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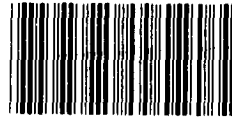
BY THE U.S. GENERAL ACCOUNTING OFFICE
**Report To The Secretary
Of The Interior**

Managing Foreign Mineral Information Programs To Support Public Policy Analyses

The management of finite, nonrenewable mineral resources in the United States must be supported by adequate, standardized, credible information concerning major aspects of foreign supply and demand.

Currently, the Department of the Interior's extensive foreign mineral information collection and analysis activities do not support policy formulation in the executive branch as intended.

GAO makes recommendations to establish a close relationship between the Department's foreign mineral information activities and public policy information needs throughout the executive branch.



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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

ENERGY AND MINERALS
DIVISION

B-201142

The Honorable Cecil D. Andrus
The Secretary of the Interior

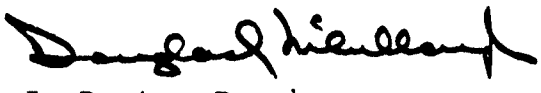
Dear Mr. Secretary:

This report considers whether U.S. foreign mineral information is adequate for public policy decisionmaking and natural resource management. The report stems from continuing congressional interest in assuring that decisions and policies that affect United States access to essential minerals and materials are made with the benefit of the best possible information about foreign supply and demand conditions.

The report focuses on the relationship between Federal foreign mineral data collection capabilities--primarily within the Department of the Interior's Bureau of Mines--and the Federal public policy needs for this information in the Departments of State, Commerce, Treasury, and Interior and throughout the executive branch. Our report makes recommendations with the intent of bringing Federal foreign mineral information programs and capabilities more in line with longstanding congressional interests. Copies of the report are being provided to the Secretaries of State, Commerce, and Treasury.

This report contains recommendations to you which are set forth on pages 23 and 24. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House and Senate Committees on Government Operations not later than 60 days after the date of the report; a like statement to the House and Senate Committees on Appropriations should accompany the agency's first request for appropriations made more than 60 days after the date of the report.

Sincerely yours,


for J. Dexter Peach
Director

D I G E S T

BACKGROUND

Changes in global mineral supply and demand conditions can have direct and far-reaching implications for U.S. economic stability and strategic capabilities. Federal programs and policies must assure the least possible supply disruption as a consequence of such changes. Effective use of information resources is critical in meeting these objectives.)

In spite of highly visible concern in the executive branch and the Congress about U.S. foreign mineral information capabilities, and numerous initiatives that have expanded Federal data collection and analysis capabilities, there continues to be no strategy for matching extensive information capabilities with public policy mineral information requirements throughout the executive branch.

The United States is the world's largest user of raw materials. We consume about 2 billion tons of new nonfuel mineral supplies annually, and this volume is projected to double by the year 2000. For many mineral commodities critical to economic stability and strategic capabilities, the United States is increasingly dependent upon foreign sources of supply. Today this dependence exceeds 50 percent for 24 of the 32 minerals essential to our very existence, and dollar totals for imports of mineral raw materials reached \$5 billion in 1979. It is increasingly important for us to know in detail about supply and demand of mineral supplies from abroad, foreign reserves, and conditions that might result in supply interruptions.

As resource manager and policymaker, Government must have access to comprehensive, credible, and accurate data on mineral supply and demand. Data on resources, reserves, mine production, smelter production, refinery production, capacity, imports and exports, stocks, consumption, forecasted supply and demand, and prices must be accessible for establishing meaningful guidelines on mineral trade, investment, stockpile levels, taxation, and the like.

Within the Federal Government, the primary mandate for collection, analysis, and dissemination of foreign mineral data lies in the Department of the Interior, principally within its Bureau of Mines. The Bureau's information activities attempt to provide a useful body of minerals data for the planning, policy, and decisionmaking of the Federal Government as a whole, as well as for private industry.

A primary overseas mechanism for the collection of foreign mineral data is the reporting carried out under Bureau of Mines guidance by the State Department's Foreign Service officers in U.S. embassies around the world. And the Bureau's Minerals Information & Analysis Directorate--charged with managing minerals information systems that serve Bureau programs--is working to implement an automated storage and data retrieval capability.

PROBLEM AREAS

Federal foreign mineral information capabilities fall short of public policy, decision-making, and overall resource management objectives, primarily because:

--The Department of the Interior's foreign mineral data collection, analysis, and dissemination activities are principally responsive to individual office mandates, not to the content, availability, and format requirements of policy analysts throughout the executive branch.

- Responsible policy planning, decisionmaking, and resource managers in the Federal Government have minimal contact with the various Government collection, analysis, and dissemination processes. The critical interaction between data collection and use, consequently, is missing.
- Although a wide selection of data is routinely acquired under a variety of programs, it does not become part of a data pool, its availability is often unknown, and its overall usefulness, as a result, is diminished.
- Use of foreign mineral data has been severely restricted due to the absence of a usable automated data management capability.
- It is the prevailing practice of commodity policy analysts throughout the executive branch to contract for data bases from a wide variety of sources outside the Federal establishment. Little communication exists between the data collection function and the policy function in the executive branch.

The coordinated effort of numerous agencies working together is necessary in identifying how materials and related policy and decisionmaking affect mineral supply.) The use of reasonably reconciled data by all parties is critical to this process. However, largely because of the inadequacies in Federal information capabilities cited above, policy analysts throughout the executive branch acquire data from numerous sources, often outside the Federal establishment. The credibility of this data is uncertain, the data is not reconciled, and extensive Government data analysis activities are not utilized.

CONCLUSIONS

The Federal Government must more effectively manage its foreign mineral information activities to support public policy and overall resource management objectives. The fact

that voluminous data is collected in itself has little significance if the data is not readily accessible to support policy and natural resource management.

Expressions of executive branch and congressional concern about foreign mineral supply availability are abundant. Most recently, the National Materials and Minerals Policy Research and Development Act of 1980, signed into law on October 21, 1980, makes clear congressional concern over U.S. ability to deal effectively with changing conditions in other countries. The Congress found that "* * * the availability of materials is essential for national security * * * and the availability of materials is affected by the stability of foreign sources of essential industrial materials." The legislation refers repeatedly to the availability of foreign source materials, and calls for improving U.S. capability to assess international mineral supplies.

Given congressional and executive branch concern that policymakers should have the benefit of the best information on the availability of foreign mineral supplies, foreign mineral data acquired through U.S. Government programs must more directly focus on Federal policy and decisionmaking needs. The following recommendations are made with the intent of establishing a framework for linking Government data collection efforts with the national economic and strategic policy process.

RECOMMENDATIONS

Lead responsibility for collection and communication of foreign mineral data (as for domestic mineral data) should continue within the Bureau of Mines, under the auspices of the Secretary of the Interior. Other executive branch agencies, as well as distinct bureaus within the Department of the Interior, should continue specific data collection activities pursuant to individual

mandates. As recommended below, these programs would then constitute interactive data bases, under the Secretary's jurisdiction.

With the inherent complexities of Government foreign mineral data collection and communication, an automated data base management system approach is recommended as the most efficient means of assuring that the best attainable information is available for shaping the Nation's minerals future. Benefits of this approach, if implemented, are that it could provide immediate availability of a body of relevant, timely, accurate information suitable for retrieval in formats conducive to use in a vast array of policy applications.'

Further, GAO recommends that the Secretary of the Interior:

- Initiate an in-depth analysis of all continuing foreign mineral data needs and resources throughout the executive branch, including capabilities and requirements of State Department Foreign Service reporting officers.
- Direct centralization of responsibility of all foreign mineral and related information (not the collection function itself) within the Minerals Information and Analysis Directorate, U.S. Bureau of Mines.
- Direct that the Minerals Information and Analysis Directorate structure the foreign mineral information system to be responsive to minerals and minerals related information needs of all agencies and to incorporate ongoing data acquisition activities of other Federal agencies. The automated capability should also incorporate (when feasible) a new file on institutional factors--factors likely to affect production and investment climate (taxes, subsidies, energy constraints, environmental constraints, political instability, and so forth) as a regular, systematized component of foreign mineral reporting, to be modified as conditions warrant.

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While GAO did not provide the draft report to the agencies for comment, GAO discussed its findings with various officials of the Departments of the Interior, State, Commerce, and Treasury. Officials in each of the agencies expressed agreement with the overall tenor of the report, that the concerns identified were real, and that initiatives needed to be made to bring together, in some manner, the longtime Federal public policy data needs and Federal data collection and analysis capabilities. GAO found overall agreement that the Bureau of Mines is ideally situated and has the inherent capability to be the focus of Federal data collection activities, and that its efforts must be developed on the basis of total Federal mineral policy formulation requirements.

Bureau of Mines officials provided GAO with a copy of a presidential directive dated November 4, 1980, which cites the need for improving the cohesion between Federal non-fuel mineral data gathering and policy formulation. The directive calls for the establishment of an information coordinating committee in order to identify information and analysis needed to support Federal policies affecting nonfuel mineral supplies. GAO supports this effort.

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ABBREVIATIONS

AMIS	Automated Minerals Information System
BOM	Bureau of Mines
CERP	Combined Economic Reporting Program
CRIB	Computerized Resources Information Bank
GAO	General Accounting Office
ITC	International Trade Commission
MAS	Minerals Availability System
USGS	U.S. Geological Survey

CHAPTER 1

INTRODUCTION

CONCERN OVER MINERALS AVAILABILITY

The United States is the world's largest consumer of raw materials. We consume about 2 billion tons of new non-fuel mineral supplies annually, and this volume is projected to double by the year 2000.

Increasingly, the availability of these minerals is tied to international supply-and-demand conditions. The United States is now dependent upon foreign sources for over 50 percent of 24 of the 32 minerals essential to our existence. Our unprocessed mineral imports reached \$5 billion in 1979.

Major changes are taking place in international mineral production which have important implications for U.S. industrial stability. New forms of ownership of foreign mineral enterprises, increased competition for finite resources, and reduced exploration in mineral-rich producer countries are among many changing aspects of international mineral production that must be recognized, monitored, and considered in developing public policy for mineral availability in the United States.

Unstable conditions in major producer countries render uncertain the future availability of such essential mineral raw materials as bauxite, chromite, manganese, and cobalt. And prices of these and other commodities are being subjected to volatile fluctuations as developing mineral producers in some cases push to retain a greater share of export wealth. Finally, the mineral and energy shortages of the 1970s clearly demonstrated the repercussions of supply aberrations and generated deep congressional and executive branch concern.

THE GOVERNMENT'S ROLE

The role of the Federal Government is, of course, central to domestic minerals availability. As owner of one-third of the Nation's highly mineralized lands, as purchaser and seller of raw materials for stockpile programs, and as lawmaker on trade, tax, investment, and environmental worker health and safety policies, the Government has a major impact on all levels of exploration and development, as well as on the overall health of the mining industry.

As resource manager and policymaker, Government must have access to comprehensive, credible, and accurate data on mineral supply and demand. Data on resources, reserves, mine production, smelter production, refinery production, capacity, imports and exports, stocks, consumption, forecasts of supply and demand, and prices are all needed to formulate policy intelligently.

A series of major studies completed in the past decade has reiterated the importance of foreign mineral information. Studies conducted by the National Commission on Supplies and Shortages, the Office of Technology Assessment, the General Accounting Office, and others have all identified foreign mineral data collection problems and stressed the need for major improvements. In these studies, shortcomings related to coverage, accuracy, timeliness, completeness, and objectivity have been identified.

Finally, by way of congressional initiatives to improve collection, organization, standardization, coordination, and dissemination of information regarding supplies of major raw materials essential to industry and agriculture, a clear mandate has been established for improving foreign data collection.

Executive branch data collection activities have been greatly expanded since the major energy and mineral shortage experiences of the early 1970s. A primary objective is to provide a coordinated body of mineral information for planning, policy, and decisionmaking. The principal Government end-products are publications. The Bureau of Mines (BOM) alone issues some 150 monthly, quarterly, and annual commodity reports. These are intended to provide early recognition of impending mineral shortages, to facilitate more timely and appropriate responses, and to serve as the basis for balanced resource management in the United States.

PRIOR REPORTS

We have published several reports pertaining to mineral information systems: (1) "U.S. Actions Needed to Cope With Commodity Shortages," B-114824, Apr. 29, 1974; (2) "Federal Materials Research and Development; Modernizing Institutions and Management," OSP-76-9, Dec. 2, 1975; (3) "The Department Of The Interior's Minerals Availability System," EMD-78-16, July 17, 1978; (4) "The Department of The Interior's Computerized Resources Information Bank," EMD-78-17, July 17, 1978; (5) "Management of Federal Materials Research Should Be Improved," EMD-78-41, July 14, 1978; and (6) "Data Base Management Systems--Without Careful Planning There Can Be Problems," FGMSD-79-35, June 29, 1979.

OBJECTIVES, SCOPE, AND METHODOLOGY

This review focuses on the relationship between foreign mineral data and public policy. We reviewed principal foreign data collection activities in Federal agencies in Washington, in foreign embassies with major mineral-reporting responsibilities, and in principal end-user agencies in Washington.

We interviewed officials of the Departments of the Interior, Treasury, State, Commerce, and Energy. We also received information from, and discussed foreign data collection activities with mineral-reporting officers and resource attaches from U.S. embassies in India, Australia, Indonesia, Brazil, Bolivia, Zaire, South Africa, and Chile. We contacted private industry, research organizations, and information specialists.

In chapter 2, we discuss Federal data collection activities and the role of foreign mineral data in public policy. Chapter 3 identifies principal Federal foreign mineral data inadequacies. Chapter 4 contains our conclusions and recommendations.

CHAPTER 2

FOREIGN MINERAL DATA: ACQUISITION AND PUBLIC POLICY APPLICATION

DATA ACQUISITION

Foreign mineral data is collected in agencies throughout the executive branch. The principal focus for collection, analysis, and dissemination of this information, however, lies with the Department of the Interior, mainly within its Bureau of Mines. The Bureau attempts to provide a useful body of minerals information for the planning, policy, and decision-making of the Federal Government as a whole, as well as for private industry. Other Federal agencies are involved in collecting specific categories of foreign mineral data for their individual mandates.

These Federal data collection activities must support over 20 Federal agencies, councils, and commissions which are involved in decisionmaking and public policy analysis on matters such as price controls, international commodity agreements, import and export controls, stockpile decisions, environmental regulations, and withdrawal of public lands from mineral exploration. Access to complete and accurate foreign mineral data for such public policy applications is essential.

The Department of the Interior

Within the Department of the Interior, BOM has traditionally been the principal collector of domestic and foreign mineral data and remains the focal point for mineral supply and demand analysis. Within the Bureau's Division of Production/Consumption Data Collection and Interpretation, information relating to minerals industries is collected and analyzed. For fiscal year 1980, this division had a staff of 164 and a budget of approximately \$6.5 million. Through the efforts of its commodity, area, and statistical specialists, the Bureau publishes monthly, quarterly, and annual commodity reports in addition to its Minerals Yearbooks.

A newly created office in the Bureau, the Office of Minerals Information Systems, within the Minerals Information and Analysis Directorate, is charged with managing the minerals information systems that serve Bureau programs, and is working to implement an automated storage and rapid retrieval capability (the Automated Minerals Information System, AMIS). The Office also is responsible for developing and maintaining

statistical standards to ensure the integrity of the information resources and that the Bureau is using the most current statistical standards and procedures.

A primary mechanism for the collection of foreign mineral data overseas is the reporting carried out under Interior and State Department guidance by Foreign Service officers in U.S. embassies around the world. Their reporting is carried out (1) under a scheduled reporting system known as the Current Economic Reporting Program (CERP); (2) under "alert" reporting guidelines--on their own initiative; and (3) through ad hoc reporting, in response to specific requests from Washington.

Reporting requirements of each post vary, and are determined by the importance of the country with respect to particular minerals and the degree to which each country's economy is dependent upon such minerals. Economic commercial officers in U.S. embassies generally carry out the reporting requirements. However, in countries with particular mineral significance to the United States, resource officers (Foreign Service Officers with specialized knowledge of the minerals industry) have been assigned. Currently, there are 11 such resource officer positions, in Australia, Brazil, Peru, India, South Africa, Mexico, Japan, Indonesia, the European communities (Brussels), Thailand, and Venezuela.

In 1971, the Minerals Availability System (MAS) was set up by BOM for purposes of providing Government decisionmakers with a comprehensive data base of nonfuel mineral occurrences, to provide analytic and modeling capability as an aid to nonfuel mineral policy development, and an overall rapid retrieval/response capability. Supporting overall MAS objectives, a foreign supply group collects, monitors, and maintains foreign mineral deposit data.

Foreign data input to MAS is now principally through contracts. Our July 1978 report, "The Department of Interior's Materials Availability System" (EMD-78-16), showed that "only 5 percent of the sources of foreign deposit information came from Government references, while trade and academic publications supplied almost 63 percent of the program's foreign deposit references." The report also pointed out that the Bureau attributed a lower priority to foreign data than to domestic data although this information is essential for developing policy options based on global market forces. Agency officials told us that the Bureau simply collects domestic data first, and foreign data second on each commodity, although the true priority should be by commodity.

Other important Department of the Interior foreign data collection activities are those of the U.S. Geological Survey (USGS). The Survey is oriented toward basic scientific information on mineral resource occurrences. In 1971, the Computerized Resources Information Bank (CRIB) was established as a primary tool for evaluating mineral resource availability worldwide, and for providing rapid retrieval of mineral resource data. CRIB contains records on the metallic and non-metallic mineral resources of the United States and other countries.

Foreign data for CRIB is obtained by reviews of the literature, by research, by interagency cooperative agreement, and from private industry. However, contributions are largely voluntary, and foreign deposit data is particularly spotty and incomplete. Our July 1978 report, "The Department of Interior's Computerized Resources Information Bank" (EMD-78-17), found foreign data was not comprehensive and that data on such critical minerals as chromium, platinum, and bauxite was inadequate.

Other Federal agencies

Acquisition of foreign mineral data by other Federal agencies has generally grown out of the specific data needs of these agencies. In addition to Interior's overall responsibilities for amassing data on mineral reserves, resources, production, consumption, and the like, these agencies gather a variety of additional data which is important to considerations of foreign mineral availability.

The Department of Commerce monitors the flow of materials to industry. Commerce's Census Bureau collects foreign trade statistics monthly, including extensive detail on raw material imports and exports. Projections are made of overall economic activity, trade statistics are tabulated, and materials implications of industrial activity are identified.

Regional analysts and commodity specialists within the Central Intelligence Agency conduct commodity studies on mineral reserves, resources, materials production, and industrial capabilities. The Department of the Treasury, the State Department, the General Services Administration, the Department of Defense, the International Trade Commission, the Environmental Protection Agency, and the Department of Energy also develop foreign mineral data relevant to commodity policy and materials supply stability.

PUBLIC POLICY APPLICATIONS

The Federal Government is deeply involved in minerals and materials management, and Federal decisionmaking has substantial impacts on short and long term availability. There are over 20 Federal agencies, councils, and commissions whose policies significantly affect mineral supply and demand. Accordingly, access to foreign mineral data by these agencies is essential.

Increasing concern has been shown in recent years that the Federal Government have access to the best possible information on foreign mineral supply and demand conditions:

- The National Commission on Materials Policy, established in 1970 to evaluate U.S. materials policy issues, found that almost every area of materials policy is handicapped by inadequate, inaccurate, or inaccessible information and recommended that a comprehensive data base be established for materials-energy-environment management.
- The Office of Technology Assessment in 1976 selected mineral information as a priority issue in need of assessment and identified major shortcomings related to U.S. foreign data capabilities.
- The Henniker conferences (materials forums convened biannually to identify materials issues of concern to industry, Government, and academic groups) have emphasized the need for a national, comprehensive information system to serve all sectors, particularly the Federal Government, in formulating domestic and international economic policy.
- The National Commission on Supplies and Shortages concluded that the inadequacy of the Government's materials information system contributed to the 1973-1974 shortage situation. The Commission set out guidelines for improvements in our data collection and analysis capabilities needed for effective policy formulation.
- Our 1974 report to the Congress, "U.S. Actions Needed to Cope With Commodity Shortages," (B-114824, April 29, 1974) concluded that the U.S. Government did not have an effective planning, policy analysis and formulation system for basic commodities. We also identified the need for the establishment of an independent Government capability to collect domestic and foreign data on non-energy mineral resources and reserves.

--The call for improved information to support Federal materials management capabilities is evidenced through numerous bills, in both the House and Senate, which have been introduced in an effort to improve U.S. mineral information capabilities. And, on October 21, 1980, the Materials Policy, Research, and Development Act was signed into law as the most recent example of congressional concern. This legislation specifically directs the Secretary of the Interior to improve U.S. assessments of international mineral supplies.

--Finally, a primary conclusion reached by the recently published "Global 2000 Report to the President," which identified progressive degradation in the earth's natural resource base, was that our Government needs a much stronger capability to project and analyze long-term trends. If problems are to be minimized, the report concludes, basic mineral resources must be better managed. While actions have been taken to improve and expand foreign mineral data collection capability, little has been accomplished in directing these efforts toward ongoing Federal public policy requirements.

Foreign mineral data needs in the
Departments of Interior, State,
Treasury, and Commerce

Although many executive branch agencies are closely involved in policy and decisionmaking that directly bear on U.S. mineral supply availability, we focused on the data requirements of the Departments of the Interior, State, Treasury, and Commerce because of the important role that they occupy in a wide variety of nonfuel mineral commodity policy analyses and decisionmaking.

Typical types of decisions and policy analyses that materials information must support Government-wide include:

- forecasting needs for and implications of price control mechanisms;
- formulating policy options for international commodity agreement negotiations;
- implementing import and export controls;
- providing incentives or disincentives for private investment in materials production or processing or to maintenance of materials inventories;

- projecting needs for and types of Federal support for materials industries;
- evaluating supply implications and overall economic impact of environmental regulations;
- forecasting industrial capacity requirements; and
- Federal land-use decisionmaking.

The Department of the Interior has widespread input to mineral policy and decisionmaking throughout the executive branch and is regularly called upon to provide foreign mineral information to other executive branch agencies, academic institutions, and private industry. Routinely, departmental positions are called for on stockpile purchases and sales, export and import controls, controls on technology transfers, and protection of domestic minerals industries.

Foreign mineral data to support the offices within Interior come from a variety of sources, such as BOM, USGS, journals, and foreign country contacts. In addition, data bases for comprehensive commodity analyses, for supply/demand projections, and for development of positions on international commodity agreements are contracted for from private sources. At the time of our review, Interior officials cited data bases and models purchased from four separate private sector sources.

Within the Department of State, information on foreign mineral supply is in constant demand. Data is relied upon to support policy positions taken in international conferences and negotiations, to shape U.S. participation in international commodity agreements, to monitor stockpile disposition, to identify impacts on producer countries of commodity policy, and to identify appropriate investment policies.

State Department officials stated that they have many sources of data on foreign mineral supply and demand, such as USGS, BOM, foreign economic reporting officers, and statistical bulletins. They stated that automated data capability is essential for their data handling, modelling and analytic manipulation responsibilities. For continuing policy analysis purposes, data bases (copper and tin data bases, for example) are purchased from private sector sources. These data bases typically provide rapid access to a wide selection of data on mineral reserves, resources, production, consumption, capacity, prices, trade, and investment.

In carrying out its responsibilities for formulating and recommending domestic and international financial, tax, and

fiscal policies, the Department of the Treasury plays a critical role in determining mineral supply availability. The agency has a continuing mandate to provide policy inputs on the ramifications of minerals balance-of-payments, producer alliances, overall minerals dependence, commodity agreements, and international trade negotiations, among others.

As with the other agencies with similar responsibilities, Treasury officials stated that rapid access to comprehensive data bases is essential in efficiently fulfilling their commodity analysis responsibilities. Treasury officials stated that they have formulated their own data bases for some commodities (copper and tin), and contracted with private sources for others.

The Department of Commerce has an overriding responsibility for the problems of U.S. industry, both its opportunities overseas and its dealings with respect to competition in domestic markets. The Department plays a central role in materials management, developing positions on export control policies, import policies, domestic industry assistance, international commodity agreements, and investment incentives. Foreign mineral data sources for the Department vary widely (publications, journals, BOM, the State Department, trade associations, and the like). Again, however, basic to the Department's continuing comprehensive commodity policy analyses are automated data bases and models acquired from private contractors. Officials told us that they often update the data bases themselves, getting whatever good data that they can find (such as BOM statistics, and industry trade associations data).

Information and public policy--findings of the Non-Fuel Minerals Policy Study

Five case studies were prepared in support of the presidential Nonfuel Minerals Policy Study. Their purpose was to evaluate the adequacy of current Government information systems on nonfuel mineral activities and problems. Four of the five related substantially to foreign data and public policy interactions: The Ferrochromium Tariff Policy Decision Process Analysis; The International Tin Agreement Policy Decision; The Price Controls Policy Study; and the High-Alumina Clay Development Decision. These studies, submitted in the fall of 1978, characterize current information capabilities. Since the studies analyzed the adequacy of existing Government capabilities to support Federal policymaking, some of their principal observations are described below.

The Ferrochromium Tariff Policy
Decision Process Analysis

This case study focused on a 1977 investigation and decisionmaking process relevant to the high-carbon ferrochromium industry by the U.S. International Trade Commission. The study was made to evaluate the policy formulation process and nonfuel information usage leading to the ITC's recommendation to the President on December 1, 1977, for import relief for the domestic high-carbon ferrochromium industry. Information on foreign supply of nonfuel minerals played a key role. Principal problems cited with the adequacy of information were that:

- The disaggregated data collected by BOM was not available in a format usable by the ITC.
- Access to international trade data was limited and efforts were made to obtain more data from the United Nations.
- Coordination of data collection among agencies was lacking. BOM's collection of data on chromium is independently developed. Information collected by the ITC duplicated data collected by BOM.
- There was a lack of data available for input to automated systems.
- The lack of statistical comparability for data on imports, exports, and production results in waste in the areas of cost, effort, time, and paper.

The International Tin
Agreement Policy Decision

Following a 5 month commodity policy review in 1975, the United States joined the fifth international tin agreement in an effort to stabilize world tin prices. The case study on the U.S. decision to join the agreement focused on the interface between the policy system and the information system in order to determine whether the policymaking process functioned efficiently and whether policymakers received, on a timely basis, sufficient accurate data and information for well-informed policy formulation. The principal problems identified were these:

- The significance of producer country domestic tax, licensing, and ownership policies on tin production

costs was not recognized. The information system was not organized to collect tin industry information on a routine basis. Specific information on fiscal policies affecting the tin industry was collected only after a special request.

--More accurate and reliable data on tin reserves would have been useful in identifying future tin supply patterns.

--The availability of a centralized analytic capability would have improved policy formulation capabilities.

The Price Controls Policy Study

The United States controlled prices in the metals industries under the auspices of the economic stabilization program of 1971-1974. The case study on the regulation of metals prices under this program was undertaken to focus on the interface between the policy system and the information system to determine whether policymakers received adequate information to aid the policy process.

It was concluded that there were several areas of weakness for administering a system of permanent controls designed to remain in place during periods of high market pressures or to cope with excess demand. These areas included the lack of overall availability of information on foreign markets.

The High-Alumina Clay Development Decision

In 1973, BOM decided to accelerate development of the technology of extraction of alumina from domestic, nonbauxitic raw materials. This case study was undertaken in an effort to evaluate the interface between the information system, whereby data are collected, stored, analyzed, and disseminated, and the policy system whereby policy decisions are made.

The reviewers cited the benefits to be gained from a data bank on aluminum in which contingency questions relating to economic factors (such as dramatic increases in the cost of foreign bauxite) or technological factors (such as a dramatic improvement in some phase of processing of a nonbauxitic raw material) could become a part of the data base which would be immediately capable of providing a new projection of alumina supply.

Conclusions

Information on foreign mineral supply conditions is essential to support informed policymaking and decisionmaking

in the United States. This type of information must be readily available so that important mineral availability implications of overall executive branch and congressional policy processes can be identified.

Vast amounts of data pertaining to foreign mineral supply availability are gathered and analyzed in executive branch agencies. Use of this data, however, is minimal for continuing Federal commodity policy analyses. Basic underlying reasons are identified in the following chapter.

CHAPTER 3

FOREIGN MINERAL DATA: UNDERLYING INADEQUACIES

U.S. Government foreign mineral data collection efforts do not constitute a useable body of mineral information for policy and decisionmaking in the Federal Government because:

- The Department of the Interior's foreign mineral information collection activities are principally responsive to individual office and Bureau requirements, not to executive branch foreign mineral information needs as a whole.
- Those involved in policy analysis and resource management in the executive branch do not shape Federal data collection activities.
- Foreign data is generally acquired to meet single-user objectives.
- A comprehensive automated data management capability is not available to support commodity policy analysis in executive branch agencies.

PRINCIPAL FEDERAL DATA COLLECTION ACTIVITIES NOT RESPONSIVE TO FEDERAL DATA NEEDS

There is no central authority within the Federal Government for directing Federal data collection efforts to support Federal needs for data.

The Department of the Interior's foreign mineral data collection, analysis, and dissemination activities are principally responsive to individual office mandates. They do not relate to the content, availability, and format requirements of policy analysts in numerous executive branch agencies today.

The mission of BOM with regard to the collection of mineral information is to provide a reliable data base to support development of effective minerals policy by collecting, interpreting, and disseminating worldwide data and information on the production and consumption of minerals. BOM's information collection mandate includes responsibility for providing a coordinated body of information that is basic to the planning policy and decisionmaking of the Federal Government as a whole.

BOM's perception of its information role, however, appears oriented toward information dissemination based on Bureau needs (commodity specialists, international specialists, and the like) and publications prerequisites. Information and analysis requirements to support the existing policies of Federal agencies with nonfuel mineral responsibilities are not communicated to the Bureau. Foreign data generated by the Bureau is disseminated through an established series of publications, special papers, reports, and speeches. The Bureau's public policy supporting function is carried out largely through publication.

A recent BOM study states that the primary data requirements of the Bureau's information system are "to support the commodity divisions, international data and analysis, and technical data service groups * * * to provide easier access to data for a greater number of qualified Bureau users." These groups, in turn, are structured according to Bureau publication requirements, the Bureau's primary means of data communication.

Commodity analysts within Government departments and agencies who use and therefore create a demand for foreign mineral data in the executive branch are familiar with BOM publications. The Minerals Yearbooks, Mineral Commodity Summaries, the Commodity Profiles, and others provide a broad range of mineral information.

Typically however, policy analysts

- have a minimum awareness of BOM and USGS automated data capabilities--MAS and CRIB;
- do not rely on BOM publications as a basis for ongoing policy analyses or decisionmaking; and
- subscribe to private data bases, construct individual commodity data bases, and contract for policy analyses based on data bases constructed by contracting firms.

Consequently, BOM data does not fulfill the role of providing a coordinated and consistent data base supportive of Federal decisionmaking and resource management. In addition, there continues to be no agency in the Federal Government that directs or manages collection of foreign mineral data.

Interior officials stated that BOM sources are minimally relied upon because of inadequate automated foreign coverage, insufficient detail, and absence of a format conducive to their modelling and analytic manipulation requirements. They said that they were uncertain about the reliability of the data sources they purchased from four separate private sector

sources and that reliability could really only be determined by individual commodity experts. They further told us that models (with associated data bases) for which they contract are constantly running into problems because data called for is not available, and they have to substitute. They said also that the practice of end-users going out and buying data bases works against the efforts of the Federal Government to compile an adequate collection and analysis function by removing the critical interaction between data acquisition and use. State Department officials who knew of MAS and CRIB cited problems with foreign data coverage as primary reasons that they did not use either of them, and Treasury officials said that BOM and USGS data did not meet either their format or content requirements. Both State and Treasury cited rapid analytic calculations as essential to their day-to-day activities. Department of Commerce officials stated that supply and demand analysis and forecasts made it imperative that they have access to automated data bases.

LIMITED INTERACTION BETWEEN DATA COLLECTION AND USE

Effective foreign mineral information management is dependent upon participation in the data collection process by the users of foreign mineral information. However, users we queried have minimal contact with the Government collection, analysis, and dissemination process.

Policy analysts within the Departments of Commerce, State, Treasury, and Interior rely minimally on Interior's data collection capabilities. Typically, data on mineral production, consumption, exports, imports, stocks, and prices are obtained from sources outside the Federal network.

The absence of any communication between data users and data collectors was stressed in discussions we had with U.S. embassy representatives. Discussions revealed underlying differences in their perception about reporting objectives and program responsibilities:

--Resource reporting officers say they do not always know who the data users are, what data is used for, and what data needs are most urgent. They stated that in the absence of specific direction, they continue reporting as they see appropriate, making subjective decisions about what is important. Consequently, export promotion is the major concern in some posts, investment climate in others, and supply projection in others. This is so not because of particular identification of specific responsibilities in particular countries, but because of the absence of that identification.

--Because there is little feedback, most resource officers assume the data they collect represents what is needed. Conversely, agency officials in Washington describe reporting inadequacies relating to overall accuracy and coverage, as follows "We need more specific data on individual country exports--not just most exports to a particular country," or "We need more data on consumption." Inadequate or inappropriate mineral reporting is often seen by Washington officials as a reflection of the lack of training in data collection efforts.

--Sources vary widely--some reporting officers consider mine visits essential to verifying data, while others minimize their importance. Some posts, as a rule, have come to rely completely on local nationals to fill out statistical reports, while others concentrate on documents received from mining companies. Some posts make efforts to verify data, and others forward data as received from the local government.

Embassy officials told us that, other than the requirements established by the Department of State's Foreign Affairs Manual, which identifies general reporting requirements, categories, and procedures, they have received no formal guidance from Washington as to what type of mineral data is most useful. One attache stated that he has received some informal guidance through discussion and personal correspondence with USGS and BOM officials, but he does not know what specific data is required to satisfy the needs of these agencies. He stated that while on leave during 1978, he visited both agencies and expressed his belief that formal guidance should be developed so that the Mineral Reporting Officers would know the data needs of the two agencies. However, while receptive to his opinions, neither agency has provided any type of formal guidance.

In essence, Federal foreign data collection efforts are carried out with little interaction with the principal Government departments and agencies. The demand for data, created by its use and essential for tailoring Government collection efforts, is missing, and as a result, what data is needed, who needs the data, the extent of verification needed, and the format required are all unknown.

RELIANCE ON AD-HOC REPORTING

Foreign mineral data is generally acquired to meet single-user objectives. Although a wide selection of data is routinely acquired under a variety of programs, it does not

become part of a data pool, its availability is often unknown, and its overall usefulness as a result is diminished. Ad-hoc reporting now constitutes the majority of all foreign mineral data reporting. It is the predominant tendency to make special requests for information each time a need arises, rather than use the existing infrastructure. We found that the volume of data requests made of foreign service reporting officers reduces their overall reporting capabilities and limits their ability to expand coverage into potentially important mineral areas.

U.S. foreign data collection activities are characteristically oriented toward a one-time use. For example, the idea behind MAS was to provide Government decisionmakers with a comprehensive data base of nonfuel mineral occurrences. Its efforts are directed primarily for evaluation of deposits but the data is little used for other purposes, even within BOM.

Most reporting officers we interviewed cited as an urgent problem the repeated requests from different agencies and offices for similar information. They cite this as a major deterrent to timely reporting, a constraint on accuracy and reliability, and a barrier to expanded mineral reporting coverage.

ABSENCE OF A COMPREHENSIVE AUTOMATED DATA MANAGEMENT CAPABILITY

Access to foreign mineral data has been severely restricted because of the absence of a comprehensive automated data management capability. Given the nature of foreign mineral data--the volume of data types necessary, the diversity of sources worldwide, the variety of agencies involved in the collection process, the vast array of uses and users throughout the Federal Government, and the modelling and manipulation requirements of these users--this type of capability is essential.

The absence of a comprehensive automated data management capability which is fed by all Federal Government data collection activities and available to all data users is a major reason why existing means of Federal foreign mineral data acquisition and analysis have been under-used. This absence is a major reason for the prevailing tendency within the executive branch to purchase such a capability from the private sector. The diversity of Government data users and needs dictates that automated data bases exist--separate from operating programs under which data is acquired. Currently, MAS and CRIB do not fulfill the needs of other users because data is unavailable for retrieval and analytic manipulation in the

format needed by commodity analysts. As a result, analysts rely on other sources.

In addition, changing information needs, reflecting changing constraints on mineral supply, are not systematically included in data collection programs. Development of policy options and assumptions of future trends, through modelling techniques, are jeopardized because information is often not available. Policy analysts cited the common need for substituting less appropriate data in commodity models because necessary data was unavailable.

UNRECONCILED DATA AND ANALYTIC INTEGRITY

A continuation of the practice of individual policy analysts acquiring data from diverse sources not only results in unreconciled data but circumvents extensive in-house analytic capabilities. Thorough analytic capabilities to evaluate data sources and assumptions, such as those carried out by BOM commodity, country, and technical data specialists are critical to effective information management. The use of reasonably reconciled data by all parties in the policy and decisionmaking process is critical.

Individual executive branch agencies and offices require modelling capabilities and data application programs tailored to specific, often distinctly different objectives. However, data to support these programs must be internally consistent, or results can be seriously flawed. A conclusion reached in a report by the National Commission on Supplies and Shortages addressing Federal decisionmaking was that variations in data and inconsistencies between sources have been sufficient to cause major impacts on policy analysis activities. Often data discrepancies are known to technicians, but not to policymakers.

Within the agencies studied, policy analysis is regularly supported by automated commodity information systems procured from a variety of sources. We identified six separate commodity information systems contracted for on an ongoing basis. These systems are tied to individual user groups, but in some cases are shared between agencies. In addition, data bases are sometimes constructed within agencies, and are constructed by contractors doing policy analyses for major Government studies. We located one commodity data base which was structured principally from a trade association statistical publication.

Data sources and commodity information systems circumventing Government capabilities are numerous. Each system we identified quoted numerous sources of foreign mineral information. A typical system, contracted for by one agency, provides 99 data types for a single commodity, and lists 21 different sources for data used in the system. Another system, in another agency, lists six sources for seven general data categories for the same commodity.

Terms used in describing mineral resource data compound the uncertainties that arise out of the unevenness and incompleteness of resource data. Particularly with respect to foreign mineral information, it is difficult to determine what statistics actually represent. Under current terminologies, reserve and resource data are misinterpreted, and comparisons between statistics supplied by different countries often cannot be drawn. Production is reported at different stages in the production system, and mineral data is gathered for a variety of reasons ranging from company financing justifications to taxation mandates.

Reporting on accuracy of production and consumption data, a Canadian mineral official reports that

"there is little consistency in the way that resources are appraised anywhere, even within individual countries, let alone across the globe * * * figures reported by different countries are not likely to refer to things that would be closely comparable from country to country * * * sub-economic material may or may not be included in reported resource figures * * * production figures may represent either production or shipments * * * generally a set of consumption statistics could represent apparent consumption * * * producers' domestic shipments * * * end-use consumption."

Ambiguities in mineral data reporting, in particular foreign mineral data reporting, substantial deviations in data from diverse sources, and general lack of critical evaluation capability by end-users all point to the importance of improving verification and data analysis capabilities.

CONCLUSIONS

Information is an invaluable resource for natural resource management, as well as for identification of mineral supply implication of overall public policy. Recognizing the growing

constraints of foreign mineral supply and increasing competition for finite mineral resources, information on foreign mineral availability is particularly valuable.

Government policy formulation and resource management depend upon the data collection and communication capability of the Department of the Interior. However, the continuing gap between Federal data collection activities and policy formulation in the executive branch minimizes the usefulness of foreign mineral data.

Because of the disparity between Federal data collection and policy formulation functions, the critical role of demand as a key determinant of data collection effectiveness and efficiency is lost. And the potential for improving Federal data collection efforts in the absence of continuous demand to do so is minimal. Within the executive branch, policy continues to be supported by data whose consistency and accuracy, are uncertain. And institutional safeguards built into Government collection and analysis functions are largely circumvented.

Management of finite, nonrenewable resources in the United States on the basis of adequate, standardized, credible information concerning major aspects of foreign supply and demand is critical to U.S. economic stability. Currently, natural resource management is hampered by an inadequate foreign data capability.

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Today important changes are taking place in the nature of foreign mineral production and consumption. Increasing dependence upon foreign-source minerals and materials, combined with conditions that threaten stable supplies of materials critical to U.S. economic stability, necessitate that U.S. policies and resource management be based on the best possible information regarding foreign supply conditions. An effective, efficient system for collecting foreign mineral data and for communicating it to key recipients throughout the Federal network is mandatory.

The mandate to improve the Federal capability in this area is abundantly in evidence. Congressional and executive branch initiatives in support of an enhanced foreign mineral information capability are well known. U.S. foreign mineral information capability, however, continues to be inadequate to support basic public policy objectives.

Although foreign mineral data is collected in numerous offices and agencies throughout the executive branch, use of this information is severely restricted. There is no structure to match the diverse array of Government data collection activities with the needs of the numerous Government departments engaged in materials activities, and data is generally not in a format suitable for useful sharing with other agencies. The lack of interaction between decision-makers and data suppliers limits the usefulness of data needed for policy formulation, for identifying mineral supply implications of Government-wide policy decisions, and for overall balanced resource management in the United States.

The potential for improving the usefulness of data presently collected, and for enhancing the accuracy, timeliness, and reliability of that data, and the potential for expanding the coverage of foreign mineral reporting by providing a clear direction to current data collection, communication, and storage activities, however, is excellent.

The organization of foreign mineral data collection through the Departments of the Interior and State provides the necessary framework. Collection through minerals reporting officers and resource officers combined with institutional analytic capabilities within the Department of the Interior is the key to a superior system. When these inherent capabilities

are tailored to foreign mineral data needs in commodity policy analysis offices within the executive branch and when the deficiencies cited in the previous chapter are overcome, this potential can be realized.

The Bureau of Mines is currently moving toward an integrated data base management capability designed to provide storage and rapid data retrieval capability. We support this effort. However, this data management capability must be based not only on a set of interactive data bases encompassing numerous agency data collection efforts, but also on the full range of Government policy related data needs and access prerequisites.

RECOMMENDATIONS

Lead responsibility for collection and analysis of foreign mineral data (as for domestic mineral data) should continue under the auspices of the Secretary of the Interior. Other executive branch agencies, as well as distinct bureaus within the Department of the Interior, should continue specific data collection activities pursuant to individual mandates. As recommended below, these programs would then constitute interactive data bases, under the Secretary's jurisdiction.

Because of the complexities of Government foreign mineral data collection and communication, we recommend an automated data base management system approach as the most efficient means of assuring that the best attainable information is available for shaping the Nation's minerals future. Benefits of this approach, if implemented, are that it could provide immediate availability of a body of relevant, timely, accurate information suitable for retrieval and forms of utilization called for by a vast array of users.

Further, we recommend that the Secretary of the Interior:

- Initiate an in-depth analysis of all continuing foreign mineral data needs and resources throughout the executive branch, including capabilities and requirements of State Department Foreign Service reporting officers.
- Direct centralization of responsibility of all foreign mineral and related information (not the collection function itself) within the Minerals Information and Analysis Directorate, U.S. Bureau of Mines.
- Direct that the Minerals Information and Analysis Directorate structure the foreign mineral information system

to be responsive to needs of all agencies for minerals and related information needs of all agencies and to incorporate ongoing data acquisition activities of other Federal agencies. The automated capability should also incorporate a new file on institutional factors--factors likely to affect production and investment climate (taxes, subsidies, energy constraints, environmental constraints, political instability, and so forth) as a regular systematized component of foreign mineral reporting, to be modified as conditions warrant.

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While we did not provide the draft report to the agencies for comment, we discussed our findings with various officials of the Departments of The Interior, State, Commerce, and Treasury. Officials in each of the agencies expressed agreement with the overall tenor of the report, that the concerns identified were real and that initiatives needed to be made to bring together, in some manner, the longtime Federal public policy data needs and Federal data collection and analysis capabilities. We found overall agreement that the Bureau of Mines is ideally situated and has the inherent capability to be the focus of Federal data collection activities, and that its efforts must be developed on the basis of total Federal mineral policy formulation requirements.

Bureau of Mines officials supported our recommendations and provided us with a copy of a presidential directive dated November 4, 1980, which also cites the need for improving the cohesion between Federal nonfuel mineral data gathering and policy formulation. The directive calls for the establishment of an information coordinating committee in order to identify information and analysis needed to support Federal policies affecting nonfuel mineral supplies. We support this effort.

Other Bureau of Mines officials cited the November 4 presidential directive as a potential means of overcoming some of the information problems we spelled out. In addition, they cited the AMIS (see pp. 4 and 23) as a tool being developed to alleviate shortcomings outlined in our report as well as the similar concerns expressed in the November 4 presidential directive. While we agree (see p. 23) that AMIS is the type of management capability needed to address policy matters discussed in chapter 3, we feel that efforts need to be made to develop this capability, as well as other Federal mineral data and analysis capabilities, subject to the information content and format requirements of those executive branch agencies with nonfuel mineral policy responsibilities.

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