87,092.00	70,730.00	74,350.00	36,001.00	38,164.00
Iron content:						
Percent Fe %	62.20	62.60	63.00	63.60	63.90	64.30
Weight of Fe thousand tons	51,579.00	54,500.00	44,560.00	47,287.00	23,005.00	24,539.00
=====						
<u>MANGANESE ORE AND OTHER</u>						
<u>MANGANIFEROUS MATERIALS: <u>7/</u></u>						
SHIPMENTS OF MARKETABLE MATERIALS: <u>8/</u>						
<u>Gross weight:</u>						
Ferruginous manganese ore	262,940.00	194,732.00	139,912.00	138,175.00	14,793.00	10,264.00
Manganiferous iron ore	20,214.00	23,624.00	17,835.00	20,364.00	13,791.00	20,148.00
TOTAL	283,154.00	218,356.00	157,747.00	158,539.00	28,584.00	30,412.00

	1978	1979	1980	1981	1982	1983
<u>Manganese content:</u>						
Percent Mn: 2/						
Ferruginous manganese ore %	12.67	13.46	13.47	14.55	16.30	14.93
Manganiferous iron ore %	7.00	7.56	9.54	9.62	8.72	8.95
TOTAL %	11.76	12.82	13.03	13.92	12.64	10.97
=====						
<u>Weight of Mn:</u>						
Ferruginous manganese ore	33,309.00	26,212.00	18,852.00	20,018.00	2,412.00	1,532.00
Manganiferous iron ore	1,414.00	1,786.00	1,701.00	1,960.00	1,202.00	1,803.00
TOTAL	34,723.00	27,998.00	20,553.00	22,068.00	3,614.00	3,335.00
<u>PRODUCTION OF MANGANESE</u>						
<u>BEARING METALLICS:</u>						
<u>Ferromanganese:</u>						
Gross weight	247,235.00	287,670.00	171,886.00	174,805.00	108,000.00	78,000.00
<u>Manganese content:</u>						
Percent Mn %	80.60	80.20	79.70	80.00	82.00	81.00
Weight of Mn	247,235.00	230,778.00	136,969.00	139,848.00	88,450.00	63,000.00
<u>Silicomanganese</u>						
<u>(Ferrosilicomanganese):</u>						
Gross weight	129,000.00	150,000.00	171,000.00	157,000.00	63,000.00	W
<u>Manganese content</u>						
percent Mn and weight of Mn	NA	NA	NA	NA	NA	NA
Manganese metal, gross weight	21,101.00	25,120.00	24,258.00	21,974.00	16,864.00	W
<u>SHIPMENTS OF MANGANESE-BEARING</u>						
<u>METALLICS (gross weight on Mn):</u>						
Ferromanganese	288,000.00	299,000.00	176,000.00	171,000.00	89,000.00	99,000.00
Silicomanganese	139,000.00	151,000.00	147,000.00	157,000.00	75,000.00	57,000.00
<u>COPPER:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore production: 9/</u>						
Gross weight	239,247,000.00	277,532,000.00	221,597,000.00	277,674,000.00	181,944,000.00	177,993,000.00
<u>Copper content:</u>						
Percent Cu %	0.51	0.47	0.48	0.51	0.55	0.51
Weight of Cu	1,220,160.00	1,304,400.00	1,063,700.00	1,416,100.00	1,000,700.00	907,800.00

	1978	1979	1980	1981	1982	1983
<u>Crude ore shipped directly</u>						
<u>to smelters: 10/</u>						
Gross weight	257,910.00	198,789.00	110,563.00	157,971.00	117,726.00	63,489.00
Copper content						
(recoverable basis 11/):						
Percent Cu %	0.22	0.30	0.38	0.14	0.14	0.04
Weight of Cu	573.00	598.00	420.00	223.00	167.00	24.00
<u>Crude ore Concentrated:</u>						
Gross weight	224,893,000.00	248,722,000.00	207,287,000.00	263,349,000.00	174,537,000.00	171,776,000.00
Copper content						
(recoverable basis 11/):						
Percent Cu %	0.50	0.40	0.46	0.49	0.51	0.47
Weight of Cu	1,126,660.00	1,208,731.00	963,506.00	1,275,999.00	883,153.00	810,090.00
<u>Crude ore treated by leaching:</u>						
Gross weight	14,096,251.00	15,869,000.00	14,199,000.00	14,167,000.00	7,289,000.00	6,154,000.00
Copper content						
(recoverable basis 11/):						
Percent Cu %	0.72	0.56	0.68	0.93	1.70	1.71
Weight of Cu	102,063.00	88,501.00	97,179.00	131,400.00	123,848.00	104,991.00
<u>Recovery of copper from sources</u>						
<u>other than copper ore:</u>						
Gross weight of materials treated:						
Tailings, dumps, and in-place						
material treated by leaching	NA	NA	NA	NA	NA	NA
Silver ore	NA	NA	NA	NA	3,652,000.00	4,097,000.00
Lead ore	NA	NA	NA	NA	8,531,000.00	7,303,000.00
Gold, gold-silver, lead-zinc,						
molybdenum and tungsten ores						
plus cleanup and tailings materials	NA	NA	NA	NA	6,417,000.00	2,652,000.00
Copper content, weight of Cu:						
From tailings, dumps, and in-place						
material, by leaching	111,164.00	126,514.00	102,263.00	113,991.00	104,791.00	89,274.00
From silver ore	-	-	-	-	20,616.00	19,384.00
From lead ore	17,126.00	19,211.00	17,748.00	16,547.00	7,941.00	7,725.00
From gold, gold-silver, lead-zinc,						
molybdenum and tungsten ores plus						
from cleanup and tailings materials	-	-	-	-	6,459.00	6,610.00
Unaccounted	-	3,030.00	-	-	-	-
<u>Total production of copper from all</u>						
<u>domestic ores and other primary</u>						
<u>materials by all methods 12/</u>	1,357,586.00	1,446,586.00	1,181,116.00	1,538,160.00	1,146,975.00	1,038,098.00

	1978	1979	1980	1981	1982	1983
SMELTEER PRODUCTION:						
Primary:						
From domestic ore	1,269,981.00	1,313,224.00	994,479.00	1,294,962.00	940,547.00	888,130.00
From foreign ore	18,397.00	22,383.00	13,918.00	21,794.00	35,148.00	39,609.00
TOTAL	1,288,378.00	1,385,607.00	1,008,397.00	1,316,756.00	975,695.00	927,739.00
Secondary						
	54,216.00	60,231.00	44,876.00	60,882.00	45,105.00	59,276.00
Grand total	1,342,594.00	1,395,838.00	1,053,273.00	1,377,638.00	1,020,800.00	987,015.00
REFINERY PRODUCTION:						
From primary producers: 13/						
Primary copper:						
From domestic materials:						
Electrolytic	1,124,585.00	1,207,572.00	924,190.00	1,194,566.00	891,615.00	820,778.00
Electrowon	98,416.00	100,134.00	117,572.00	161,083.00	131,858.00	101,935.00
Fire refined	104,372.00	105,091.00	84,469.00	74,561.00	41,060.00	80,955.00
Total from domestic materials	1,327,373.00	1,412,797.00	1,126,231.00	1,430,210.00	1,064,533.00	1,003,668.00
From foreign materials, by all processes	121,684.00	103,858.00	88,957.00	113,807.00	162,245.00	178,422.00
Total primary	1,449,057.00	1,516,655.00	1,215,188.00	1,544,017.00	1,226,778.00	1,182,090.00
Secondary copper:						
From old scrap	166,615.00	158,708.00	227,781.00	239,004.00	194,897.00	183,796.00
From new scrap	126,822.00	139,636.00	87,281.00	75,049.00	74,055.00	40,925.00
Total secondary	293,437.00	298,344.00	315,062.00	314,053.00	268,952.00	224,721.00
Total from primary producers	1,742,494.00	1,814,999.00	1,530,250.00	1,847,355.00	1,495,730.00	1,406,811.00
From secondary producers:						
From old scrap	126,666.00	200,115.00	200,021.00	179,499.00	198,597.00	176,911.00
Total refined output: 14/						
Primary	1,449,057.00	1,516,655.00	1,215,188.00	1,544,017.00	1,226,778.00	1,182,090.00
Secondary	420,103.00	498,459.00	515,083.00	493,552.00	467,549.00	401,632.00
Grand total	1,869,160.00	2,015,114.00	1,730,271.00	2,037,569.00	1,694,327.00	1,583,722.00

	1978	1979	1980	1981	1982	1983
<u>LEAD:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude lead ore production:</u>						
Gross weight	8,004,900.00	8,275,851.00	9,144,127.00	7,729,857.00	8,534,351.00	7,303,067.00
Lead content (recoverable basis):						
Percent Pb <u>2/</u>	5.78	5.71	5.44	5.04	5.56	5.60
Weight of Pb	462,567.00	472,376.00	497,928.00	389,746.00	474,553.00	409,281.00
<u>Crude zinc ore production: 15/</u>						
Gross weight	1,003,475.00	589,328.00	871,234.00	908,090.00	609,152.00	683,150.00
Lead content (recoverable basis):						
Percent Pb <u>2/</u>	0.30	0.35	0.28	0.28	0.16	0.19
Weight of Pb	3,016.00	2,054.00	2,439.00	2,575.00	974.00	1,299.00
<u>Crude lead-zinc ore production 15/</u>						
Gross weight	1,165,986.00	914,506.00	1,052,771.00	878,750.00	308,726.00	(16/)
Lead content (recoverable basis):						
Percent Pb <u>2/</u>	3.42	3.31	3.17	3.24	3.96	(16/)
Weight of Pb	39,904.00	30,314.00	33,329.00	28,484.00	12,238.00	(16/)
<u>Crude copper-lead, copper-zinc, and copper-lead-zinc ore production: 15/</u>						
Gross weight	180,212.00	--	--	--	--	--
Lead content (recoverable basis):						
Percent Pb <u>2/</u>						
Weight of Pb	4,270.00	--	--	--	--	--
<u>Other sources of primary lead: 17/</u>						
Gross weight	46,910,819.00	50,437,079.00	38,723,932.00	68,838,151.00	41,475,733.00	17,948,423.00
Lead content (recoverable basis):						
Percent Pb <u>2/</u>	0,042.00	0,041.00	0,041.00	0,036.00	0,059.00	0.21
Weight of Pb	19,904.00	20,825.00	15,788.00	24,730.00	24,660.00	38,458.00
<u>Lead from unspecified sources, weight of Pb 18/</u>						
	--	--	882.00	--	91.00	--

	1978	1979	1980	1981	1982	1983
<u>Total crude lead-bearing ores production:</u>						
Gross weight	57,265,332.00	60,216,764.00	49,792,064.00	78,354,848.00	50,927,962.00	25,934,640.00
Lead content (recoverable basis):						
Percent Pb	0.92	0.87	1.11	0.57	1.01	1.73
Weight of Pb	529,661.00	525,569.00	550,366.00	445,535.00	512,516.00	449,038.00
SMEILER AND REFINERY PRODUCTION: 19/						
<u>Primary:</u>						
From domestic ores and base bullion	501,643.00	529,970.00	508,163.00	440,238.00	459,865.00	459,328.00
From foreign ores and base bullion	63,530.00	45,641.00	39,427.00	55,085.00	52,295.00	55,227.00
TOTAL	575,173.00	575,611.00	547,590.00	495,323.00	512,160.00	514,555.00
<u>Secondary: 20/</u>						
From primary plants	1,244.00	2,862.00	2,117.00	1,745.00	657.00	648.00
From secondary plants	767,992.00	798,506.00	673,461.00	599,360.00	570,619.00	502,853.00
TOTAL	769,236.00	801,368.00	675,578.00	641,105.00	571,276.00	503,501.00
<u>Secondary:</u>						
From old scrap	649,500.00	672,743.00	581,387.00	578,031.00	521,272.00	451,978.00
From new scrap	119,736.00	128,625.00	94,191.00	63,074.00	50,004.00	51,523.00
TOTAL	769,236.00	801,368.00	675,578.00	641,105.00	571,276.00	503,501.00
<u>All types:</u>						
Primary	575,173.00	575,611.00	547,590.00	495,323.00	512,160.00	514,555.00
Secondary from old scrap	649,500.00	672,743.00	581,387.00	578,031.00	521,272.00	451,978.00
TOTAL 21/	1,224,673.00	1,248,354.00	1,128,977.00	1,073,354.00	1,033,432.00	966,533.00
Secondary from new scrap	119,736.00	128,625.00	94,191.00	63,074.00	50,004.00	51,523.00
Grand total	1,344,409.00	1,376,979.00	1,223,168.00	1,136,428.00	1,083,436.00	1,018,056.00

	1978	1979	1980	1981	1982	1983
<u>ZINC:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude zinc ore production:</u>						
Gross weight	4,911,273.00	4,499,058.00	5,861,248.00	6,011,658.00	5,610,194.00	5,128,874.00
Zinc content (recoverable basis):						
Percent Zn <u>2/</u>	3.52	3.50	3.50	3.38	3.74	3.87
Weight of Zn	172,647.00	157,462.00	205,142.00	203,068.00	209,935.00	198,367.00
<u>Crude lead ore production: 22/</u>						
Gross weight	8,004,900.00	8,275,851.00	9,091,559.00	7,729,850.00	8,530,735.00	7,303,067.00
Zinc content (recoverable basis):						
Percent Zn <u>2/</u>	0.80	0.75	0.69	0.68	0.75	0.78
Weight of Zn	63,931.00	61,751.00	62,886.00	52,908.00	63,680.00	57,044.00
<u>Crude lead-zinc ore production 22/</u>						
Gross weight	1,165,986.00	914,506.00	1,052,771.00	878,750.00	308,726.00	(16/)
Zinc content (recoverable basis):						
Percent Zn <u>2/</u>	4.12	3.98	2.48	5.10	5.25	(16/)
Weight of Zn	47,990.00	36,370.00	26,097.00	44,835.00	16,204.00	(16/)
<u>Crude copper-lead, copper-zinc, and copper-lead-zinc ore production: 22/</u>						
Gross weight	2,017,638.00	1,900,925.00	1,901,533.00	1,783,605.00	1,603,935.00	1,822,270.00
Zinc content (recoverable basis):						
Percent Zn <u>2/</u>	0.55	0.20	0.19	0.13	0.14	0.09
Weight of Zn	11,063.00	3,761.00	3,694.00	2,315.00	2,284.00	1,605.00
<u>Other sources of primary zinc: 17/</u>						
Gross weight	46,910,819.00	50,395,891.00	38,519,054.00	68,838,151.00	NA	NA
Zinc content (recoverable basis):						
Percent Zn <u>2/</u>	0.015.00	0.016.00	0.010.00	0.013.00	NA	NA
Weight of Zn	7,039.00	7,997.00	3,763.00	9,292.00	8,171.00	18,277.00
<u>Zinc from unspecified sources, weight of Zn 18/</u>						
	--	--	--	--	2,886.00	--

	1978	1979	1980	1981	1982	1983
<u>Total crude zinc bearing materials production:</u>						
Gross weight	63,010,616.00	65,986,231.00	56,478,528.00	85,242,014.00	NA	NA
Zinc content:						
Percent Zn <u>2/</u>	0.48	0.41	0.56	0.37	NA	NA
Weight of Zn <u>23/</u>	302,669.00	267,341.00	317,103.00	312,418.00	303,160.00	275,294.00
ZINC METAL (SLAB ZINC) PRODUCTION:						
<u>Primary:</u>						
From domestic ores	267,350.00	255,344.00	231,850.00	259,835.00	193,284.00	210,315.00
From foreign ores	139,348.00	217,137.00	108,606.00	86,728.00	34,892.00	25,379.00
TOTAL	406,698.00	472,481.00	340,456.00	346,563.00	228,176.00	235,694.00
<u>Secondary: <u>24/</u></u>						
At primary smelters	24,085.00	40,343.00	13,113.00	14,438.00	42,418.00	40,545.00
At secondary smelters	10,689.00	12,868.00	16,283.00	35,754.00	31,870.00	28,845.00
TOTAL	34,774.00 <u>23/</u>	53,212.00	29,396.00	50,192.00	74,288.00	69,390.00
Grand total	441,472.00	525,693.00	369,852.00	396,755.00	302,464.00	305,084.00
<u>GOLD:</u>						
<u>MINE PRODUCTION:</u>						
<u>Placer deposit production:</u>						
Gravel processed						
thousand cubic meters	1,113,000.00	599,000.00	760,000.00	2,550,000.00	4,269,000.00	4,366,000.00
Gold content (recoverable basis), weight of Au troy ounces	22,291.00	9,527.00	16,968.00	28,927.00	38,466.00	49,066.00
<u>Crude gold ore production:</u>						
Ore mined	3,893,974.00	6,391,766.00	8,974,417.00	11,547,503.00	16,254,983.00	21,333,550.00
Gold content (recoverable basis), weight of Au troy ounces	534,568.00	516,747.00	599,506.00	921,930.00	1,124,225.00	1,553,206.00
<u>Crude gold-silver ore production:</u>						
Ore mined	669,141.00	686,031.00	791,083.00	944,249.00	1,100,639.00	1,024,898.00
Gold content (recoverable basis), weight of Au troy ounces	39,038.00	35,184.00	33,428.00	40,514.00	37,697.00	43,795.00
<u>Crude silver ore production: <u>25/</u></u>						
Ore mined	899,691.00	872,974.00	1,746,276.00	3,999,603.00	4,824,854.00	6,706,174.00
Gold content (recoverable basis), weight of Au troy ounces	3,975.00	5,816.00	5,472.00	15,254.00	13,539.00	34,931.00

	1978	1979	1980	1981	1982	1983
<u>Crude copper ore production: 25/</u>						
Ore mined	192,212,661.00	212,853,986.00	178,980,552.00	239,812,348.00	147,223,926.00	140,568,752.00
Gold content (recoverable basis), weight of Au troy ounces	367,159.00	383,348.00	272,665.00	352,768.00	233,093.00	258,222.00
<u>Crude lead and zinc ore production: 25/</u>						
Ore mined	43,741.00	3,065,397.00	3,094,368.00	579.00	--	--
Gold content (recoverable basis), weight of Au troy ounces	111.00	434.00	1,887.00	30.00	--	--
<u>Crude copper-lead, lead-zinc, copper-zinc, and copper-lead- zinc ore production: 25/</u>						
Ore mined	3,254,071.00	909,066.00	1,038,962.00	2,860,011.00	(28/)	(28/)
Gold content (recoverable basis), weight of Au troy ounces	31,092.00	12,497.00	37,092.00	11,582.00	(28/)	(28/)
<u>Old tailings processed for gold recovery:</u>						
Tailings processed	42,108.00	38,549.00	61,347.00	328,027.00	586,118.00	777,422.00
Gold content (recoverable basis), weight of Au troy ounces	598.00	837.00	2,764.00	8,156.00	18,666.00	18,159.00
<u>Total primary gold-bearing materials:</u>						
Crude materials processed 26/	201,015,387.00	224,817,769.00	194,687,004.00	259,492,310.00	169,990,521.00	170,410,422.00
Gold content (recoverable basis):						
In placer material troy ounces	22,291.00	9,527.00	16,968.00	28,927.00	38,466.00	49,066.00
In other material troy ounces	976,541.00	954,863.00	952,814.00	1,350,234.00	1,427,120.00	1,908,313.00
Grand total troy ounces	998,832.00	964,390.00	969,782.00	1,379,161.00	1,465,686.00	1,957,379.00

	1978	1979	1980	1981	1982	1983
REFINED METAL PRODUCTION:						
=====						
<u>From concentrates, ores and</u>						
<u>other primary materials:</u>						
Of domestic origin						
thousand troy ounces	962.00	795.00	773.00	801.00	718.00	885.00
Of foreign origin						
thousand troy ounces	71.00	83.00	14.00	4.00	1.00	7.00
TOTAL thousand troy ounces	1,033.00	878.00	787.00	805.00	719.00	892.00
<u>From old scrap</u>						
thousand troy ounces	1,384.00	1,675.00	2,184.00	1,610.00	1,444.00	1,380.00
<u>From new scrap</u>						
thousand troy ounces	1,701.00	1,208.00	1,640.00	1,475.00	1,596.00	1,580.00
=====						
Grand total						
thousand troy ounces	4,118.00	3,761.00	4,612.00	3,890.00	3,760.00	3,853.00
<u>U.S. Government-owned gold</u>						
<u>(mostly gold coin), up-</u>						
<u>graded through metallurgical</u>						
<u>processing (not included above),</u>						
thousand troy ounces	2,387.00	3,000.00	2,922.00	2,477.00	--	--

	1978	1979	1980	1981	1982	1983
<u>SILVER:</u>						
<u>MINE PRODUCTION:</u>						
<u>Placer gravel production:</u>						
Gravel produced						
thousand cubic meters	NA	NA	NA	NA	NA	NA
Silver content (recoverable basis),						
weight of Ag troy ounces	2,014.00	431.00	467.00	1,839.00	2,012.00	4,035.00
<u>Crude silver ore production:</u>						
Ore mined	999,878.00	966,688.00	1,872,603.00	4,117,098.00	4,919,046.00	6,793,140.00
Silver content (recoverable basis),						
weight of Ag troy ounces	18,453,836.00	16,766,967.00	13,699,057.00	19,095,412.00	23,577,319.00	30,063,899.00
<u>Crude gold-silver ore production: 27/</u>						
Ore mined	669,141.00	686,032.00	791,083.00	944,269.00	1,100,639.00	1,024,898.00
Silver content (recoverable basis),						
weight of Ag troy ounces	2,614,678.00	2,152,845.00	1,953,874.00	2,263,535.00	2,769,495.00	1,794,753.00
<u>Crude gold ore production: 27/</u>						
Ore mined	3,174,345.00	3,811,958.00	4,999,265.00	7,945,456.00	11,872,749.00	16,628,449.00
Silver content (recoverable basis),						
weight of Ag troy ounces	555,863.00	677,819.00	749,785.00	754,037.00	852,500.00	1,146,835.00
<u>Crude copper ore production: 27/</u>						
Ore mined	246,026,180.00	242,502,743.00	199,846,947.00	255,771,371.00	173,012,221.00	155,686,342.00
Silver content (recoverable basis),						
weight of Ag troy ounces	12,456,126.00	13,877,531.00	11,135,824.00	13,952,838.00	9,420,220.00	7,344,180.00
<u>Crude lead ore production: 27/</u>						
Ore mined	7,963,443.00	8,276,078.00	9,145,319.00	7,732,886.00	8,534,327.00	7,303,067.00
Silver content (recoverable basis),						
weight of Ag troy ounces	2,062,010.00	2,278,603.00	2,534,828.00	1,839,198.00	2,244,737.00	2,021,346.00
<u>Crude zinc ore production: 27/</u>						
Ore mined	1,257,489.00	609,893.00	336,295.00	509,811.00	647,030.00	683,150.00
Silver content (recoverable basis),						
weight of Ag troy ounces	71,389.00	12,984.00	20,956.00	28,863.00	27,212.00	33,137.00
<u>Crude copper-lead, lead-zinc,</u>						
<u>copper-zinc and copper-lead-</u>						
<u>zinc ore production: 27/</u>						
Ore mined	3,263,297.00	2,815,602.00	2,954,304.00	2,891,188.00	1,927,901.00	(28/)
Silver content (recoverable basis),						
weight of Ag troy ounces	2,925,975.00	2,055,561.00	2,112,419.00	2,369,785.00	919,329.00	(28/)
<u>Old tailings and other ores</u>						
<u>processed for silver recovery: 27/29/</u>						
Quantity processed	110,287.00	38,549.00	61,347.00	259,835.00	393,215.00	777,049.00
Silver content (recoverable basis),						
weight of Ag troy ounces	243,559.00	72,783.00	122,163.00	377,666.00	435,585.00	1,007,082.00

	1978	1979	1980	1981	1982	1983
<u>Total production of primary</u>						
<u>silver-bearing materials:</u>						
Crude materials processed	258,876,687.00	259,707,544.00	220,007,163.00	280,171,914.00	202,407,481.00	188,896,096.00
=====						
Silver materials						
(recoverable basis):						
In placer material troy ounces	2,014.00	431.00	467.00	1,839.00	2,012.00	4,035.00
In other material troy ounces	39,383,356.00	37,895,093.00	32,328,906.00	40,681,334.00	40,246,397.00	43,411,232.00
=====						
Grand total troy ounces	39,385,370.00	37,895,524.00	32,329,373.00	40,683,173.00	40,248,409.00	43,415,267.00
=====						
<u>REFINED METAL PRODUCTION:</u>						
<u>From concentrates, ores and</u>						
<u>other primary materials:</u>						
Of domestic origin						
thousand troy ounces	44,018.00	38,982.00	36,171.00	44,487.00	43,825.00	50,281.00
Of foreign origin						
thousand troy ounces	10,342.00	11,779.00	3,182.00	2,520.00	344.00	169.00
TOTAL thousand troy ounces	54,360.00	50,761.00	39,353.00	47,007.00	44,170.00	50,450.00
=====						
<u>From old scrap:</u>						
Coins thousand troy ounces	1,331.00	3,909.00	12,089.00	1,118.00	NA	NA
Other thousand troy ounces	35,751.00	35,820.00	41,043.00	37,949.00	NA	NA
TOTAL thousand troy ounces	37,082.00	39,729.00	53,131.00	39,067.00	27,171.00	25,549.00
<u>From new scrap</u>						
thousand troy ounces	41,171.00	36,714.00	65,642.00	44,738.00	37,812.00	41,839.00
=====						
Grand total refined						
thousand troy ounces	132,613.00	127,204.00	158,126.00	130,812.00	109,153.00	117,838.00

	1978	1979	1980	1981	1982	1983
MOLYBDENUM						
CONCENTRATE PRODUCTION:						
Molybdenum content of concentrate produced, weight of contained Mo	59,803.00	65,302.00	68,350.00	63,458.00	38,275.00	15,400.00
Molybdenum content of concentrate shipped, weight of contained Mo	59,282.00	65,092.00	67,726.00	53,939.00	34,543.00	22,300.00
TIN:						
CONCENTRATE PRODUCTION:						
Tin content of concentrate produced, weight of contained Sn e/ 30/	100.00	100.00	100.00	100.00	100.00	100.00
METAL PRODUCTION:						
Primary e/	5,900.00	4,600.00	3,000.00	2,000.00	3,500.00	2,500.00
=====						
Secondary (as elemental tin):						
Produced at detinning plants	1,539.00	1,749.00	1,677.00	1,569.00	1,054.00	1,170.00
Produced at other plants	26.00	18.00	26.00	18.00	13.00	10.00
TOTAL	1,565.00	1,767.00	1,703.00	1,587.00	1,067.00	1,180.00
=====						
Secondary recovery other than as elemental metal tin:						
Bronze and brass:						
From copper-base scrap	12,357.00	12,044.00	10,352.00	8,864.00	6,897.00	6,596.00
From lead-base and tin-base scrap	62.00	46.00	e/ 50.00	30.00	74.00	88.00
TOTAL	12,419.00	12,090.00	10,402.00	8,894.00	6,971.00	6,684.00

	1978	1979	1980	1981	1982	1983
Other:						
Solder	4,363.00	5,282.00	4,423.00	3,035.00	2,723.00	3,072.00
Type metal	1,038.00	58.00	525.00	576.00	222.00	172.00
Babbitt	521.00	441.00	378.00	261.00	237.00	185.00
Antimonial lead	712.00	867.00	856.00	791.00	1,015.00	803.00
Chemical compounds	463.00	433.00	321.00	265.00	447.00	182.00
Miscellaneous <u>31/</u>	19.00	29.00	e/ 30.00	29.00	101.00	94.00
Undistributed <u>31/</u>	--	--	--	--	1,510.00	2,450.00
TOTAL	7,116.00	7,636.00	6,533.00	4,957.00	5,255.00	6,958.00
Grand total of secondary recovery	21,100.00	21,493.00	18,638.00	15,438.00	14,293.00	14,822.00
TUNGSTEN:						
CONCENTRATE PRODUCTION:						
Tungsten content of concentrate produced, weight of contained W	3,128.00	3,013.00	2,754.00	3,605.00	1,521.00	980.00
Tungsten content of concentrate shipped, weight of contained W	3,130.00	3,014.00	2,738.00	3,545.00	1,575.00	1,016.00
FLUORSPAR:						
MINE PRODUCTION:						
Crude ore mined, gross weight	406,306.00	369,273.00	337,556.00	377,264.00	181,178.00	W
Crude ore beneficiated, gross weight	406,020.00	322,645.00	291,405.00	380,163.00	210,218.00	W
CONCENTRATE PRODUCTION:						
Concentrate produced, gross weight	113,350.00	96,251.00	80,586.00	100,952.00	69,232.00	W
Concentrate shipped:						
Gross weight:						
Acid grade and ceramic grade	67,930.00	W	W	W	W	W
Metallurgical grade	49,485.00	W	W	W	W	W
TOTAL	117,415.00	99,154.00	84,037.00	104,693.00	69,869.00	55,300.00
Calcium fluoride content:						
Percent CaF2 for total shipment only <u>32/</u>	92.10	87.65	89.68	86.12	95.70	96.02
Weight of CaF2 for total shipment only <u>32/</u>	102,916.00	86,910.00	75,366.00	90,165.00	66,864.00	53,100.00

	1978	1979	1980	1981	1982	1983
<u>PHOSPHATE ROCK:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore mined:</u>						
Gross weight thousand tons	173,429.00	185,757.00	209,883.00	183,733.00	104,135.00	125,691.00
Phosphorus pentoxide content:						
Percent P2.O5 <u>2/</u>	12,270.00	8,057.00	11,324.00	12,931.00	12,895.00	13,970.00
Weight of P2.O5 thousand tons	21,278.00	23,056.00	23,767.00	23,759.00	13,428.00	17,559.00
<u>Crude ore sold directly:</u>						
Gross weight thousand tons	2,738.00	2,775.00	2,564.00	2,836.00	6,594.00	4,920.00
Phosphorus pentoxide content:						
Percent P2.O5 <u>2/</u>	26,224.00	26,414.00	26,209.00	26,305.00	28,753.00	28,089.00
Weight of P2.O5 thousand tons	718.00	733.00	672.00	746.00	1,896.00	1,382.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced:</u>						
Gross weight thousand tons	47,298.00	48,835.00	51,851.00	50,788.00	30,815.00	37,653.00
Phosphorus pentoxide content:						
Percent P2.O5 <u>2/</u>	30,898.00	30,941.00	30,933.00	30,753.00	31,180.00	31,089.00
Weight of P2.O5 thousand tons	14,614.00	15,110.00	16,039.00	15,619.00	9,608.00	11,706.00
<u>MARKETABLE PRODUCTION <u>33/</u></u>						
<u>Output:</u>						
Gross weight thousand tons	<u>23/</u> 50,037.00	<u>23/</u> 51,611.00	54,415.00	53,624.00	37,409.00	42,573.00
Phosphorus pentoxide content:						
Percent P2.O5 <u>2/</u>	30,641.00	30,697.00	30,710.00	30,518.00	30,748.00	30,428.00
Weight of P2.O5 thousand tons	15,332.00	15,843.00	16,711.00	16,365.00	11,504.00	13,088.00
<u>Sales:</u>						
Gross weight thousand tons	48,774.00	53,063.00	54,581.00	45,526.00	38,571.00	46,839.00
Phosphorus pentoxide content:						
Percent P2.O5 <u>2/</u>	30,647.00	30,765.00	30,798.00	30,618.00	30,629.00	30,607.00
Weight of P2.O5 thousand tons	14,948.00	16,325.00	16,810.00	13,939.00	11,814.00	14,336.00

- e/ Estimated by U.S. Bureau of Mines. NA not available. W withheld to avoid disclosing individual company proprietary data.
- 1/ Although individual data for the gross weight of crude ore mined for direct shipping and of concentrates produced cannot be published because to do so would reveal company proprietary data, the aggregate of these two figures can be published, and is given below under "Production of useable ore".
- 2/ Computed from published figures for gross weight and weight of metal contained.
- 3/ Concentrate production and shipments do not include any material used in producing agglomerates (shown separately below).
- 4/ Comprises the nonduplicative sum of crude ore mined for direct shipment to iron and steel plants concentrate produced for direct shipment to iron and steel plants, and agglomerates produced.
- 5/ Duplicates data presented above; included here to show components of total given below.
- 6/ "Crude ore mined for direct shipment and "Concentrates produced" cannot be reported separately as previously noted (footnote); figures entered here under "Concentrates produced" are actually the sum of these two figures.
- 7/ By U.S. standards (not used elsewhere), manganiferous materials must contain 35% or more manganese in order to be classified as manganese ore, and no such materials were produced in the United States during 1978-83. However, lower grade manganiferous materials were produced as a source of manganese, and available information on this output is included below.
- 8/ Data on actual crude mine production and on concentrate production are not available; figures given below represent shipments of marketable products, including without duplication, direct-shipping ore, concentrates made from ore of domestic origin, and nodules manufactured from ore of domestic origin.
- 9/ Includes only that ore designated as copper ore does not include ores from which copper is obtained as a by product.
- 10/ Primarily smelter fluxing material.
- 11/ For explanation of recoverable basis, see accompanying text; values are calculated from reported gross weights and reported metal content on a weight basis.
- 12/ Total weight of recoverable copper in all primary materials of domestic origin.
- 13/ Not synonymous with primary production; this is output by plants that operate largely on ores, but that also process some scrap.
- 14/ Includes all primary production, all secondary production on from primary producers, (both from old and new scrap) and secondary production by secondary producers from old scrap.
- 15/ Includes only these ores of this type from which lead is actually recovered.
- 16/ Included with "Other sources" below to avoid disclosing individual company proprietary data
- 17/ Ores of copper, silver, gold, fluorspar and items indicated by footnote 16, as well as minetailings and materials from miscellaneous cleanups.
- 18/ Included to make sum of detail agree with published total. The total was revised but the specific distribution of the addition was not reported.
- 19/ Smelter and refinery output for the United States are not significantly different; separate data are not kept.
- 20/ Includes output from both old and new scrap; breakdown given below.
- 21/ Corresponds to United Nations tentative proposal for total smelter/refinery production.

- 22/ Includes only those ores of this type from which zinc is actually recovered.
- 23/ Detail does not add to total shown because of independent rounding.
- 24/ Almost exclusively produced from old scrap.
- 25/ Includes only those ores of this type from which gold is actually recovered.
- 26/ Excludes placer gravels for which gravimetric data are not available (only volumetric figures are recorded).
- 27/ Includes only those ores of this type from which silver is actually recovered.
- 28/ Included elsewhere (partly in "Copper ore" and partly in "Old tailings etc." in order to avoid disclosing individual company proprietary data.
- 29/ Ores of tungsten and fluorspar and part of material indicated by footnote 28 as well as minetailings and materials from miscellaneous cleanups.
- 30/ The U.S. Bureau of Mines cannot publish reported output because to do so would disclose individual company proprietary figures; data supplied here is an estimate by the international Tin Council reflecting approximate order of magnitude of production.
- 31/ Data captioned "Miscellaneous" is reported under that heading (including foil and terne metal); that data captioned "Undistributed" is the difference between the reported total and the sum of listed items of detail, including "miscellaneous".
- 32/ Detail by grade not available for publication.
- 33/ Sum of direct-shipping ore sold directly and concentrate produced.

TABLE 9. MEXICO: Production of selected mineral commodities

Commodity	Unit of measure	1978	1979	1980	1981	1982	1983
IRON ORE:							
IRON CONTENT OF:							
Direct shipping ore	m.t.	1,387,268.00	1,447,315.00	1,637,499.00	1,568,139.00	329,817.00	258,568.00
Concentrate	m.t.	1,116,976.00	1,128,834.00	1,849,236.00	1,988,319.00	2,306,327.00	1,423,238.00
Pellets	m.t.	1,051,865.00	1,464,840.00	1,600,626.00	1,736,151.00	2,746,095.00	3,624,537.00
TOTAL	m.t.	3,556,109.00	4,040,989.00	5,087,361.00	5,292,609.00	5,382,329.00	5,306,343.00
MANGANESE ORE:							
MANGANESE CONTENT OF:							
Direct shipping ore	m.t.	10,048.00	6,251.00	6,176.00	4,941.00	1,422.00	629.00
Concentrate	m.t.	178,292.00	171,108.00	154,790.00	203,252.00	181,698.00	132,375.00
TOTAL	m.t.	188,340.00	177,359.00	160,966.00	208,193.00	183,120.00	133,004.00
COPPER:							
COPPER CONTENT OF:							
Concentrate	m.t.	208.00	23,252.00	89,789.00	161,267.00	161,718.00	114,068.00
Impure bars	m.t.	11,988.00	2,076.00	--	7,898.00	15,949.00	11,091.00
Refined copper	m.t.	74,990.00	81,781.00	85,610.00	61,301.00	61,424.00	80,903.00
TOTAL	m.t.	87,186.00	107,109.00	175,399.00	230,466.00	239,091.00	206,062.00
LEAD:							
LEAD CONTENT OF:							
Concentrate	m.t.	4,119.00	12.00	108.00	333.00	462.00	605.00
Calcinate	m.t.	309.00	256.00	311.00	337.00	--	--
Lead sulfate	m.t.	7.00	165.00	162.00	--	--	--
Impure bars	m.t.	6,756.00	6,106.00	4,674.00	6,164.00	8,144.00	4,089.00
Antimonial lead	m.t.	9,080.00	8,671.00	9,260.00	12,310.00	8,373.00	9,842.00
Refined lead	m.t.	150,262.00	158,245.00	131,034.00	138,240.00	128,865.00	152,619.00
Other metallurgical products	m.t.	--	--	--	--	--	250.00
TOTAL	m.t.	170,533.00	173,455.00	145,549.00	157,384.00	145,844.00	167,405.00

		1978	1979	1980	1981	1982	1983
<u>ZINC:</u>							
<u>ZINC CONTENT OF:</u>							
Concentrate	m.t.	47,894.00	61,176.00	71,863.00	61,639.00	90,237.00	66,906.00
Scoria	m.t.	10,298.00	7,326.00	8,390.00	9,299.00	--	664.00
Zinc oxide	m.t.	8,985.00	10,866.00	11,119.00	11,389.00	12,065.00	12,656.00
Zinc sulfate	m.t.	3,922.00	3,755.00	2,214.00	2,412.00	2,249.00	2,227.00
Impure zinc	m.t.	699.00	631.00	682.00	353.00	406.00	859.00
Aluminized zinc	m.t.	3,840.00	4,670.00	4,809.00	3,028.00	4,209.00	2,742.00
Refined zinc	m.t.	169,254.00	157,053.00	139,059.00	123,509.00	122,744.00	171,390.00
TOTAL	m.t.	244,892.00	245,477.00	238,136.00	211,629.00	231,910.00	257,444.00
<u>GOLD:</u>							
<u>GOLD CONTENT OF:</u>							
Concentrate	Kg.	192.00	81.00	315.00	474.00	334.00	217.00
Mixed bars	Kg.	--	--	--	--	--	840.00
Impure bars	Kg.	159.00	--	--	344.00	270.00	352.00
Doré	Kg.	--	--	--	--	51.00	--
Refined	Kg.	5,932.00	5,830.00	5,781.00	5,501.00	5,449.00	5,521.00
TOTAL	Kg.	6,283.00	5,911.00	6,096.00	6,319.00	6,104.00	6,930.00
<u>SILVER:</u>							
<u>SILVER CONTENT OF:</u>							
Concentrate	Kg.	58,350.00	25,103.00	60,158.00	94,954.00	95,073.00	89,902.00
Mixed bars	Kg.	--	--	--	--	--	49,513.00
Impure bars	Kg.	62,096.00	19,623.00	18,011.00	98,898.00	74,741.00	107,790.00
Doré	Kg.	--	--	--	--	138.00	--
Refined	Kg.	1,458,947.00	1,492,046.00	1,394,388.00	1,460,977.00	1,380,269.00	1,663,634.00
TOTAL	Kg.	1,579,383.00	1,536,772.00	1,472,557.00	1,654,829.00	1,550,221.00	1,910,839.00

		1978	1979	1980	1981	1982	1983
<u>MOLYBDENUM:</u>							
MOLYBDENUM CONTENT OF:							
Ore	m.t.	11.00	48.00	74.00	--	--	--
Concentrate	m.t.	--	--	--	451.00	5,190.00	5,866.00
TOTAL	m.t.	11.00	48.00	74.00	451.00	5,190.00	5,866.00
<u>TIN:</u>							
TIN CONTENT OF:							
Impure metal	m.t.	4.00	23.00	60.00	28.00	27.00	50.00
Refined metal <u>1/</u>	m.t.	69.00	1,268.00	1,322.00	838.00	944.00	1,216.00
=====							
<u>TUNGSTEN:</u>							
TUNGSTEN CONTENT OF:							
Ore	m.t.	234.00	47.00	58.00	24.00	12.00	15.00
Concentrate	m.t.	--	205.00	208.00	239.00	182.00	171.00
TOTAL	m.t.	234.00	252.00	266.00	263.00	194.00	186.00
=====							
<u>FLUORSPAR:</u>							
ORE, GROSS WEIGHT: <u>2/</u>							
Acid grade	m.t.	462,366.00	469,807.00	491,941.00	507,983.00	408,704.00	407,262.00
Ceramic grade	m.t.	42,882.00	72,370.00	104,281.00	107,500.00	54,144.00	45,860.00
Metallurgical grade	m.t.	300,481.00	275,113.00	299,892.00	307,405.00	172,285.00	72,600.00
Submetallurgical grade	m.t.	154,055.00	166,566.00	210,430.00	193,454.00	99,960.00	79,059.00
TOTAL	m.t.	959,784.00	983,856.00	1,106,544.00	1,116,342.00	735,093.00	604,781.00
=====							
<u>PHOSPHATE ROCK:</u>							
GROSS WEIGHT: <u>3/</u>							
For fertilizer and chemical industry	m.t.	NA	166,743.00	281,369.00	356,992.00	515,000.00	510,000.00
For animal food supplement	m.t.	NA	107,685.00	115,277.00	146,260.00	138,050.00	275,038.00
TOTAL	m.t.	322,076.00	274,428.00	396,646.00	503,252.00	653,050.00	785,038.00
=====							

1/ Produced from imported raw material.

2/ The following grade (% CaF_2) ranges were provided: Acid --97% or more; ceramic --85-96%; metallurgical --70-85%; submetallurgical --below 70%.

3/ The following grade (% P_2O_5) Figures were provided: for fertilizer and chemical industry grade --31-33%; for animal food supplement grade --18.22%.

TABLE 10. PERU: Production of Selected Mineral Commodities
(Metric tons unless otherwise specified)

	1978	1979	1980	1981	1982	1983
<u>IRON ORE:</u>						
<u>MINE PRODUCTION</u>						
<u>Crude ore mined:</u>						
Gross weight	7,063,076.00	7,913,785.00	7,608,153.00	9,332,405.00	7,558,909.00	6,981,682.00
Iron content:						
Percent Fe	% 53.00	53.00	53.00	53.30	53.00	53.31
Weight of Fe	3,743,430.00	4,194,306.00	4,032,321.00	4,974,183.00	4,006,222.00	3,721,237.00
<u>Crude Ore sold directly:</u>						
Gross weight	--	--	--	--	--	57,144.00
Iron content:						
Percent Fe	% --	--	--	--	--	68.63
Weight of Fe	--	--	--	--	--	39,218.00
<u>Crude ore concentrated:</u>						
Gross weight	6,951,979.00	7,789,115.00	7,488,299.00	10,074,000.00	7,321,500.00	6,871,700.00
Iron content:						
Percent Fe	% 53.00	53.00	53.00	53.30	53.00	53.31
Weight of Fe	3,684,549.00	4,128,231.00	3,968,798.00	5,369,442.00	3,902,360.00	3,662,616.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced:</u>						
Gross weight	5,212,219.00	5,835,510.00	5,600,000.00	6,037,307.00	5,462,647.00	4,275,917.00
Iron content:						
Percent Fe	% 67.10	67.15	67.18	67.10	68.00	67.00
Weight of Fe	3,497,399.00	3,918,545.00	3,767,210.00	4,051,033.00	3,714,612.00	2,864,865.00
<u>Concentrate sold:</u>						
Gross weight	<u>1/</u> 5,742,921.00	<u>1/</u> 4,885,480.00	<u>1/</u> 6,137,541.00	5,485,790.00	5,871,940.00	4,391,588.00
Iron content:						
Percent Fe	% 67.10	67.15	67.18	67.10	68.00	67.00
Weight of Fe	3,853,500.00	3,280,600.00	4,123,200.00	3,680,915.00	3,992,919.00	2,896,027.00

	1978	1979	1980	1981	1982	1983
<u>MANGANESE ORE:</u>						
<u>MINE PRODUCTION:</u>						
Crude ore mined, manganese content, weight of Mn	--	3,990.00	2,943.00	--	--	NA
<u>COPPER:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore mined:</u>						
Gross weight	50,983,421.00	49,072,032.00	50,256,147.00	44,520,960.00	49,492,980.00	46,728,814.00
Copper content:						
Percent Cu	% 0,874.00	0,931.00	0,829.00	0,864.00	0,845.00	0,801.00
Weight of Cu	445,597.00	456,861.00	416,623.00	384,661.00	418,216.00	374,298.00
<u>Crude ore sold directly</u>						
<u>Crude ore concentrated:</u>						
Gross weight	49,963,844.00	48,262,835.00	49,251,025.00	43,293,543.00	48,644,480.00	46,040,882.00
Copper content:						
Percent Cu	% 0,874.00	0,931.00	0,829.00	0,864.00	0,845.00	0,801.00
Weight of Cu	427,944.00	449,327.00	408,291.00	374,421.00	410,975.00	368,791.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced:</u>						
Gross weight	1,269,990.00	1,316,870.00	1,270,003.00	1,106,587.00	1,236,107.00	1,129,966.00
Copper content:						
Percent Cu	% 29.99	31.05	28.95	30.00	29.85	29.70
Weight of Cu	<u>2/</u> 380,870.00	<u>2/</u> 408,888.00	<u>2/</u> 367,666.00	331,976.00	368,978.00	335,600.00
<u>Concentrate sold:</u>						
Gross weight	192,251.00	181,710.00	130,041.00	194,760.00	253,494.00	244,990.00
Copper content:						
Percent Cu	% 29.99	31.05	28.95	30.00	29.85	29.70
Weight of Cu	57,656.00	56,421.00	37,647.00	58,428.00	75,660.00	72,762.00
<u>Concentrate smelted:</u>						
Gross weight	287,023.00	301,122.00	346,464.00	<u>3/</u> 183,637.00	<u>3/</u> 232,198.00	<u>3/</u> 251,875.00
Copper content:						
Percent Cu	% 29.99	31.05	28.95	<u>4/</u> 30.00	<u>4/</u> 29.85	<u>4/</u> 29.70
Weight of Cu	86,078.00	93,498.00	100,302.00	55,091.00	69,311.00	74,807.00

	1978	1979	1980	1981	1982	1983
SMELTER PRODUCTION: 5/						
Primary	85,045.00	90,693.00	98,296.00	53,438.00	67,282.00	73,311.00
Secondary	--	3,200.00	--	6,624.00	5,945.00	6,545.00
TOTAL	85,045.00	93,893.00	98,296.00	60,062.00	73,227.00	79,856.00
REFINERY PRODUCTION						
	224,052.00	240,406.00	230,858.00	209,124.00	224,035.00	182,982.00
Grand total copper produced 6/	366,753.00	390,720.00	366,801.00	327,614.00	369,425.00	335,600.00
LEAD:						
MINE PRODUCTION:						
Crude ore mined:						
Gross weight 1/	50,983,437.00	49,072,899.00	50,256,304.00	44,520,898.00	49,492,955.00	46,728,794.00
Lead content:						
Percent Pb %	0.483.00	0.476.00	0.460.00	0.512.00	0.511.00	0.514.00
Weight of Pb	246,250.00	233,587.00	231,179.00	227,947.00	252,909.00	240,186.00
Crude ore sold directly						
	--	--	--	--	--	--
Crude ore concentrated:						
Gross weight 1/	48,976,398.00	48,254,832.00	49,411,522.00	43,293,555.00	48,644,423.00	46,040,856.00
Lead content:						
Percent Pb %	0.483.00	0.476.00	0.460.00	0.512.00	0.511.00	0.514.00
Weight of Pb	236,556.00	229,693.00	227,293.00	221,663.00	248,573.00	236,650.00
CONCENTRATE PRODUCTION:						
Concentrate produced:						
Gross weight	397,995.00	389,787.00	382,090.00	377,070.00	423,975.00	424,267.00
Lead content:						
Percent Pb %	51.11	50.67	51.23	50.55	51.12	50.11
Weight of Pb	203,415.00	197,505.00	195,745.00	190,609.00	216,736.00	212,600.00
Concentrate sold:						
Gross weight	169,047.00	175,745.00	247,335.00	205,155.00	263,654.00	287,705.00
Lead content:						
Percent Pb %	51.11	50.67	51.23	50.55	51.12	50.11
Weight of Pb	86,400.00	89,050.00	126,710.00	103,706.00	134,780.00	144,169.00

	1978	1979	1980	1981	1982	1983
<u>Concentrate smelted:</u>						
Gross weight	177,243.00	180,375.00	173,289.00	171,915.00	160,321.00	136,562.00
Lead content:						
Percent Pb	% 51.11	50.67	51.23	50.55	51.12	50.11
Weight of Pb	90,589.00	91,396.00	88,776.00	86,903.00	81,956.00	68,431.00
=====						
<u>SMELTER PRODUCTION:</u>						
Primary	85,656.00	86,420.00	83,848.00	80,807.00	78,767.00	69,332.00
Secondary	1,030.00	--	120.00	3,030.00	80.00	--
TOTAL	86,686.00	86,420.00	83,968.00	83,837.00	78,847.00	69,332.00
REFINERY PRODUCTION	84,100.00	84,950.00	82,423.00	79,999.00	76,990.00	68,431.00
Grand total lead produced 6/	170,500.00	174,000.00	189,133.00	186,735.00	211,850.00	212,600.00
<u>ZINC:</u>						
<u>MINE PRODUCTION:</u>						
<u>Crude ore produced:</u>						
Gross weight 1/	50,983,389.00	49,072,062.00	50,256,191.00	44,520,944.00	57,583,875.00	46,728,806.00
Zinc content:						
Percent Zn	% 1,192.00	1,217.00	1,171.00	1,356.00	1,358.00	1,399.00
Weight of Zn	607,722.00	597,207.00	588,500.00	603,704.00	781,989.00	653,736.00
Crude ore sold directly	--	--	--	--	--	--
<u>Crude ore concentrated:</u>						
Gross weight 1/	48,965,772.00	48,299,918.00	49,282,067.00	43,293,510.00	48,644,477.00	46,040,886.00
Zinc content:						
Percent Zn	% 1,192.00	1,217.00	1,171.00	1,356.00	1,358.00	1,399.00
Weight of Zn	583,672.00	587,810.00	577,093.00	587,060.00	660,592.00	644,112.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced:</u>						
Gross weight	1,224,848.00	946,594.00	952,076.00	962,049.00	1,007,597.00	1,097,333.00
Zinc content:						
Percent Zn	% 53.00	52.59	52.31	52.80	56.00	52.50
Weight of Zn	7/ 503,709.00	507,280.00	498,031.00	507,962.00	564,254.00	576,100.00

		1978	1979	1980	1981	1982	1983
<u>Concentrate sold:</u>							
Gross weight		649,170.00	527,962.00	664,378.00	794,529.00	703,088.00	793,301.00
Zinc content:							
Percent Zn	%	53.00	52.59	52.30	52.80	56.00	52.50
Weight of Zn		344,060.00	227,655.00	347,536.00	419,511.00	393,729.00	416,483.00
<u>Concentrate smelted:</u>							
Gross weight		135,558.00	159,504.00	145,976.00	293,224.00	342,893.00	414,186.00
Zinc content:							
Percent Zn	%	53.00	52.59	52.31	52.80	56.00	52.50
Weight of Zn		71,846.00	83,883.00	76,360.00	154,822.00	192,020.00	217,448.00
=====							
<u>SMELTER PRODUCTION:</u>							
Primary		60,351.00	70,462.00	65,670.00	130,108.00	161,367.00	159,229.00
Secondary		3,656.00	4,230.00	4,597.00	4,538.00	4,112.00	3,873.00
TOTAL		64,007.00	74,692.00	70,267.00	134,646.00	165,479.00	163,102.00
REFINERY PRODUCTION		58,540.00	68,400.00	63,700.00	126,205.00	158,140.00	156,004.00
Grand total zinc produced	6/	402,600.00	432,000.00	487,596.00	550,254.00	555,981.00	576,400.00
<u>GOLD:</u>							
<u>MINE PRODUCTION:</u>							
Gold recovered from placers etc.	grams	2,346,300.00	2,105,892.00	2,264,401.00	2,651,275.00	2,066,712.00	2,628,141.00
Gold content of ores mined	grams	4,965,470.00	4,799,128.00	4,915,536.00	3,214,706.00	2,416,900.00	3,186,656.00
<u>CONCENTRATE PRODUCTION:</u>							
Gold content of concentrates produced	grams	4,468,922.00	4,319,214.00	4,423,982.00	8/ 2,893,235.00	2,175,210.00	8/ 2,867,940.00
Gold content of concentrates sold	grams	NA	NA	NA	9/ 160,066.00	660,938.00	9/ 594,844.00
REFINERY PRODUCTION	grams	1,157,831.00	1,878,080.00	1,592,000.00	2,009,159.00	1,578,000.00	1,592,000.00
Grand total gold produced	grams	3,504,131.00	4,155,201.00	3,870,053.00	4,820,500.00	4,305,650.00	4,814,985.00

		1978	1979	1980	1981	1982	1983
<u>SILVER:</u>							
<u>CONCENTRATE PRODUCTION:</u>							
<u>Gross weight of silver concentrate</u>		NA	NA	NA	NA	NA	
<u>Silver content of silver concentrate:</u>							
Grams per metric ton	Grams	11.63	11.62	11.62	11.62	11.62	11.62
Total weight of silver	Grams	(10/)	(10/)	(10/)	(10/)	(10/)	(10/)
<u>Gross weight of lead-silver concentrate</u>		NA	NA	NA	NA	NA	NA
<u>Silver content of silver concentrate:</u>							
Grams per metric ton	Grams	3.15	3.15	3.15	3.15	3.15	3.15
Total weight of silver	Grams	(10/)	(10/)	(10/)	(10/)	(10/)	(10/)
<u>Silver content of all concentrates</u>							
11/	Kg.	1,438,797.00	1,528,856.00	1,318,642.00	1,248,996.00	1,561,493.00	1,737,800.00
<u>CONCENTRATE SALES:</u>							
<u>Gross weight of concentrates sold</u>		NA	NA	NA	NA	NA	NA
<u>Silver content of concentrates sold, weight</u>	Kg.	812,500.00	743,300.00	819,400.00	644,260.00	818,917.00	980,300.00
<u>CONCENTRATES SMELTED:</u>							
<u>Gross weight</u>		NA	NA	NA	NA	NA	NA
<u>Silver content, weight</u>	Kg.	279,100.00	233,890.00	289,180.00	332,051.00	179,201.00	467,675.00
<u>SMELTER PRODUCTION, secondary only</u>	Kg.	65,300.00	63,200.00	67,250.00	71,140.00	66,000.00	66,845.00
<u>REFINED PRODUCTION</u>	Kg.	775,800.00	791,100.00	759,800.00	745,700.00	778,455.00	690,855.00
<u>Total silver production in all forms</u>	6/ Kg.	1,151,000.00	1,220,350.00	1,460,320.00	1,460,100.00	1,663,372.00	1,738,000.00

	1978	1979	1980	1981	1982	1983
MOLYBDENUM: 12/						
MINE PRODUCTION:						
Crude ore concentrated:						
Gross weight	NA	NA	NA	NA	NA	NA
Molybdenum content:						
Percent Mo	%					
Weight of Mo	13/	13/	13/	13/	13/	13/
	1,299.00	4,370.00	1,172.00	6,202.00	2,678.00	2,868.00
CONCENTRATE PRODUCTION:						
Concentrate produced:						
Gross weight	4,320.00	5,441.00	1,223.00	4,665.00	3,201.00	3,328.00
Molybdenum content:						
Percent Mo	%					
Weight of Mo	14/	14/	14/	14/	14/	14/
	53.71	53.80	54.61	53.25	53.77	55.38
	2,320.00	2,928.00	668.00	2,484.00	1,721.00	1,843.00
Concentrate sales:						
Gross weight	1,772.00	1,284.00	2,642.00	3,437.00	3,252.00	2,748.00
Molybdenum content:						
Percent Mo	%					
Weight of Mo	14/	14/	14/	14/	14/	14/
	53.71	53.80	54.61	53.25	53.77	55.38
	951.00	691.00	1,443.00	1,831.00	1,748.00	1,522.00
TIN:						
MINE PRODUCTION: 15/						
Crude ore concentrated:						
Gross weight	50,883.00	65,461.00	82,987.00	122,606.00	115,497.00	165,024.00
Tin content:						
Percent Sn	%					
Weight of Sn	2.11	2.11	2.11	2.11	2.11	2.11
	1,073.00	1,381.00	1,751.00	2,587.00	2,437.00	3,482.00
CONCENTRATE PRODUCTION:						
Concentrate produced:						
Gross weight	1,906.00	2,451.00	3,108.00	4,592.00	4,325.00	6,182.00
Tin content:						
Percent Sn	%					
Weight of Sn	38.68	38.68	38.68	38.68	38.68	38.68
	737.00	948.00	1,202.00	1,776.00	1,673.00	2,391.00

	1978	1979	1980	1981	1982	1983
<u>Concentrate sold:</u>						
Gross weight	1,867.00	2,246.00	2,785.00	3,927.00	4,325.00	6,122.00
Tin content:						
Percent Sn %	38.68	38.68	38.68	38.68	38.68	38.68.
Weight of Sn	722.00	869.00	1,077.00	1,519.00	1,673.00	2,368.00
<u>TUNGSTEN:</u>						
<u>MINE PRODUCTION: 15/</u>						
<u>Crude ore concentrated:</u>						
Gross weight	NA	NA	NA	NA	NA	NA
Tungsten content:						
Percent W %	NA	NA	NA	NA	NA	NA
Weight of W 16/	234.00	674.00	477.00	673.00	459.00	730.00
<u>CONCENTRATE PRODUCTION:</u>						
<u>Concentrate produced:</u>						
Gross weight	276.00	795.00	564.00	793.00	538.00	859.00
Tungsten content:						
Percent W 16/ %	59.48	59.48	59.48	59.39	59.68	59.59
Weight of W 16/	164.00	473.00	335.00	471.00	321.00	512.00
<u>Concentrate sold:</u>						
Gross weight	276.00	795.00	564.00	793.00	538.00	859.00
Tungsten content:						
Percent W 16/ %	59.48	59.48	59.48	59.39	59.68	59.59
Weight of W 16/	164.00	473.00	335.00	471.00	321.00	512.00
REFINERY PRODUCTION	151.00	165.00	247.00	--	--	--
Grand total tungsten produced	315.00	638.00	582.00	471.00	321.00	512.00

NA Not available

1/ Calculated from other data provided at conference.

2/ Including lixiviation materials transferred directly for electrowinning without intermediate processing.

3/ Calculated from assumed approximate grade and reported lead content.

4/ Assumed, based on reported grades of concentrates produced and sold.

- 5/ Production of smelters product for sale as suaws includes no adjustment for refined copper produced from smelter product or for material refined directly.
- 6/ As reported.
- 7/ Source material footnotes this entry including metallic content of "bulks and other concentrates" but multiplication of the reported gross weight by the reported metal content produces a figure of 649,169 tons of contained zinc, a number higher than the reported 503,709 tons. Apparently, the metal content of some unspecified material is not included.
- 8/ Includes content of concentrates other than gold concentrates.
- 9/ Excludes recovery of gold from washeries and elaboration of gold bars.
- 10/ Not reported separately, but included in total below of silver content of all concentrates.
- 11/ Silver content of silver concentrates, bulk concentrates and other concentrates.
- 12/ Data on crude ore not provided because molybdenum is produced as a byproduct from ores in which the molybdenum content is only at trace levels.
- 13/ Traces.
- 14/ Converted from MoS₂ originally reported to Mo basis.
- 15/ Data on crude ore not available.
- 16/ Converted from W03 originally reported to W basis.

TABLE 11. VENEZUELA: Production of selected mineral commodities

Commodity	Unit of measure	1978	1979	1980	1981	1982	1983
<u>IRON ORE:</u>							
<u>MINE PRODUCTION:</u>							
<u>Crude ore mined:</u>							
Gross weight	m.t.	13,515,081.00	15,260,367.00	16,102,455.00	15,530,785.00	11,701,036.00	9,448,628.00
Iron content: <u>1/</u>							
Percent Fe.	%	63.80	64.03	64.18	64.51	64.00	65.01
Weight Fe.	m.t.	8,622,622.00	9,771,213.00	10,334,556.00	10,018,909.00	7,488,663.00	6,142,553.00
<u>Ore sold directly:</u>							
Gross weight	m.t.	13,342,889.00	13,681,340.00	14,478,682.00	15,276,989.00	10,533,382.00	9,526,975.00
Iron content: <u>2/</u>							
Percent Fe.	%	61.37	60.95	61.08	60.46	61.21	62.22
Weight Fe.	m.t.	8,188,464.00	8,338,972.00	8,843,422.00	9,236,128.00	6,447,448.00	5,927,099.00
<u>AGGLOMERATE PRODUCTION:</u>							
=====							
<u>Aglomerate produced:</u>							
Gross weight:							
High silica pellets	m.t.	--	--	--	--	--	347,933
Briquets	m.t.	--	--	300,742.00	261,312.00	176,944.00	120,412.00
TOTAL	m.t.	--	--	300,742.00	261,312.00	176,944.00	468,345.00
=====							
Iron content: <u>2/</u>							
Percent Fe:							
High silica pellets	%	--	--	--	--	--	63.48
Briquets	%	--	--	86.50	63.02	85.68	85.00
TOTAL	%	--	--	86.50	63.02	85.68	68.84
=====							
Weight Fe:							
High silica pellets	m.t.	--	--	--	--	--	220,077.00
Briquets	m.t.	--	--	260,142.00	164,679.00	151,606.00	102,350.00
TOTAL	m.t.	--	--	260,142.00	164,679.00	151,606.00	322,427.00

		1978	1979	1980	1981	1982	1983
<u>Agglomerate sold</u>							
Gross weight:							
High silica pellets	m.t.	--	--	--	--	--	250,077.00
Briquets	m.t.	--	--	225,855.00	84,450.00	39,405.00	103,497.00
TOTAL	m.t.	--	--	225,855.00	84,450.00	39,405.00	353,574.00
Iron content: 2/							
Percent Fe.							
High silica pellets	%	--	--	--	--	--	63.48
Briquets	%	--	--	86.50	63.02	85.68	85.00
TOTAL	%	--	--	86.50	63.02	85.68	69.78
Weight of Fe:							
High silica pellets	m.t.	--	--	--	--	--	158,749.00
Briquets	m.t.	--	--	195,365.00	53,220.00	33,762.00	87,973.00
TOTAL	m.t.	--	--	195,365.00	53,220.00	33,762.00	246,722.00
<u>LEAD:</u>							
Smelter Production:							
Secondary only e/	m.t.	8,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00
<u>GOLD:</u>							
FROM GOLD MINES:							
Ore extracted	m.t.	37,974.00	86,115.00	109,676.00	169,050.00	149,565.00	166,693.00
Gold content:							
Au per ton.	Grams.	10.29	4.51	3.48	4.02	4.02	4.43
Weight of Au.	Grams.	390,658.00	338,567.00	381,721.00	679,823.00	601,894.00	739,544.00
FROM PLACER DEPOSITS:							
Material processed:							
From minning concessions	m.t.	10,631.00	10,376.00	11,964.00	35,428.00	36,948.00	72,267.00
By itinerant miners	m.t.	NA	NA	NA	NA	NA	NA

		1978	1979	1980	1981	1982	1983
Metal content:							
Au per ton:							
From mining concessions	Grams	2.92	4.44	3.71	1.84	1.87	2.56
By itinerant miners	Grams	NA	NA	NA	NA	NA	NA
Weight of Au:							
From mining concessions	Grams	31,094	46,022.00	44,409.00	65,356.00	69,375.00	186,689.00
By itinerant miners	Grams	18,939.00	32,009.00	44,259.00	183,233.00	225,934.00	155,038.00
Total gold production	Grams	440,691.00	416,598.00	470,389.00	928,412.00	897,203.00	1,081,271.00
PHOSPHATE ROCK:							
CRUDE ORE MINED:							
Gross weight	m.t.	1,188.00	2,342.00	3,836.00	5,498.00	5,475.00	3,732.00
Crude ore sold directly:							
Gross weight	m.t.	459.00	2,017.00	4,329.00	5,680.00	5,617.00	3,473.00

e/ Estimate. NA Not available.

1/ Dry basis.

2/ Wet basis.

TABLE 12. PRODUCTION OF MARKETABLE IRON ORE BY CONFERENCE PARTICIPANTS
(Metric tons)

	1978	1979	1980	1981	1982	1983
GROSS WEIGHT BASIS:						
ARGENTINA:						
Direct-shipping ore	4,541.00	3,519.00	3,065.00	3,339.00	3,252.00	3,021.00
Concentrate	115,134.00	85,784.00	80,871.00	102,926.00	64,006.00	117,334.00
Agglomerate	--	300,000.00	365,374.00	373,662.00	616,173.00	546,152.00
TOTAL	119,675.00	389,303.00	449,310.00	479,927.00	683,431.00	666,507.00
BOLIVIA: Concentrate	55,279.00	4,126.00	--	6,477.00	7,832.00	10,991.00
=====						
BRAZIL:						
Direct-shipping ore <u>1/</u>	--	--	--	9,940.00	12,476.00	20,969.00
Concentrate	84,437,915.00	95,457,384.00	113,024,964.00	97,850,231.00	93,146,524.00	88,694,635.00
TOTAL	84,437,915.00	95,457,384.00	113,024,964.00	97,860,171.00	93,159,000.00	88,715,604.00
=====						
CANADA:						
Direct-shipping ore	2,806,520.00	2,346,732.00	1,802,516.00	4,077,234.00	2,350,389.00	--
Concentrate	24,055,559.00	30,277,967.00	20,539,159.00	20,219,821.00	15,989,406.00	12,629,062.00
Pellets	30,775,448.00	27,263,037.00	26,412,533.00	27,687,873.00	17,252,079.00	17,693,500.00
TOTAL	57,637,527.00	59,887,736.00	48,754,208.00	51,984,928.00	35,591,874.00	30,322,562.00
=====						
COLOMBIA: Direct-shipping ore	497,000.00	396,900.00	506,269.00	433,411.00	469,850.00	456,000.00
CHILE: Concentrate	7,813,314.00	8,225,089.00	8,834,577.00	8,514,176.00	6,469,670.00	5,973,672.00
=====						
UNITED STATES:						
Direct-shipping ore	10,472,000.00	8,898,000.00	1,208,000.00	197,000.00	274,000.00	42,000.00
Concentrate	"	"	3,732,000.00	3,078,000.00	2,164,000.00	1,218,000.00
Agglomerate	72,420,000.00	78,194,000.00	65,790,000.00	71,075,000.00	33,563,000.00	36,904,000.00
TOTAL	82,892,000.00	87,092,000.00	70,730,000.00	74,350,000.00	36,001,000.00	38,164,000.00
=====						
MEXICO:						
Direct-shipping ore	NA	NA	NA	NA	NA	NA
Concentrate	NA	NA	NA	NA	NA	NA
Pellets	NA	NA	NA	NA	NA	NA
TOTAL <u>e/</u>	5,388,000.00	6,123,000.00	7,708,000.00	8,019,000.00	8,155,000.00	8,040,000.00

	1978	1979	1980	1981	1982	1983
<u>PERU:</u>						
Direct-shipping ore	--	--	--	--	--	57,144.00
Concentrate	5,212,219.00	5,835,510.00	5,600,000.00	6,037,307.00	5,462,647.00	4,275,917.00
TOTAL	5,212,219.00	5,835,510.00	5,600,000.00	6,037,307.00	5,462,647.00	4,333,061.00
=====						
<u>VENEZUELA:</u>						
Direct-shipping ore	13,342,889.00	13,681,340.00	14,478,680.00	15,276,989.00	10,533,382.00	9,526,475.00
High silica pellets	--	--	--	--	--	347,933.00
Briquets	--	--	300,740.00	261,312.00	176,949.00	120,412.00
TOTAL	13,342,889.00	13,681,340.00	14,779,420.00	15,538,301.00	10,710,326.00	9,994,820.00
<u>IRON CONTENT BASIS:</u>						
=====						
<u>ARGENTINA:</u>						
Direct-shipping ore	3,052.00	2,466.00	2,040.00	2,433.00	2,346.00	2,115.00
Concentrate	50,514.00	36,265.00	33,989.00	43,176.00	31,198.00	53,507.00
Agglomerate	--	204,400.00	248,454.00	254,090.00	418,998.00	371,383.00
TOTAL	53,566.00	243,131.00	284,483.00	299,699.00	452,542.00	427,005.00
BOLIVIA: Concentrate	35,213.00	2,628.00	--	2,612.00	4,891.00	7,001.00
=====						
<u>BRAZIL:</u>						
Direct-shipping ore <u>1/</u>	--	--	--	5,799.00	7,348.00	12,262.00
Concentrate	55,627,698.00	62,591,407.00	74,257,401.00	64,483,302.00	61,262,459.00	61,057,387.00
TOTAL	55,627,698.00	62,591,407.00	74,257,401.00	64,489,101.00	61,269,807.00	61,069,649.00
=====						
<u>CANADA:</u>						
Direct-shipping ore	1,526,466.00	1,299,620.00	960,200.00	2,202,114.00	1,280,962.00	--
Concentrate	15,282,497.00	19,274,954.00	13,097,822.00	20,219,822.00	10,236,418.00	8,188,684.00
Pellets	19,326,981.00	17,110,282.00	16,745,540.00	17,504,273.00	11,118,965.00	11,090,286.00
TOTAL	36,135,944.00	37,684,856.00	30,803,568.00	39,926,209.00	22,636,345.00	19,278,970.00
=====						
COLOMBIA: Direct-shipping ore	208,740.00	166,698.00	212,633.00	182,033.00	197,337.00	191,520.00
CHILE: Concentrate	4,810,657.00	5,057,607.00	5,344,027.00	5,190,270.00	3,873,867.00	3,601,943.00

	1978	1979	1980	1981	1982	1983
UNITED STATES:						
Direct-shipping ore	W	W	W	W	W	W
Concentrate	W	W	W	W	W	W
Agglomerate	W	W	W	W	W	W
TOTAL	51,579,000.00	54,500,000.00	44,592,000.00	47,286,000.00	23,005,000.00	24,555,000.00
MEXICO:						
Direct-shipping ore	1,387,268.00	1,447,315.00	1,637,490.00	1,568,390.00	329,817.00	258,568.00
Concentrate	1,116,976.00	1,128,834.00	1,849,230.00	1,988,319.00	2,306,327.00	1,423,238.00
Pellets	1,051,865.00	1,464,840.00	1,600,620.00	1,736,151.00	2,746,095.00	3,624,537.00
TOTAL	3,556,109.00	4,040,989.00	5,087,340.00	5,292,860.00	5,382,239.00	5,306,343.00
PERU:						
Direct-shipping ore	--	--	--	--	--	39,218.00
Concentrate	3,497,399.00	3,918,545.00	3,767,210.00	4,051,033.00	3,714,612.00	2,864,865.00
TOTAL	3,497,399.00	3,918,545.00	3,767,210.00	4,051,033.00	3,714,612.00	2,904,083.00
VENEZUELA:						
Direct-shipping ore	8,188,464.00	8,338,972.00	8,843,422.00	9,236,128.00	6,447,448.00	5,927,099.00
High silica pellets	--	--	--	--	--	220,868.00
Briquets	--	--	260,142.00	164,679.00	151,606.00	102,350.00
TOTAL	8,188,464.00	8,338,972.00	9,103,564.00	9,400,807.00	6,599,054.00	6,250,317.00

e/ Estimate.

1/ Shipments, not production.

TABLE 13. PRODUCTION OF CRUDE IRON ORE BY CONFERENCE PARTICIPANTS
(Metric tons, gross weight)

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA	1,055,224.00	768,252.00	1,294,367.00	983,146.00	778,260.00	889,004.00
BOLIVIA ^{1/}	55,279.00	4,126.00	--	6,477.00	7,832.00	10,991.00
BRAZIL	103,896,097.00	117,502,304.00	139,696,561.00	122,709,149.00	119,939,149.00	114,190,190.00
CANADA	129,376,366.00	135,431,797.00	122,730,172.00	121,313,044.00	84,277,601.00	74,363,180.00
COLOMBIA	497,000.00	396,900.00	506,269.00	433,411.00	469,850.00	456,000.00
CHILE	NA	NA	NA	NA	NA	NA
UNITED STATES	238,191,000.00	259,929,000.00	215,468,000.00	230,644,000.00	108,273,000.00	117,388,000.00
MEXICO	NA	NA	NA	NA	NA	NA
PERU	11,689,383.00	13,973,305.00	12,591,485.00	15,491,792.00	12,472,199.00	11,589,592.00
VENEZUELA	13,515,081.00	15,260,367.00	16,102,455.00	15,530,785.00	11,701,036.00	9,448,628.00

^{1/} Figures represent concentrate output, but inasmuch as production is essentially on a testing basis, and therefore not large by world standards, and because the ores are of a relatively high grade, the difference between crude iron ore production and concentrate production is not regarded as substantial.

TABLE 14. PRODUCTION OF MARKETABLE MANGANESE ORE BY CONFERENCE PARTICIPANTS
(metric tons)

	1978	1979	1980	1981	1982	1983
<u>GROSS WEIGHT BASIS:</u>						
<u>ARGENTINA:</u>						
Direct-shipping ore <u>1/</u>	10,625.00	7,159.00	5,840.00	1,136.00	3,700.00	4,084.00
Concentrate	--	W	W	--	--	--
TOTAL:	10,625.00	NA	NA	1,136.00	3,700.00	4,084.00
BOLIVIA: Concentrate <u>1/</u>	807.00	63.00	924.00	--	120.00	61.00
=====						
<u>BRAZIL:</u>						
Direct shipping ore <u>1/</u>	266,838.00	308,530.00	237,031.00	206,689.00	116,046.00	193,152.00
Concentrate	1,399,308.00	1,807,439.00	1,865,226.00	1,835,455.00	2,240,321.00	1,898,479.00
TOTAL:	1,666,146.00	2,115,969.00	2,102,257.00	2,042,144.00	2,356,367.00	2,091,631.00
COLOMBIA: Direct-Shipping ore	20,011.00	21,453.00	21,400.00	20,300.00	--	--
CHILE: Direct-Shipping ore	23,243.00	24,969.00	27,701.00	25,557.00	16,111.00	26,050.00
=====						
<u>UNITED STATES: <u>1/</u></u>						
Ferruginous manganese ore	262,940.00	194,732.00	139,912.00	138,175.00	14,793.00	10,264.00
Manganiferous iron ore	20,214.00	23,624.00	17,835.00	20,364.00	13,791.00	20,148.00
TOTAL:	283,154.00	218,356.00	157,747.00	158,539.00	28,584.00	30,412.00
MEXICO <u>e/</u>	523,200.00	506,700.00	447,100.00	578,300.00	508,700.00	369,500.00
PERU	--	<u>e/</u> 13,300.00	<u>e/</u> 9,810.00	--	--	--
=====						
<u>MANGANESE CONTENT BASIS:</u>						
<u>ARGENTINA:</u>						
Direct-Shipping ore <u>1/</u>	2,442.00	2,144.00	1,564.00	213.00	749.00	775.00
Concentrate	--	W	W	--	--	--
TOTAL:	2,442.00	NA	NA	213.00	749.00	775.00
BOLIVIA: Concentrate <u>1/</u>	371.00	29.00	425.00	--	55.00	28.00
=====						
<u>BRAZIL:</u>						
Direct-shipping ore <u>1/</u>	105,267.00	110,916.00	94,622.00	77,611.00	42,774.00	59,645.00
Concentrate	575,115.00	737,435.00	791,905.00	833,614.00	875,390.00	742,874.00
TOTAL:	680,382.00	848,351.00	886,527.00	911,225.00	918,164.00	802,519.00

	1978	1979	1980	1981	1982	1983
COLOMBIA: Direct-Shipping ore	6,003.00	6,436.00	6,420.00	6,090.00	--	--
CHILE: Direct-Shipping ore	8,306.00	8,623.00	8,974.00	8,596.00	5,207.00	8,485.00
=====						
UNITED STATES: 1/						
Ferruginous manganese ore	33,309.00	26,212.00	18,852.00	20,108.00	2,412.00	1,532.00
Manganiferous iron ore	1,414.00	1,786.00	1,701.00	1,960.00	1,202.00	1,803.00
TOTAL:	34,723.00	27,998.00	20,553.00	22,068.00	3,614.00	3,335.00
=====						
MEXICO:						
Direct-Shipping ore	10,048.00	6,251.00	6,176.00	4,941.00	1,422.00	629.00
Concentrate	178,292.00	171,108.00	154,790.00	203,252.00	181,698.00	132,375.00
TOTAL:	188,340.00	177,359.00	160,966.00	208,193.00	183,120.00	133,004.00
PERU	--	3,990.00	2,943.00	--	--	NA

e/ Estimate

NA Not available. W. with held to avoid disclosing individual company proprietary data.

1/ Shipments, not production.

TABLE 15. PRODUCTION OF CRUDE MANGANESE ORE BY CONFERENCE PARTICIPANTS
(Gross weight, metric tons)

	1978	1979	1980	1981	1982	1983
ARGENTINA	30,756.00	38,982.00	49,557.00	57,238.00	79,826.00	96,484.00
BOLIVIA	NA	NA	NA	NA	NA	NA
BRAZIL	2,744,392.00	2,809,167.00	3,044,320.00	3,165,744.00	2,883,211.00	2,594,105.00
COLOMBIA	20,011.00	21,453.00	21,400.00	20,300.00	--	--
CHILE	23,243.00	24,969.00	27,701.00	25,557.00	16,111.00	26,050.00
UNITED STATES	NA	NA	NA	NA	NA	NA
MEXICO	NA	NA	NA	NA	NA	NA
PERU	--	NA	NA	--	--	--

NA Not available.

TABLE 16. PRODUCTION OF COPPER FROM MINES 1/ BY CONFERENCE PARTICIPANTS
(Metric tons of contained copper)

COUNTRY		1978	1979	1980	1981	1982	1983
ARGENTINA	<u>2/</u>	319.00	89.00	182.00	80.00	43.00	41.00
BOLIVIA		2,833.00	1,844.00	1,866.00	2,621.00	2,290.00	1,982.00
BRAZIL		--	--	402.00	13,945.00	24,381.00	32,081.00
CANADA	<u>3/</u>	659,380.00	636,383.00	716,363.00	691,328.00	612,455.00	625,100.00
COLOMBIA		128.00	108.00	141.00	100.00	94.00	173.00
CHILE	<u>4/</u>	1,029,456.00	1,067,781.00	1,062,978.00	1,105,537.00	1,255,101.00	1,255,374.00
UNITED STATES	<u>5/</u>	1,357,586.00	1,446,586.00	1,181,116.00	1,538,160.00	1,146,975.00	1,038,098.00
MEXICO	<u>4/</u>	87,186.00	107,109.00	175,399.00	230,466.00	239,091.00	206,062.00
PERU		380,870.00	408,888.00	367,666.00	331,976.00	368,978.00	335,600.00

1/ Content of concentrates produced unless otherwise noted.

2/ Content of ore mined.

3/ Content of blister copper produced from domestic primary materials plus recoverable copper in exported concentrate and matte.

4/ Nonduplicative sum of copper in all final products of the country's mining industry.

5/ Recoverable copper in all domestically produced ores and other primary materials.

TABLE 17. PRODUCTION OF SMELTER COPPER BY CONFERENCE PARTICIPANTS
(Metric tons)

COUNTRY	1978	1979	1980	1981	1982	1983
BRAZIL: Primary ^{1/}	--	--	--	--	4,812.00	63,083.00
CANADA: Primary and secondary	425,300.00	398,642.00	492,710.00	456,401.00	350,382.00	336,917.00
CHILE: Primary	817,604.00	837,167.00	824,372.00	818,513.00	917,485.00	913,965.00
=====						
UNITED STATES:						
Primary	1,288,378.00	1,335,607.00	1,008,397.00	1,316,756.00	975,695.00	927,739.00
Secondary	54,216.00	60,231.00	44,876.00	60,882.00	45,105.00	59,276.00
=====						
TOTAL	1,342,594.00	1,395,838.00	1,053,273.00	1,377,638.00	1,020,800.00	987,015.00
MEXICO: Primary	86,978.00	83,857.00	85,610.00	69,199.00	77,373.00	91,994.00
=====						
PERU:						
Primary ^{2/}	309,097.00	331,099.00	329,154.00	262,562.00	291,267.00	256,293.00
Secondary ^{3/}	--	3,200.00	--	6,624.00	5,945.00	6,545.00
=====						
TOTAL	309,097.00	334,299.00	329,154.00	269,186.00	297,212.00	262,838.00

^{1/} Actual smelter output not recorded; refined output entered here as closest approximation.

^{2/} Sum of figures reported for smelter output plus that reported for refined output, because smelter output consumed in production of refined copper is not included in officially reported smelter output.

^{3/} Smelter output only.

TABLE 18. PRODUCTION OF REFINED COPPER BY CONFERENCE PARTICIPANTS
(Metric tons)

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA, secondary <u>e/</u> <u>1/</u>	14,000.00	14,000.00	14,000.00	14,000.00	14,000.00	14,000.00
BRAZIL:						
Primary	--	--	--	--	4,812.00	63,083.00
Secondary	45,000.00	53,110.00	63,000.00	45,000.00	57,000.00	39,920.00
TOTAL	45,000.00	53,110.00	63,000.00	45,000.00	61,812.00	103,003.00
CANADA: Primary and secondary	446,278.00	397,263.00	505,238.00	476,655.00	337,780.00	464,333.00
CHILE: Primary	665,972.00	695,226.00	708,621.00	673,347.00	750,087.00	712,971.00
UNITED STATES:						
Primary	1,449,057.00	1,516,655.00	1,215,188.00	1,544,017.00	1,226,778.00	1,182,090.00
Secondary	420,103.00	498,459.00	515,083.00	493,552.00	467,549.00	401,632.00
TOTAL	1,869,160.00	2,015,114.00	1,730,271.00	2,037,569.00	1,694,327.00	1,583,722.00
MEXICO: Primary and secondary	74,990.00	81,781.00	85,610.00	61,301.00	61,424.00	80,903.00
PERU:						
Primary <u>1/</u>	224,052.00	237,206.00	230,858.00	202,500.00	218,090.00	176,437.00
Secondary <u>1/</u>	--	3,200.00	--	6,624.00	5,945.00	6,545.00
TOTAL <u>1/</u>	224,052.00	240,406.00	230,858.00	209,124.00	224,035.00	182,982.00

e/ Estimate.

1/ Primary calculated by subtracting reported secondary smelter output from reported total refined production.

TABLE 19. PRODUCTION OF LEAD FROM MINES ^{1/} BY CONFERENCE PARTICIPANTS
(Metric tons of contained LEAD)

	1978	1979	1980	1981	1982	1983
ARGENTINA:						
Content of direct-shipping ore	224.00	160.00	137.00	244.00	78.00	7.00
Content of concentrate	30,027.00	31,619.00	32,469.00	32,367.00	32,698.00	31,677.00
TOTAL						
BOLIVIA	18,039.00	15,978.00	17,269.00	16,722.00	12,429.00	7,695.00
BRAZIL:						
Content of direct-shipping ore	1,344.00	2,318.00	1,229.00	7.00	1,540.00	130.00
Content of concentrate	19,245.00	22,452.00	22,037.00	21,751.00	19,584.00	18,743.00
TOTAL	21,589.00	24,770.00	23,266.00	21,758.00	21,124.00	18,873.00
CANADA	365,782.00	341,777.00	296,641.00	332,045.00	341,212.00	251,383.00
COLOMBIA	104.00	196.00	162.00	133.00	203.00	160.00
CHILE	431.00	252.00	461.00	223.00	1,552.00	1,679.00
UNITED STATES ^{2/}	529,661.00	525,569.00	550,366.00	445,535.00	512,516.00	449,038.00
MEXICO ^{3/}	170,533.00	173,455.00	145,549.00	157,384.00	145,844.00	167,405.00
PERU	203,415.00	197,505.00	195,745.00	190,609.00	216,736.00	212,600.00

^{1/} Content by analysis of concentrates produced unless otherwise specified.

^{2/} Recoverable content of crude materials produced.

^{3/} Non duplicative sum of lead contained in lead concentrate, lead calcinate, lead sulfate, impure lead bars, antimonial lead, refined lead and (in 1983) additional, not further described metallurgical products.

TABLE 20. PRODUCTION OF SMELTER LEAD BY CONFERENCE PARTICIPANTS
(Metric tons)

COUNTRY		1978	1979	1980	1981	1982	1983
ARGENTINA:							
Primary	<u>1/</u>	31,300.00	28,700.00	23,200.00	19,029.00	15,942.00	15,270.00
Secondary	<u>1/</u>	24,000.00	24,500.00	18,500.00	15,600.00	14,617.00	16,070.00
TOTAL	<u>1/</u>	55,300.00	53,200.00	41,700.00	34,629.00	30,559.00	31,340.00
=====							
BRAZIL:							
Primary	<u>1/</u>	47,236.00	55,084.00	44,519.00	34,657.00	21,943.00	20,581.00
Secondary	<u>1/</u>	33,220.00	43,999.00	40,431.00	31,029.00	27,407.00	28,939.00
TOTAL	<u>1/</u>	80,456.00	99,083.00	84,950.00	65,686.00	49,350.00	49,520.00
=====							
CANADA:							
Primary	<u>1/</u>	194,054.00	183,769.00	162,463.00	168,450.00	174,310.00	178,043.00
Secondary	<u>1/</u>	51,800.00	68,568.00	72,117.00	69,658.00	64,572.00	63,914.00
TOTAL	<u>1/</u>	245,854.00	252,337.00	234,580.00	238,108.00	238,882.00	241,957.00
=====							
UNITED STATES:							
Primary	<u>1/</u>	565,173.00	575,611.00	547,590.00	495,323.00	512,160.00	514,555.00
Secondary	<u>1/</u>	649,500.00	672,743.00	581,387.00	578,031.00	521,272.00	451,978.00
TOTAL	<u>1/</u>	1,214,673.00	1,248,354.00	1,128,977.00	1,073,354.00	1,033,432.00	966,533.00
=====							
MEXICO	<u>2/</u>	166,098.00	173,022.00	144,968.00	156,714.00	145,382.00	166,550.00
=====							
PERU:							
Primary		85,656.00	86,420.00	83,848.00	80,807.00	78,767.00	69,332.00
Secondary		1,030.00	--	120.00	3,030.00	80.00	--
TOTAL		86,686.00	86,420.00	83,968.00	83,837.00	78,847.00	69,332.00

1/ Refined production.

2/ Nonduplicative sum of impure bars, lead content antimonial lead and refined lead (may be primary only).

TABLE 21. PRODUCTION OF REFINED LEAD BY CONFERENCE PARTICIPANTS

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA:						
Primary	31,300.00	28,700.00	23,200.00	19,029.00	15,942.00	15,270.00
Secondary	24,000.00	24,500.00	18,500.00	15,600.00	14,617.00	16,070.00
TOTAL	55,300.00	53,200.00	41,700.00	34,629.00	30,559.00	31,340.00
BRAZIL:						
Primary	47,236.00	55,084.00	44,519.00	34,657.00	21,943.00	20,581.00
Secondary	33,220.00	43,999.00	40,431.00	31,029.00	27,407.00	28,939.00
TOTAL	80,456.00	99,083.00	84,950.00	65,686.00	49,350.00	49,520.00
CANADA:						
Primary	194,054.00	183,769.00	162,463.00	168,450.00	174,310.00	178,043.00
Secondary	51,800.00	68,568.00	72,117.00	69,658.00	64,572.00	63,914.00
TOTAL	245,854.00	252,337.00	234,580.00	238,108.00	238,882.00	241,957.00
COLOMBIA: Secondary <u>e/ 1/</u>	2,000.00	2,500.00	3,000.00	3,000.00	3,000.00	3,000.00
UNITED STATES:						
Primary	565,173.00	575,611.00	547,590.00	495,323.00	512,160.00	514,555.00
Secondary	649,500.00	672,743.00	581,387.00	578,031.00	521,272.00	451,978.00
TOTAL	1,214,673.00	1,248,354.00	1,128,977.00	1,073,354.00	1,033,432.00	966,533.00
MEXICO: Probably primary only <u>2/</u>	150,262.00	158,245.00	131,034.00	138,240.00	128,865.00	152,619.00
PERU:						
Primary <u>3/</u>	83,070.00	84,950.00	82,303.00	76,969.00	76,910.00	68,431.00
Secondary <u>3/</u>	1,030.00	--	120.00	3,030.00	80.00	--
TOTAL <u>3/</u>	84,100.00	84,950.00	82,423.00	79,999.00	76,990.00	68,431.00
VENEZUELA: Secondary <u>e/ 1/</u>	8,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00

1/ Not officially reported; data provided are estimates by the International Lead and Zinc Study Group.

2/ See accompanying text.

3/ Primary calculated by subtracting reported secondary smelter output from reported total refined production.

TABLE 22. PRODUCTION OF ZINC FROM MINES ^{1/} BY CONFERENCE PARTICIPANTS
(metric tons of contained ZINC)

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA:						
Content of direct-shipping ore	18.00	25.00	4.00	4.00	2.00	---
Content of concentrate	36,581.00	37,310.00	33,409.00	35,137.00	36,635.00	36,586.00
TOTAL	36,599.00	37,335.00	33,413.00	35,141.00	36,637.00	36,586.00
BOLIVIA	59,619.00	49,636.00	50,457.00	47,395.00	45,667.00	47,217.00
=====						
BRAZIL:						
Content of direct-shipping ore	11,303.00	--	--	--	--	--
Content of concentrate	76,673.00	98,840.00	104,272.00	95,218.00	110,559.00	118,587.00
TOTAL	87,976.00	98,840.00	104,272.00	95,218.00	110,559.00	118,587.00
CANADA	1,245,248.00	1,202,635.00	1,058,714.00	1,095,958.00	1,189,129.00	1,069,947.00
COLOMBIA	--	--	182.00	182.00	--	--
CHILE	1,814.00	1,847.00	1,134.00	1,516.00	5,656.00	5,993.00
UNITED STATES ^{2/}	302,669.00	267,341.00	317,103.00	312,418.00	303,160.00	275,294.00
MEXICO ^{3/}	244,892.00	245,477.00	238,136.00	211,629.00	231,910.00	257,444.00
PERU	503,709.00	507,280.00	498,031.00	550,254.00	555,981.00	576,400.00

^{1/} Content by analysis of concentrates produced, unless otherwise indicated.

^{2/} Recoverable content of crude materials produced.

^{3/} Non duplicative sum of zinc contained in marketed production of concentrates, scoria, zinc oxide, zinc sulfate, impure zinc metal, aluminized zinc and refined zinc.

TABLE 23. PRODUCTION OF METALLIC ZINC BY CONFERENCE PARTICIPANTS
(Metric tons)

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA:						
Primary	28,395.00	41,158.00	28,886.00	30,300.00	32,500.00	31,500.00
Secondary	2,500.00	2,800.00	2,800.00	3,000.00	3,000.00	3,000.00
TOTAL	30,895.00	43,958.00	31,686.00	33,300.00	35,500.00	34,500.00
BRAZIL:						
Primary	56,097.00	63,494.00	78,359.00	91,830.00	96,037.00	99,913.00
Secondary	12,200.00	15,327.00	17,666.00	19,000.00	14,397.00	11,045.00
TOTAL	68,297.00	78,821.00	96,025.00	110,830.00	110,434.00	110,958.00
CANADA: Primary	495,420.00	580,449.00	591,565.00	618,650.00	511,870.00	617,033.00
UNITED STATES:						
Primary	406,698.00	472,481.00	340,456.00	346,563.00	228,176.00	235,694.00
Secondary	34,774.00	53,212.00	29,396.00	50,192.00	74,288.00	69,390.00
TOTAL	441,472.00	525,693.00	369,852.00	396,755.00	302,464.00	305,084.00
MEXICO: Primary <u>1/</u>	173,793.00	162,354.00	144,550.00	126,890.00	127,359.00	174,991.00
PERU:						
Primary <u>2/</u>	60,351.00	70,462.00	65,670.00	130,108.00	161,367.00	159,229.00
Secondary <u>2/</u>	3,656.00	4,230.00	4,597.00	4,538.00	4,112.00	3,873.00
TOTAL <u>2/</u>	64,007.00	74,692.00	70,267.00	134,646.00	165,479.00	163,102.00

1/ Includes impure zinc, aluminized zinc and refined zinc.

2/ Primary calculated by subtracting reported secondary smelter output from reported refined production.

TABLE 24. PRODUCTION OF GOLD FROM MINES BY CONFERENCE PARTICIPANTS
(Kilograms of contained gold)

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA:						
In manganese ore	66.00	21.00	150.00	283.00	390.00	417.00
In lead ore	--	--	114.00	134.00	--	--
In polymetal ores	--	--	--	--	202.00	250.00
From alluvial deposits	108.00	294.00	77.00	42.00	40.00	60.00
TOTAL:	174.00	315.00	341.00	459.00	632.00	727.00
BOLIVIA: Placer	1,093.00	948.00	1,620.00	2,064.00	1,299.00	1,531.00
BRAZIL:						
In gold ores	3,808.00	3,163.00	3,771.00	4,229.00	4,433.00	6,191.00
In other ores (recoverable content)	200.00	179.00	228.00	291.00	207.00	126.00
Placer	5,400.00	1,100.00	9,700.00	12,900.00	20,900.00	47,468.00
TOTAL	9,408.00	4,442.00	13,699.00	17,420.00	25,540.00	53,790.00
CANADA: <u>2/</u>						
In auriferous quartz	36,340.00	33,794.00	31,929.00	35,877.00	47,866.00	53,416.00
In base metal ores	17,071.00	16,449.00	16,632.00	14,525.00	14,393.00	14,798.00
From placers	556.00	899.00	2,060.00	1,633.00	2,476.00	2,532.00
TOTAL	53,967.00	51,142.00	<u>1/</u> 50,620.00	<u>1/</u> 52,034.00	64,735.00	70,746.00
COLOMBIA <u>3/</u>	7,665.00	8,378.00	15,876.00	16,460.00	14,702.00	13,641.00
CHILE:						
In gold ores and from placers	729.00	934.00	3,848.00	8,724.00	13,121.00	14,049.00
In copper ores	2,335.00	2,428.00	2,820.00	3,362.00	3,459.00	3,262.00
In silver ores	118.00	103.00	161.00	370.00	178.00	339.00
In lead and zinc ores	--	--	7.00	--	149.00	109.00
TOTAL:	3,182.00	3,465.00	6,836.00	12,456.00	16,907.00	17,759.00

COUNTRY	1978	1979	1980	1981	1982	1983
UNITED STATES: <u>2/</u>						
In gold ore	16,627.00	16,073.00	18,647.00	28,675.00	34,967.00	48,310.00
In gold-silver ore	1,214.00	1,094.00	1,040.00	1,260.00	1,173.00	1,362.00
In silver ore	124.00	181.00	170.00	474.00	421.00	1,086.00
In copper ore	11,420.00	11,923.00	8,481.00	10,972.00	7,250.00	8,032.00
In lead and zinc ores	3.00	13.00	59.00	1.00	--	--
In polymetal ores	967.00	389.00	1,154.00	360.00	581.00	565.00
In old tailings	19.00	26.00	86.00	254.00	"	"
From placer operations	693.00	296.00	528.00	900.00	1,196.00	1,526.00
TOTAL	31,067.00	<u>1/</u> 29,995.00	<u>1/</u> 30,165.00	<u>1/</u> 42,896.00	45,588.00	60,881.00
MEXICO <u>4/</u>	6,283.00	5,911.00	6,096.00	6,319.00	6,104.00	6,930.00
PERU:						
In concentrates of all types	4,468.00	4,319.00	4,424.00	2,893.00	2,175.00	2,868.00
From placer operations	2,346.00	2,106.00	2,264.00	2,651.00	2,067.00	2,628.00
TOTAL	6,814.00	6,425.00	6,688.00	5,544.00	4,242.00	5,496.00
VENEZUELA:						
In gold ore	391.00	339.00	382.00	680.00	602.00	740.00
From placer operations:						
From mining concessions	31.00	46.00	44.00	65.00	69.00	187.00
From itinerant miners	19.00	32.00	44.00	183.00	226.00	155.00
TOTAL	441.00	417.00	470.00	928.00	897.00	<u>1/</u> 1,081.00

1/ Detail does not add to total shown because of independent rounding.

2/ Recoverable basis.

3/ In terms of total metal output; approximately 78% of this total is from placer operations and 22% from lode (vein) mines.

4/ Nonduplicative sum of gold in all final products of the Mexican mining industry.

TABLE 25. PRODUCTION OF SILVER FROM MINES BY CONFERENCE PARTICIPANTS
(Kilograms of contained silver)

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA:						
Copper ore	100.00	390.00	123.00	153.00	84.00	2,712.00
Tin ore	10,929.00	12,040.00	15,927.00	19,384.00	18,451.00	13,989.00
Manganese ore	734.00	2,006.00	2,071.00	1,362.00	1,864.00	2,509.00
Lead ore	51,703.00	54,338.00	55,187.00	57,426.00	63,090.00	58,557.00
TOTAL	63,466.00	68,774.00	73,308.00	78,325.00	83,489.00	77,765.00
BOLIVIA	195,000.00	198,000.00	190,000.00	199,000.00	190,000.00	187,000.00
=====						
BRAZIL:						
Placer	--	440.00	1,475.00	4,480.00	3,822.00	7,684.00
Various ores and concentrates	15,723.00	33,139.00	22,919.00	19,300.00	19,803.00	15,426.00
TOTAL	15,723.00	33,579.00	24,394.00	23,780.00	23,625.00	23,110.00
=====						
CANADA:						
Silver ores	41,007.00	22,870.00	33,000.00	199,412.00	299,000.00	387,000.00
Gold ores	8,200.00	6,685.00	5,000.00	10,582.00	20,000.00	77,000.00
Base metal ores	1,217,586.00	1,117,186.00	1,031,000.00	914,898.00	994,000.00	642,000.00
Placer (by product of gold)	134.00	167.00	1,000.00	4,502.00	1,000.00	--
TOTAL	1,266,927.00	1,146,908.00	1,070,000.00	1,129,394.00	1,314,000.00	1,106,000.00
COLOMBIA	2,388.00	3,090.00	4,713.00	4,440.00	4,231.00	3,078.00
=====						
CHILE:						
Silver ores	37,155.00	62,153.00	88,235.00	109,397.00	74,518.00	111,986.00
Copper ores	215,733.00	207,644.00	204,567.00	243,264.00	284,853.00	320,062.00
Gold ores	1,430.00	962.00	3,654.00	7,528.00	20,876.00	33,982.00
Lead and zinc ores	1,055.00	1,077.00	2,089.00	918.00	1,940.00	2,246.00
TOTAL	<u>1/</u> 255,373.00	271,836.00	298,545.00	361,107.00	<u>1/</u> 382,187.00	468,276.00

COUNTRY		1978	1979	1980	1981	1982	1983
UNITED STATES:	<u>3/</u>						
Silver ore		573,979.00	521,512.00	426,089.00	593,935.00	733,338.00	935,093.00
Gold-silver ore		81,326.00	66,961.00	60,772.00	70,404.00	86,141.00	55,823.00
Gold ore		17,289.00	21,083.00	23,321.00	23,453.00	26,516.00	35,671.00
Copper ore		387,429.00	431,640.00	346,363.00	433,982.00	293,002.00	<u>2/</u> 228,430.00
Lead ore		64,136.00	70,873.00	78,842.00	57,206.00	69,819.00	62,871.00
Zinc ore		2,218.00	404.00	652.00	898.00	846.00	1,031.00
Polymetal ores		91,008.00	63,935.00	65,704.00	73,709.00	28,594.00	<u>2/</u>
Old tailings		7,576.00	2,264.00	3,800.00	11,747.00	13,548.00	<u>2/</u> 31,324.00
Placer		63.00	13.00	15.00	57.00	63.00	126.00
TOTAL		1,225,024.00	<u>1/</u> 1,178,685.00	<u>1/</u> 1,005,558.00	<u>1/</u> 1,265,391.00	1,251,867.00	<u>1/</u> 1,350,369.00
MEXICO	<u>4/</u>	1,579,383.00	1,536,772.00	1,472,557.00	1,654,829.00	1,550,221.00	1,910,839.00
PERU	<u>5/</u>	1,151,000.00	1,220,350.00	1,460,320.00	1,460,100.00	1,663,372.00	1,738,000.00

1/ Detail does not add to total shown because of independent rounding.

2/ Silver recovered from polymetal ores is included partly with that from copper ore and partly with that from old tailings in order to avoid disclosing individual company proprietary data.

3/ Recoverable basis.

4/ Nonduplicative sum of silver in all final products of the Mexican mining industry.

5/ Sum of silver content of concentrates sold, silver recovered in blister copper, and silver recovered in intermediate processes, lead and zinc smelting and minor amounts in other concentrates processed.

TABLE 26. PRODUCTION OF MOLYBDENUM FROM MINES 1/ BY CONFERENCE PARTICIPANTS
(Metric tons of contained MOLYBDENUM)

COUNTRY	1978	1979	1980	1981	1982	1983
CANADA <u>2/</u>	13,943.00	11,175.00	11,889.00	12,850.00	13,961.00	10,523.00
CHILE	13,196.00	13,560.00	13,668.00	15,360.00	20,048.00	15,264.00
UNITED STATES	59,803.00	65,302.00	68,350.00	63,458.00	38,275.00	15,400.00
MEXICO <u>3/</u>	11.00	48.00	74.00	451.00	5,190.00	5,866.00
PERU	2,320.00	2,928.00	668.00	2,484.00	1,721.00	1,843.00

1/ Molybdenum (Mo) contained in concentrates produced unless otherwise specified.

2/ Molybdenum (Mo) contained in non-duplicative sum of producer's shipments of molybdenum concentrates, molybdenum oxide, and ferromolybdenum.

3/ Molybdenum (Mo) contained in ores marketed directly and in concentrates produced.

TABLE 27. PRODUCTION OF TIN FROM MINES BY CONFERENCE PARTICIPANTS
(Metric tons)

	1978	1979	1980	1981	1982	1983
TIN CONTENT OF ORE MINED:						
Argentina	824.00	607.00	695.00	656.00	606.00	537.00
Bolivia	NA	NA	NA	NA	NA	NA
Brazil	6,190.00	7,005.00	5,517.00	9,037.00	9,040.00	11,928.00
Canada	NA	NA	NA	NA	NA	NA
United States <u>e/ 1/</u>	100.00	100.00	100.00	100.00	100.00	100.00
Mexico	NA	NA	NA	NA	NA	NA
Peru <u>2/</u>	1,073.00	1,381.00	1,751.00	2,587.00	2,437.00	3,482.00
TIN CONTENT OF CONCENTRATE PRODUCED: <u>3/</u>						
Argentina	362.00	386.00	351.00	369.00	339.00	291.00
Bolivia	31,291.00	27,861.00	29,465.00	27,657.00	24,343.00	25,278.00
Brazil	6,190.00	7,005.00	6,377.00	8,253.00	9,293.00	13,418.00
Canada <u>4/</u>	360.00	337.00	243.00	239.00	135.00	141.00
United States <u>e/ 1/</u>	100.00	100.00	100.00	100.00	100.00	100.00
Mexico <u>5/</u>	4.00	23.00	60.00	28.00	27.00	50.00
Peru	737.00	948.00	1,202.00	1,519.00	1,673.00	2,391.00

e/ Estimate. NA not available.

1/ Only a single mine, this in the State of Alaska, produced tin in the United States during 1978-83, and output of this mine is regarded as company proprietary data and thus cannot be published. Figures given for tin-in-concentrate production represent estimates by the International Tin Council of the order of magnitude of output; this same figure has been entered under tin-in-ore mined.

2/ Tin in ore for beneficiation.

3/ Unless otherwise noted.

4/ Non duplicative sum of tin content of concentrates shipped plus tin in lead-tin-alloys produced.

5/ Presumably a partial figure (see accompanying text).

TABLE 28. PRODUCTION OF TIN IN SMELTERS BY CONFERENCE PARTICIPANTS
(Metric tons)

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA:						
Primary	--	--	--	--	--	124.00
Secondary <u>e/</u>	50.00	50.00	50.00	50.00	50.00	50.00
TOTAL	50.00	50.00	50.00	50.00	50.00	174.00
BOLIVIA: Primary only	16,184.00	15,696.00	17,648.00	19,937.00	18,980.00	14,163.00
BRAZIL : Primary only	9,329.00	10,132.00	8,796.00	7,789.00	9,298.00	12,741.00
=====						
UNITED STATES:						
Primary <u>e/</u>	5,900.00	4,600.00	3,000.00	2,000.00	3,500.00	2,500.00
Secondary	21,100.00	21,493.00	18,638.00	15,438.00	14,293.00	14,822.00
TOTAL	27,000.00	26,093.00	21,638.00	17,438.00	17,793.00	17,322.00
=====						
MEXICO: Primary only <u>1/</u>	73.00	1,291.00	1,382.00	866.00	971.00	1,266.00

e/ Estimate.

1/ Includes impure bars as follows: 1978--4; 1979--23;; 1980--60; 1981--28; 1982--27; 1983--50.

TABLE 29. PRODUCTION OF TUNGSTEN FROM MINES 1/ BY CONFERENCE PARTICIPANTS
(Metric tons of contained TUNGSTEN)

COUNTRY	1978	1979	1980	1981	1982	1983
ARGENTINA	96.00	59.00	34.00	11.00	17.00	40.00
BOLIVIA	2,476.00	2,384.00	2,733.00	2,779.00	2,618.00	2,406.00
BRAZIL	1,067.00	1,092.00	1,052.00	1,154.00	1,158.00	894.00
CANADA <u>2/</u>	2,289.00	2,581.00	3,178.00	1,995.00	2,403.00	1,220.00
UNITED STATES	3,128.00	3,013.00	2,754.00	3,605.00	1,521.00	980.00
MEXICO <u>3/</u>	234.00	252.00	266.00	263.00	194.00	186.00
PERU <u>4/</u>	315.00	638.00	582.00	471.00	321.00	512.00

1/ Tungsten (W) contained in concentrates produced, unless otherwise specified.

2/ Tungsten (W) contained in sheelite concentrates shipped.

3/ Tungsten (W) contained in ores marketed directly and in concentrates produced.

4/ Tungsten (W) contained in all marketable products.

TABLE 30. PRODUCTION OF MARKETABLE FLUORSPAR BY CONFERENCE PARTICIPANTS
(Metric tons)

	1978	1979	1980	1981	1982	1983
GROSS WEIGHT BASIS:						
ARGENTINA:						
Direct-shipping ore:						
Metallurgical grade <u>1/</u>	8,046.00	5,863.00	4,829.00	4,248.00	3,048.00	NA
Concentrate: Acid and ceramic grade	6,100.00	4,365.00	6,154.00	5,582.00	5,110.00	4,951.00
TOTAL	14,146.00	10,228.00	10,983.00	9,830.00	8,158.00	NA
=====						
BRAZIL:						
Direct-shipping ore	193.00	106.00	1,125.00	306.00	323.00	1,422.00
Concentrate:						
Acid grade	31,174.00	38,323.00	32,729.00	37,980.00	35,581.00	43,059.00
Metallurgical grade	30,161.00	36,468.00	22,640.00	18,253.00	21,467.00	26,148.00
TOTAL	61,528.00	74,897.00	56,494.00	56,539.00	57,371.00	70,629.00
=====						
UNITED STATES: CONCENTRATE,						
ALL GRADES <u>2/</u>	117,415.00	99,154.00	84,037.00	104,693.00	69,869.00	e/ 55,300.00
=====						
MEXICO:						
Acid grade	462,366.00	469,807.00	491,941.00	507,983.00	408,704.00	407,262.00
Ceramic grade	42,882.00	72,370.00	104,281.00	107,500.00	54,144.00	45,860.00
Metallurgical grade	300,481.00	275,113.00	299,892.00	307,405.00	172,285.00	72,600.00
Sub-metallurgical grade	154,055.00	166,566.00	210,430.00	193,454.00	99,960.00	79,059.00
TOTAL	959,784.00	983,856.00	1,106,544.00	1,116,342.00	735,093.00	604,781.00
=====						

	1978	1979	1980	1981	1982	1983
CaF₂ CONTENT BASIS:						
ARGENTINA:						
Direct-shipping ore:						
Metallurgical grade <u>1/</u>	6,437.00	4,690.00	3,863.00	3,398.00	2,438.00	NA
Concentrate: Acid and ceramic grade	5,795.00	4,147.00	5,846.00	5,303.00	4,855.00	4,703.00
TOTAL	12,232.00	8,837.00	9,709.00	8,701.00	7,293.00	NA
=====						
BRAZIL:						
Direct-shipping ore	119.00	71.00	504.00	131.00	131.00	558.00
Concentrate:						
Acid grade	30,332.00	37,212.00	31,714.00	36,992.00	34,513.00	41,638.00
Metallurgical grade	24,123.00	29,174.00	18,112.00	15,241.00	17,882.00	16,395.00
TOTAL	54,574.00	66,457.00	50,330.00	52,364.00	52,526.00	58,591.00
=====						
UNITED STATES: CONCENTRATE,						
ALL GRADES <u>2/</u>	102,916.00	86,910.00	75,366.00	90,165.00	66,864.00	e/ 53,100.00
=====						
MEXICO: <u>3/</u>						
Acid grade	455,431.00	462,760.00	484,562.00	500,363.00	402,573.00	401,153.00
Ceramic grade	38,808.00	65,495.00	94,374.00	97,288.00	49,000.00	41,503.00
Metallurgical grade	232,873.00	213,213.00	232,416.00	238,239.00	133,521.00	56,265.00
Sub-metallurgical grade	100,136.00	108,268.00	136,780.00	125,745.00	64,974.00	51,388.00
TOTAL	827,248.00	849,736.00	948,132.00	961,635.00	650,068.00	550,309.00

FOOTNOTES MARKETABLE FLUORSPAR:

1/ Crude ore sold directly.

2/ Shipments of marketable products of all types (direct-shipping ore plus concentrates); actual output cannot be published because to do so would reveal company proprietary information.

3/ Grades estimated on data supplied by Mexico giving range of grades for each category; ranges reported and estimated grade used in computation (the latter in parentheses) are as follows: Acid grade, 97% CaF₂ (98.5% CaF₂); ceramic grade, 85-96% CaF₂ (90.5% CaF₂); metallurgical grade, 70-85% CaF₂ (77% CaF₂); submetallurgical grade, under 70% CaF₂ (65% CaF₂).

TABLE 31. PRODUCTION OF MARKETABLE PHOSPHATE RAW MATERIALS BY CONFERENCE PARTICIPANTS
(Metric tons)

COUNTRY AND COMMODITY DESCRIPTION	1978	1979	1980	1981	1982	1983
<u>GROSS WEIGHT BASIS:</u>						
ARGENTINA: Thomas slag <u>1/</u>	3,080.00	6,676.00	3,621.00	673.00	<u>e/</u> 600.00	<u>e/</u> 600.00
=====						
BRAZIL:						
Crude phosphate rock sold directly	26,831.00	39,370.00	49,752.00	52,618.00	7,395,311.00	32,300.00
Phosphate rock concentrate produced	1,023,287.00	1,588,823.00	2,561,889.00	2,657,986.00	2,767,017.00	3,208,303.00
TOTAL	1,050,118.00	1,628,193.00	2,611,641.00	2,710,604.00	10,162,328.00	3,240,603.00
=====						
COLOMBIA: Crude rock sold directly	1,320.00	6,776.00	6,370.00	17,329.00	20,393.00	16,944.00
=====						
CHILE:						
Crude phosphate rock sold directly	--	--	--	--	1,377.00	935.00
Guano	240.00	--	--	1,100.00	50.00	--
TOTAL	240.00	--	--	1,100.00	1,427.00	935.00
=====						
UNITED STATES:						
Crude phosphate rock sold directly	2,738,000.00	2,775,000.00	2,564,000.00	2,836,000.00	6,594,000.00	4,920,000.00
Beneficiated rock produced	47,298,000.00	48,835,000.00	51,851,000.00	50,788,000.00	30,815,000.00	37,653,000.00
TOTAL	50,037,000.00	51,611,000.00	54,415,000.00	53,624,000.00	37,409,000.00	42,573,000.00
=====						

	1978	1979	1980	1981	1982	1983
MEXICO:						
Phosphate rock for fertilizer and chemical industry	NA	166,743.00	281,369.00	356,992.00	515,000.00	510,000.00
Phosphate rock for animal food supplement	NA	107,685.00	115,277.00	146,260.00	138,050.00	275,038.00
TOTAL	322,076.00	274,428.00	396,646.00	503,252.00	653,050.00	785,038.00
VENEZUELA: Crude rock sold directly						
P2.05 CONTENT BASIS:						
ARGENTINA: Thomas slag 1/ 3/	555.00	1,202.00	652.00	121.00	e/ 110.00	e/ 110.00
BRAZIL:						
Crude phosphate rock sold directly	2,554.00	3,637.00	4,711.00	4,604.00	693,687.00	3,123.00
Phosphate rock concentrates produced	180,507.00	221,005.00	393,762.00	436,175.00	431,377.00	517,178.00
TOTAL	183,061.00	224,642.00	398,473.00	440,779.00	1,025,064.00	520,301.00
COLOMBIA: Crude rock sold directly 4/	264.00	1,355.00	1,274.00	3,466.00	4,079.00	3,389.00
CHILE:						
Crude phosphate rock sold directly	--	--	--	--	275.00	187.00
Guano	23.00	--	--	104.00	5.00	--
TOTAL	23.00	--	--	104.00	280.00	187.00
UNITED STATES:						
Crude phosphate rock sold directly	718,000.00	733,000.00	672,000.00	746,000.00	1,896,000.00	1,382,000.00
Beneficiated rock produced	14,614,000.00	15,110,000.00	16,039,000.00	15,619,000.00	9,608,000.00	11,706,000.00
TOTAL	15,332,000.00	15,843,000.00	16,711,000.00	16,365,000.00	11,504,000.00	13,088,000.00

	1978	1979	1980	1981	1982	1983
MEXICO:						
Phosphate rock for fertilizer and chemical industry <u>5/</u>	NA	53,358.00	90,038.00	114,237.00	164,800.00	163,200.00
Phosphate rock for animal food supplement <u>6/</u>	NA	21,527.00	23,055.00	29,252.00	27,610.00	55,008.00
TOTAL <u>e/</u>	88,000.00	74,885.00	113,093.00	143,489.00	192,410.00	218,208.00
VENEZUELA: Crude rock						
sold directly <u>7/</u>	261.00	515.00	844.00	1,210.00	1,205.00	821.00

FOOTNOTES MARKETABLE PHOSPHATE MATERIALS:

e/ Estimate. NA Not available.

1/ Unofficial (Thomas slag, a byproduct of the steel industry, is not within the range of commodities for which the National Directorate of Mineral Economics is responsible.

2/ Detail does not add to total because of independent rounding.

3/ Calculated, assuming an average grade of 18% P₂O₅

4/ Calculated, assuming an average grade of 20% P₂O₅

5/ Calculated, assuming an average grade of 32% P₂O₅

6/ Calculated, assuming an average grade of 20% P₂O₅

7/ Calculated, assuming an average grade of 22% P₂O₅