STRATEGIC MANAGEMENT AND POLICY IMPLICATIONS OF DEVELOPING A MINERALS BUSINESS LINE

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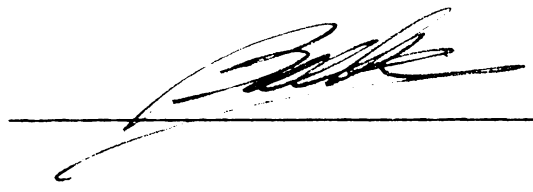
The development of a minerals business line within an oil company is examined. Three alternative methods for entry and growth in the industry are identified as internal development, joint ventures, and mergers and acquistions. Each of the strategies is examined in light of the specific objectives of the company. The last of these options, mergers and acquisitions, is determined to be the route of accelerated growth and eight possible substrategies are examined in greater detail. Evaluation and monitoring mechanisms are explored.

ADVISOR'S APPROVAL 

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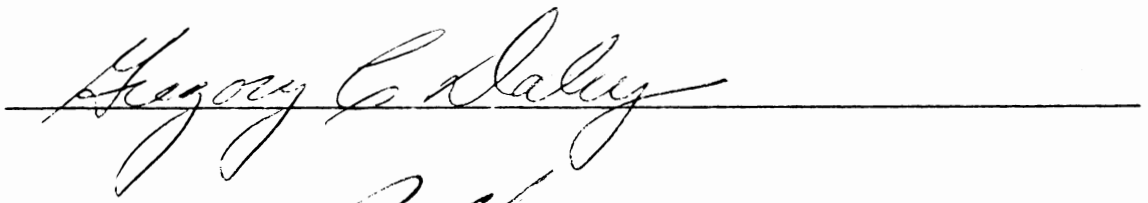

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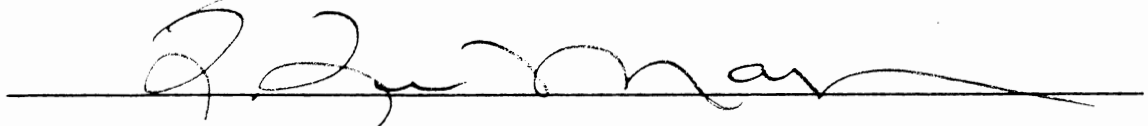

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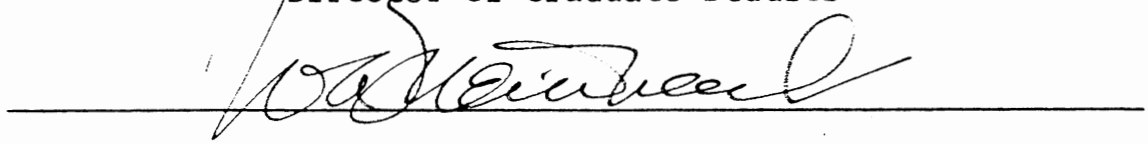

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I. INTRODUCTION

The mission of the Minerals Development Division of Phillips Petroleum Company is to profitably acquire, develop and market mineral reserves of uranium, oil shale, oil sands, geothermal and non-fuel minerals. To successfully fulfill this mission requires the development of strategies and policies by the management of the Minerals Development Division. The Division already has strong exploration bases located in Albuquerque, Salt Lake City, Bartlesville and other smaller field offices, from which to draw state-of-the-art expertise in developing a profitable minerals business line. However, the development of overall management strategies and policies will allow not only synergism in the exploration for various minerals but also possible escalated growth of the Division through enhanced financial strategies such as joint ventures or mergers and acquisitions.

A strategy is a unified comprehensive and integrated plan relating the strategic advantages of the firm to the challenges of the environment. It is designed to ensure that the basic objectives of the enterprise are achieved. The strategy is the means used to achieve an end or an objective. A strategy is a plan that is unified: it ties all the parts of the enterprise together. A strategy is comprehensive: it covers all major aspects of the enterprise. A strategy is integrated: all the parts of the

plan are compatible with each other and fit together well (Glueck, p.9) In this thesis many of the strategies available to the Minerals Development Division will be discussed and those thought to be of primary importance will be discussed in greater detail.

Several benefits accrue companies using strategic management which include some of the following:

- Strategic management helps the firm anticipate future problems and opportunities.
- Strategic management provides clear objectives and directions to the future of the enterprise.
- Strategic management helps educate managers to become better decision makers. It helps managers examine the basic problems of a company.
- Strategic management helps improve corporate communication, coordination of individual projects, allocation of resources and short range planning, such as budgeting.

(Glueck, p.20)

II. OBJECTIVES

Before determining strategies and policies for a business line to folow it is necessary to determine the goals and objectives of the business line. There are two types of objectives which can be delineated for an organization. The first are considered broad goals rather than specific objectives. These would include some of the following:

- profitability
- efficiency
- employee satisfaction and development
- quality
- market leadership
- survival
- adaptability

Although these general goals are valid and are certainly required for continued growth and profitable operation, the objectives must now be narrowed down to more specific operating characteristics of the business line in order to be functional.

In this regard eight specific objectives can be identified for the Minerals Development Divison as follows:

1. Develop White River Shale project with 9000 barrells per day average gross module demonstration phase production in 1984 expanding to 100,000 barrells per day gross commercial production by 1991.

2. Acquire domestic oil shale resources to support additional shale oil projects in Utah, Colorado, and the Eastern United States.
3. Acquire domestic oil sands resources to support at least one future commercial project.
4. Become a profitable operator and producer of non-fuel minerals.
5. Complete geologic evaluation of the Mt. Hamilton property and make a development recommendation to management by year end 1982.
6. Enter at least one domestic and one Canadian or Australian non-fuel minerals exploration or development joint venture by the end of 1981.
7. Negotiate a sales agreement in 1980 for the stage development of Roosevelt Hot Springs Utah geothermal reservoir for 120 Mw of electrical capacity with first sales in 1982.
8. Identify minerals companies with compatible strategic objectives for possible acquisition candidates.

Objectives and projection of their implementation in the future explicitly present a picture of the characteristics of the minerals business lines. The immediate question is the compatibility of this business line with other business lines within Phillips Petroleum

Company. This compatability should be analyzed with respect to the various functions presently existing in the company, such as, financial, marketing, reserves, production, accounting, computing, personnel, research and development and legal functions.

II.1 Financial Compatability of Minerals Business Lines With Phillips Petroleum Company

The financial requirements of the minerals business line are those of a project oriented business. In other words, the expenditures and cash incomes are associated with major one of a kind projects. This is very similar to most of the business lines within Phillips, whether it be Natural Resources oriented, such as the drilling of a well with large front end expenditures and revenues occurring at the completion of the investment or the building of a chemical plant. Obviously, the financial profile of a chemical plant or a refinery requiring expenditures to maintain and update the plant are more in line with the types of cash flows associated with mines. Projects such as geothermal projects which require the drilling of geothermal steam wells are more closely associated with the oil and gas operations of the Natural Resources Group.

II.2 Marketing

The marketing aspect of the oil shale/oil sands related businesses will be compatible with the marketing of crude from the Natural Resources Group of Phillips.

There is some variation of the chemical makeup of the end product as it is kerogen instead of natural crude oil, but the primary markets for the product are thought to have similar features. The geothermal and other mineral markets will be exclusively different from the oil shale market in as much as Phillips presently does not have any large steam marketing function. There are some small mineral operations such as trona and phosphate which are currently underway, but none at the present time deal with the strategic minerals and metals which the business line intends to develop. The market for the uranium products is similar to the utility market for crude oil in that the end user is the same, the utility company. However, the similarity ends there. The nature of the sale of large amounts of yellowcake for future operations entails vastly different marketing concepts than does the sale of crude oil.

II.3 Reserves

There is currently much similarity between the types of reserves in the ground required for the operation of the minerals business line and those already existing in the current operations of Phillips. Indeed, some of the western lands contain mineral rights belonging to Phillips currently for minerals other than those that Phillips is actively developing at the present time. This is one of the prime reasons that development of a minerals business

line offers so much synergism to the overall operation.

II.4 Production

The production of the ores and steam from the minerals business line will entail three basic production methodologies. They are as follows:

1. Open Pit Mining - Some minerals and most lignite reserves will be produced through the use of open pit mining techniques such as bucket-wheel excavators, drag lines, etc.
2. Deep Shaft Mining - Many uranium and non-fuel minerals will only be accessable through the sinking of deep shafts and production techniques associated with deep mining operations.
3. Wells - Both geothermal wells and in-situ leaching operations, such as those required for in place uranium recovery, require the drilling and operating of wells.

Of the three above mentioned techniques, Phillips currently has primary expertise in the drilling and operating technology. Phillips has also had some experience in open pit mining through a test pit in Louisiana. The division recently has sunk mine shafts in New Mexico to depths of 3000 feet. Compatability synergisms should be found from the similarity of production methods in the development of the business lines.

II.5 Accounting

The specialized accounting required for Natural Resource oriented companies, such as depletion requirements, special investment tax credit features, & a project oriented accounting system in lieu of a product oriented accounting system, is available currently within the company.

II.6 Computing

Technical applications amongst the various projects of the business line and the remainder of the company are similar in nature. Development of a three dimensional geothermal reservoir model was a direct spin off of the Exploration and Production three dimensional oil and gas model. Since the business line is primarily project-oriented commercial computing systems will likewise be applicable.

II.7 Personnel

Technical and commercial skills learned within the various projects of the minerals business lines will be applicable to other projects within the division as well as other projects in other business lines of Phillips. This gives great flexibility in assigning personnel to various groups and businesses in order to further develop them.

II.8 Research and Development

There are many similarities between the Research and Development work required to maintain a competitive edge within the minerals business line and the other business lines of Phillips. Many projects undertaken now by Phillips R&D benefiting Minerals Development Divison have been created from spinoffs of oil and gas Exploration and Production division of Natural Resource Group projects.

II.9 Legal

The legal concepts involved with land ownership and project oriented businesses have similar compatability amongst the businesses of the business line and amongst the remaining businesses of Phillips.

II.10 Hypothesis

It is the hypothesis of this paper that entry and growth into the minerals industry will be be most effective and expeditious through a merger or acquisition of a current mineral producer rather than by internally developing projects into a business line.

III. EXTERNAL THREATS AND OPPORTUNITIES

External analysis is the process by which strategists monitor the environment to determine opportunities and threats to their firm. Analysis is the tracing of an opportunity or threat to its source breaking the whole into its parts to find its nature, function and relationship. Strategic management requires searching for opportunities and threats and determining where they come from and which ones are potentially hazardous or beneficial to the firm. In analyzing the external environment several factors should be considered. Some of the following concepts are examples:

- Economic Factors
- Government Legal Factors
- Market/Competitive Factors
  - Entry and exit of major competitors
  - Availability of substitutes
  - Major strategic changes by current competitors
- Supplier/Technological Factors
  - Availability and cost of raw materials
  - Availability and cost of money
  - Availability and cost of labor
  - Availability and cost of sub-assemblies
  - Technological change
- Geographic Factors
- Social and Other Factors

The remainder of this section on external threats and opportunities presents analyses of the external environment of the Minerals Development Division of Phillips Petroleum Company specifically concentrating in three main areas. The first of these areas deals with observations occurring in the external environment which are not necessarily threats or opportunities but which may have some impact on the Division. The second section deals with further tracing back of these observations and identifying those which are opportunities. The third section deals with tracing back the observations of the external environments and identifying those which are potential threats.

III.1 EXTERNAL ENVIRONMENT ANALYSIS

III.1.a Non-Fuel Minerals Business Line

- The U. S. has a very high dependency on imported minerals with over 50% of 25 critical minerals being imported in 1979 and with all forms of minerals imports accounting for over $24 billion dollars.
- Environmental controls and federal land closures that adversely affect mineral exploration mining and processing have been increasing.
- During the past 5 years, oil companies have acquired mining companies as a diversification and as an investment opportunity.
- New resource discoveries, process breakthroughs and government changes in mining laws, tax

procedures or federal stockpile sale policy can rapidly change demand and prices of mineral commodities.

- Capital requirements are large and increasing for development of new properties in the mining industry.

III.1.b Oil Shale External Environment

- There is a renewed interest in urgency in development of a U. S. synthetic fuels industry: shale oil production appears to be economically viable at todays oil prices and holds a significant economic advantage over liquids produced from coal.
- Production technology is currently not proven at a commercial scale.
- Pipeline transport of shale oil to major refining centers and refinery modifications necessary to process high-nitrogen shale oil will most likely be required.
- The regulatory environment for oil shale is still in the formative stages. Air quality and water regulations may restrict the ultimate level of production.

III.1.c Phillips Uranium External Environment

- National energy policy, particularily nuclear power policy, is in a state of disarray; public opinion pressure is required to affect significant changes.

- The uranium market is soft and will remain so until the mid-1980's.
- Rapid growth in uranium demand on a world wide basis is expected.
- Uranium exports from foreign countries will be increasing in the 1980's.
- Nuclear/uranium industries tend to be government controlled.

III.1.d Geothermal External Environment

- Some utility commission rate decisions continue to erode the financial strength of the major utilities and have severely reduced many utilities' ability to raise capital and install needed new capacity. However, the capital requirements for new geothermal power plants are lower than for new coal fired power plants.
- Utilities with the most pressing load growth requirements are those whose financial weakness are most accute preventing them from participating in geothermal development.
- Municipalities and utilities throughout the West appear to be increasing their willingness to look at new sources of energy and to take the investment risk associated with geothermal reservoir uncertainties.
- The ready availability of natural gas and oil in storage has delayed the full impact of

current oil prices yet to be felt by consumers who receive their electricity from utilities which depend heavily on oil and interruptable gas for electrical generation.

- To date, the only demonstrated profitable U. S. geothermal operation is in the Geysers, California area.

III.2 Opportunities Provided By The External Environment

From the above list of important externalities existing in the minerals business line environment, one can see that several opportunities are available to those who have an understanding of the main factors impacting minerals industry.

111.2.a Non-Fuel Minerals Opportunities

- A growing demand is projected for most non-fuel minerals.
- The Mt. Hamilton tungsten prospect represents an opportunity to exploit the U. S. trend to greater dependency on tungsten imports and the anticipated stronger demands for secure domestic resource.
- Phillips advanced exploration technique and expertise provide a base on which a competitive position in the non-fuels minerals exploration may be developed.

III.2.b Oil Shale Opportunities

- Oil Shale represents a potential large secure

domestic supply for Phillips refining and marketing network.

- The growing demand for and shortage of secure transportation fuels should reward those that proceed with well conceived plans for oil shale development.
- World oil prices have increased at rates considerably higher than general inflation and will probably continue to strengthen the viability of oil shale projects.
- Phillips refining and marketing region is located near the western oil shale region.

III.2.c Uranium Company Opportunities

- NUEXCO projects U. S. uranium demand to expand at a rate which will provide market opportunities during the last half of the 1980's and the 1990's to companies with vigorous programs for selectively acquiring and developing competitive reserves.
- Depressed near term uranium market is curtailing industry exploration activity which it affords a better opportunity to acquire a fine reserve with strong competitive producing cost advantages.

112.2.d Geothermal Opportunities

- Higher prices for fuels that are now being used for electricity generation make geothermal energy very attractive to selected markets throughout the West.

- Western non-Califoria utilities are viewing California as environmental obstacles to power generation as an opportunity to profit by exporting power which is not competitive within their own market area.
- Several western utilities have proposed to enter geothermal projects very soon after discovery, placing 10Mw semi-portable units in service to produce electricity for resale outside their service areas. This approach would resolve the cost of delay and utilities would share in both the loss and gain due to uncertainties asssociated with the projects.
- Recently enacted and/or proposed incentives for alcohol production may make alcohol from agriculture products very attractive to producers with access to low cost process heat. In the West the indigenous agricultural industry and transportation system are in reasonably close proximity to proven sources of geothermal energy.

III.3 External Environmental Threats

The external environment of the Minerals Development Division can be reanalyzed, this time in search of threats which could potentially hender the performance of the division. These are broken down as follows:

III.3.a Non-Fuel Minerals Threats

- Competition from more experienced companies could jeopardize entry & growth into industry.
- Environmental and social issues may constrain or reduce the development of some domestic minerals.

III.3.b Oil Shale Threats

- A deficiency of experienced people in mining and solids handling within the industry could prevent attainment of production targets.
- Scale-up from known pilot operations to the largest capacity underground mines and solids handling operations in the world is subject to cost overruns and schedule delays.
- Huge capital requirements for major oil shale projects will require considerable equity and borrowed funds.
- Environmental and no growth groups will inhibit development at every possible opportunity.

III.3.c Phillips Uranium Corporation Threats

- Future uranium productions from planned production centers for large reserves in Canada and Australia will be lower in cost than uranium produced from Nose Rock Unit No. 1.
- Discovery of new lower cost domestic reserves

IV. INTERNAL STRATEGIC ADVANTAGES

Management performs strategic advantage analysis and diagnosis to identfiy clearly the current strength and weaknesses of the firm. Management also examines the most probable future strengths and weaknesses. This clearly labels the current policies as they are relative to:

- Corporate Objectives
- Competitors
- Major Environmental Factors
- Project/Service Life Cycle

Data for a strategic internal analysis and the diagnosis of the factors comes from several sources. One source is the data gathered in the environmental analysis and diagnosis stage of strategic management. The other source is the internal data generated in doing business and available from the management information system and the functional departments.

An internal strategic analysis can be broken down into five major area. These are:

1. Finance/Accounting Factors
2. Marketing Distribution Factors
3. Product Operations Management Factors
4. Personnel Labor Relations Factors
5. Corporate Resources Factor

Each of these major areas have generalized lists associated with them which should be considered in numerating a firms particular strategic internal advantages. (Glueck, p. 157)

IV.a.1 Finance/Accounting Factors

Some of the major strategic advantage factors in finance and accounting are listed below. The objective of the analysis is to determine if the firm is stronger fiancially than its competitor. Can it hold out longer or compete more effectively because it has the financial strength to do so?

Other factors listed have efficiency or strategic values to a firm. The accounting function is a necessary one for legal and management information purposes. Accounting policy on inventory valuation policy can have strategic value when changed in response to inflation and other external changes.

A firm at a particular time can be strong financially which allows it to make strategic changes. Financial rationale in accouting analyses help measure this strategic advantage.

A few of the generalized finance/accounting factors to be considered are:

1. Total financial resources and strength.
2. Low cost of capital relative to industry and competitors because of stock price and dividend policy.
3. Effective capital structure, allowing flexibility in raising additional capital as needed: financial leverage.
4. Amicable relations with owners and stockholders
5. Advantageous tax conditions

6. Efficient and effective financial planning, working capital and capital budgeting procedures.
7. Efficient and effective accounting systems for cost, budget and profit planning and auditing procedures.
8. Inventory evaluation policy.

IV.a.2 Marketing/Distribution Factors

Once again the strategist is looking to see if the firm is substantially and strategically stronger in marketing and distribution than its competitors. Some firms are strong in the market, and this provides them with a strategic advantage in launching new projects and services and defending an increasing market share on present ones.

Some of the generalized factors to consider are:

1. Competitive structure and market share; to what extent has the firm established a strong market share in the total market or its key submarket?
2. Efficient and effective market research systems.
3. The product service mix: quality of product/services.
4. Product service line: completeness and product service line, and product service mix: phase of life cycle the main products/services are in.
5. Strong new product service leadership.
6. Patent protection or equivalent legal protection for service such as mining claims.

7. Positive feelings about the firm and its product/services on parts of ultimate consumers.
8. Efficient and effective packaging of products.
9. Effective pricing strategy for products/services.
10. Efficient and effective sales force: close ties with key customers. How vulnerable are we in terms of concentration of sales to a few customers?
11. Effective advertising: has it established the company's product/brand image to develop loyal customers.
12. Efficient and effective marketing promotion activities other than advertising.
13. Effecient and effective service after purchase.
14. Efficient and effective channels of distribution and geographic coverage including international efforts.

IV.a.3 Production/Operations Management Factors

The factors concerning production/operations management are centered around productivity. Can we produce at a lower cost than our competitor? Do we have the capacity to handle at the times and in place when our competitor can't? Do we have the ability to furnish products when our competitors can't get raw materials?

North American firms have become less competitive relative to overseas competitors. They use to be cited as leaders in this area. Now it seems to be Japanese, Taiwanese, Korean, or European firms that are taking the lead.

Consider steel firms. Their facilities are out of date and haven't been able to raise funds to modernize. They are at a serious disadvantage to the Japanese.

Consider the food chains. Safeway and Kroger have larger and newer stores than A&P. A&P has had to spend large sums to try to catch up and is loosing business.

In the oil industry those firms which produce their own crude oil have a strategic advantage over those firms which must rely on purchased crude oil for further processing and marketing work. Some of the more generalized factors to consider in production/operation management are:

1. Lower total cost of operations than competitors.
2. Capacity to meet market demand.
3. Efficient and effective facilities.
4. Raw materials and sub-assemblies costs.
5. Adequate availability of raw materialsd and sub-assemblies.
6. Efficient and effective equipment and machinery.
7. Efficient and effective offices.
8. Strategic location of facilities and offices.
9. Efficient and effective inventory control systems.
10. Efficient and effective procedures: design, scheduling, quality control.
11. Efficient and effective maintenance policies.
12. Effective vertical integration.

IV.a.4 Personnel Labor Relation Factors

Some firms have attracted and held high quality, highly productive, and loyal employees and managers. IBM, Texas Instruments, GE and other firms are known for this. Since these people make the decisions for all functions, this can be a crucial advantage. Many firms have purchased other firms just to get their top quality managerial, professional and other employees.

Some firms are at a strategic disadvantage because they are unionized by a union with difficulties, such as the United Mine Workers. Often being unionized is a strategic disadvantage because of loss of flexiability or because of higher direct costs of labaor. Other firms are unionized but have had good relations with efficient and effective unions.

Some of the generalized factors to consider in personnel and labor relations are:

1. High quality employees.
2. Balanced functional experience and track record of top management: are replacements trained and ready to take over? Do the top managers work well together as a team?
3. Effective relations with trade unions.
4. Efficient and effective personnel relations policies: staffing, appraisal and promotion, training and development, and compensation and benefits.
5. Lower costs of labor as measured by compensation, turnover, and absenteeism.

IV.a.5 Corporate Resources Factors

Some of the generalized corporate resource factors to be considered are:

1. Corporate image and prestige.
2. Effective organization structure and climate.
3. Company size relative to industry.
4. Strategic management system.
5. Record for reaching objectives: how consistent has it been? How well does it do compared to similar enterprises?
6. Influence with regulatory and governmental bodies.
7. Effective corporate staff support systems.
8. Effective research and development capacity.
9. Effective management information and computer systems.

Each of these can add to the ability of a firm to achieve its objectives by varying strategies. Some firms are well known for these advantages. General Electric for example has advantages on all nine of these.

IV.b Internal Strategic Advantages for the Phillips Minerals Business Line

Taking into account the forementioned generalized strategic advantage factors one can analyze the external environment and current situation within Phillips in order to determine on a business line basis what particular strategic advantages occur.

IV.b.1 Non-Fuel Minerals Strategic Advantages

Although staffing is currently limited, outside technical

contractors will be used to satisfy the non-fuels minerals business line needs.

- The Mount Hamilton property, from a preliminary evaluation, appears to be a major tungsten discovery with significant molybdenum values.
- Phillips management and financial position are uniquely capable of undertaking the opportunities afforded by today's environment.

IV.b.2 Oil Shale Strategic Advantages

- The Supreme Court has resolved the title questions on Ua and Ub concerning state or federal ownership and the validity of unpatented mining claims.
- Phillips internal policy to maintain private enterprise through the free market with minimal regulatory controls will apply to oil shale development.
- Phillips financial condition can support commercial projects particularly with joint venture partners.
- Environmental baseline work and preliminary engineering plans for Utah tract developments are complete.

IV.b.3 Phillips Uranium Strategic Advantages

- Nose Rock Mine Unit #1 is still in development stages although other companies have chosen to shut down their mines.
- Depressed near term uranium outlook limits opportunities to joint venture and thereby dilute Phillips' exposure at Nose Rock.

- Shaft sinking rates at Section 31 in the Nose Rock Project have improved significantly as a result of changing contractors.
- Approximately one-fourth of the reserves at Nose Rock Mining Unit #1 are committed under a favorable market contract.
- Phillips Uranium has favorable fee lands, water rights, and housing positions for Nose Rock Development.
- Nose Rock reserves are not on Indian Land which avoid significant potential development delays and costs.
- Nose Rock area properties have the reserves potential to be one of the five largest uranium production centers in the U. S. Phillips Uranium Corporation being a part of Phillips Petroleum Company is a strength that is viewed by potential customers, employees and mineral leasors.

IV.b.4 Geothermal Strategic Advantages

- Recent additions to the engineering staff and computing facilities have expanded the capabilities to analyze and solve technical problems and execute development plans in a timely manner.
- Phillips has an outstanding U. S. geothermal leasehold or option position affording many opportunities for significant discoveries and favorable deals.
- The Roosevelt Hot Springs Utah prospect is the best

geothermal resource in the U. S. ouside of the geysers, California area.

- Phillips has management, financial, technological and R&D strength available to resolve business line development obstacles.

V. ALTERNATIVE STRATEGIES

Carefully reviewing the external environment and internal strategic advantages which Phillips' Minerals Development Division has, leads one to believe that there are several opportunities lying ahead for Phillips in the minerals industry. However, these opportunities require entrance and large growth in the minerals industry by the division. Both entrance and growth may be undertaken down one, or a combination of more than one, different avenues. This section details a few of the different approaches the division needs to consider before wandering down unproven paths.

Categorically, there are three main approaches which may be taken to enter or grow in an industry. Actual performance may reflect one of the hundreds of variations within one category or performance may reflect a few scenarios from each category. The categories are delineated as follows:

- Internal Develpment
- Joint Venture
- Mergers and Acquisitions

Each of these categories represent unique opportunities to the division at varying costs and consuming various lengths of time for consumation. The mergers and acquisition strategy will be discussed in depth as it is thought to represent the most cost

effective way to establish a position of significance within the industry within the least amount of time.

V.1 Internal Development

There is a skeleton core of technical expertise existing within the Minerals Division at the present time. This organizational structure includes geological exploration teams, engineering development teams, financial analysts, and other required line and staff people necessary for the location, development, and production of minerals prospects.

The exploration side of the business line is one of long lead times. Many times while one mineral is being actively pursued, other minerals are found. At the present time all of the synergisms of this effect is not being fully taken advantage of due to a lack of staffing. In order to be a major mineral producer, more staffing will be required. This process takes time. One does not simply advertise for new employees and expect the high quality persons required for these tasks to come forward. Most of the good geoligists are presently working for companies and are not seeking new employment. The ones that are seeking new employment may have certain problems provoking their desire for termination from their present employer.

From a development standpoint, the verification of the prospect and the determination that the project

is economically viable may take from one to seven years. Many times extensive coring into the prospect is required in order to determine the quality of the prospect, the nature of the mineral depositions, and estimation of reserves in place. Once this data has been secured development plans indicating the optimum method by which to produce the mineral are made. These are estimated for capital expenditures and operating expenses. Market analyses of the minerals will aid the economic evlauation of whether or not the property will add value to the company.

One of the highest priority goals of mineral companies without regard to which category is chosen for growth, is to always try to be a low cost producer. The cyclical nature of the metals pricing mechanism cause marginal mines (i.e., those mines having the highest production costs for a particular product) to be shut down. When prices climb to the required level which may be a matter of months or sometimes even years, the mines are re-opened, as they are once again profitable. Without a doubt, the minerals industry is one of the fastest supply and demand compliant indutries in existance.

The point to be made for development work is that, again, the nature of this work requires a large staff of highly competent technical people. The staff in place is of such nature but is inadequate in size.

At the present time there are no operating facilities within either the Minerals Division as a whole or the Non-Fuel Minerals business line specifically. There are two non-fuel mineral operations in which the division hlods the role of royalty owner. This brings in royalty income to the division but does not give any specific operating experience. At the termination of the exploration and development phase of a project, it will still be necessary to hire adequate staff to run a project as it is unlikely that the exploration and development people will have the technical requirements to adequately run a mine. They will however have other prospects to locate and develop.

The internal development mode of entry and growth is certainly viable and important to the division. No matter what strategies are used from the other two categories overall success and performance will be based on the performance of the in house people having the minerals expertise required. To a certain extent, this mode of entry and growth is consistent with the corporate philosophy of not doing too much too fast. The threat that implementation of only this category poses is that the division may be too small and may not have have a large enough foot in the door when a metals crisis does occur. The long lead times associated with this business may put the division

at a critical stage of development when a crisis occurs. To a certain extent this was the case with the Uranium Nose Rock No. 1 Unit. The effects of the Three Mile Island incident tumbled the price of Uranium below the marginal cost of production at that mine causing a moth ball program to be instated. The objective is to be strategically in position to take advantage of such external influences, instead of them creating havoc. Had the division acquired or joint ventured a mine with a lower cost of production, it would have been in a much better position to handle such a problem.

V.2 Joint Venture

Although many joint ventures take place between firms in different countries, they also take place within the same countries or, in fact, within the same industry. Research indicates that these types of joint ventures are formed for different purposes and have different success rates and problems. (Glueck p. 219)

V.2.a Joint Ventures Across National Boundaries

There are many good reasons for entering joint ventures across national boundaries. A few of these follow:

- Joint ventures lower capital expenditure outlays for both parties as well as operating expenses.
- Joint ventures increase sales, thus allowing

for important production cost savings.

- Joint ventures provide speedy channel acceptance, and this reduces marketing costs.
- Joint ventures maintain the independence of both companies.
- Joint ventures provide the foreign country with "front row seats" in the new country. This means that locals interpret the industrial language and customs of the country. It also reduces nationalistic concerns of host governments' fearing foreign take overs. This has been known to have the detrimental effect of expiditing unfriendly host government take over of the foreign facility.

There are several strategies which can be associated with foreign country joint venturing. Listed below are three of them:

- The Spider Web Strategy - A small firm establishes a series of joint ventures so that it can survive (not be absorbed) by its largest competitors.
- Go Together/Split Strategy - In this strategy, the firms agree to joint venture for a specific project or length of time. This strategy can also evolve as the two partners grow such that they don't need each other for economy

of scale or efficiency reasons.

- Successive Integration Strategy - In this strategy a firm becomes a relationship which is weak, then develops several joint ventures which can lead to a merger. In fact, joint ventures could become a laboratory setting prior to a mergers, a trial marriage if you please.

Two crucial decisions should be well thought out prior to negotiating for joint ventures. These are:

- Share Decisions - Share control and voting strength and share of ownership. Ownership structure can be complex such as majority/ minority cross holdings like Dunlop Perelli. Joint holding companies such as Fiat and KHD or mixed structures such as Lamco and Bethlehem Steel are viable alternatives.
Choice of Partners - Research indicates that the choice process is delegated by top managers but pursued informally by them. Firms will pursue joint ventures over a lengthy period if they desire to introduce new projects over time. If they want to concentrate on one project, these joint ventures are typically not long lasting.

V.2.b Joint Ventures Within National Boundaries

There are many rationales forwarded supporting the joint venturing projects. Some of the more common ones are:

- To reduce the risk of a venture
- To help smaller companies compete with larger ones
- To introduce new technologies more quickly

The literature on joint ventures provides much more information concerning international ventures than it does concerning domestic ventures. In fact, studies indicate that many joint ventures are engaged by larger firms in conventional products/projects, as opposed to new products/projects, and appear to have as their main purposes controlling, influencing, or reducing competition and / or influencing suppliers. In effect, joint ventures can become quasimergers. Joint ventures in this respect have anti trust implications.

With reference to the Minerals Division, the reason requiring domestic joint venturing would more often than not be to reduce risk or to limit exposure. A viable alternate strategic development plan scenario for the Nose Rock Unit No. 1 Mine would be to joint venture. For example a new 50% partner would be required to match the capital expenditures and expenses put into the mine to date. These funds would be utilized

for further development work until they run out. At such time each of the partners would spend such funds require in proportion to their ownership until the project is complete. Revenues are simillarly shared on an equity percentage basis.

The net effect to the division on this mode of operation is extremely profitable from a sunk cost point of view. For only a small amount of future incremental investment and expense outlays give rights to a larger stream of revenue. If a partner is found perceiving this as a profitable venture to him, then everyone stands to benefit from the joint venture.

V.3 Mergers and Acquisitions (Glueck, p. 212)

Similar to joint ventures, mergers and acquisitions can take place within one country or across national boundaries. There are reasons why the seller wants to merge and there are different reasons why the buyer wants to merge. Some of the more typical motives for buyers desiring to merge or acquire are as follows:

- To increase the firm's stock value. Often in the past, mergers led to significant increases in the new firm's stock price and/or in the price to earnings ratio. This factor is key to successful mergers and acquisitions as most executives are on an incentive plan

which is keyed to earnings per share, market price per share, price to earnings ratio, or to some combination of these factors.

- To increase the growth rate of the firm faster than the present internal development strategy.
- To make a good investment. This could be accomplished through the purchase of a unit which makes a better use of funds than plowing the same funds back into internal growth or worse yet, by reducing debt below strategic debt to equity target ratios.
- To improve the stability of a firms earnings and sales. This could be accompished by acquiring firms which have earnings and sales which compliment the acquiror's peaks and valleys.
- To balance or fill out a product line or development strategy.
- To diversify the product line or projects. This would prove useful if the present life cycle of the product line has peaked.
- To reduce competition by purchasing a competitor.
- To acquire a needed resource quickly. For example, should high quality technology or highly innovative management be required, a firm having these assets could be purchased.
- For tax reasons. A firm with prior tax losses

could be purchased at a lower than market value and even have more value to the acquiring company as their tax bill would be reduced by the amount of the tax loss carryover of the acquired firm.

- To increase efficiency and profitability especially if there is potential for synergy between the two firms. Synergy comes about from a variety of different factors. A few are listed below:
  - Sales synergy arises from many products using the same sales persons, warehouses, channels, and advertising.
  - Investment synergy arises from many products using the same plants, inventory, Research & Development, and machinery.
  - Operation synergy arises from many products resulting in higher utilization of facilities, personnel, and spreading of overhead. This is usually maximized by horizontal mergers.
  - Management synergy arises from management experience in handling problems in one industry that help to solve problems in another industry.

Some of the more typical reasons why sellers find a merger or acquisition desirable are listed below:

- To increase the value of owner stock and investment in the firm.
- To increase the firm's growth rate by receiving more resources from the acquiring firm. These resources could be either in the form of cash or undeveloped land or ideas.
- To acquire the resources to stabilize operations and make them more efficient.
- For tax reasons. If the firm is owned by a family or an individual, it may be extra beneficial to them from an estate tax point of view.
- To help diversify the owners holdings beyond that of the present firm.
- To deal with top management problems such as management succession or entrepreneurship or dissention amoung the top managers.

V.4 Selection of Strategy

For the purposes of this paper, alternative number three will be selected as the alternative strategy of interest. This does not imply that this one strategy is the only which should be pursued for optimum entry and growth. Selection of alternative three as the

strategy of interest allows greater detailed examination of that strategy. Various strategies will be identified under this alternative. Questions of implementation and effectiveness will be able to be addressed in greater detail.

VI. IMPLEMENTATION CONSIDERATIONS

There are several key questions which must be addressed before successful implementation of a merger and acquisition strategy can become effective. A few of the more important ones are as follows:

- What characteristics of a merger or acquisition would make this strategy attractivve to Phillips Petroleum Company?
- What characteristics of a merger or acquisition would be attractive to a target mineral company?
- Would such a merger or acquisition be desirable to the public in general?
- How is the strategy to be implemented?
- What timetable would be feasible with each different strategy?

VI.1 Phillips' Acceptance of the Strategy

There are several key factors which have been identified throughout this paper which would make an acquisition strategy desirable to Phillips' managers, executives, board, and stockholders. In summary form along with other important factors, they are as follows:

- Target company has large diversified minerals resource base.
- Target company has highly competent, large technical staff in place (e.g., geologists, engineers, analysts,etc.).
- Target company has strong financial position.

- Target company has competent and effective managers with proven performance.
- Target company shows conservatism in dealing with highly volatile metals markets.
- Target company has field offices in locations of highly mineralized areas.
- Target company has projects requiring funds for development which cannot be supplied by the target. or
- Target company is being actively pursued as an acquisition target by an unfriendly company.
- Target stockholders, board, executives, and managers perceive the acquisition or merger as being in their best interest.
- Public interest is served by undertaking such an acquisition or merger.
- The acquisition or merger does not create a significant dilution of earnings or earnings per share for Phillips Petroleum Company.
- The projected earnings and earnings per share for Phillips show show significant increase after the acquisition above the forecasts for no acquistion.

IV.2 Target's Acceptance of Being Acquired

One of the objectives to be met in identifying an acceptable acquisition candidate is that the merger or acquisition be perceived as friendly from the viewpoint of the candidate. The following benefits would accrue the target of a Phillips' acquisition or merger:

- Phillips Petroleum has a large financial base from which capital intensive projects may be developed faster than they would without an acquisition or merger. This financial base results from an extremely positive cash flow position which Phillips is presently using to lower debt below the historical debt to equity ratio.
- The target company would have ties to an energy resource company. Just as Phillips is interested in maintaining an adequate supply of its catalysts and other strategic metal requirements, so would the target be interested in maintaining an adequate supply of energy resources.
- Phillips Petroleum has a proven management performance record which puts the company in a most competitive position in the oil and gas and chemical industry. The company has been recognized as a leader financially and technologically.

VI.3 Public Acceptance of the Acquisition

There are many advantages resulting from acceptance of the acquisition by the public in general. Exxon proved this premise in its acquisition of Reliance. Much effort was expended in securing public acceptance of the transaction through the expenditure of many dollars on advertising how the synergisms of the deal would behove the public domain. By so doing this, time consuming and potentially expensive litigation with the Federal Trade Commission was not encountered.

This same philosophical approach would apply to the acquisition of a minerals company by Phillips' Petroleum. The public has had a taste of the oil crisis produced through excessive reliance on foreign imports by U. S. industries. This same posture is being undertaken in the minerals industry. Reliance on potentially unstable and currently unstable governments for important metals has put the United States in a very vulnerable position once again. See Appendix A for details as to the magnitude of the reliance.

The chance of a minerals' crisis would be minimized by the acquisition of a minerals company meeting the requirements set forth above by Phillips in two ways. First, capital intensive projects would be expedited due to the infusion of cash for capital expenditures which a company such as Phillips would provide. Secondly,

secure energy resource bases for a minerals company would provide a more stable environment in which to conduct business.

VI.4 Acquisition Strategies

Having addressed some of the more salient requirements for a successful acquisition, attention is now turned to investigating implementation methods for various possible strategies. It should be noted from the start that few of the strategies or mutually exclusive. One, parts of one, parts of one along with parts of other, or a sampling from many of the different strategies can produce effective results.

VI.4.a Acquisition of 100% of the Target

This form of acquisition, total acquisition, is the most common form found today. There are several variations to this strategy. One involves the manner in which the company is managed. Will it be operated at arm's length? Or will the parent company managers participate in the day to day decisions of the target. Companies which performed effectively prior to acquisition will tend to be operated more effectively after acquistion by the arm's length method. Those companies which were acquired with the objective of turning them around after acquistion will be operated more effectively with reinforcement from the parent.

Another option open after a 100% acquistion allows for transfer of employees and managers between acquired and acquiree. Again comments concerning the method of operations apply to interdivision transfers. If the target had been a close knit high performing company, then transfers may do more harm than good. If the company needs a shot of new blood to bring it about, then transfers may be just what is required.

It has been found that parent company intervention in the form of close controls and employee transfers tends to result in employees of the target resigning. This is not necessarily all bad. This method could selectively be used to weed out known non-performers.

VI.4.b Partial Acquisition

Companies are now considering partial acquisition strategies as a trial marriage for full merger or acquisition. Partial acquisition may also be undertaken as an end unto itself if there is a good reason for it. The question most commonly put to the board by stockholders of a company that has undertaken a partial acquisition strategy is: Why is that company better than our company? If we would have wanted to invest our money in the other company we would have. The board has a certain fiduciary responsibility to be able to adequately answer these types of questions.

In terms of trial marriages, partial acquisitions involve certain risks. The target may ascertain that it does not to be acquired, while the potential acquirer determines that the acquisition is exactly the optimum strategy. The result may be similar to the Amax - Standard Oil of California stand off. Standard of California acquired 20% of Amax, only to later make an offer for the remaining 80%. Amax has rejected time and time again such an offer.

Partial acquisitions do offer some advantages. This gives the parent time to evaluate the company from more of an insider's view. Acquisition of 20% of a company may offer access to a seat on the Board of Directors. This along with exchange of personnell and managers will allow the parent to make a more comprehensive and detailed evaluation of the target. The target will receive a flavor of what acquisition by the parent would be like. Both could decide that the acquisition is the most favorable strategy for each to undertake, or both may decide that the acquisition should not be undertaken.

In the later case, the acquirer is in the unique position of being able to profit from the partial acquisition. The 20% portion may be retained as a sound income producing investment. Or, the 20% may be sold to a third party for a capital gain. Or, the 20% may be liquidated in smaller portions

over a longer period of time so as to minimize the potetial loss of stock price possible from the dumping of a large portion on the open market.

If the decision for an acquisition is made after a trial marriage, the acquirer would be in a better position to understand the more intimate details of how the company operates. There may be low performing projects or divisions which should be divested in order to improve the performance of the merged firm. This would be hard to determine from the public data available to the firm prior to the partial acquisition.

A potentially profitable strategy may be to finance the acquisition. The case of a target having a lower target debt to equity ratio than the parent, would be an obvious candidate for financing while maintaining the parent debt to equity at historic levels. A case can be made for the merged firm to have a higher target debt to equity ratio without an increase in business risk, due to the increased stability gained from the synergisms of the acquisition.

VI.4.c Exchange of Shares

Many of the acquisitions today are made using cash. One of the primary reasons for this phenomena is that the companies perceive their stock as being undervalued. Therefore, for a given dollar value,

preference is given to cash over stock as a medium of exchange. However, one of the least discussed points to remember is that the stock of the target may be also undervalued. If the target stock is undervalued more than the parent stock, then stock transfer benefits the parent.

This strategy may be an effective method of minimizing earnings per share dilution which can result from an acquisition.

VI.4.d Exchange Resource Bases

There are many possibilities under this strategy. Phillips has many properties bearing oil, gas, uranium, coal, oil shale, oil sands, and other resources in various stages of development. The target mineral company may be in a similar position with respect to mineral resources. One strategy for both companies not involving acquisitions or mergers would be the exchange of a resource base. For example, an oil property for a gold property or a Phillips' coal property for a target's silver property.

More in line with merger and acquisitions concepts, it is possible to acquire part or all of a company using a resource base as a form of payment for the shares. In this case, it may be benficial to trade Phillips shares for a producing mining property, or to acquire a target's shares for an oil property.

Each of these strategies have financial implications which are not intuitively obvious, and can have both positive or negative aspects to either target, parent or both.

VI.4.e Third Party Block Strategy

Acquisition of shares from a third party has the flavor af an unfriendly acquisition. Although this may be an effective method of acquiring large blocks of the target company, this method does not meet the objectives of the previous sections.

VI.4.f White Knight Strategy

One of the single most effective acquistion strategies meeting the requirements of being friendly is that of the white knight acquisition. This requires being in the right place at the right time. This is almost a passive strategy until an unfriendly poential acquirer pulls the trigger on the target, putting him in the position of seeking a white knight. To be a white knight, requires that the target knows that you want to be a white knight. This involves detailing all of the terms and conditions of an acquisitions and passively waiting for a signal from the target that the time is right. This is thought to be the ultimate in friendly acquisitions, and the most difficult to actively pursue.

VI.5 Implementation Summary

Many different strategies are avaible meeting various characteristics for an acquisition or merger program. The selection of parts of or all of each strategy will impact on the nature of the acquisition.

Under the right conditions, acquiring the right minerals candidate can be profitable to Phillips Petroleum.

VII. EVALUATION AND MONITORING

Implementation of acquisition and merger strategies are accomplished over a period of time. Therefore it is possible and desirable to monitor the progress being made toward acquisitions. The acquisition process itself is not an end unto itslef. The purchase of a company is only the first step in integrating the company into the parent. There are several feedback measures which can be made to determine the effectiveness of the post - mergered firm.

The results of the acquisition pose few special considerations over the normal planning and budgeting cycle already implemented in many large organizations today, other than the addition of the business lines which the new company brings to the parent. The planning and budgeting process is one system which can comprehensively measure the effectiveness of the firm's business units.

Whether or not the acquired company meets expectations for financial projections may provide valuable insights to future acquisition planning. As understanding of the acquired company grows, projections and plans will be modified in order to accomodate new opportunities found or to handle problems not previously identified in the acquired company.

There are other characteristics which should be monitored in a newly acquired firm in order to safeguard against potential problems. One is in the area of personell. There can be a tendancy of personell in the new firm to

be somewhat touchy about their new environment. Stress levels are higher in times of uncertainty. Having one's company bought out qualifies for lending uncertainty to the environment. Close monitoring of numbers of people and attitudes of the people will give an indication of potential problems in this regard.

An evaluation of the prospects and the current level of development of each will add valuable information as to whether or not projections can be met. This may have an impact on the capital expenditure stream which was to be allocated to the target in either a postive or negative manner.

Another effective method for determing performance uses comparisons with similar oil companies. Other oil companies have purchased varying amounts of mineral companies. For example, Standard of California has purchaserd 20% of Amax, the largest of the mining companies. Penzoil, a company of similar size and structure to Phillips has purchased Duval. Atlantic Richfield has purchased Anaconda. Union Oil Co. has purchased Molycorp. Standard of Indiana has purchased Cypress Mines.

Each of these acquistions and their post merger performance stand as reference points against which to compare your own particular situation.

VIII. CONCLUSIONS

There are three intertwined roads by which the Minerals Group of Phillips Petroleum can grow - internal development, joint ventures, and mergers and acquistions. All three roads can be simultaneously and profitably be travelled. The merger and acquisition road allows for accelerated growth and entry into the non - fuel mineral industry. Within this strategy there are many avenues which can result in completion of objectives. The white knight strategy is one of the more complex but one which offers the greatest advantages.

APPENDIX A

AN ALPHABETIZED AND ANNOTATED LISTING OF

STRATEGIC AND OTHER MINERALS

HISTORICAL MINERAL PRICES*

		Barite ($/ST)		Chromium ($/ST)		Cobalt ($/Lb)		Manganese ($/LTU)	
	Factor	Actual	Const. $	Actual	Const. $	Actual	Const. $	Actual	Const. $
1970	1.0	14.99	14.99	154	154	2.20	2.20	.54	.54
1971	1.043	16.35	15.68	166	159	2.20	2.11	.60	.58
1972	1.078	16.43	15.24	143	133	2.45	2.27	.60	.56
1973	1.144	15.12	13.21	138	120	3.00	2.62	.65	.57
1974	1.270	15.21	11.97	212	167	3.46	2.72	.90	.71
1975	1.386	16.06	11.58	421	304	3.98	2.87	1.38	1.00
1976	1.466	23.25	15.85	423	289	4.44	3.03	1.45	.99
1977	1.561	20.26	12.97			6.85	2.11		
1978	1.682	20.26	12.04			25.00	14.86		
1979	1.853	35.00e	18.88			25.00	13.49		

	Platinum ($/T Oz.)		Silver ($/T Oz.)		Tin ($/Lb.)		Titanium**($/Lb.)		Tungsten ($/Lb.)	
	Actual	Const. $	Actual	Const. $	Actual	Const. $	Actual	Const. $	Actual	Const. $
1970	133	133	1.77	1.77	1.74	1.74	.45	.45	2.55	2.55
1971	121	116	1.54	1.48	1.67	1.60	.45	.43	2.96	2.84
1972	121	112	1.68	1.56	1.77	1.64	.45	.42	2.56	2.37
1973	150	131	2.56	2.24	2.28	1.99	.50	.44	2.71	2.37
1974	181	143	4.71	3.71	3.96	3.12	.72	.57	4.77	3.76
1975	164	118	4.42	3.19	3.40	2.45	.73	.53	5.24	3.78
1976	162	111	4.35	2.97	3.80	2.59	.78	.53	6.54	4.46
1977	162	104	4.62	2.96	5.35	3.43	.81	.52	9.77	6.26
1978	237	141	5.40	3.21	6.30	3.75				
1979	350	189	9.14	4.93	7.08	3.82				

* = See Graphs For Each Mineral
** = Rutile

$$\text{Factor} = \frac{\text{Yrs. CPI}}{\text{1970 CPI}} \qquad \text{Constant \$ Price} = \text{Actual Price} \div \frac{\text{Yrs. CPI}}{\text{1970 CPI}} = \text{Actual} \div \text{Factor}$$

HISTORICAL PRIMARY DOMESTIC DEMAND & PRODUCTION* FOR VARIOUS MINERALS

	Barite (M st)		Chromium (M st)		Cobalt (M lbs)		Manganese (M st)	
	Primary Demand	Production	Primary Demand	Production	Primary Demand	Production	Primary Demand	Production
1970	1497	854	491	-	16193	697	1327	66
1971	1285	825	341	-	13418	690	1170	38
1972	1477	906	508	-	19268	-	1366	29
1973	1752	1104	548	-	21848	-	1554	31
1974	1774	1106	560	-	23427	-	1492	35
1975	1895	1318	372	-	13714	-	1133	19
1976	2097	1234	461p	-	19472	-	1364	29p
1977	2399	1494	?	-	?	-	1280e	?
1978	2760	1700	590	-	18958	-	1415	?
1979								

* See graphs For Each Mineral

HISTORICAL PRIMARY DOMESTIC DEMAND & PRODUCTION FOR VARIOUS MINERALS

	Platinum (M T.Oz)		Silver (MM T.Oz)		Tin (MT)		Titanium (M st)		Tungsten (M Lbs)	
	Primary Demand	Prod.	Primary Demand	Prod.	Primary Demand	Prod.	Primary Demand	Prod.	Primary Demand	Prod.
1970	391	8	73.1	45.0	54700	-	498	276	16565	9625
1971	324	8	101.5	41.6	50654	-	491	224	13496	6900
1972	469	5	122.2	37.2	49808	-	607	228	14229	8150
1973	563	6	162.3	37.8	55032	-	567	270	19771	7575
1974	848	4	122.9	33.8	46580	-	542	257	21347	7381
1975	595	6	157.7	34.9	39944	-	452	250	11868	5588
1976	786	1	170.6	34.3	46482	-	512	237	15008	6330
1977	721p	1p	153.6	38.2	47600	-	535p	236p	15600	7000e
1978	1100	?	160.0	38.0	48403	<100 met tons	529p	?	?	?
1979										

ALUMINUM

The aluminum industry depends on imports of bauxite, the basic raw material, for 90 percent of its requirements. Bauxite consumed in the United States for alumina by the aluminum industry is estimated at 13.5 million long tons (dry equivalent) for 1979.

The main countries of origin are Jamaica (58 percent), Guinea (20 percent), and Surinam (11 percent). Bauxite production in the United States is centered in the Staes of Arkansas, Alabama, and Georgia. About 90 percent of production comes from Arkansas. Production for 1979 is estimated at 1.7 million long tons. Bauxite reserves in the United States are estimated at 40 million long tons and world bauxite reserves at 27 billion long tons.

U. S. imports of alumina in 1978 amounted to 4.4 million short tons. Major countries of origin were Australia (76 percent), Jamaica (16 percent), and Surinam (6 percent).

The International Bauxite Association (IBA), at its annual meeting held in late 1978, agreed to set the price of metallurgical grade bauxite in North America at 2 percent of the average list price of 99.5 percent aluminum unalloyed ingot. Australia refused to accept this "common price" formula. The price set for 1979 was a change from the "common price" of $24 a metric ton for basegrade bauxites sales to North America, established late in 1977 for the year 1978.

To stimulate bauxite production, the Jamaican government is considering lowering its bauxite levy of 7.5 percent of the average price for base aluminum ingot in the U. S. market.

Energy is a significant cost factor in the aluminum industry. The companies continually improve their production technology in order to reduce energy requirements. Prior to World War II, 12 kwh were required to produce one pound of primary aluminum. Currently the average requirement is about 8 kwh. A pilot commercial plant incorporating a new process is reported to use less than 5 kwh per pound.

The aluminum industry should grow at a compound annual rate of 5 percent for the period 1978-84. Shipments in 1984 should amount to 18.7 billion pounds, valued at $33.3 billion. Aluminum should expand its share of existing markets. Major developments can be expected in the transportation area, particularly in the automotive sector where the saving of energy will gain importance. The share of cans in the beverage market for soft drinks and beer will probably reach 75 percent.

The industry will continue to have significant research and development programs and will make progress in reducing per unit energy requirements. Plant modernizations can be expected, and expansions will be needed to expand the metal supply to meet increased demand. The question of whether to expand in the United States or overseas will become a serious consideration. Research will continue in exploring alternate ways of producing aluminum economically from domestic sources other than bauxite. To justify and attract the capital needed for the future, the industry must continue to improve its economic base.

MINERAL BARITE

USES:	90% for drilling muds. Other uses are paint, glass, rubber, barium chemicals.
FOREIGN SOURCES:	40% imported. Peru, Ireland, Morocco, Mexico, Thailand.
DOMESTIC SOURCES:	Nevada 80%. Big 4 = N L Baroid, Magcobar, Imco, and Milchem.
SUBSTITUTES:	No economical sub. for main use.
BY PRODUCTS - CO PRODUCTS:	Sometimes associated with lead, zinc, rare earths and fluorspar.
DOMESTIC RESERVES-RESOURCES:	USBM recently cut its estimate of worldwide reserves in half to 100 million tons. U.S. 25MM tons - 91MM tons.
DEMAND GROWTH RATE:	4% 1974-85. Up 27% from 1977 to 1978 declining after 1990 as drilling tapers off.
PRODUCTION-SALES UNITS:	Short ton.
OUTLOOK:	If drilling continues at a high rate, Barite will be in very short supply as it is presently.

TABLE 1 MINERAL Barite UNITED STATES PRIMARY DEMAND & PRODUCTION

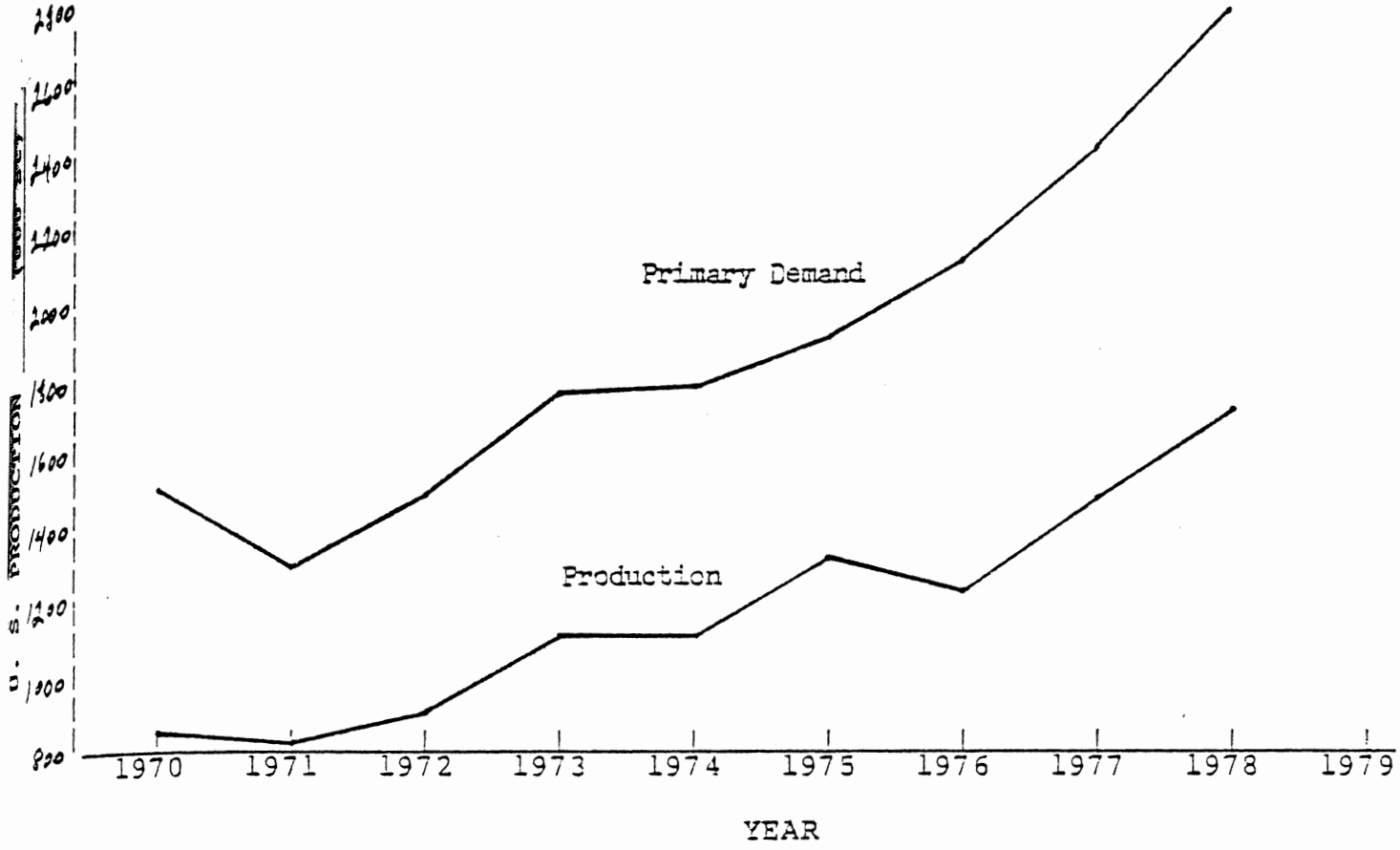
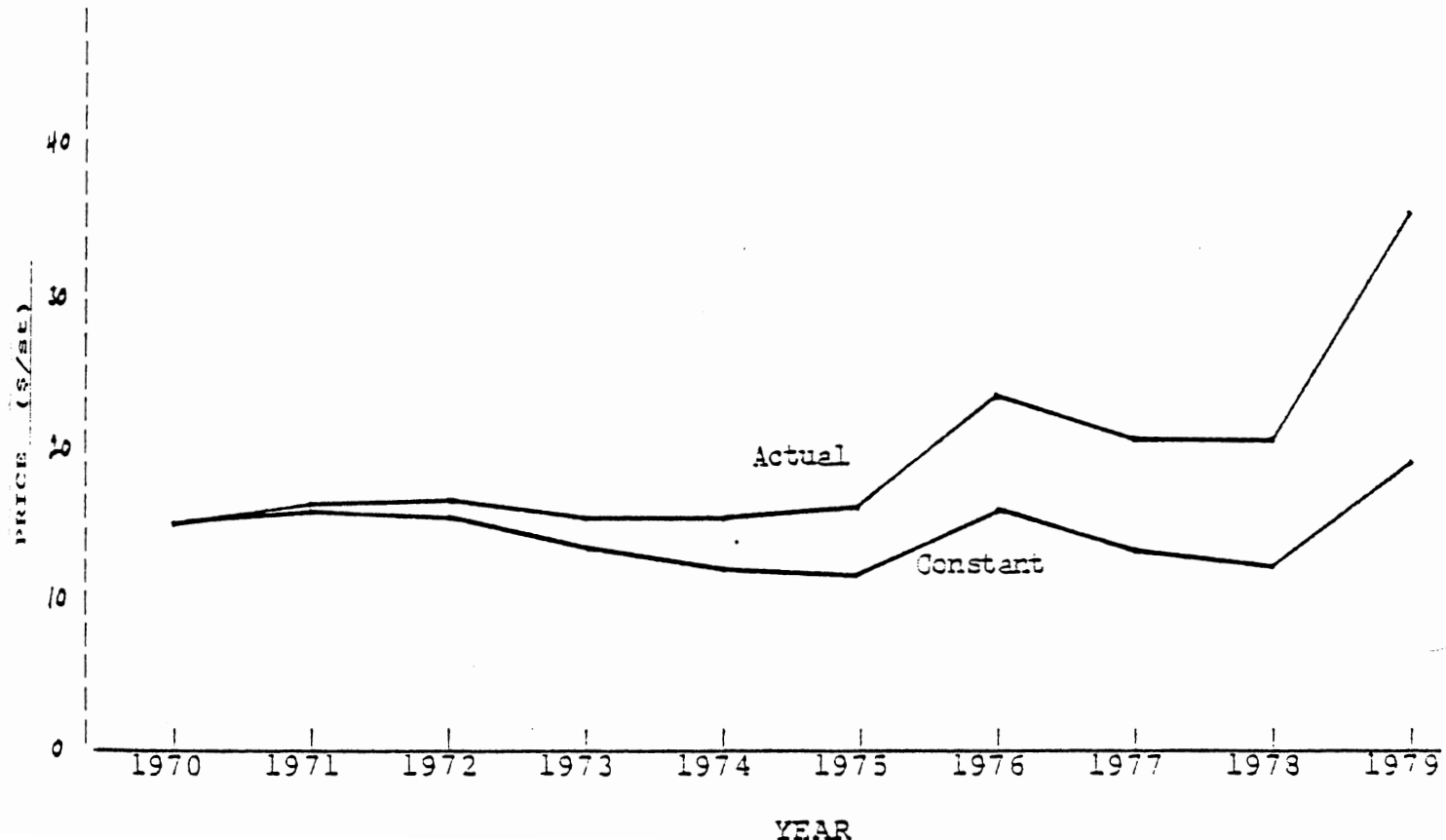


TABLE 2 MINERAL Barite ACTUAL AND CONSTANT (1970$) PRICE



CADMIUM

HISTORICAL DATA:

Year	U. S. Primary Demand (Metric Tons)	U. S. Production (Metric Tons)	Average Price ($ Per Lb.)
1970	4110	1613	3.57
1971	4932	1612	1.92
1972	5727	2168	2.56
1973	5685	2610	3.64
1974	5488	1724	4.09
1975	3031	1089	3.36
1976	5381	1400	2.26
1977	4064	1600	2.96
1978	4469	1550	2.45
1979	4670	1490 est.	2.66

PERCENT IMPORTED: 66

DEMAND GROWTH RATE: 2.2% (1977-2000)

RESERVES: U. S. 110 thousand metric tons, World 680 thousand metric tons

MAJOR PRODUCING COUNTRIES: Canada, USSR, Australia, Mexico

DOMESTIC SOURCES: 4 western states

SUBSTITUTES: Zinc, aluminum, plastic, tin, iron

BY-PRODUCTS-CO-PRODUCTS: By-product of zinc

END USES: Coating, plating, batteries, paints

DEPLETION ALLOWANCE: Domestic 22%, Foreign 14%

REFERENCES (PRODUCERS, DEALERS, ETC.): "Roskill's Metals Databook" 1979. "Mining International" Financial Times 1979 Yearbook. "International Directory of Mining & Mineral Processing Operations" E&MJ-1979.

PRINCIPLE U. S. PRODUCING COMPANIES: Asarco, Amax, Bunker Hill, National Zinc

MINERAL CHROMIUM

USES:	Steel alloy. Transportation, construction, machinery, refractories, & plating. Essential in the production of energy.
FOREIGN SOURCES:	92% imported. 1974-77 averages-chromite: So. Africa 35%, USSR 18%. Ferrochrome: So. Africa 38%, Rhodesia 23%.
DOMESTIC SOURCES:	None economic but the largest domestic resources are in Montana. Government stockpile.
SUBSTITUTES:	Nickel, zinc, cadmium, aluminum, cobalt, molybdenum, vanadium & titanium for various uses but with some sacrifice in performance. The U.S. depends on imports for all these subs except moly. No sub for use in stainless steel.
BY PRODUCTS - CO PRODUCTS:	Magnesium, aluminum, iron, chromium oxides.

RESERVES-RESOURCES: (000 ST)		
	World	3,700,000 - 36,000,000
	So. Africa	2,500,000 - 25,000,000
	Rhodesia	1,100,000 - 10,000,000

DEMAND GROWTH RATE:	3.4% to 1985.
PRODUCTION-SALES UNITS:	Short ton.
OUTLOOK:	Supply tight and dependent on foreign sources. Demand will grow faster in other countries, putting a squeeze on the world production. No substitute for use in stainless steel.

TABLE 3 MINERAL Chromium UNITED STATES PRIMARY DEMAND & PRODUCTION

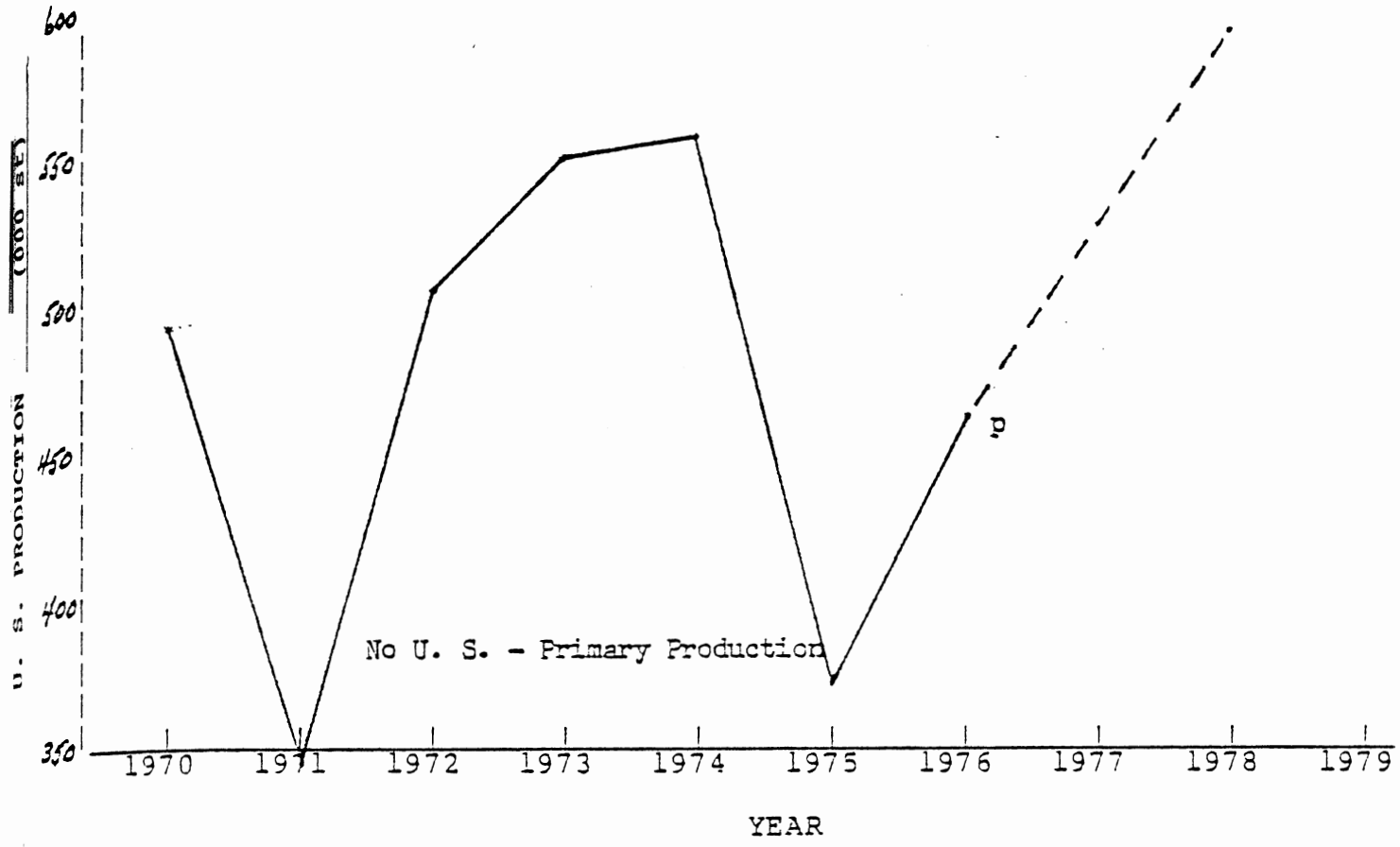


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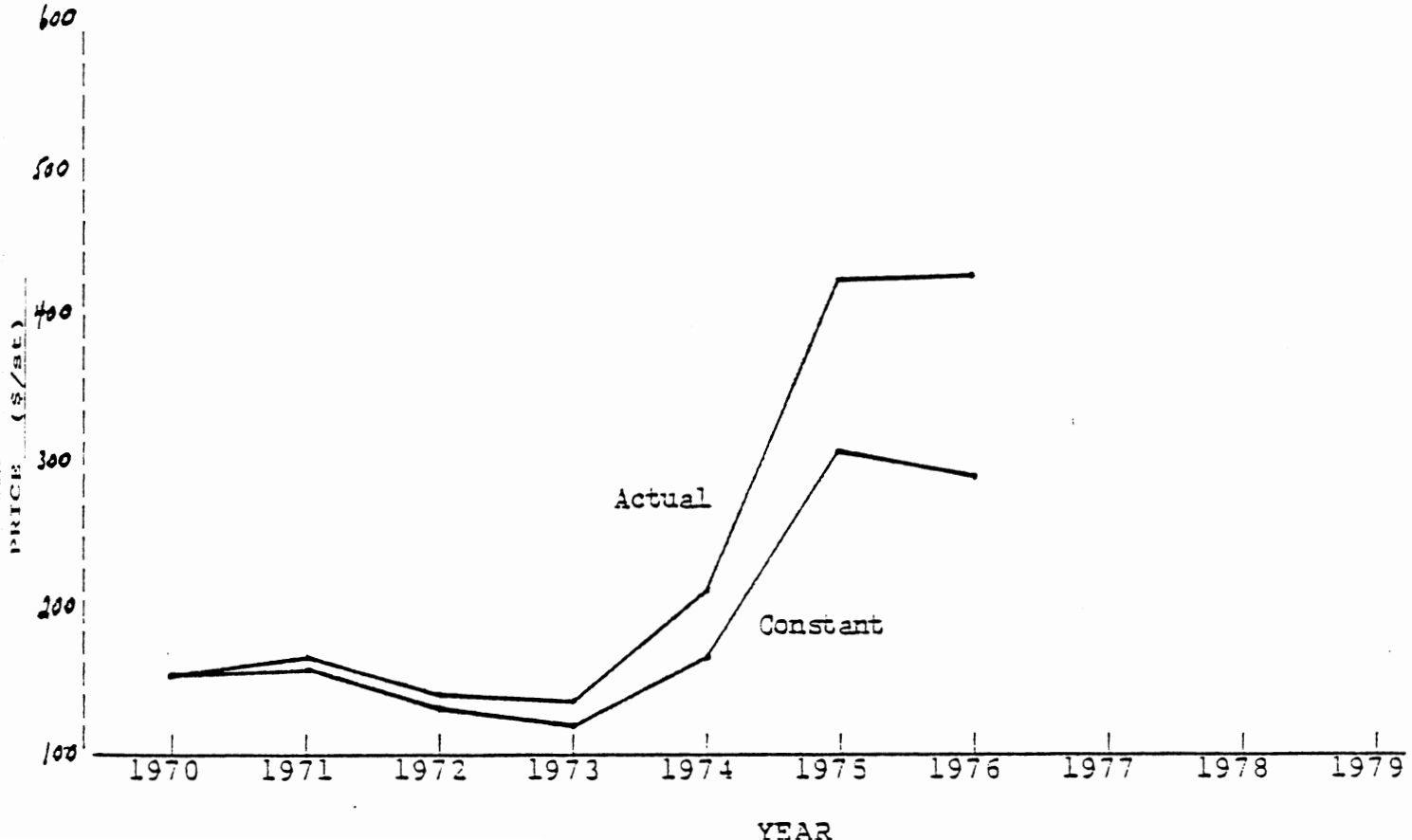
TABLE 4 MINERAL Chromium ACTUAL AND CONSTANT (1970S) PRICE



MINERAL COBALT

USES: Machine tools, carbides, magnets, alloys.

FOREIGN SOURCES: 100% of primary is imported. 1974-77 average % of consumption: Zaire 65, Zambia 7.

DOMESTIC SOURCES: Recycling. Possible future seabed mining.

SUBSTITUTES: Nickel with loss in effectiveness. Platinum, tungsten, and ceramics for some uses.

BY PRODUCTS - CO PRODUCTS: Copper, nickel, silver, iron ores. Produced as the major mine product only in Morocco.

RESERVES-RESOURCES: (ST)

World	1,600,000 - 5,000,000	excludes
Zaire	500,000 - 1,000,000	deep sea
Zambia	125,000 - 640,000	
USSR-Cuba	350,000 - 1,400,000	
U.S.	- 762,000	

DEMAND GROWTH RATE: 2.9% to 1985.

PRODUCTION-SALES UNITS: Lbs.

OUTLOOK: Very tight supply. Foreign sources subject to interruption.

TABLE 5 MINERAL Cobalt UNITED STATES PRIMARY DEMAND & PRODUCTION

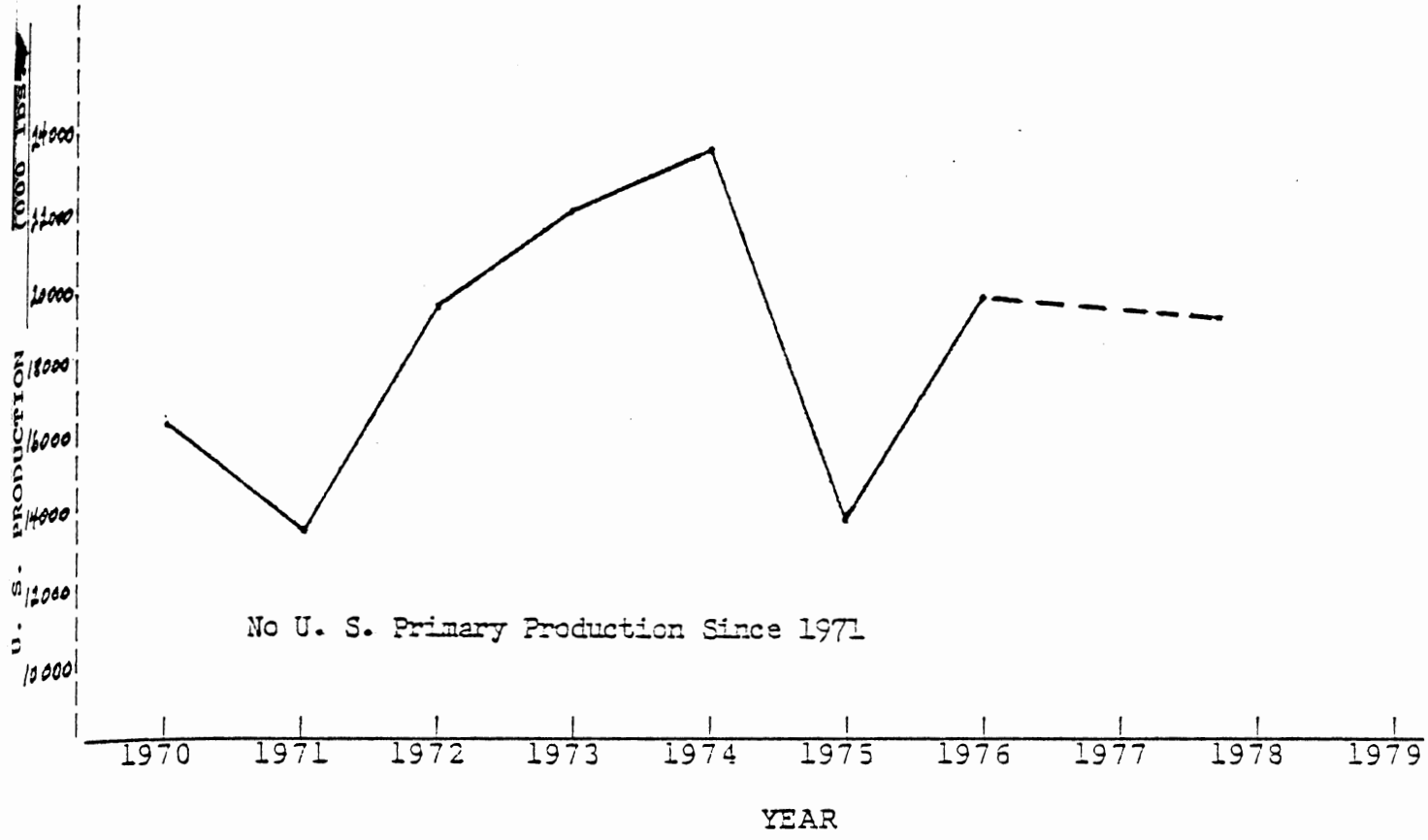
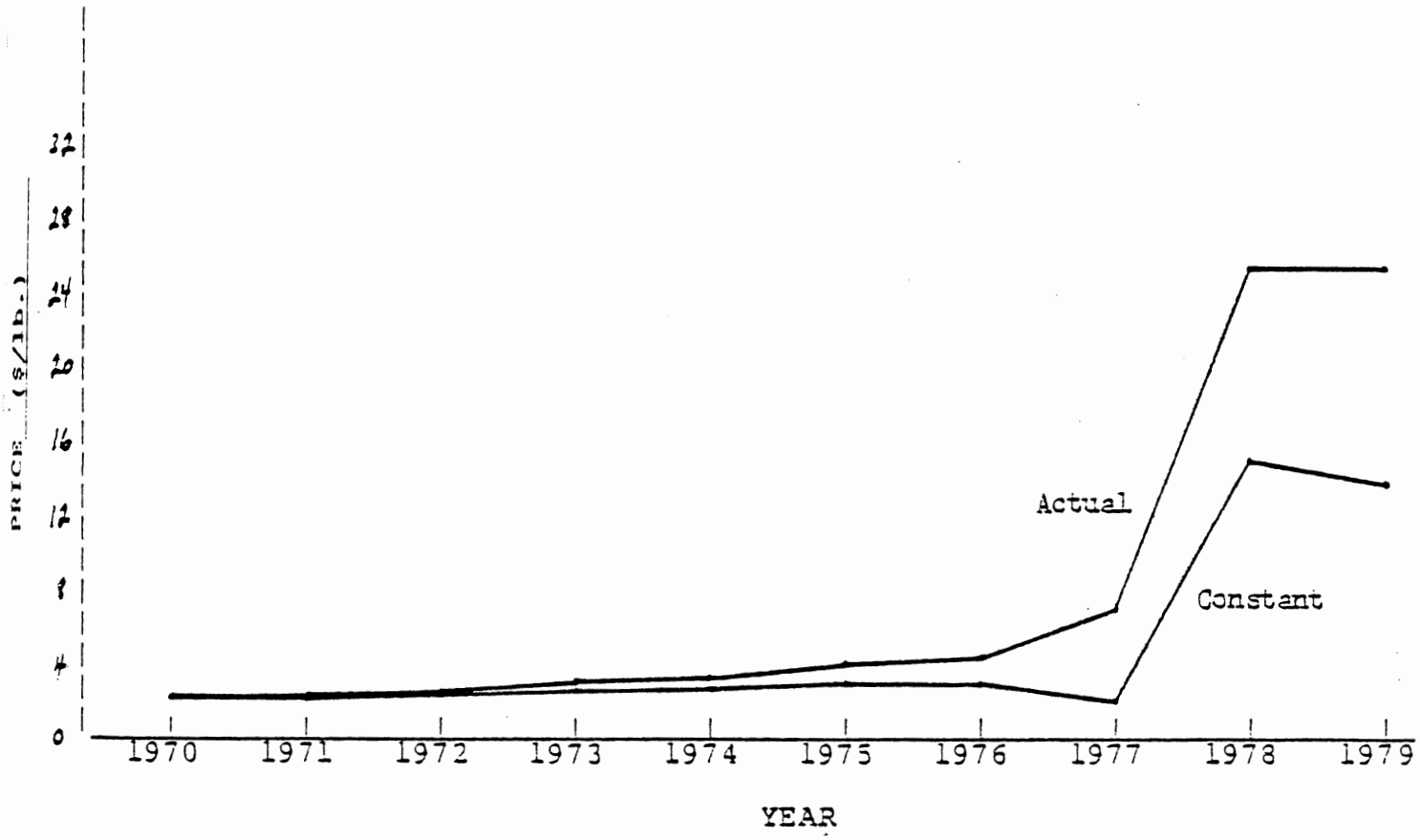


TABLE 6 MINERAL Cobalt ACTUAL AND CONSTANT (1970$) PRICE



COPPER

The drastic drop in refined imports during 1979 was directly influenced by U. S. producers' decision, in mid-1978, either to adopt an exchange-based (COMEX) price or to price their material at a level near COMEX and reflect COMEX fluctuations.

U. S. producers had traditionally sold their material at their published prices. These "producer prices" were influenced by the COMEX and London Metal Exchange (LME) copper price. However, these producer prices were much more stable and at times were above and below the exchange or "outside market" price. During periods of strong demand, U. S. producers would hold their prices below those of the "outside market," giving their customers an advantage on raw material costs and retarding substitution by other materials.

During periods of weak demand, U. S. prices were usually higher as producers attempted to recover costs of production. This system seemed to work as long as the market did not weaken. Between 1975-78, however, the world copper market weakened, and "outside market" prices or imported prices fell substantially below those of U. S. producers. Many U. S. copper consumers increasingly switched their purchases to lower-priced, imported material in an effort to compete with other U. S. mills and mill-product imports. The situation climaxed in the new producers' price policies of mid-1978 when U. S. producers decided to become directly price competitive with importers. By basing their prices on COMEX, U. S. producers largely eliminated the price advantages enjoyed by imports.

This action, coupled with the decline of the dollar against the currencies of major U. S. trading partners, resulted in a 60 percent drop in refined imports from 444,000 tons in 1978 to 180,000 tons in 1979. Copper and brass mill-product imports also declined about 25 percent during the same period. Assuming that U. S. producers continue to price their material at or near COMEX, refined imports should increase during 1980 to 225,000 tons. This increase will result from consumer "strike buying" and corresponding pre-strike inventory accumulation. The expected level of imports for 1980 could drastically increase if U. S. producers experience a prolonged work stoppage.

With capacity expansion lagging behind expected increases in demand, some analysts believe spot shortages will occur before 1984. In any event, if development and capacity expansion does not resume within the next five years, a serious domestic copper shortages could occur by the late 19809's given the long lead times involved in bringing mineral projects into production.

GOLD

The ongong shift into gold from currencies in response to oil-based monetary and inflationary considerations continued in 1979, with the pace quickened by increasing tension in the Persian Gulf area.

World wide production of gold in 1979 was estimated by the U. S. Bureau of Mines at 40.9 million ounces, up 2.7 percent from 1978 putput. However, U. S. production of gold declined 9 percent in 1979 to 0.91 million troy ounces as producers took advantage of the higher gold prices to mine leaner ores. Domestic consumption in 1979 was just under 5.0 million ounces. Imports of gold, excluding coins, amounted to 3.9 million ounces in 1979, of which 40 percent came from the USSR, 38 percent from Canada and 12 percent from Switzerland. Imports of coins were estimated at 3.8 million ounces, of which two-thirds were South African Krugerrands. In addition, 4.1 million ounces were delivered from the International Monetary Fund's monthly auctions, and 13.3 million ounces were delivered from auctions held by the U. S. Treasury Department. Exports of about 15.6 million ounces went mainly to the United Kingdom, Switzerland, and Canada.

Stocks of gold in the U. S. Treasury at the end of 1979 totaled 263 million ounces, down from 276 million a year earlier. Industry stocks at the end of the year were about 0.9 million ounces and futures exchange stocks totaled about 2.4 million ounces.

GOLD

HISTORICAL DATA:

Year	U. S. Primary Demand (MM Troy Oz.)	U. S. Production (MM Troy Oz.)	Average Price ($ Per Troy Oz.)
1970	5.1	1.7	35.97
1971	6.2	1.5	40.81
1972	6.6	1.5	58.17
1973	6.1	1.2	97.12
1974	4.0	1.1	157.12
1975	2.9	1.1	161.09
1976	3.6	1.0	124.83
1977	3.8	1.1	147.71
1978	3.4	1.0	193.35
1979	3.9	0.9	307.50 est.

PERCENT IMPORTED: 54

DEMAND GROWTH RATE: 2.4% (1976 to 2000)

RESERVES: U. S. 110 million tr. oz., World 1.2 billion tr. oz.

MAJOR PRODUCING COUNTRIES: So. Africa, USSR, Canada, U. S.

DOMESTIC SOURCES: 13 Western States and 5 Southeastern States

SUBSTITUTES: Platinum, Palladium, Tin-Nickel, Silver

BY-PRODUCTS-CO-PRODUCTS: Copper, Nickel, Silver, Platinum, Uranium

END USES: Jewelry and Arts, Electronics, Dental Supplies

DEPLETION ALLOWANCE: Domestic 15%, Foreign 14%

REFERENCES (PRODUCERS, DEALERS, ETC.): "Roskill's Metals Databook" 1979. "Mining International" Financial Times 1979 Yearbook. "International Directory of Mining & Mineral Processing Operations" E&MJ-1979.

PRINCIPLE U. S. PRODUCING COMPANIES: Homestake, Kennecott, Carlin

LEAD

After an unusually strong performance in 1979, the U. S. lead industry should return to normal production levels in 1980. Domestic production is projected to decline 3.2 percent to 1,425,000 short tons.

Consumption should be 1,580,000 tons in 1980, a 2 percent decline from the estimated 1979 level. However, if there is a severe winter, consumption should not decline as much due to strong demand for replacement batteries.

Prices, which reached record highs during 179, should fall off in 1980 as demand slackens.

The future depends largely on these two factors: (1) the stingency of environmental and health regulations and (2) developments in the battery market. Even if less stringent standards are adopted, some displacement could occur in the secondary industry.

The secondary producing industry will also be hit by the growing popularity of the maintenance-free battery, which is expected to account for 90 percent of all batteries manufactured in 1984, compared to 15 percent in 1976. Since the maintenance-free battery uses either pure lead or lead with a low antimony content, secondary smelters will have to adjust their recycling facilities. The transition will not be easy since producers will have to absorb the loss of antimony profits and incur the expense of pruchasing new equipment.

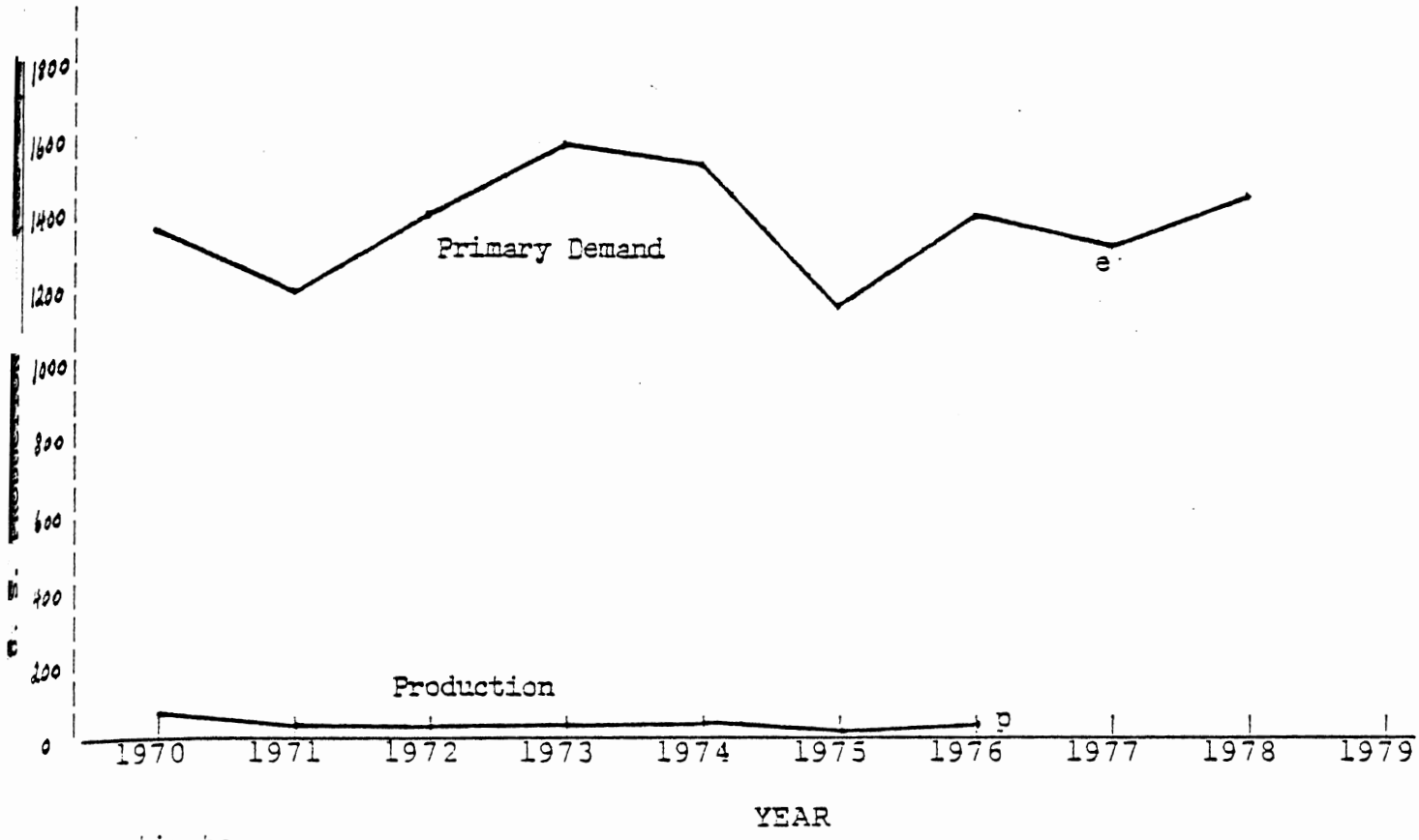
The battery market also will play an important role in future lead consumption. Shifts toward lighter cars and maintenance-free batteries should restrain the growth of lead consumption for batteries. This setback will be tempered by increases in lead consumption in batteries as a result of the growing use of diesel engines. Because these engines need twice the cranking power of conventional engines, automobile manufacturers may install two batteries in diesel-powered vehicles.

In the absence of inroads from the newly developed zinc battery, lead demand for batteries will be boosted from the possible growth in two new markets: electric vehicles and energy storage systems for peak-power demand periods. Assuming these two applications catch on, an additional 450,000 tons of lead would be consumed annually.

As an energy storage system, batteries would supply large amounts of energy during peak demand period, maximizing the efficiency of conventional electric generation operations. One major corporation has estimated that this application would generate an additional 225,000 tons of demand for lead a year in 1985.

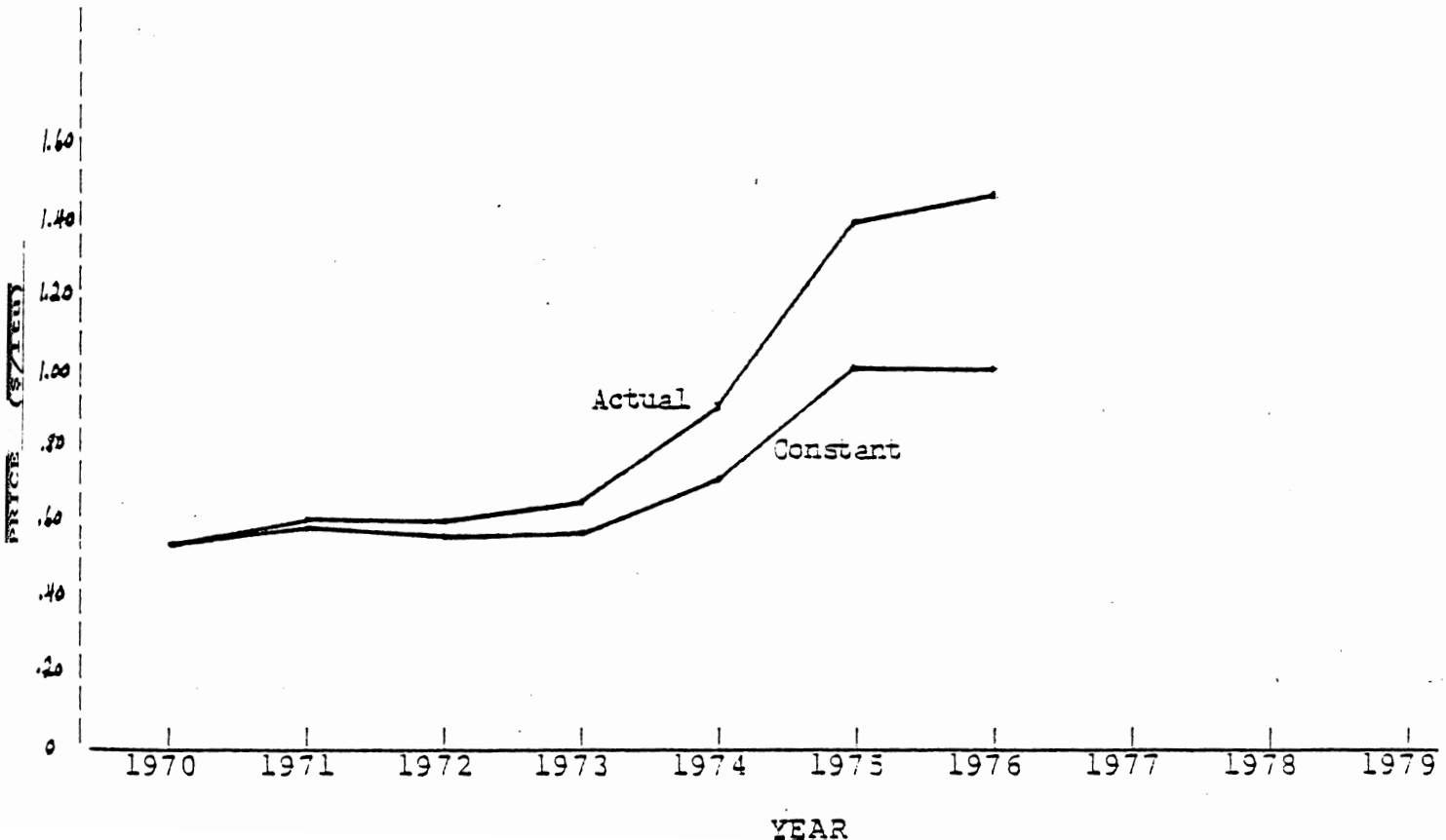
Whether production keeps pace with demand depends to a large extent on the nature of the proposed environmental and health regulations. The industry has indicated that it could comply with modified, less stringent, EPA and OSHA regulations, but at the expense of an increase in the price of lead. A large price increase could boost imports, with advers effects on the domestic industry.

TABLE 7 MINERAL Manganese UNITED STATES PRIMARY DEMAND & PRODUCTION



e=estimate
p=preliminary

TABLE 8 MINERAL Manganese ACTUAL AND CONSTANT (1970S) PRICE



MINERAL PLATINUM GROUP

USES: Catalysts, chemicals, refining, electrical, dentistry, medical, jewelry.

FOREIGN SOURCES: 91% imported. 1974-77 average % of consumption: So. Africa 42, USSR 26

DOMESTIC SOURCES: U. S. Metals Refining Co. in New Jersey. Asarco in Texas. Kennecott in Utah. All from copper ore. Secondary recovery.

SUBSTITUTES: Gold, silver and tungsten for electrical. Improved engines or fuels could reduce use for auto catalysts.

BY PRODUCTS - CO PRODUCTS: Nickel - copper.

RESERVES-RESOURCES (TR. OZ)

World	790,000 -	2,800,000,000
So. Africa	580,000 -	2,000,000,000
USSR	200,000 -	400,000,000
Rhodesia	- -	100,000,000

DEMAND GROWTH RATE: 3-4% to 1985.

PRODUCTION-SALES UNITS: Troy Oz.

OUTLOOK: Supply tight and subject to interruption. The use for automobile exhaust catalysts can affect demand.

TABLE 9 MINERAL Platinum UNITED STATES PRIMARY DEMAND & PRODUCTION

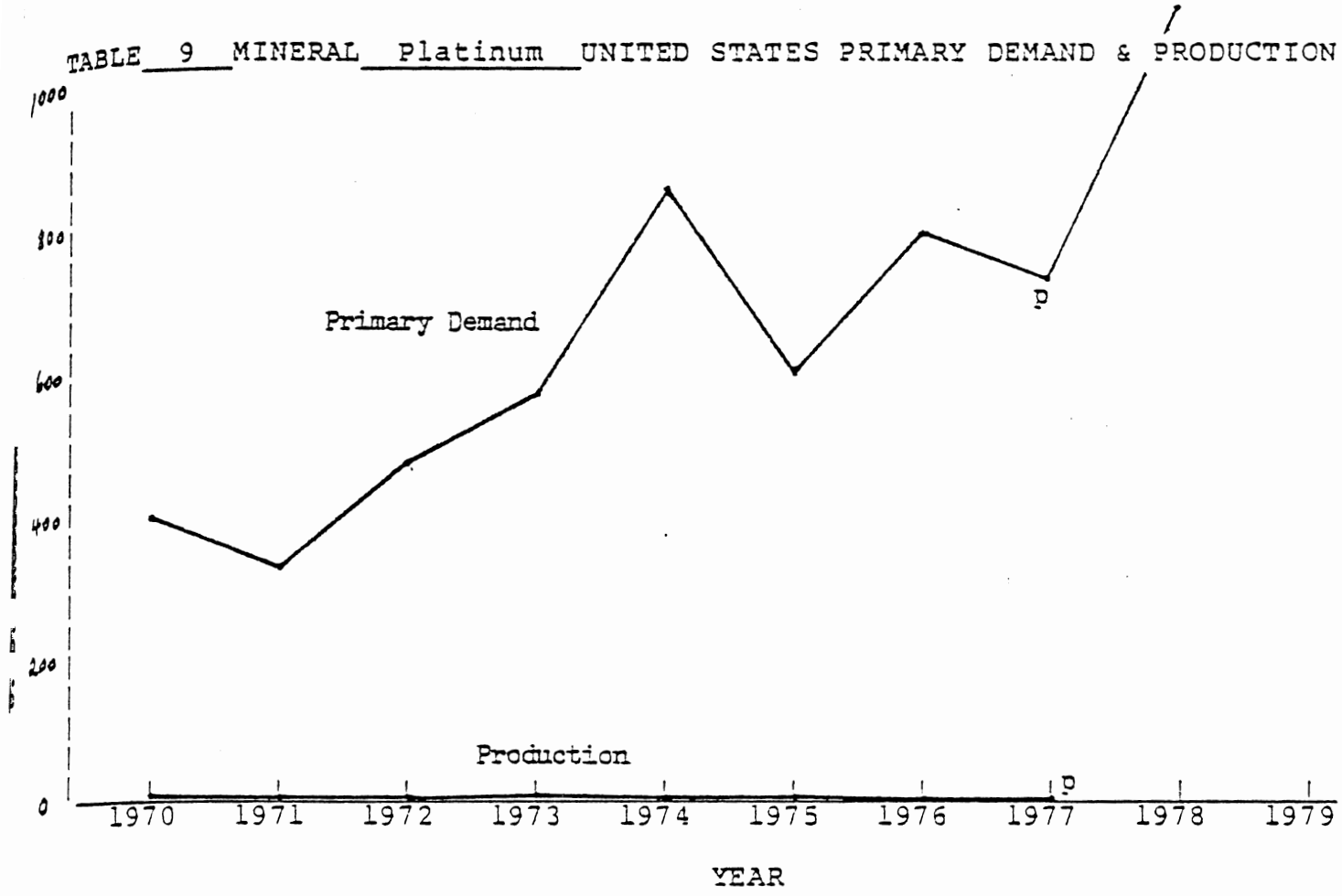


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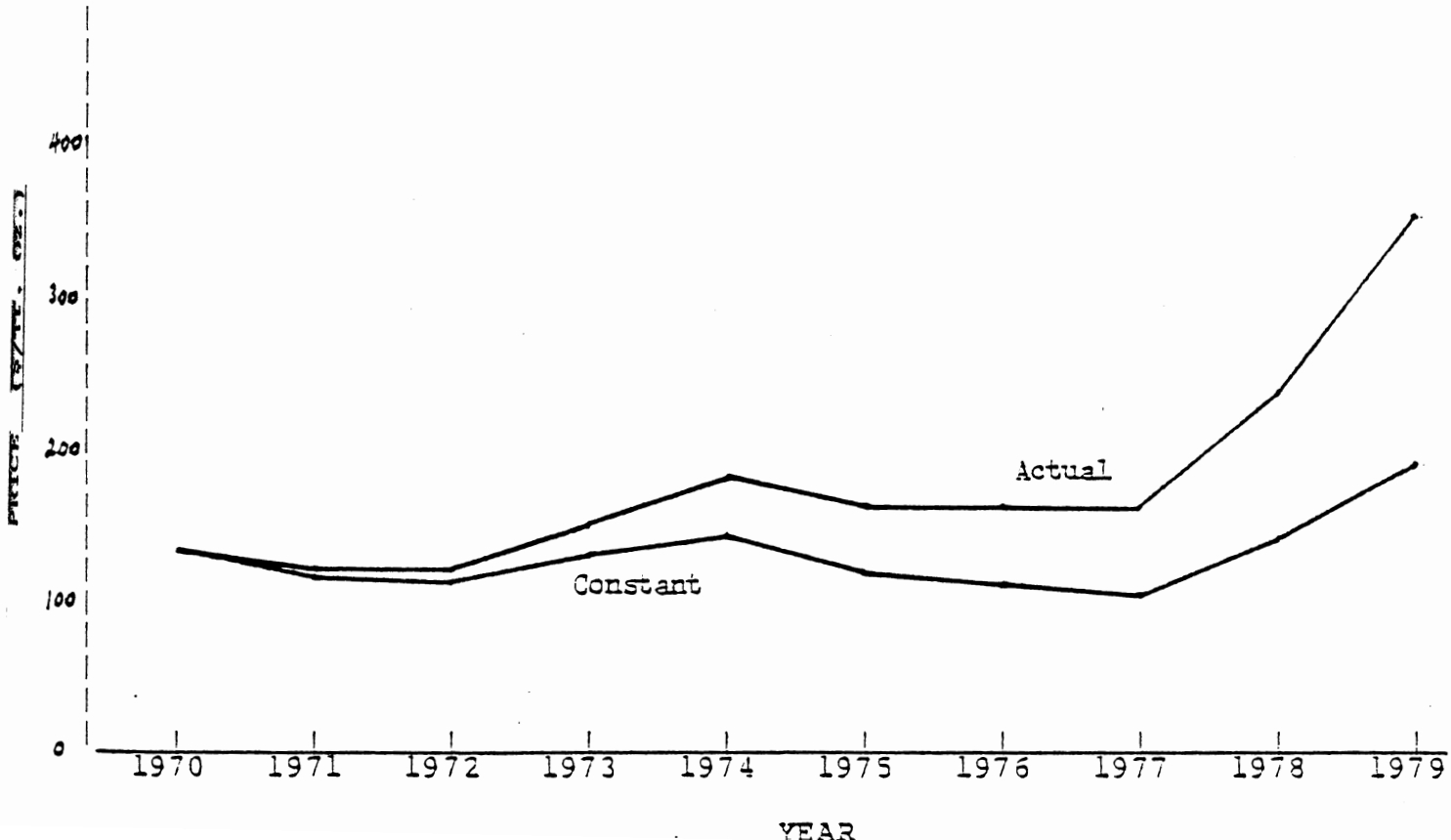
TABLE 10 MINERAL Platinum ACTUAL AND CONSTANT (1970$) PRICE



SILVER

World mine production of silver in 1979 was estimated to be about 5 percent above that of 1978, according to preliminary data of the U. S. Bureau of Mines. U. S. mine produciton of silver was about 3 percent lower than in 1978. Byproduct silver recovery decreased due to reduced production of silver-containing base metal ores. (About 66 percent of primary supply was a byproduct of copper, lead and zinc mining.) Silver output in Idaho, which accounted for about 48 percent of U. S. production, was the same as that of the previous year. Old scrap recycled in 1979 was estimated at 36 million ounces, equivalent to 21 percent of total consumption.

Imports of silver into the U. S. for consumption decreased during 1979 to about 75.0 million ounces from 75.6 million in 1978. Major import sources were Canada, 37 percent of total imports; Mexico, 24 percent; Peru, 15 percent; the United Kingdom, 6 percent; others, 18 percent. Net import reliance (imports minus exports plus adjustments for government and industry stock changes) in 1979 was 45 percent of apparent consumption versus 48 percent in 1978 and as little as 15 percent in 1975.

Exports of silver from the U. S. dropped to about 20.0 million ounces in 1979 from 22.4 million in the previous year. Most exports went to Japan, the United Kingdom, Canada, and Belgium-Luxembourg.

U. S. demand for silver in 1979 was about 5 times domestic mine production and about 50 percent of world production. The U. S. deficit was met mainly by secondary recovery, existing stocks, and imports. Industrial consumption of silver in the U. S. rose about 9 percent in 1979. End use categories of silver consumed in 1979 were: the photographic industry, which is located primarily in New York State, 39 percent; electrical and electronic components, 25 percent; sterlingware and electroplated ware, 15 percent; brazing alloys and solders, 8 percent; and other uses, 13 percent.

MINERAL SILVER

USES:	Photography, electrical, brazing and soldering, batteries, bearings, catalysts, sterling & plated ware, jewelry. Will be important in making mirrors for solar use.
FOREIGN SOURCES:	37% imported 1973-77.
DOMESTIC SOURCES:	Idaho, Arizona, Utah, Montana, Colorado, Missouri and Michigan.
SUBSTITUTES:	Stainless steel, aluminum, rhodium and tantalum in some applications.
BY PRODUCTS - CO PRODUCTS:	About 66% of 1978 primary supply was a by-product of copper, lead, or zinc.
RESERVES-RESOURCES: (TR. OZ.)	World 6,000,000,000 - in 1976 U.S. 1,500,000,000 - 2,300,000,000
DEMAND GROWTH RATE:	2.4% 1974-1985.
PRODUCTION-SALES UNITS:	Troy Oz.
OUTLOOK:	Supply tight. Low grades may become economic.

TABLE 11 MINERAL Silver UNITED STATES PRIMARY DEMAND & PRODUCTION

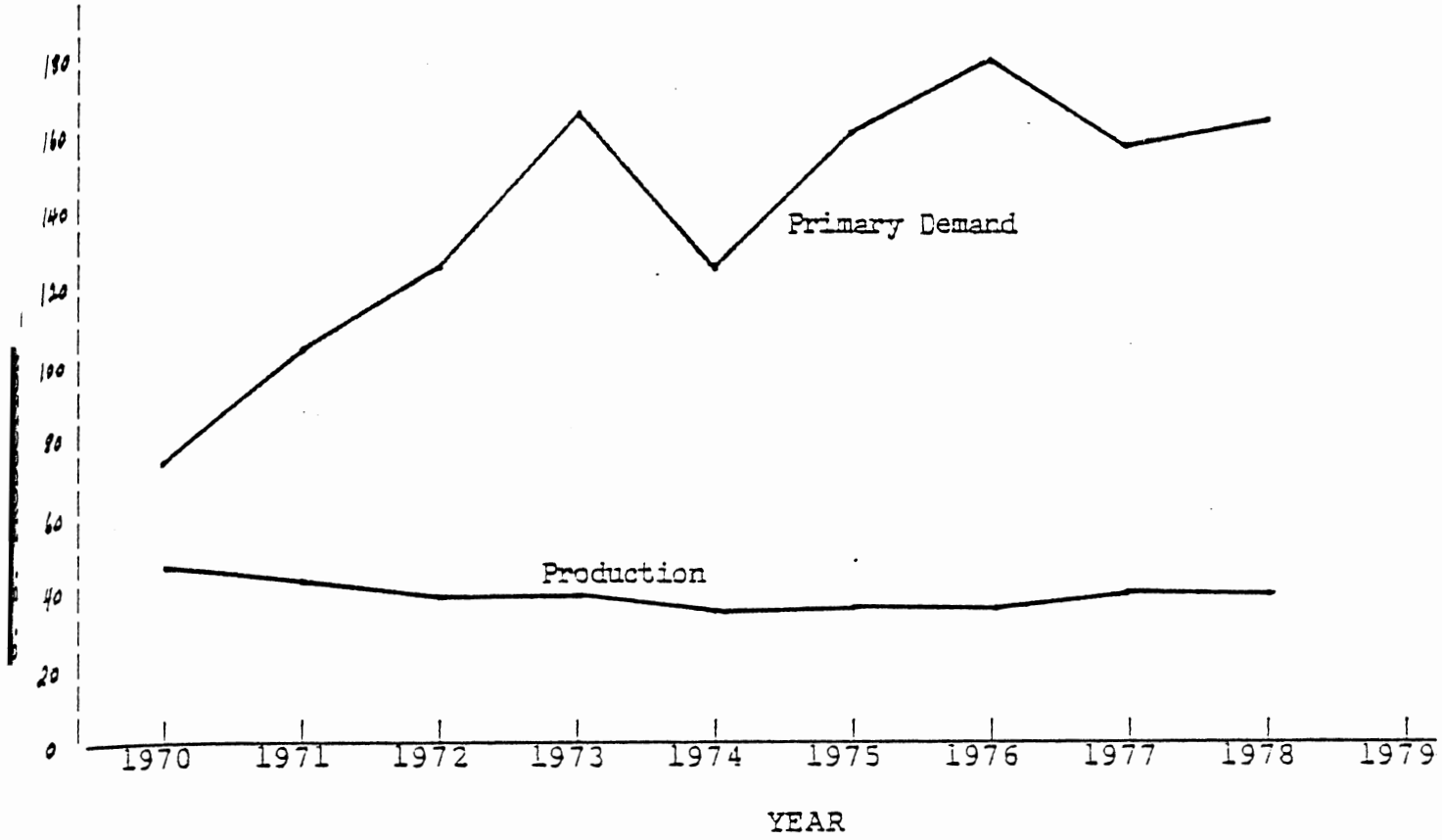
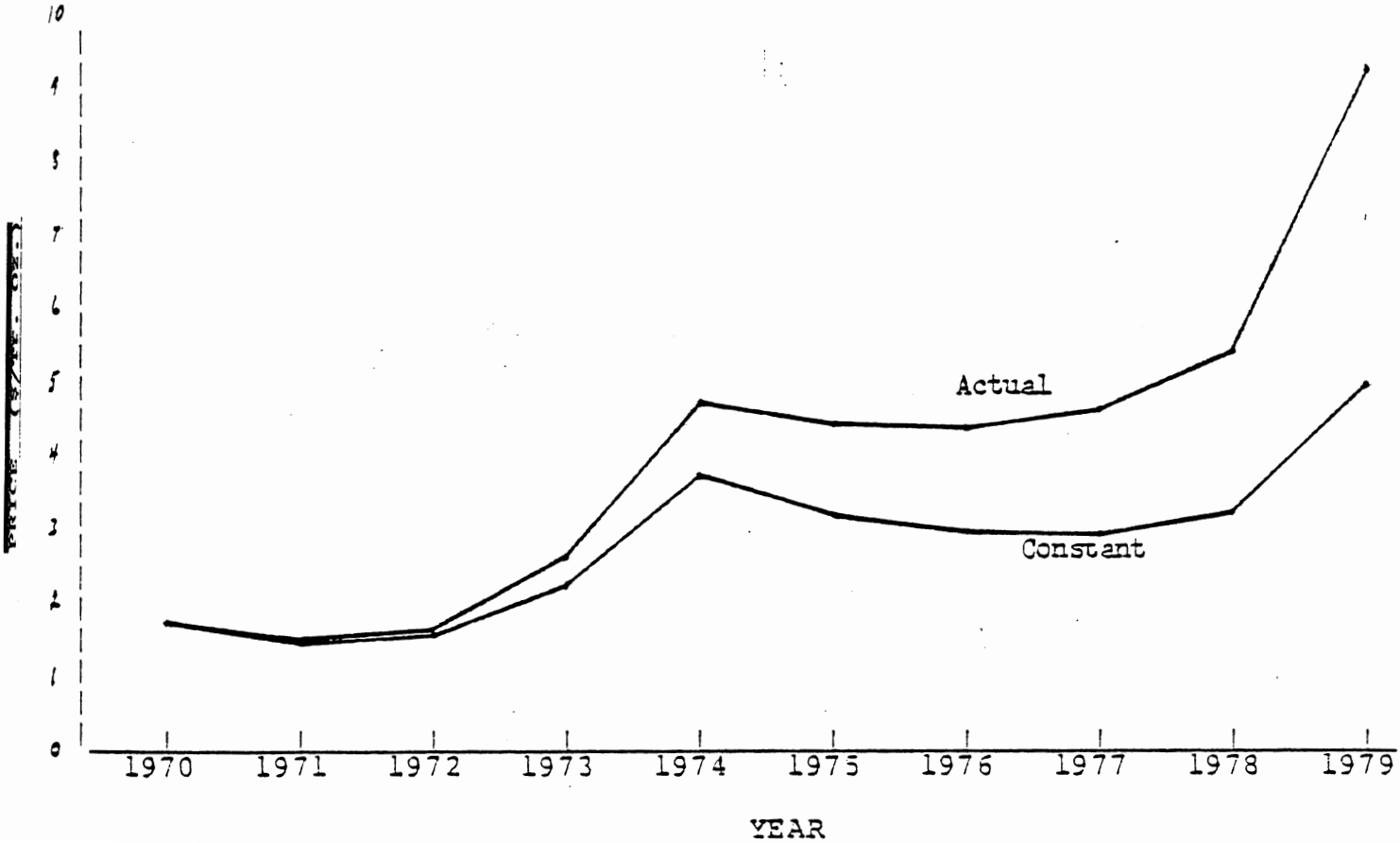


TABLE 12 MINERAL Silver ACTUAL AND CONSTANT (1970$) PRICE



STEEL

Domestic industry shipments of steel mill products in 1980 should decline 5 percent from the 100 million tons of 1979. Apparent consumption (shipments minus exports plus imports) should fall by slighty more than 5 percent of 107.5 million tons from the 13.5 million tons estimated for 1979.

Outlook to 1984

Apparent steel consumption for 1984 is projected at 124 million tons, representing an average annual growth of 1.8 percent. Assuming that imports account for 15 percent of the market, domestic industry shipments would total an estimated 108 million tons, including about 2.5 million tons of exports. At that level, shipments would be 8 percent above 1979 but below the peak of 111.4 million tons reached in 1973.

As the steel consumption cycle turns down after expanding steadily from the 1975 low, the major factors influencing steel demand over the last decade are still operating: the slower growth of steel-intensive industries relative to others and the continuing reduction in the size of passenger cars, which has received additional emphasis with the events of 1979. In 1980, U. S. production of compact and subcompact models is expected, for the first time, to account for more than half of total passenger car output. Development of alternate energy sources, such as synfuel, is not likely to stimulate steel demand before the mid-1980's.

TIN

The U. S. tin industry should be less vulnerable to tight supplies and volatile prices through 1980. For the last few years, the price of tin has risen dramatically as a result of inadequate supplies. However, the balance between world production and consumption was restored in 1979, and there should be a production surplus in 1980.

U. S. consumers rely on imports for 80 percent of their primary tin requirements. Primary tin consumption in 1980 should be 3 percent below the 1979 level, which was 5 percent higher than the 1978 level.

Long-term developments depend on: (1) U. S. policy toward its large tin stockpile, (2) producing governments' policies toward their tin-mining sector, and (3) technological events in the tinplate and canning industry.

There are about 167,500 more long tons of tin in the U. S. Strategic Stockpile than the prescribed stockpile goal. Pressure to sell as much of that as possible can be expected, in order to free funds to purchase stockpile materials whose inventory is below the prescribed goal.

Another deterrent to increased production is the attitude and policies of the governments of certain tin-producing countries, which have recently stated that they will attempt to correct certain conditions in order to provide a climate more conducive to investment and production. For example, the private tin mining sector in Malaysia has been petitioning the Government to reduce taxes, expedite the process for renewing leases, and open up additional land to mineral development and exploitation.

New technology in the tinplate and canning industry could significantly affect the tin market. This industry has experienced a series of technological changes since 1960 in the form of reduced tin coatings and tinplate thicknesses, rapid penetration of such substitute materials as aluminum, and a revolution in canmaking technology. Industry officials expect the two-piece can to replace the three-piece in the beverage sector by 1981 and tinplate to replace aluminum as the dominant material for two-piece cans.

In the meantime, current research could produce a non-tin-coated steel material to replace tinplate in the highly competitive beverage can market. Small amounts of non-tin-coated steel materials, such as chrome-coated steel and blackplate, are already used as canmaking materials.

Concerned with the supply and price problems in obtaining tin, steel companies are doing research both to improve the effectiveness of blackplate and to develop other tinplate substitutes.

MINERAL TIN

USES:	Construction, communication, plating, soldering, casting alloys and bearings.
FOREIGN SOURCES:	80%, Malaysia, Bolivia, Thailand, Indonesia.
DOMESTIC SOURCES:	Less than 100 metric tons/year. Secondary recovery.
SUBSTITUTES:	Plastics, glass, aluminum, paper, copper, zinc. No satisfactory sub for soldering.
BY PRODUCTS - CO PRODUCTS:	U. S. production is principally the by-product of molybdenum.
RESERVES-RESOURCES: (MT)	World 10,200,000 - 37,000,000 in 1976 U.S. 40,000 - 190,000
DEMAND GROWTH RATE:	2.1% 1974-1985.
PRODUCTION-SALES UNITS:	Production = metric ton Sales = Lbs.
OUTLOOK:	Supply tight. Primary consumption is mostly imported.

TABLE 13 MINERAL Tin UNITED STATES PRIMARY DEMAND & PRODUCTION

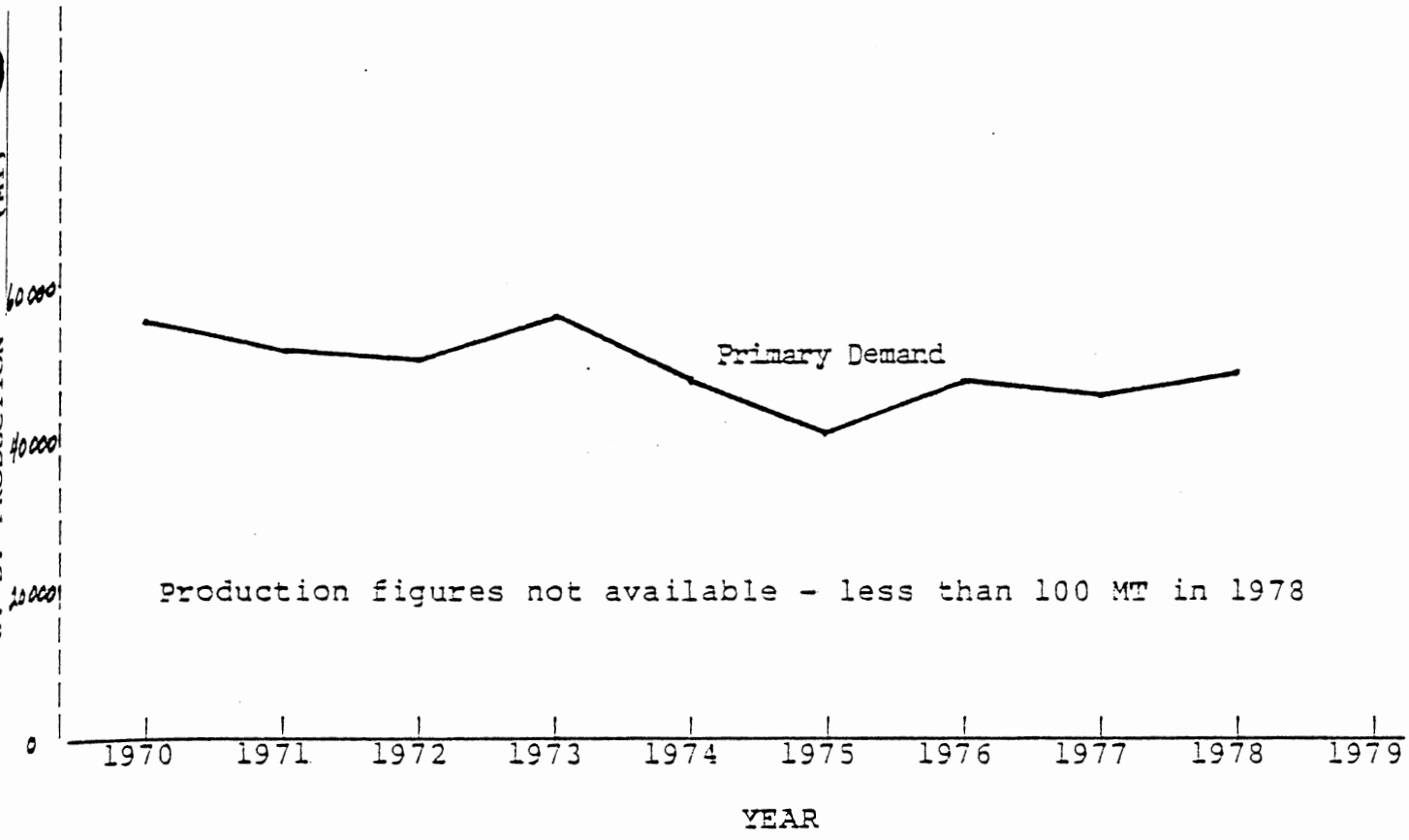
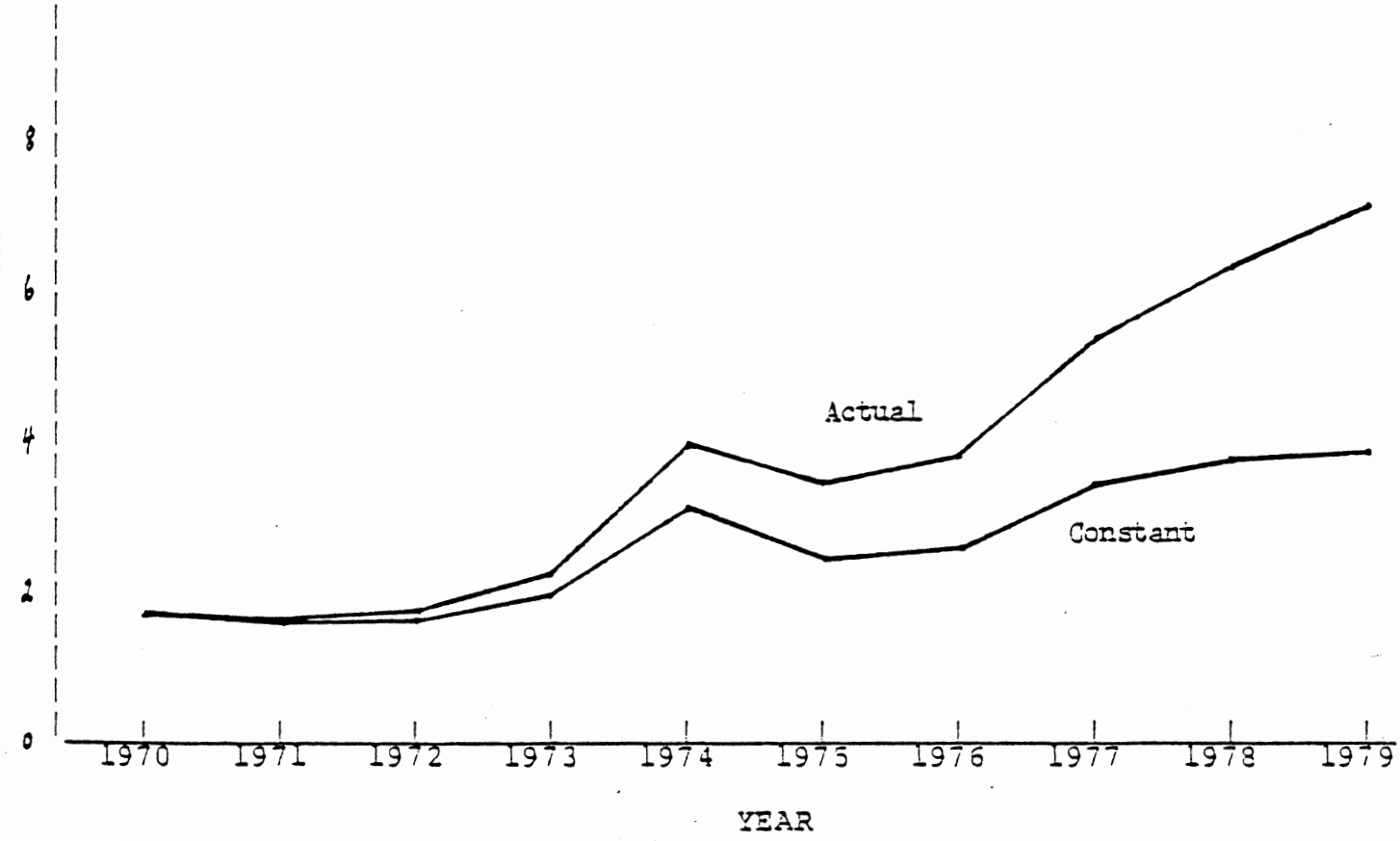


TABLE 14 MINERAL Tin ACTUAL AND CONSTANT (1970S) PRICE



MINERAL TITANIUM

USES:	Aircraft, space vehicles, paint, heat exchangers, Geothermal power plants.
FOREIGN SOURCES:	Australia, Japan and USSR Ilmenite - 39% Rutile - Most U. S. consumption supplied by Australia.
DOMESTIC SOURCES:	Practically none. Secondary recovery.
SUBSTITUTES:	Aluminum, low alloy steels.
BY PRODUCTS - CO PRODUCTS:	Zircon, monazite, kyanite, garnet, staurolite, iron and vanadium are sometimes co products.
RESERVES-RESOURCES: (MT)	World 340,100,000 - 1,234,000,000 in 1976 U.S. Rutile 450,000 - 3,000,000 U.S.Ilemite 91,000 - 508,000,000
DEMAND GROWTH RATE:	3.4% 1974-1985
PRODUCTION-SALES UNITS:	Production = short ton Sales = lbs.
OUTLOOK:	Supply tight.

TABLE 15 MINERAL Titanium UNITED STATES PRIMARY DEMAND & PRODUCTION

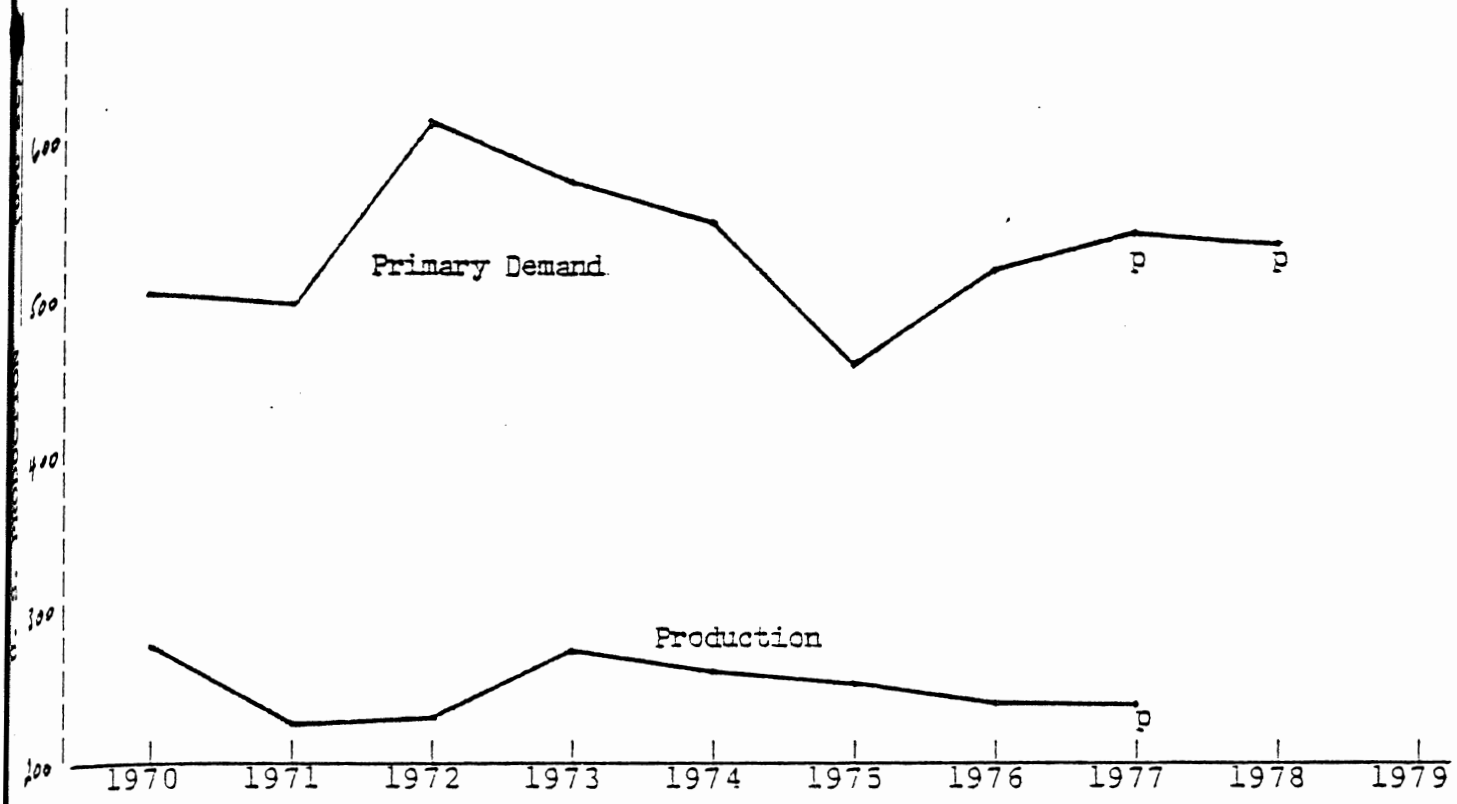


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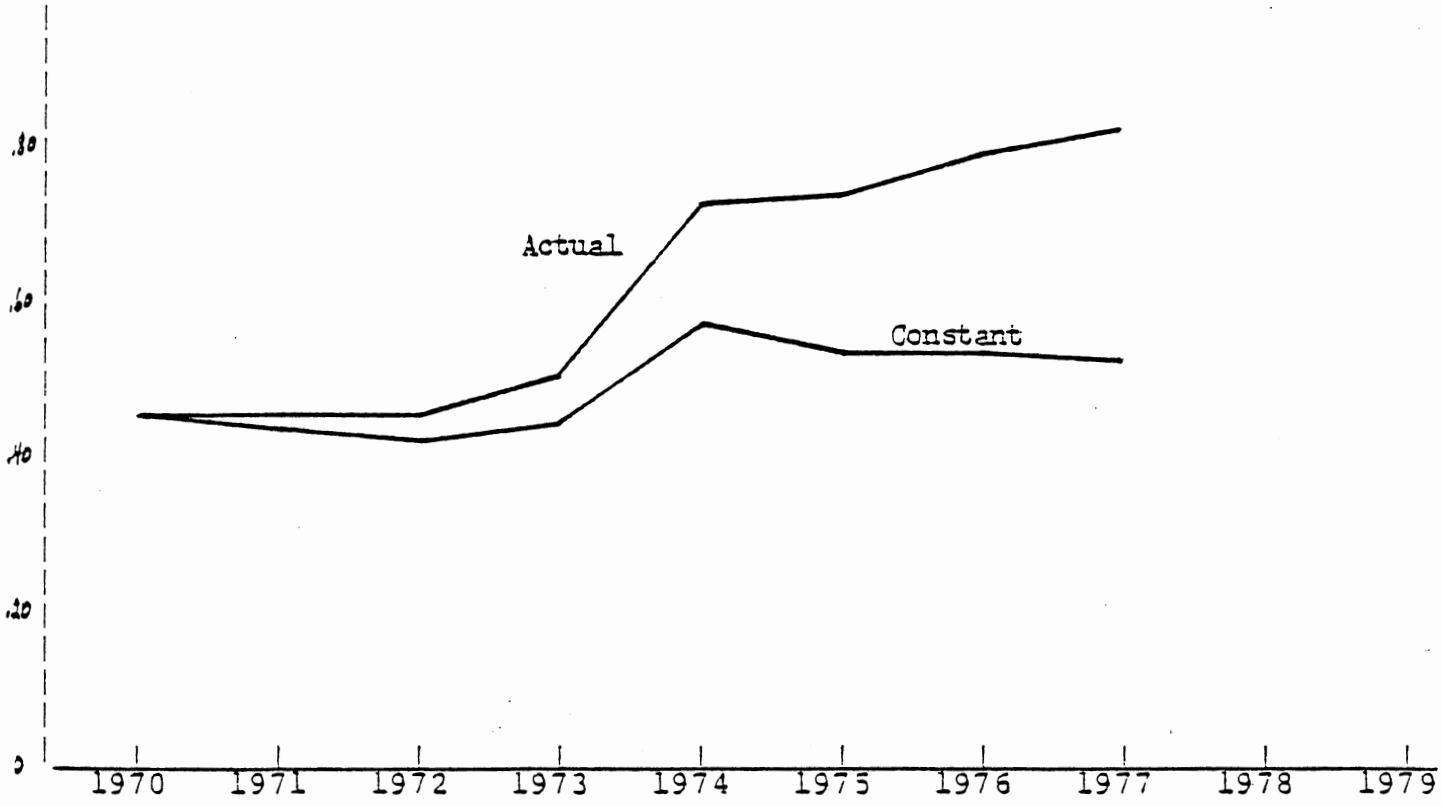
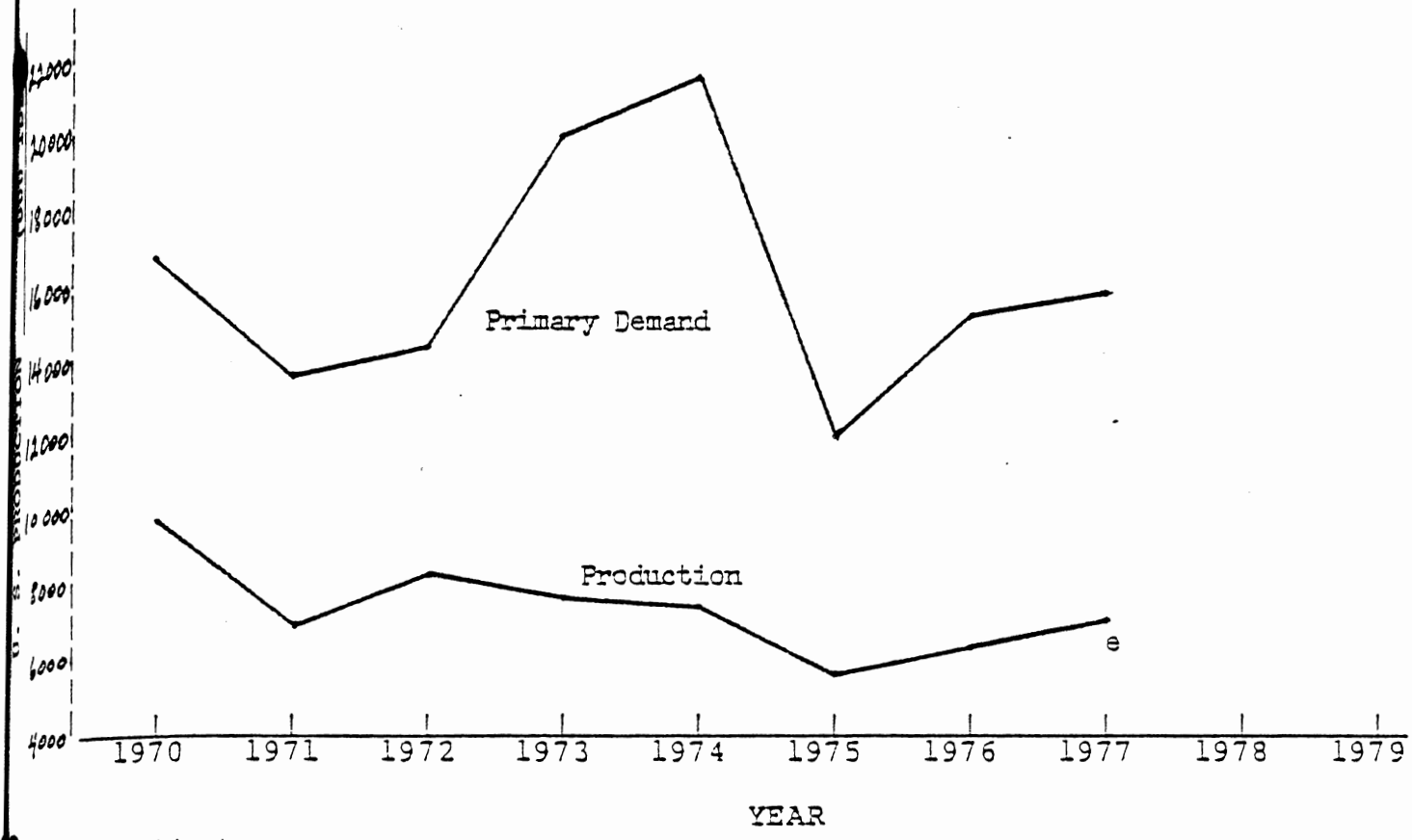
TABLE 16 MINERAL Titanium ACTUAL AND CONSTANT (1970S) PRICE



MINERAL TUNGSTEN

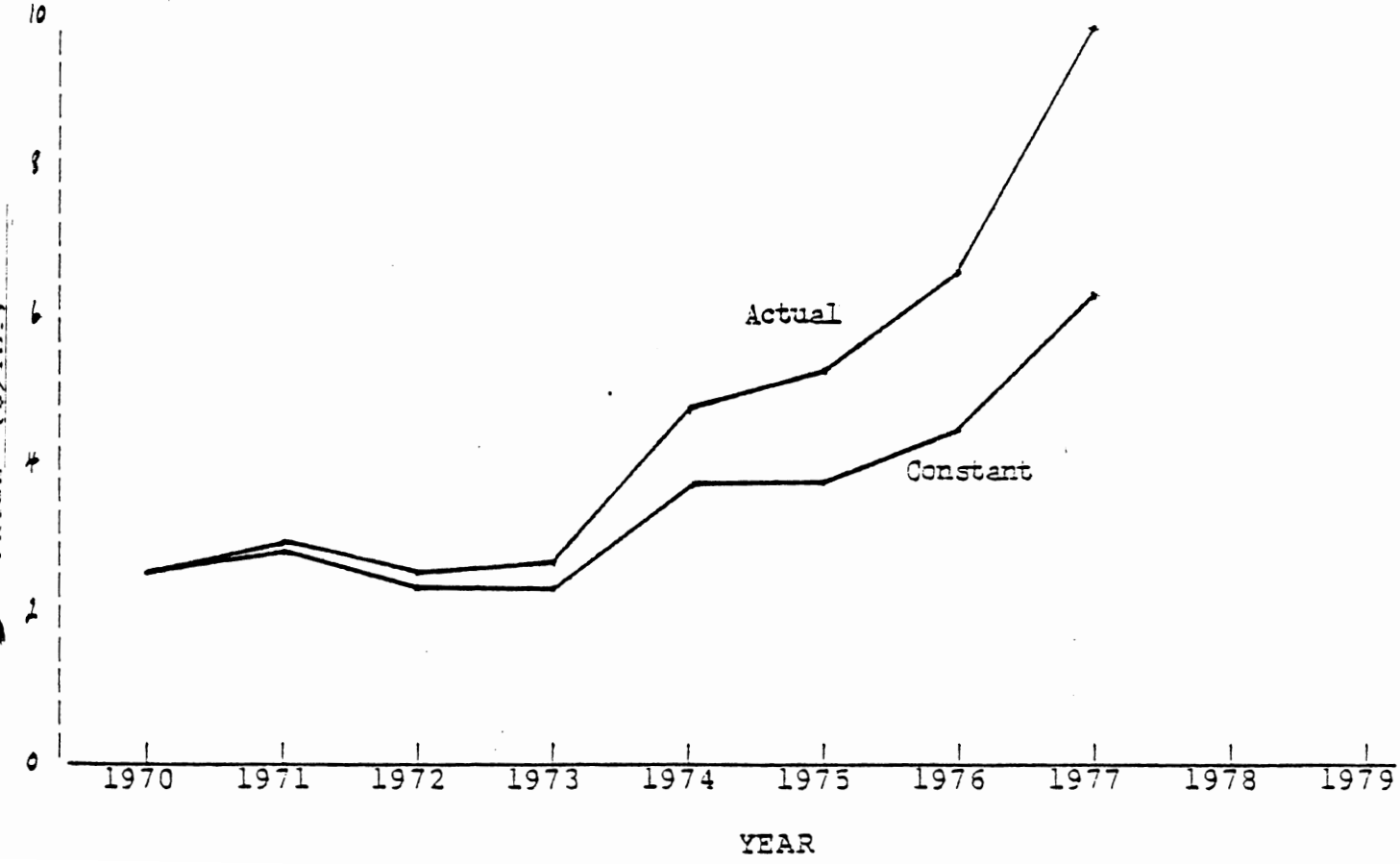
USES:	Tool bits, electric filaments, alloys, space crafts and powder metallurgy.
FOREIGN SOURCES:	62%. Canada, Bolivia, Mexico, Peru and Thailand.
DOMESTIC SOURCES:	North Carolina and Western States. Abracadabra Exploration Co., Amax, Oxbow and Union Carbide. Secondary recovery.
SUBSTITUTES:	Molybdenum, Tantalum.
BY PRODUCTS - CO PRODUCTS:	Molybdenum, copper, gold and silver.
RESERVES-RESOURCES: (MT)	World 1,800,000 - 5,200,000 in 1976 U.S. 118,000 - 300,000
DEMAND GROWTH RATE:	4.9% 1974-1985
PRODUCTION-SALES UNITS:	Lbs.
OUTLOOK:	Supply probably adequate.

TABLE 17 MINERAL Tungsten UNITED STATES PRIMARY DEMAND & PRODUCTION



e=estimate

TABLE 18 MINERAL Tungsten ACTUAL AND CONSTANT (1970$) PRICE



ZINC

Under the voluntary price standards, a company may directly exclude commodities whose historical and current price changes are closely tied to price movements on an organized exchange--either domestic or foreign. While zinc is traded on both the New York Commodity Exchange and the London Metal Exchange, the Council on Wage and Price Stability (COWPS), in early 1979 ruled that domestic zinc producers did not qualify for this exclusion because their price changes were not closely related to exchange price movements.

This ruling was disputed by zinc producers and remains a matter of continuing discussion.

Domestic producers increased prices within the COWPS guidelines through either the application of the "75 percent rule" or through disaggregation and the profit margin test. The domestic zinc industry faces special problems relating to price restrictions that COWPS is considering in developing its second-year guidelines. These include mandated environmental costs, weak markets, and the loss of industry capacity. Domestic prices in 1979, while above those of 1978, were below the average price levels attained in 1975 and 1976.

Zinc consumption should grow at an annual rate of 3.5 percent from depressed 1980 levels, reaching 1.26 million tons in 1984. The largest volume contributor to this growth should be the galvanizing sector, increasing about 4 percent annually. This growth will result largely from the trend toward increased corrosion protection in the durable goods, automotive, and construction areas. The rapid decline in zinc die-castings is expected to stabilize in 1981-82, then gain modestly, reaching 360,000 tons in 1984. This growth depends largely on the continuing use of thin-wall-die-castings and the cost of alternative materials.

The energy crisis, while presenting problems for the zinc industry, could also hold promise. The increased use of electric vehicles depends on the development of efficient battery power systems. The continued development of various zinc batteries may represent a significiant new future market. Though currently in the development stage, these batteries could be in production by 1982.

The health of the primary zinc industry between now and 1984 continues to depend on world supply rather than demand. Given current and expected near-term market conditions and world capacities, it is unlikely that the industry will experience dynamic growth. If world producers ignore demand, excess supply could force prices down, lowering or eliminating profits. This could impel further capacity reductions, endangering supply by the late 1980's.

APPENDIX B

AN ABBREVIATED COMPENDIUM OF

SIGNIFICANT MINERALS COMPANIES

AMAX, INC.

INCORPORATED: JUNE, 1887, NEW YORK
HEADQUARTERS: GREENWICH, CONNECTICUT

PRINCIPLE MINERALS: MOLYBDENUM, TUNGSTEN, NICKEL

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL	RESERVES/PRODUCTION
PORT NICKEL REFINERY LOUISIANA	NICKEL	80,000,000 LBS NICKEL/YR 47,000,000 LBS COPPER/YR 1,000,000 LBS COLBALT/YR 100,000 TONS AMMONIA SULFATE/YR
COFREMMI (44%), NEW CALEDONIA	NICKEL	
PENAMAZ, NEW CALEDONIA (50%)	NICKEL	400,000,000 TONS 1.37% NICKEL
AMAX PLANT, ILLINOIS	CADMIUM, NICKEL	84,000 TONS ZINC/YR
BOSS MINE (50%), MO	LEAD, ZINC	177,000 TONS LEAD/YR 83,000 TONS ZINC/YR
HEATH STEEL (75%), NEW BRUNSWICK	LEAD, ZINC, COPPER	35,000 TONS LEAD/YR 76,000 TONS ZINC/YR 38,000 TONS COPPER/YR
TWIN BUTTES MINE, AZ (50%)	COPPER	329,000,000 TONS SULFIDE ORE 0.7% COPPER 57,000,000 TONS OXIDE ORE 1.1% COPPER
PALO VERDE, (50%), NM	COPPER	125,000,000 TONS ORE 0.6% COPPER
PONCE MINING CO. (88.5%) PUERTO RICO	COPPER	
TECARN LTD. (36%), NEWFOUNDLAND		
CLIMAX, HENDERSON CO.	MOLYBDENUM	171,000,000 TONS @ .299 % MOLY. 305,000,000 TONS @ .313% MOLY.
CLIMAX, LAKE COUNTY, CO	MOLYBDENUM TUNGSTEN	266,000,000 TONS @ .421% MOLY.
MT. EMMONS, CO	MOLYBDENUM	165,000,000 TONS .4% MOLY.
AMAX FUELS	COAL	3.6 BILLION TONS 2.5 BILLION, HIGH SULFUR, MIDWEST 1.1 BILLION, LOW SULFUR, FAR WEST

AMAX, INC (PAGE 2)

COMPANY/PROPERTY	MINERAL	RESERVE/PRODUCTION
AMAX PETROLEUM	OIL GAS	17 STATES, OFFSHORE, LA. NORTH SEA
ALUMAX (50%)	ALUMINUM	
CANADA TUNGSTEN MINING (65%)	TUNGSTEN	

FINANCIAL SUMMARY

MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	3471.1	2996.1	2798.9	2480.1	1767.8	1712.1
TOTAL REVENUES	1807.1	1397.1	1237.9	1031.0	1245.6	1381.9
NET INCOME	160.0	69.0	150.1	134.4	148.4	105.1
RETURN ON SALES	8.9	4.9	12.1	13.0	11.9	7.6
RETURN ON AVG. ASSETS	4.9	2.4	5.6	6.3	8.5	6.7
TOTAL MARKET VALUE	1608.4	1174.4	1913.0	1466.9	729.8	1217.6
BOOK VALUE	1634.4	1560.5	1562.7	1362.9	940.4	838.6

ASARCO

INCORPORATED: JULY 1899, NEW JERSEY
HEADQUARTERS: NEW YORK, NY

PRINCIPLE MINERALS: COPPER, SILVER, LEAD, ZINC, ASBESTOS, COAL

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL	RESERVES/PRODUCTION
GALENA, IDAHO	SILVER, COPPER	
MISSION & SAN XAVIER, AZ	COPPER, SILVER, MOLYBDENUM, COPPER LEACHING	
SACATON, AZ	COPPER	
SILVER BELL, AZ	COPPER, SILVER, MOLYBDENUM	
VANADIUM, NV	ZINC, LEAD, SILVER	
PALO VERDE (50%), AZ	COPPER	125 MM TON .6% COPPER
EISENHOWER, AZ	COPPER	31.5 MM TONS .7% COPPER
COUERER'S SILVER MINE, ID	SILVER	2.2 MM OZ SILVER/YR
BLACK CLOUD (50%), CO	LEAD, ZINC, SILVER	12,000 TONS LEAD/YR 23,000 TONS ZINC/YR 500,000 OZ SILVER/YR
MIDLAND COAL, IL	COAL	2.4 MM TONS/YR
MANCHESTER, NJ	ILMENITE	20,000 TONS/DAY
TROY, MONTANA	COPPER, SILVER	50 MM TONS .7% COPPER 1.5 OZ SILVER

FINANCIAL SUMMARY

MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	1622.6	1529.6	1543.7	1501.6	1328.8	1149.5
TOTAL REVENUES	1245.6	1090.5	1143.1	1038.1	1459.5	1160.4
NET INCOME	49.5	-29.5	42.3	25.4	125.8	113.4
RETURN ON SALES	3.9	-2.7	3.7	2.5	8.6	9.8
RETURN ON AVG. ASSETS	3.1	-1.9	2.8	1.8	10.1	10.6
TOTAL MARKET VALUE	418.0	400.8	443.7	350.3	360.5	605.7
BOOK VALUE	934.0	809.1	857.4	861.1	862.5	774.0

ATLAS CONSOLIDATED MINING & DEVELOPMENT CORP.

INCORPORATED: MARCH 1935 AS MASKAT CONSOLIDATED MINING CO., NAME CHANGED 1953 ON AMALGAMATION WITH ANATAMOK GOLDFIELDS MINING CO., INC. AND IXL MINING CO.

HEADQUARTERS:: MAKATI, RIZAL, PHILLIPINES

PRINCIPLE MINERALS: COPPER, SILVER

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	83.158	71.193	65.443	52.845	46.445	39.139
TOTAL REVENUES	53.613	69.154	56.865	53.220	46.191	39.610
NET INCOME	1.138	7.019	4.023	3.013	1.562	-2.446
RETURN ON SALES	2.122	10.149	7.074	5.661	3.381	-6.175
ETURN ON AVG. ASSETS	1.474	10.274	6.802	6.069	3.650	-6.015
TOTAL MARKET VALUE	30.189	43.435	54.652	49.880	14.660	24.492
BOOK VALUE	38.705	37.543	30.576	26.403	23.433	21.571

CALLAHAN MINING CORP.

FINANCIAL SUMMARY

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	41.352	33.624	32.437	28.797	24.844	19.305
TOTAL REVENUES	35.615	29.975	28.363	21.956	20.009	11.864
NET INCOME	4.769	3.154	2.821	2.813	4.278	2.387
RETURN ON SALES	13.390	10.522	9.946	12.811	21.380	20.119
RETURN ON AVG. ASSETS	12.721	9.548	9.213	10.488	19.380	13.373
TOTAL MARKET VALUE	51.689	49.603	51.207	39.756	25.961	39.062
BOOK VALUE	29.500	25.885	24.039	22.133	20.115	16.380

CAMPBELL RED LAKE MINES LTD.

INCORPORATED: JULY, 1944, ONTARIO CANADA

HEADQUARTERS: TORONTO, ONTARIO, CANADA

PRINCIPLE MINERAL: GOLD BULLION, SOME SILVER

FINANCIAL SUMMERY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	57.864	44.102	41.610	41.135	37.706	23.656
TOTAL REVENUES	39.888	31.254	25.712	31.617	33.781	20.778
NET INCOME	14.338	10.171	7.572	11.365	14.091	8.907
RETURN ON SALES	35.945	32.543	29.449	35.945	41.712	42.867
RETURN ON AVG. ASSETS	28.123	23.732	18.302	28.830	45.927	44.624
TOTAL MARKET VALUE	233.592	275.957	196.767	155.972	239.961	307.995
BOOK VALUE	38.768	35.626	34.648	34.274	27.707	19.614

COMINCO LTD.

INCORPORATED: January, 1906, CANADA

HEADQUARTERS: VANCOUVER, BRITISH COLUMBIA

PRINCIPLE MINERALS: ZINC AND LEAD

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	938.2	961.8	973.2	869.5	765.7	673.2
TOTAL REVENUES	776.6	712.9	737.8	762.7	794.9	516.7
NET INCOME	54.9	56.9	47.7	73.6	86.3	42.8
RETURN ON SALES	7.1	8.0	6.5	9.7	10.9	8.3
RETURN ON AVG. ASSETS	5.8	5.9	5.2	9.0	12.0	6.9
TOTAL MARKET VALUE	447.0	448.7	618.5	567.1	415.7	583.8
BOOK VALUE	385.3	397.2	415.3	405.2	382.2	346.9

COMMERCIAL METALS

NOT IN MINING INTERNATIONAL

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	172.2	146.5	153.2	120.3	144.8	96.8
TOTAL REVENUES	702.3	557.2	503.4	474.6	646.4	328.6
NET INCOME	5.6	-.26	3.0	9.4	19.1	5.2
RETURN ON SALES	0.8	-.05	.6	2.0	2.9	1.6
RETURN ON AVG. ASSETS	3.5	-.18	2.2	7.1	15.8	6.2
TOTAL MARKET VALUE	30.1	21.1	29.8	26.7	24.7	21.4
BOOK VALUE	64.3	59.4	60.7	58.7	50.3	31.2

DAY MINES

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	14.309	12.182	11.143	9.725	10.924	9.144
TOTAL REVENUES	12.637	11.691	9.158	5.606	7.380	6.673
NET INCOME	1.691	1.651	1.565	-.735	1.434	1.623
RETURN ON SALES	13.381	14.121	17.088	-13.110	19.430	24.321
RETURN ON AVG. ASSETS	12.767	14.157	14.999	-7.119	14.291	19.188
TOTAL MARKET VALUE	27.885	24.399	20.913	17.427	15.684	24.910
BOOK VALUE	11.913	10.947	9.877	8.891	9.918	8.664

ENGLEHARD MINERALS AND CHEMICALS CORP.

INCORPORATED: MARCH, 1960 DELAWARE
HEADQUARTERS: NEW YORK, NY

PRINCIPLE MINERALS: ATTAPULGITE, BUAXITE, KAOLIN, LIMESTONE

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL	PRODUCTION
NATIONAL ZINC CO., BARTLESVILLE	ZINC	50,000 TONS/YR
ROANE ELECTRIC FURNACE CO. TENNESSEE	FERRO-ALLOY	
CONSERV INC., FLORIDA	AGRICULTURAL PHOSPHATE	
ROBE RIVE LTD. AUSTRALIA (21%)		

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	2853	2330	1853	1325	1383	1048
TOTAL REVENUES	10173	7346	6469	5671	5379	3049
NET INCOME	142.2	122.6	124.9	114.7	110.2	52.5
RETURN ON SALES	1.4	1.7	1.9	2.0	2.0	1.7
RETURN ON AVG. ASSETS	5.5	5.9	7.9	8.5	9.0	5.7
TOTAL MARKET VALUE	904.8	853.1	1055.2	706.0	520.7	436.6
BOOK VALUE	790.7	683.8	600.3	499.6	402.1	310.2

FREEPORT MINERALS CO.

INCORPORATED: SEPTEMBER, 1913, DELAWARE, AS FREEPORT TEXAS COMPANY NAME CHANGED TO FREEPORT SULPHUR CO. DECEMBER 1936 AND TO PRESENT TITLE 26, APRIL, 1971

HEADQUARTERS: NEW YORK, NEW YORK

PRINCIPLE MIENRALS: SULPHUR, URANIUM, NICKEL, COBALT AND COPPER

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	452.110	465.168	463.789	429.864	420.035	326.009
TOTAL REVENUES	311.910	294.623	320.853	303.382	294.268	185.600
NET INCOME	31.271	21.184	48.538	34.518	80.244	32.897
RETURN ON SALES	10.025	7.190	15.127	11.377	27.269	17.724
RETURN ON AVE. ASSETS	6.818	4.560	10.862	8.122	21.511	10.621
TOTAL MARKET VALUE	447.877	300.509	455.360	332.890	408.603	391.830
BOOK VALUE	301.675	343.056	348.208	324.382	319.479	257.773

GIANT YELLOWKNIFE MINES LTD.

INCORPORATED: JUJE, 1960, ONTARIO

HEADQUARTERS: TORONTO, ONTARIO, CANADA

PRINCIPLE MINERALS: GOLD, SILVER

FINANCIAL SUMMARY
MM#

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	14.270	12.649	10.716	11.668	13.099	13.921
TOTAL REVENUES	19.378	16.417	13.568	16.209	17.363	17.827
NET INCOME	3.144	2.239	-.185	.304	2.778	4.270
RETURN ON SALES	16.224	13.638	-1.363	1.875	15.999	23.952
RETURN ON AVE. ASSETS	23.359	19.166	-1.652	2.454	20.562	35.251
TOTAL MARKET VALUE	36.140	40.443	27.965	27.965	43.025	45.607
BOOK VALUE	10.322	9.748	8.860	9.476	10.792	10.165

GULF RESOURCES & CHEMICAL CORPORATION

INCORPORATED: FORMERLY GULF SULFUR CORPORATION: NAME CHANGED 1966
HEADQUARTERS: HOUSTON, TEXAS

PRINCIPLE MINERALS: LEAD, ZINC, SILVER

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL	RESERVES/PRODUCTION
C&K COAL/CHARTER COAL CO.	COAL	(
GRC COAL/GRC MINING CO.	COAL	(
SHARON COAL/VANTAGE COAL CO.	COAL	(70,195,000 TONS
W. P. STALLHAN COAL CO., INC.	COAL	(
CAMBRIA COAL CO.	COAL	(
BUNKER HILL CO.	SILVER/LEAD, ZINC	2,838,500 (2.4% LEAD (3.3% ZINC (1.4 OZ/T SILVER
		102,000 T(46.3% OZ/T SILVER (6.9% LEAD
		631,200 T(7.8% ZINC (4 OZ/T SILVER
		110,000 T(.7% LEAD (6% ZINC
LITHIUM CORP. OF AMERICA	LITHUM CARBONATE 36MM LBS/YR	
IRECO CHEMICALS		
GREAT SALT LAKE MINERALS & CHEM. CORP		
BETHLEHEM COPPER CORP. (26%) (BRITISH COLUMBIA)	COPPER	286,280,000 TONS (4.3% COPPER, .017% MOLY)

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	408.3	394.1	331.2	277.3	218.4	139.1
TOTAL REVENUES	389.0	330.4	314.8	300.0	249.6	146.3
NET INCOME	14.1	9.3	17.0	28.7	36.2	7.7
RETURN ON SALES	3.6	2.8	5.4	9.6	14.5	5.2
RETURN ON AVG. ASSETS	3.5	2.6	5.6	11.6	20.3	6.2
TOTAL MARKET VALUE	61.0	85.8	117.9	97.1	56.2	48.1
BOOK VALUE	158.6	149.1	149.0	117.6	75.1	38.8

HANDY AND HARMAN

NOT IN MINING INTERNATIONAL

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	241.9	187.2	173.8	146.5	157.2	127.5
TOTAL REVENUES	468.2	382.0	347.9	338.1	391.1	333.2
NET INCOME	12.9	11.1	10.6	12.7	12.2	5.4
RETURN ON SALES	2.8	2.9	3.0	3.8	3.1	1.6
RETURN ON AVG. ASSETS	6.0	6.2	6.6	8.4	8.6	4.5
TOTAL MARKET VALUE	106.4	78.8	68.4	51.1	58.6	40.8
BOOK VALUE	78.7	69.2	61.0	56.4	45.4	35.0

HANNA MINING COMPANY

INCORPORATED: MARCH 1927, DELAWARE
HEADQUARTERS: CLEVELAND, OHIO

PRINCIPLE MINERALS: IRON, NICKEL

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL	RESERVES/PRODUCTION
GROVELAND OPEN PIT MINE (100%)	IRON	(
PILOT KNOB PELLET CO. (50%)	IRON	(14.2 MILLION TONS
WHITNEY MINE (15%)	IRON	(OF IRON ORE
NATIONAL STEEL CO. (15%)	IRON	(
NICKEL MOUNTAIN MINE (10%)	NICKEL	23.9MM LBS. NICKEL
IRON ORE CO. OF CANADA (27%)		
HOLLINGER NORTH SHORE EXPL. CO. LTD. (40%)		
LABRADOR MINING AND EXPL. CO., LTD. (22.3%)		
NATIONAL STEEL CORP. (5.7%)		
ST. JOHN D'EL REY MINING CO. LTD. (66.3%)		
EXPLORACIONES Y EXPLORTATIONES MINERALES IZABEL SA (20%), BRAZIL		
POCOS DE CALDAS (32%), BRAZIL	ALUMINUM	60,000 T/YR
COMPANIA DE NIQUEL COLUMBIANA SA (33% TO 40%), COLUMBIA		
COLOWYO COAL CO. (50%)	COAL	3 MILLION TON/YR
H-G COAL CO. (50%)	COAL	750,000 TON/YR
OFFSHORE LA., NORTH SEA	OIL & GAS	

FINANCIAL SUMMARY

MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	498.7	478.0	441.5	385.0	396.7	366.8
TOTAL REVENUES	340.4	359.7	386.4	352.9	269.7	220.3
NET INCOME	25.5	45.5	53.8	47.3	20.5	23.6
RETURN ON SALES	7.5	12.6	13.9	13.4	7.6	10.7
RETURN ON AVG. ASSETS	5.2	9.9	13.0	12.1	5.4	6.6
TOTAL MARKET VALUE	268.9	332.7	478.6	394.3	220.9	450.6
BOOK VALUE	360.8	355.2	340.6	292.7	282.2	281.0

HECLA MINING COMPANY

INCORPORATED: JULY, 1898, WASHINGTON
HEADQUARTERS: WALLACE, IDAHO

PRINCIPLE MINERALS: ZINC, LEAD, SILVER

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL	RESERVES
STAR MINE (30%) IDAHO	ZINC, LEAD, SILVER	290,000 TONS
SUNSHINE UNITIZED AREA (33.25%), IDAHO		284,000 TONS
CONSOLIDATED SILVER CORP. (50%), IDAHO	SILVER	
LUCKY FRIDAY (100%), IDAHO	SILVER, LEAD	510,000 TONS
LISBON VALLEY (50%), UTAH	URANIUM	
LAIRD SCHAFT CREEK (100%),CANADA	COPPER, MOLYBDENUM	300,000,000 TONS
LAKESHORE COPPER (50%), AZ	COPPER	472 MM TONS .75% COPPER

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	12.0	121.0	137.8	137.1	102.9	81.6
TOTAL REVENUES	31.1	48.0	35.0	31.8	31.6	20.5
NET INCOME	-96.8	-13.6	-5.4	5.9	8.4	4.2
RETURN ON SALES	-311.7	-28.3	-15.5	18.7	26.7	20.7
RETURN ON AVG. ASSETS	-145.5	-10.5	-4.0	5.0	9.2	5.5
TOTAL MARKET VALUE	35.6	51.0	76.1	94.7	90.2	127.2
BOOK VALUE	-47.3	49.5	62.8	68.3	62.6	54.1

HOMESTAKE MINING COMPANY

INCORPORATED: NOVEMBER, 1877, CALIFORNIA
HEADQUARTERS: SAN FRANCISCO, CA

PRINCIPLE MINERALS: GOLD, URANIUM, COPPER, POTASH, LEAD, ZINC, SILVER

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL	RESERVES/PRODUCTION
BLACK HILLS, SD	GOLD	5,500 TONS/DAY
AMBROSIA, NM (30%)	URANIUM	865,000 TONS .17% U_3O_8
PITCH MINE, CO (85%)	URANIUM	2.3 MM TONS .19% U_3O_8
HOMESTAKE-KEWEENAW, MI (60%)	COPPER	
BUICK, MO (50%)	LEAD, ZINC	26.8 MM TONS 7% LEAD 1.9% ZINC
COMPANIA MINERA DEL MADRIGAL (57%), PERU	COPPER, LEAD, ZINC	903,000 METRIC TONS 1.2% COPPER 2.3% LEAD 5.4% ZINC 2.1 OZ. SILVER
BULLDOG, CO	SILVER, LEAD	480,000 TONS 16.9 OZ SILVER 2.7% LEAD

FINANCIAL SUMMARY

MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	194.1	181.4	166.2	153.4	155.0	130.3
TOTAL REVENUE	170.3	163.4	131.2	121.4	125.7	111.4
NET INCOME	31.0	25.8	21.9	24.2	34.1	23.2
RETURN ON SALES	18.2	15.8	16.7	20.0	27.1	20.8
RETURN ON AVG. ASSETS	16.5	14.9	13.7	15.7	23.9	19.5
TOTAL MARKET VALUE	340.1	412.7	419.3	401.1	406.8	396.1
BOOK VALUE	169.8	153.1	139.9	130.3	122.7	101.2

INCO LTD.

INCORPORATED: JULY 1916, CANADA AS INTERNATIONAL NICKEL COMPANY OF CANADA, LTD., NAME CHANGED, APRIL 1976

HEADQUARTERS: TORONTO, CANADA

PRINCIPLE MINERALS: NICKEL, COPPER, COBALT, PLATINUM, GOLD, SILVER

PRINCIPLE HOLDINGS:

200,000 ACRES OF MINERAL LANDS IN NORTH ONTARIO

COMPANY/PROPERTY	
FROOD-STOBIE MINE, ONTARIO	
CREIGHTON MINE, ONTARIO	
LEVACK MINE, ONTARIO	1977 PRODUCTION
GARSON, ONTARIO	ORE MINED-19 MM T
LEVACK WEST MINE, ONTARIO	NICKEL 312 MM#
COLEMAN MINE, ONTARIO	COPPER 341 MM#
COPPER CLIFF SOUTH MINE, ONTARIO	COBALT 1.6 MM#
LITTLE STOBIE MINE, ONTARIO	GOLD, PLATINUM 438,000 OZ.
SHEBANDOWAN MINE, ONTARIO	SILVER 2.2 MM OZ.
PIPE MINES, MANITOBA	
THOMSAN MINES, MANITOBA	
COTTEN MINE, ONTARIO	
MURRAY CLARABELLE MINE, ONTARIO	RESERVES
COPPER CLIFF NORTH MINE, ONTARIO	6.9 MMT NICKEL
CREAN HILL MINE, ONTARIO	4.3 MMT COPPER
BIRCHTREE MINE, MANITOBA	
SOAB MINE, MANITOBA	

FINANCIAL SUMMARY

MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	4145.6	4075.8	3628.3	3025.7	2796.6	2248.8
TOTAL REVENUES	2172.7	2047.1	2093.3	1746.9	1719.7	1191.1
NET INCOME	77.8	99.9	196.8	186.9	306.0	226.9
RETURN ON SALES	3.6	4.9	9.4	10.7	17.8	19.0
RETURN ON AVG. ASSETS	1.9	2.6	5.9	6.4	12.1	10.5
TOTAL MARKET VALUE	1163.7	1275.5	2424.0	1879.0	1595.1	2623.6
BOOK VALUE	1566.7	1561.6	1562.4	1484.4	1431.5	1244.5

KENNECOTT COPPER CORPORATION

INCORPORATED: MAY, 1915, STATE OF NEW YORK

HEADQUARTERS: NEW YORK, NEW YORK

PRINCIPLE MINERALS: COPPER, MOLYBDENUM, GOLD AND SILVER

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	2617	2659	2309	2224	2209	1977
TOTAL REVENUES	1886	925	956	769	1664	1395
NET INCOME	5	(5)	6	27	169	159
RETURN ON SALES	.002%	NIL	.006%	.035%	.10%	.11%
RETURN ON AVG. ASSETS	0.2%	NIL	0.4%	1.0%	8.1%	8.3%
TOTAL MARKET VALUE	658	738	920	1024	1198	1498
BOOK VALUE	1035	1325	1397	1408	1440	1305

NEWMONT MINING CORPORATION

INCORPORATED: MAY 1921, DELAWARE USA
HEADQUARTERS. NEW YORK CITY, NY

PRINCIPLE MINERALS: GOLD, URANIUM, LEAD, ZINC, COPPER

PRINCIPLE HOLDINGS:

COMPANY	MINERAL	RESERVES(1977)TONS
MAGMA COPPER (100%)	COPPER	1,000,000,000 @ 7% SULPHIDE ORE
CARLIN GOLD MINING CO.(100%)	GOLD	6,166,000 @ .202 OZ/TON
ATLANTIC CEMENT (100%)	-	-
RESURRECTION MINING CO. (100%)	LEAD/ZINC/ SILVER	1,925,000 (5.01% LEAD (10.11% ZINC (2.72 OZ/TON SILVER
FOOTE MINERAL CO.(90.6%)	LITHIUM CARBONATE	28,000,000 LBS/YR.
O'OKIEP COPPER CO. (57.5%) (SOUTH AFRICA)	COPPER/ZINC	26,463,000 1.73% SULFIDE ORE 941,000 1.13% OXIDE ORE
DAWN MINING CO. (51%)	URANIUM	3 MM LBS U_3O_8
TSUMEB CORP. LTD. (29.6%) (SOUTH AFRICA)	COPPER/LEAD/ZINC	-
PEABODY HOLDING CO. (27.5%)	COAL	10 BILLION TONS

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	1198	1180	1178	1129	1077	943
TOTAL REVENUE	704	605	642	556	606	482
NET INCOME	34.1	5.1	48.8	52.9	113.6	103.3
RTN ON SALES	4.8	.84	7.6	9.5	18.7	21.4
RTN ON AVG. ASSETS	2.8	.43	4.2	4.8	11.2	11.5
TOTAL MARKET VALUE	534.1	431.7	695.8	566.3	466.6	774.9
BOOK VALUE	633.7	621.6	652.8	645.5	634.4	560.9

NORTHGATE EXPLORATION LTD.

INCORPORATED: JANUARY 1919, ONTARIO AS KIRKLAND-HUDSON BAY GOLD MINES LTD: NAME CHANGED TO KIRK-HUDSON MINES LTD, MAY, 1956, AND TO PRESENT TITLE DECEMBER, 1958

HEADQUARTERS: TORONTO, ONTARIO, CANADA

PRINCIPLE MINERALS: LEAD, ZINC, COPPER, SILVER

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	49.811	51.293	56.647	57.085	57.780	49.345
TOTAL REVENUES	13.790	21.991	21.209	35.073	41.737	43.229
NET INCOME	.385	-.539	-.597	1.155	4.025	9.120
RETURN ON SALES	2.791	-2.451	-2.814	3.293	9.643	21.096
RETURN ON AVG. ASSETS	.761	-.998	-1.049	2.011	7.514	20.431
TOTAL MARKET VALUE	35.142	28.250	34.453	21.358	18.601	26.962
BOOK VALUE	41.009	42.353	48.778	49.037	49.604	45.076

O'OKIEP COPPER CO. LTD.
(A MAJORITY OWNED AND MANAGED COMPANY
BY NEWMONT MINING CORP - 57.5%)

INCORPORATED: MAY 1937, SOUTH AFRICA
HEADQUARTERS: CAPETOWN, SOUTH AFRICA

PRINCIPLE MINERALS: COPPER, ZINC AND LEAD

COMPANY/PROPERTY	MINERAL	RESERVES/PRODUCTION
CAROLUSBERG MINE	ZINC	(120,000 TONS/MO.
O'OKIEP ZINC (PTY) LTD. (GAMESBERG ZINC PROJECT)		(PRODUCTION (1,947,100 TONS MILLED (IN 1977, GRADE 1.46%
NAMAQ VENTURE W/UNION CORP. (O'OKIEP COPPER & NEWMONT HAVE 50% EACH)		(COPPER, 77,085 TONS (CONCENTRATE, (34% COPPER, 43,088 TONS/ (BLISTER COPPER
SUMEB CORP. LTD. (QV) (9.5%)	COPPER & LEAD	(RESERVES (26,463,000 METRIC TONS (SULPHIDE ORE, AS OF (DECEMBER 1977, GRADE (1.73% COPPER, 941,000 (TONS OXIDE ORE, GRADE (1.13% COPPER

PHELPS DODGE CORPORATION

INCORPORATED: AUGUST, 1885, AS COPPER QUEEN CONSOLIDATED MINING COMPANY: NAME CHANGED MARCH 1917

HEADQUARTERS: NEW YORK, NEW YORK

PRINCIPLE MINERALS: COPPER, URANIUM, FLUORSPAR

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	1916	1860	1774	1652	1493	1269
TOTAL REVENUES	1007	969	942	781	1026	962
NET INCOME	30	16	43	46	113	109
RETURN ON SALES	.02%	.01%	.05%	.05%	.11%	.10%
RETURN ON AVG. ASSETS	1.6	0.9	2.5	3.0	8.1	9.4
TOTAL MARKET VALUE	434	455	845	742	597	968
BOOK VALUE	964	952	894	895	894	818

PLACER DEVELOPMENT, LTD.

INCORPORATED: FEBRUARY 1971, BRITISH COLUMBIA

HEADQUARTERS: VANCOUVER, BRITISH COLUMBIA, CANADA

PRINCIPLE MINERALS: MOLYBDENUM, MERCURY, COAL

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	318.102	304.698	271.292	253.419	241.833	208.108
TOTAL REVENUES	161.550	172.412	132.034	126.970	135.139	161.775
NET INCOME	17.015	18.967	17.959	16.283	43.141	71.810
RETURN ON SALES	10.532	11.000	13.601	12.824	31.923	44.388
RETURN ON AVG. ASSETS	5.464	6.585	6.845	6.575	19.276	36.369
TOTAL MARKET VALUE	270.085	258.906	234.262	222.894	173.075	281.443
BOOK VALUE	195.492	202.482	210.006	201.116	199.003	170.210

ROSARIO RESOURCES CORPORATION

INCORPORATED: NOVEMBER 1880, NEW YORK, NY
HEADQUARTERS. NEW YORK, NY

PRINCIPLE MINERALS: SILVER, LEAD, ZINC, GOLD

PRINCIPLE HOLDINGS

COMPANY	MINERAL	RESERVES (1977) TONS
EL MOCHITO MINE (100%) (HONDURAS)	SILVER/GOLD/ LEAD/ZINC	6,470,000 (4.92 OZ SILVER (.002 OZ GOLD (4.87% LEAD (8.18% ZINC
PUEBLO VIEJO MINE (27%) (DOMINICAN REPUBLIC)	SILVER, GOLD, ZINC/COPPER	22,435,618 (.64 OZ SILVER (.116 OZ GOLD
NEPTUNE MINING CO. (36%) (NICARAGUA)	GOLD/SILVER/ LEAD/ZINC/COPPER	972,000 (.8% LEAD (.42% COPPER (5.76% ZINC (.09 OZ GOLD (.91 OZ SILVER
ALAMO PETROLEUM CO. (100%)	OIL & GAS	
HUAUTLA MINE (49%) (MEXICO)	SILVER	441,812 14.94 OZ
LA LUZ MINES LTD (100%) (NICARAGUA)	GOLD/COPPER	3,284,000 .095 OZ GOLD
CIA (40%) (MEXICO)	SILVER/GOLD LEAD/ZINC/ COPPER	6,179,550 (5.27 OZ SILVER (.006 OZ GOLD (3.7% LEAD (3.9% ZINC (.38% COPPER

FINANCIAL SUMMARY

MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	135.5	107.2	90.0	80.5	64.7	54.5
TOTAL REVENUE	94.0	71.9	69.3	64.1	63.2	47.3
NET INCOME	12.0	7.6	10.6	10.2	12.0	7.1
RTN ON SALES	12.8	10.6	15.3	15.8	19.0	14.9
RTN ON AVG. ASSETS	9.9	7.7	12.4	14.0	20.2	15.2
TOTAL MKT. VALUE	98.9	116.9	114.9	137.9	144.3	124.6
BOOK VALUE	84.5	76.4	58.3	50.1	42.0	31.0

ST. JOE MINERALS CORPORATION

INCORPORATED: MARCH, 1864, NEW YORK, NY
HEADQUARTERS. NEW YORK, NY

PRINCIPLE MINERALS: LEAD, ZINC, SILVER, COAL

PRINCIPLE HOLDINGS:

COMPANY	MINERAL	PRODUCTION 1977
ST. JOE LEAD (100%)	LEAD	17,500 T/D
ST. JOE ZINC (100%)	ZINC	5,000 T/D
COMPANIA MINERA AGUILAR (99.9%) (ARGENTINA)	LEAD/ZINC/ SILVER	1,900 T/D
CIA MINERALES SANTANDER IN (100%) (PERU)	LEAD/ZINC/ COPPER	37,481 T/Y ZINC 2,056 T/Y LEAD 1,999 T/Y COPPER
COQUINA OIL CORP. (100%)	OIL & GAS	
AT MASSEY COAL (100%)	COAL	8.9 MM TONS
CANADIAN SMELTING & REFINING LTD (100%)	SILVER	6 MM OZ.

FINANCIAL SUMMARY
MM$

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	911.8	780.1	659.0	555.9	496.2	309.1
TOTAL REVENUES	810.0	803.8	794.5	745.3	694.7	262.8
NET INCOME	43.6	67.8	68.7	81.7	88.6	31.4
REN ON SALES	5.4	8.4	8.6	10.9	12.7	11.9
REN ON AVG. ASSETS	5.2	9.4	11.3	15.5	22.0	10.8
TOTAL MARKET VALUE	506.1	706.5	884.3	693.4	340.8	303.2
BOOK VALUE	484.3	469.2	415.8	360.5	298.9	198.7

TEXASGULF INC.

INCORPORATED: DECEMBER 1909 AS GULF SULPHUR CO, NAME CHANGED APRIL '72
HEADQUARTERS: STAMFORD, CONNECTICUT

PRINCIPLE MINERALS: SULPHUR, COPPER, LEAD, ZINC, SILVER

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL		RESERVES
KIDD CREEK MINE, ONTARIO		#1	79.3 MM T ORE 2.8% COPPER .23% LEAD 6.19% ZINC 2.37 OZ SILVER
		#2	39.7 MM T ORE 3.0% COPPER .06% LEAD 2.02% ZINC 1.02 OZ SILVER
COOK LAKE, NW TERRITORY			12.2 MM T ORE 2.8% COPPER 13.8% ZINC 1.4% LEAD 2.05 OZ SILVER
AUSTRALIAN INLAND EXPLORATION CO., WEST AUSTRALIA			12-15 MMT 1% COPPER 2.5% LEAD 3.6% ZINC 2 OZ SILVER
PANDORRA, S. AFRICA	CHROMIUM PLATINUM		200 MMT

FINANCIAL SUMMARY
MMS

	1978	1977	1976	1975	1974	1973
TOTAL ASSETS	1514	1478	1373	1156	977	776
TOTAL REVENUES	609	491	491	462	584	369
NET INCOME	50.1	46.3	62.9	103.2	147.4	73.9
RETURN ON SALES	8.2	9.4	12.8	22.4	25.3	20.0
RETURN ON AVG. ASSETS	3.3	3.2	5.0	9.7	16.8	9.9
TOTAL MARKET VALUE	576	695	895	858	785	936
BOOK VALUE	619	605	648	628	560	440

WESTERN MINING CORPORATION LTD.

INCORPORATED: MARCH 1933, VICTORIA, AUSTRALIA
HEADQUARTERS: MELBOURNE, AUSTRALIA

PRINCIPLE MINERALS: NICKEL, ALUMINUM, GOLD, URANIUM, COPPER

PRINCIPLE HOLDINGS:

COMPANY/PROPERTY	MINERAL	RESERVES
GREAT BOULDER SCOTIA MINE (WESTERN AUSTRALIA)		95,100 TONS 1.45% NICKEL 0.09% COPPER 8,080 TONS 13.66% NICKEL 0.66% COPPER
KUNDARRA NICKEL PROJECT (WESTERN AUSTRALIA)		5.5 MM TONS 1.68% NICKEL 2.8 MM TONS 1.10% NICKEL
PEELIRRIE (WEST. AUST.)		32 MM TONS ORE, 46M TONS U_3O_8 0.15% GRADE
KAMBALDA & ST. IVES (W.A.)		22.3 MM TONS 3.19% NICKEL

FINANCIAL SUMMARY
MM$

	1977
TOTAL ASSETS	503
TOTAL REVENUES	198
NET INCOME	15.7
RETURN ON SALES	7.9
RETURN ON ASSETS	3.1
TOTAL MARKET VALUE	168
BOOK VALUE	276

APPENDIX C

MERGER AND ACQUISITION ANALYSIS OF

SELECTED MINERALS COMPANIES

M1 COMPANY

HEADQUARTERS: San Francisco, CAlifornia
INCORPORATED: California, 1877
EMPLOYEES: 2,397
REGISTERED EXCHANGE: New York Stock Exchange

Stock as of December 31, 1979:

	Authorized	Issued
Common Stock	36,000,000	11,337,934
Preferred Stock	4,000,000	0
Number of Equity/ Holders		20,983
Options		130,500
Stock & Stock Equivalents for Dilution		11,350,912

Financial Data For Year Ended December 31, 1979:

Total Revenue - $234.8MM
Net Income $ 61.4MM
Assets - $260.0MM
Equity - $210.7MM
Market Value @ $60/share - $680MM
Market Value @ $70/share - $793MM
Market Value @ $80/share - $906MM

EXPLORATION DIVISION

Mineral Objectives

- Gold
- Silver
- Uranium

EXPLORATION COSTS

1979 - $11.9 MM
1978 - $ 6.5 MM

HEADQUARTERS - San Francisco

FIELD OFFICES

Hard Rock Minerals
. Lakewood, Colorado
. Reno, Nevada
. Lead, South Dakota
. Adelaide, Australia

Energy Minerals
. Albuquerque, New Mexico
. Gunnison, Colorado
. Casper, Wyoming
. Spokane, Washington

233 Corporate Staff Employees
(Thought to be at least 50% Exploration)

Officers of M1

KEY OFFICERS:

Name	Position	12/31/79	Education	Officer
Paul C. Henshaw	Chairman of Board	66	Geologist	19
Harry M. Conger	President & Chief Executive Officer	49	Mining Engr.	4
Richard J. Stoehr	Sr. Vice Pres. Planning & Dev.	52	Mining Engr.	18
James A. Anderson	Vice President Exploration	44	Geologist	4
Kenneth S. Canfield	Vice President Energy	55	Chemical Engr.	1
Thomas J. Connolly	Vice President Gold	45	Mining Engr.	1
Richard R. Hinkel	Vice President Ind. Relations	44	-	5
Martin M. Koffel	Vice President Base Metals	40	-	-
Langan W. Swent	Vice President Engineering	63	Mining Engr.	18
Howard C. Harvey	Treas. & Sec.	57	CPA	16
Charles R. Thurman	Asst. Sec.	51	CPA	3
Jonathan J. Williams	Controller	48	CPA	8

M1 COMPANY
HISTORICAL & FORECASTED FINANCIAL DATA
MILLION $'S

	HISTORICAL				FORECASTED *					
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
SALES	128.8	160.2	163.9	220.2	259.2	305.1	359.1	422.6	497.4	585.5
SALES GROWTH RATE %	10.3	24.4	2.3	34.4	17.7	17.7	17.7	17.7	17.7	17.7
NET INCOME	21.9	25.8	31.0	61.4	57.3	72.0	90.3	113.1	141.5	176.7
PROFIT MARGIN %	17	16	19	28	22	24	25	27	28	30
TOTAL ASSETS	166.2	181.4	194.0	257.0	225.9	271.3	328.3	399.6	488.7	600.1
ROA %	13	14	16	24	25	27	28	38	29	29
CAPITAL EXPEND.	14.7	10.3	11.7	14.3	15.9	18.1	20.6	23.6	27.2	31.4
W/C INCREASE	-3.2	4.6	9.5	31.8	5.9	6.9	8.1	9.5	11.2	13.2
NET CASH FLOW	29.2	3.1	31.2	78.2	29.1	34.3	40.3	47.5	55.9	65.8
DEBT/EQUITY	0	0	0	0	0	0	0	0	0	0

*Premises
1. Discounts Foreign Operations
2. Sales Growth at 17.7T annually
3. EBIT/Sales Ration = .25
4. Capital Expenditures/Sales Ration = .257

Value of M1
1. DCF of Operations = $570MM
2. 1979 Value of Reserves = $6,146MM
3. Market Value @ $70 = $1,191MM
4. Book VAlue = $29 MM

M1 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUE		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
GOLD	82.0	35	20.0	23	3.5	24	51.8	20	38.6
SILVER	19.7	8	11.2	13	0.2	1	11.4	4	98.2
LEAD & ZINC	76.6	33	51.7	60	0.8	6	47.5	18	108.8
URANIUM	42.4	18	14.1	16	8.5	59	47.8	19	29.5
FOREST PRODUCTS	6.7	3	(0.4)	0	0.8	6	9.5	4	(4.2)
CORPORATE	7.5	3	(10.5)	(12)	0.6	4	89.0	35	(11.8)
TOTAL	234.8	100	86.1	100	14.3	100	257.0	100	33.5

M1 PROJECTS

COMPANY	ACRES	LOCATION	%	Product	Depth	Grade
M1 Company	11,700	Black Hills, S.D.	100	Au	<7400'	.211 oz/t.
		Nappa Valley	100	Au	-	-
Kalgoorlie	-	Mt. Charlotte, Austr.	48	Au	-	.146 oz/t.
		Fimiston, Austr.	48	Au	-	.242 0z/t.
(Partnership w/Amax)	32,000	Boss, MO	50	Pb	1400'	6.1%
			50	Zn	1400'	1.6%
UNC-M1 Partners	5,271	Grants, NM	30	U_3O_8	750'	.161%
M1 Company	-	Creede, CO	100	Ag	-	17.3 oz/t.
				Pb	-	2.7%
Compania Minera del Madrigal		Andes, Peru	56	Cu	-	.85%
				Pb	-	2.1%
				Zn	-	5.0%
M1	60,000	Black Hills, S.D.	100	Pine	-	-

SUMMARY BY COMMODITIES	RESERVES	RESERVES @ 1979 VALUE	%
Gold (Au)	6.1MM oz.	$1,866MM	30
Silver (Ag)	6.6MM oz.	73MM	1
Lead (Pb)	6.09 Bil.#	3,170MM	52
Zinc (Zn)	1.71 Bil.#	630MM	10
Copper (Cu)	27.5 MM#	22MM	1
U_3O_8	9.17MM#	385MM	6
		$6,146MM	

Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
3.5MM oz.	$306/oz.	$1094MM	245M oz.	Spot
1.0MM oz.	$306	$306MM	0	-
1.3MM oz.	$306/oz.	$ 414MM	109M oz.	Spot
.3MM oz.	$306/oz.	$ 91MM	0 ('83)	Spot
5.91 Bil.#	52¢/#	$3074MM	197,000 T.	Bunker Hill Asarco
1.55 Bil.#	37¢/#	$ 155MM	73,000 T	Amax
9.17MM#	42$/#	$ 385MM	1.5MM #	L.T. Contract
6.6MM oz.	11$/oz.	$ 72MM	7,486 T.	Spot
120.8MM#	52¢	$10.8MM	-	Asarco
27.5MM#	80¢	$22MM	-	Japan
68. MM#	52¢	$35MM	-	Europe
162 MM#	37¢	$60MM	-	Mexican Smelter thru Peruvian Agency
300 MM Bd.Ft.	-	-	30MM Bd.Ft.	Midwest 1% to M1

M2 COMPANY

HEADQUARTERS: New York, New York
INCORPORATED: Delaware
EMPLOYEES: NA
REGISTERED EXCHANGE: New York Stock Exchange

Stock as of December 31, 1979:

	Authorized	Issued
Common Stock	60,000,000	25,124,953
Preferred Stock	5,000,000	425,285
Common Stock Holders		17,052
Preferred Stock Holders		1,604
Options		277,555
Stock & Stock Equivalents for Dilution		26,568,000

Financial Data For Year Ended December 31, 1979:

Total Revenue	867.5MM	Assets	1,309.7MM
Net Income	178.7MM	Equity	775.9MM
Market Value @$30/share	$753.7MM		
Market Value @$40/share	$1,055MM		
Market Value @$50/share	$1,256MM		
Market Value @$60/share	$1,507.5MM		

Exploration, Research, Engineering

Mineral Objectives	Costs	
-Nonferrous metal	-1979	$23,800,000
-Precious MEtal	-1978	$17,400,000
-Tin		
-Molybdenum		

FIELD OFFICES

Copper & Other Nonferrous Metals
- San Manuel, Arizona
- Danbury, Connecticut
- Vancouver, B. C.
- Republic of South Africa

Energy Minerals
- Houston, Texas
- Ford, Washington

Gold
- Melbourne, Australia
- Carlin, Nevada

Other Interests
- Stamford, Connecticut
- Exton, Pennsylvania
- Tucson, Arizona

M2 OFFICERS

NAME	POSITION	AGE 12/31/79	EDUCATION	YEARS AS OFFICER
Plato Malozemoff	Chairman of Board & Chief Executive Officer	70	-	14
Jack E. Thompson	President; Director	55	-	9
Richard B. Leather	Executive Vice President and Director	48	-	1
Wayne H. Burt	Sr. Vice President Operations & Director	59	-	5
Robert F. Boyce	Vice President, Taxes	47	-	1
David J. Christie	Vice President, Metallurgical Operations	61	-	7
Peter J. Crescenzo	Vice President, Engr.	56	-	6
Richard D. Ellett	Vice President, Expl.	59	-	7
Edward P. Fontaine	Vice President, Fiance	44	-	<1
William A. Humphrey	Vice President, Operations	53	-	4
William L. Johnson	Vice President, Secretary and General Counsel	51	-	1
Robert J. Searls	Vice President, Australia	57	-	16
Harry Van Benschoten	Vice President, Acct.	52	-	<1
Philip C. Walsh	Vice President, Admin.	58	-	6
Christopher S. Hardesty	Treasurer	35	-	<1
Joseph Perry	Controller	44	-	<1

M 2 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUES		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
NONFERROUS METALS	498.2	57	121.2	57	46.6	49	640.7	49	18.9
GOLD	80.5	9	46.8	22	6.4	6	60.3	5	77.6
OIL/GAS	42.0	5	23.5	11	26.9	28	86.2	7	27.3
CEMENT	63.9	7	6.3	3	2.0	2	77.1	6	8.2
URANIUM	12.0	2	4.1	2	5.7	6	18.9	1	21.7
FERROALLOYS LITHIUM CHEMICALS	171.0	20	14.9	7	8.2	9	145.1	11	10.3
CORPORATE	-	-	(3.3)	(2)	-	-	281.4	21	(1.2)
TOTAL	867.6	100	213.4	100	95.8	100	1309.7	100	16.3

M2 PROJECTS

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
Magma Copper Co.							Sufficient for 40 Yrs.		-	61,005 tons/day	-
- San Manuel	-	Arizona	100	Copper	-	.63%		91¢	-	2,374 tons/day	-
- Superior	-	Arizona	100	Copper	-	4.41%		91¢			
Resurrection Mining Co.	-	Colorado	100	Lead	-	3.86%	1,619,000	-	-	-	-
				Zinc	-	7.30%					
				Silver	-	2.01 oz.					
				Gold	-	.07 oz.					
Similkameen	-	British Columbia, Canada	100	Copper	-	.43%	142,379,000	$1.06	-	29,200 tons	-
				Gold	-	-				38,100 oz.	-
				Silver	-	-				138,800 oz.	
Bethlehem Copper Corp.	-	British Columbia, Canada	22.8	Copper	-	.41%	-	-	-	23,400 tons	-
Sherritt Gordon Mines Ltd.	-	Manitoba, Canada	39.9	Nickel	-		-	-	-	32,018,100 lbs.	-
		Alberta, Canada		Cobalt	-					1,333,200 lbs.	
				Copper	-	1.39%				37,300 tons	
				Zinc	-	1.17%				26,500 tons	
				Fertilizer	-					402,800 tons	
Southern Peru Copper Corp.	-	Peru	10.7	Copper	-	1.16%	-	-	92¢	320,853 tons	-
O'okiep Copper Co. Ltd.	-	South Africa	57.5	Copper	-	1.29%	27,251,000 metric tons	-	-	20,800 metric tons	
Tsumeb Corp. Ltd.	-	Southwest Africa	29.8	Lead	-	6.27%	3,543,000 tons	$ .53	-	474,050 metric tons	
				Copper	-	4.38%		$ .87			
				Silver	-	-		$10.03			
Carlin Gold Mining Co.	-	Nevada	100	Gold	-	.186 oz/ton	8,192,000	$309/oz.	-	130,800 t. oz.	
M2 Proprietary Ltd.	-	Australia	100	Gold	-	.36 oz/ton	4,295,000	$325	-	484,000 tons	
M2 Oil Co.	-	North America	100	Oil	-	-	9,761,884	-	-	3,848 barrels	
				Gas	-	-	1,817,173	-	-	33,640 barrels	

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
Peabody Holding Company, Inc.	-	U. S.	27.5	Coal	-	-	-	-	-	60,189,000 tons	-
Dawn Mining Co.	-	Washington	51	U_3O_8	-	.134%	766,000 tons	-	-	381,000 lbs.	-
Atlantic Cement	-	N.Y. & East Coast	100	Cement			-	-	-	-	-
Foote Mineral Co.	-	Eastern U.S.	89.5%	Ferroalloy		-	-	-	-	-	-
				Vanadium		-	-	-	-	-	-
				Lithium Carbonate		-	-	-	-	-	-
Highveld Steel & Vanadium Corp.	-	South Africa	10.4	Iron		-	-	-	-	716,500 tons	-
				Steel		-	-	-	-	751,900 tons	-
				Rolled Product		-	-	-	-	599,700 tons	-
				Vanadium Slag		-	-	-	-	53,000 tons	-

M3 COMPANY

HEADQUARTERS: Cleveland, Ohio
INCORPORATED: Delaware
EMPLOYES: 10,874
REGISTERED EXCHANGE: New York Stock Exchange

Stock as of December 31, 1970:

	Authorized	Issued
Common Stock	13,500,000	8,942,550
Preferred Stock		-
Number Equity/Holders		4,438
Options		115,000
Stock & Stock Equivalents for Dilution		NA

Financial Data For Year Ended December 31, 1979:

Total Revenue	$408.912MM	Assets	$565.524MM
Net Income	$ 54.600MM	Equity	$397.145MM
Market Value @$20/share	$178.9MM		
Market Value @$30/share	$268.3MM		
Market Value @$40/share	$357.7MM		
Market Value @$50/share	$447.1MM		

Exploration Division

Mineral Objectives
- Mine and process copper ore
- Coal
- Magnesium Minerals

Headquarters: Cleveland, Ohio

Field Offices

Minerals
. Cleveland, Ohio
. London, England
. Riddle, Oregon

Marine Services
. Greenwich, Connecticut
. Philadelphia, Pennsylvania
. Cleveland, Ohio

M3 OFFICERS

NAME	POSITION	12/31/79	EDUCATION	OFFICER
R. F. Anderson	President & Chief Executive Officer	58	-	1
J. E. Courtney	Exec. Vice President	48	-	1
C. E. Nickels, Jr.	Exec. Vice President	49	-	1
F. Heller	Sr. Vice President Sales & Transportation	47	-	4
F. H. Lee	Sr. Vice President, Operations	60	-	4
L. H. Carlson	Vice President and Comptroller	58	-	4
G. M. Humphrey, II	Vice President, Sales	38	-	2
B. M. Monaghan	Vice President, Technical Services	54	-	1
D. K. Nelson	Vice President, International Operations	53	-	2
J. A. Nordine	Vice President, Lands & Leases	60	-	2
J. S. Pyke, Jr.	Vice President & Secretary	41	-	1
G. A. Siler	Vice President, Energy Resources	53	-	1
R. R. Smith	Vice President, Domestic Operations	51	-	1
L. C. Van Hoeven, Jr.	Treasurer	43	-	<1

M3 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUES		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
IRON ORE	354.9	75	66.4	77	NA	NA	383.9	87	17
FERRONICKEL	68.5	14	9.8	11	NA	NA	27.1	6	36
OTHER	53.1	11	10.5	12	NA	NA	29.5	7	36
TOTAL	476.5	100	86.7	100	NA	NA	440.5	100	19

M3 PROJECTS

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
M3 Co-Groveland Mine	-	Michigan	100	Iron Ore Pellet Plt.			-	-	-	2,017	-
M3 Co.-Butler Taconite Proj.	-	Minnesota	37.5	Iron Ore Pellets			-	-	-	2,552	-
National Steel Pellet Co.	-	-	15	Iron Ore Pellets			-	-	-	5,368	-
Pilot Knob Pellet Co.	-	Missouri	50	Iron Ore Pellets			-	-	-	750	-
Iron Ore of Canada	-	Carol Lake, Labrador	26.77	Pellets Concentrates			-	-	-	10,123	-
M3 Co. Smelter	-	Oregon	100	Ferronickel			20 years	-	-	8,077	U.S. Abroad
M3 Co.-Mine/Smelter	-	Washington	100	Silicon Metal Ferosilicon			-	-	-	21,788,000 lbs.	-
Australian M3,Ltd.	-	Inc./Delaware	100				-	-	-	33,775,000 lbs.	-
Coastal Mining Co. of CA	-	Inc./Delaware	100								
Dartmouth Shipping Co.	-	Liberia	100								
M3-Itasca Co.	-	Delaware	100								
M3 Mines Co.	-	Delaware	100								
M3 Nickel Smelting Co.	-	Delaware	100								
M3 Petroleum Co.	-	Delaware	100								

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
M3 (P-K) Co.	-	Delaware	100	-	-	-					
Hanwest, Inc.	-	Delaware	100	-	-	-					
Iverness Shipping Co.	-	Liberia	100	-	-	-					
Lower Lake Dock Co.	-	Ohio	100	-	-	-					
Ohio Western Pennsylvania Dock Co.	-	Ohio	100	-	-	-					
Pennsylvania Tidewater Dock Co.	-	Delaware	100	-	-	-					
Trimor Shipping Co.	-	Liberia	100	-	-	-					
Western M3, Inc.	-	Delaware	100	-	-	-					
Well Tech, Inc.	-	Delaware	50	-	-	-					
Colowys Coal Co.	-	-	50	-	-	-					
Labrador Mining & Exploration Company, Ltd.	-	Newfoundland	20	-	-	-					
St. John d'el Rey Mining Company, Ltd.	-	England	64.78	-	-	-					

M4 COMPANY

HEADQUARTERS: Wallace, Idaho
INCORPORATED: Washington, 1898
EMPLOYEES: 721
REGISTERED EXHCANGE: New York Stock Exchange

Stock as of December 31, 1979:

	Authorized	Issued
Common Stock	20,000,000	6,988,959
Preferred	1,000,000	25,532
Number Equity/Holders		13,647
Options		-
Stock & Stock Equivalents for Dilution		NA

Financial Data for Year Ended December 31, 1979:

Total Revenue	$64.1MM	Assets	$32.1MM
Net income	$35.2MM	Equity	$(9.6)MM
Market Value @$30/share	$209.6MM		
Market Value @$40/share	$279.6MM		
Market Value @$50/share	$349.4MM		
Market Value @$60/share	$419.3MM		

Exploration Division

Mineral Objectives	Exploration Costs
- Silver	1979 - $249,715
- Lead	1978 - $677,806
- Zinc	
- Uranium	

Headquarters: Wallace, Idaho

FIELD OFFICES

Hard Rock Minerals
. Mullan, Idaho
. Burke, Idaho

M4 OFFICERS

NAME	POSITION	12/31/79	EDUCATION	OFFICER
William A. Griffith	President & Chief Executive	57	-	1
William J. Grismer	Vice President-Finance & Secretary-Treasurer	50	-	7
Thomas T. Giles	Asst. Treasurer and Controller	49	-	12
Arthur Brown	Manager of Operations	-	-	-
Wallace E. Crandall	Chief Engineer	-	-	-
Philip M. Lindstrom	Manager of Public & Stockholder Relations	-	-	-
Gus Voltolini	Personnel Manager	-	-	-

M4 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUES		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
SILVER	42.7	67	NA	NA	NA	NA	NA	NA	NA
LEAD	18.5	29	NA	NA	NA	NA	NA	NA	NA
OTHERS	2.5	4	NA	NA	NA	NA	NA	NA	NA
TOTAL	63.7	100	NA	NA	NA	NA	NA	NA	NA

M4 PROJECTS

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
M4 Company -Lucky Friday Mine	-	Coeur d'Alene District-Idaho	100	Silver Lead Zinc	5080'	16.4 Oz/ton 11.5% 1.5%	567,000 tons	$11.09 52.64	-	175,900 tons (4% of production from Hunter property-Day Mines has 50% int	
M4 Company -Star-Morning Unit Area	-	Coeur d'Alene District-Idaho	30	Silver Lead Zinc	8172'	2.8 oz/ton 4.9% 6.4%	456,000 (Hecla's 30%)	$11.09 52.64 37.30	- - -	284,100 tons=Total 85,200 (Hecla's 30%)	
Sunshine Mining Company	-	-	33.25	Silver	5400'	21.6 oz/ton	409,000 tons (Hecla's 33.25)	-	-	51,100 tons (Hecla's 33.25%)	Asarco
Granduc Mines, Ltd.	-	British Columbia Canada	35.4	-	-	-	-	-	-	-	-
Libson Valley Project-50% Union Carbide-50%	-	Utah	50	Uranium vanadium	785'		250 tons/day >10 yrs. life	- -	- -	scheduled-1981	
Consolidated Silver Corp.	-	Idaho	50	Silver Copper	5524'	20 oz/ton .5%	67,000 tons	-	-	not in production	
Accoli	-	Idaho	100	-	-	-	-	-	-	-	
M4 Mining Co.of Canada	-	Canada	100	-	-	-	-	-	-	-	

M5 COMPANY

HEADQUARTERS: Houston, Texas
INCORPORATED: Delaware, 1956
EMPLOYEES: 4,955
REGISTERED EXCHANGE: New York Stock Exchange

Stock as of December 31, 1979:

	Authorized	Issued
Common Stock	20,000,000	7,188,896
Preferred Stock	4,000,000	1,918,430
Number Equity/Holders		17,682
Options		737,019
Stock & Stock Equivalents for Dilution		8,972,000

Financial Data For Year Ended December 31, 1979:

Total Revenue	$510.01MM	Assets	$507.62MM
Net Income	$13.99MM	Equity	$167.33MM
Market Value @$10/share	$71.88MM		
Market Value @$20/share	$143.78MM		
Market Value @$30/share	$215.67MM		
Market Value @$40/share	$287.56MM		

Exploration Research & Development Division

Objectives	Exploration Costs
- Lithium	1979 - $11,125,000
- Explosives	1978 $ 7,064,000
- Oil & Gas	
- Clays	

Headquarters: Houston, Texas

FIELD OFFICES

Hard Rock Minerals
. Kellogg, Idaho
. Houston, Texas
. Gastania, North Carolina
. Las Vegas, Nevada
. Hong Kong, B.C.C.

Energy Minerals
. Clarian, Pennsylvania
. Houston, Texas

Chemicals
. Salt Lake City, Utah
. Ogden, Utah

M5 COMPANY

NAME	POSITION	12/31/79	EDUCATION	OFFICER
Robert H. Allen	Chairman of Board Directors & Chief Executive Officer	52	-	5
Frank G. Woodruff	President & Chief Operating Officer and Director	63	-	5
Donald P. deBrier	Vice President & General Counsel & Director	40	-	4
William M. Wolf	Sr. Vice President	63	-	4
Gene M. Baker	Vice President, Environmental Affairs	47	-	2
Robert E. Bowman	Vice President & Executive Asst to Chairman of Board	52	-	1
Robert H. Gow	Vice President, Planning & Corporate Develpment	46	-	1
Robert E. Holt	Vice President, Expl.	53	-	5
Donald M. Rose	Vice President, Controller	44	-	8
Arthur M. Ureck	Vice President, Finance and Treasurer	53	-	13
Jack M. Webb	Vice President, Government Relations	44	-	2
Jose Diaz de Leon	Assistant Treasurer	47	-	2
Jerry T. Northcutt	Asst. Controller-Acct.	33	-	6
Elsee D. Wilson	Corporate Secretary & Asst. General Counsel	29	-	2

M5 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUES		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
COAL	119.5	24	15.9	34	14.3	29	96.5	23	16
SILVER, LEAD ZINC	228.9	45	14.0	30	4.1	8	153.9	36	9
LITHIUM	54.4	11	12.9	28	4.9	10	40.0	9	32
INDUSTRIAL EXPLOSIVES	49.0	10	4.2	9	3.7	7	33.8	8	12
FERTILIZERS & SALT	26.4	5	2.3	5	4.9	10	31.7	7	7
OIL & GAS	7.9	1	1.7	4	16.9	34	28.3	7	6
SPECIALTY CLAYS	2.1	1	(2.1)	(5)	0.5	1	9.7	2	(22)
ENGINEERING & SERVICES	16.7	3	(2.6)	(5)	0.7	1	32.3	8	(8)
TOTAL	504.9	100	46.3	100	50.0	100	426.2	100	11

M5 PROJECTS

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
M5	103M	Pennsylvania	100	Coal	7100'	-	65 MM Tons	$27.11/ton	-	5.9 MM Tons	Utilities Industries
Bunker Hill Co.	-	Idaho		Silver	-	2.5 oz/ton	2.07 MM tons	-	-	8.7 MM oz	Commodity Exchange
				Lead	-	3.0%		.53¢	-	10 M tons	
				Zinc	-	2.9%		.37¢	-	22 M tons	
				Cadmium	-	-				592 M lbs.	
M5 Exploration Co.	-	TN, MO, NC	100	-	-	-					
Industrial Mineral Ventures	-	NV, CA	100	Clays	-	-					
Lithium Corp. of America	-	NC	100	Lithium	-	1.48%				550 M tons	Pharm., rubber, plastic elect. etc. Independen s-term contracts
IRECO	-	UT	100	Explosives	-	-					
Great Salt Lake Minerals and Chemical Corp.	-	UT	100	Sulfate of Potash-fertlizer		-				180 M tons	Worldwide chem. paper & detergent industries
				Common Salt						603 M tons	
Pend Oreille Oil & Gas Co.	73,797	LA, TX, CA	100	Oil		-	475.5 M barrels	$14.62 bbl.		112 M barrels	
				Gas			17.2 MM Mcf	$ 2.50 Mcf			
Black, Sivalls & Bryson Co.	-	TX, London, Paris, Mexico, France, Canada, Japan, Great Britain	100	Engineering & Contract Services for oil & GAs		-					Worldwide
Bethlehem Copper Corp.	-	British Columbia1	26	Copper	-	.42%					
				Molybdenum	-	.003%					

M6 COMPANY

HEADQUARTERS: New York, New York
INCORPORATED: New Jersey, 1899
EMPLOYEES: 12,700
REGISTERED EXCHANGE: New York Stock Exchange

Stock as of December 31, 1979:

	Authorized	Issued
Common Stock	40,000,000	31,478,223
Preferred Stock	10,000,000	-
Number Equity/Holders		42,400
Options	1,007,094	335,767
Stock & Stock Equivalents for Dilution	-	-

Financial Data For Year Ended December 31, 1979

Total Revenue	$1,724.2MM	Assets	$1,969.7MM
Net Income	$259.1MM	Equity	$1,130.7MM
Market Value @$20/share	$629.560MM		
Market Value @$30/share	$944.35MM		
Market Value @$40/share	$1,259.10MM		
Market Value @$50/share	$1,573.90MM		

Exploration Division

Objectives	Exploration Costs
- Silver	1979 - $10.7MM
- Zinc	1978 - $8.0MM

Headquarters: New York, NY

FACILITIES

Minerals
- Sahuarita, Arizona
- Silver Bell, Arizona
- Vanadium, New Mexico
- Troy, Montana
- Peru
- Jefferson, Tennessee

Smelters & Refineries
- Amarillo, Texas
- El Paso, Texas
- Hayden, Arizona
- Tacoma, Washington
- Easts Helena, Montana
- Glover, Missouri
- Omaha, Nebraska
- Denver, Colorado

Recycling
- Houston, Texas
- Ontario, Canada
- Newark, New Jersey
- San Francisco, CA
- Sand Springs, Oklahoma
- Whiting, Indiana

Chemicals
- Omaha, Nebraska
- Tacoma, Washington
- Denver, Colorado
- Chicago, Illinois
- West Haven, Connecticut
- Columbus, Ohio
- Hayden, Arizona
- Hillsboro, Illinois
- Corpus Christi, Texas

M6 OFFICERS

NAME	POSITION	12/31/79	EDUCATION	OFFICER
Charles F. Barber	Chairman of Board & Chief Executive Officer	63	-	21
Ralph L. Hennebach	President	59	-	17
Richard deJ Osborne	Executive Vice President	45	-	5
A. J. Gillespie, Jr.	Sr. Vice President, Secretary & Gen. Counsel	56	-	11
K. D. Loughridge	Sr. Vice President	64	-	10
G. W. Anderson	Vice President (ore)	46	-	3
F. W. Archibald	Vice President	60	-	12
W. A. Bennis	Vice President (Purch.)	50	-	2
J. C. Buck	Vice President (Sales)	55	-	8
R. A. Kenkel	Vice President (Recycling)	60	-	11
F. L. Merwin	Vice President (Traffic)	62	-	16
M. J. Messel	Vice President (Asbestos)	65	-	6
R. J. Muth	Vice President	46	-	3
K. W. Nelson	Vice President (Environmental Affairs)	62	-	7
T. C. Osborn	Vice President (Expl.)	52	-	2
Dr. W. P. Roe	Vice President (Research)	56	-	6
D. H. Soutar	Vice President (Industrial Relations & Personnel)	61	-	17
N. Visnes	Vice President (Mining)	63	-	5
S. P. McCandless	Treasurer	38	-	1
F. R. McAllister	Controller	37	-	2
H. E. Kelshaw, Jr.	General Auditor	54	-	13

M6 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUES		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
PRIMARY METALS	1353.6	79	143.0	45	56.2	80	997.8	51	14.3
RECYCLING	164.2	10	(5.9)	(2)	0.9	1	39.1	2	(15.1)
ASBESTOS	108.4	6	20.3	7	6.0	9	76.4	4	26.6
COAL	54.2	3	(2.3)	(1)	3.5	5	81.3	4	(2.8)
OTHER	59.8	3	3.5	1	3.2	5	41.9	2	8.4
CORPORATE	(15.8)	(1)	158.2	50	0.1	-	733.2	37	21.6
TOTAL	1724.4	100	316.8	100	69.9	100	1969.7	100	16.1

M6 PROJECTS

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
M6 Company	-	Idaho	50	Silver	-	20 oz/ton*	2,554,000			6,514,000 oz.	
-Mining				Copper	-	.67%*				2,205 tons	
M6 Company	-	Texas									
-smelting & refining		-	-	Silver	-	-				36,101,000	
M6-Company											
-Mission Mine	-	Arizona	100	Copper	-	.69%	96,028,000 tons			28,000 tons	
-Eisenhower Mine	-	Arizona	M6-Anamax	Copper	-	.35%	152,814,000 tons			12,100 tons	
-San Xavier	-	Arizona	100	Copper	-	.85%	164,152,000 tons			5,700 tons	
-Silver Bell	-	Arizona	100	Copper	-	.66%	21,246,000 tons			21,800 tons	
-Sacaton	-	Arizona	100	Copper	-	.65%	28,401,000 tons			21,400 tons	
-Qureuvilca	-	Arizona	100	Copper	-	1.50%	3,998,000 tons			4,100 tons	
M6-Company											
-Smelting & Refining	-	-	-	Copper							
M6-Company											
-Buchans			49	Lead, Zinc	-	6.51%, 11.64%				6,800, 11,200 tons	
-Ground Hog			100	Lead, Zinc	-	- -				- -	
-Leadville			50	Lead, Zinc	-	3.86%, 7.3%				6,000, 9,600 tons	
-Park City			100	Lead, Zinc	-	- -				- -	
-Quiruvilca			100	Lead, Zinc	-	1.51%, 3.74%				3,700, 9,100 tons	
-Tennessee			100	Lead, Zinc	-	- , 2.55%				- , 38,000 tons	
M6 Company											
-Smelting & Refining	TX,MT,NE, MI			Lead							
M6 Company				Gold						18,210 oz.	
Federated Metals Corp.			100	Various							
Lacd 'Amiante du Quebec - Black Lake Mine	Quebec, Canada		100	Asbestos	-	3.52%	101,384,000 tons			163,800 tons	

* Average

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
M6-Midland Coal Co.		Illinois	100	Coal			25,500,000 tons			1,904,000 tons	Public Utilities
Enthone, Inc.		Conn., Ill.	100	Chemicals							
M6		N.J.	100	Ilmeite		2.7%	25,700,000 tons			181,000 tons	Single Customer
American Limestone		TN, Ill.	100	Limestone, Sand, Concrete			> 15years				S.E. United States
Sun Solector Corp.		NJ	100	Solar Equip.							

M7 COMPANY

HEADQUARTERS: New York, New York
INCORPORATED: New York, 1864
EMPLOYEES: NA
REGISTERED EXHCANGE: New York Stock Exchange

Stock as of December 31, 1979:

	Authorized	Issued
Common Stock	60,000,000	23,250,214
Preferred Stock	2,000,000	-
Number Equity/Holders		NA
Options		165,200
Stock & Stock Equivalents for Dilution		NA

Financial Data For Year Ended December 31, 1979:

Total Revenue	$1,148.1MM	Assets	$1,111.6MM
Net Income	$77.6MM	Equity	$568.2MM
Market Value @$20/share	$465.0MM		
Market Value @$30/share	$697.5MM		
Market Value @$40/share	$930.0MM		
Market Value @$50/share	$1,162.5MM		

Exploration Division

Mineral Objectives
- Coal
- Nickel-zinc
- Lead
- Gold
- Silver
- Tungsten
- Uranium
- Diamonds
- Copper

Exploration Costs
1979 - $15.9MM
1978 - $13.1MM

Headquarters: New York, NY

FIELD OFFICES

Hard Rock Minerals
. Clayton, Missouri
. Pittsburgh, Pennsylvania
. New York, New York
. Buenos Aires, Argentina
. Santiago, Chile
. Lima, Peru
. Danbury, Connecticut
. Sydney, Australia

Energy Minerals
. Richmond, Virginia
. Jasper, Tennessee
. Calgary, Alberta
. Midland, Texas
. New York, New York

M7 OFFICERS

NAME	POSITION	12/31/79	EDUCATION	OFFICER
John C. Duncan	Chairman of Board & Chief Executive Officer	-	-	-
D. Broward Craig	President	-	-	-
Charles E. Barnett	Vice President, General Counsel & Secretary	-	-	-
James L. Broadhead	Vice President - Zinc	-	-	-
Charles R. Carlisle	Vice President	-	-	-
R. V. Cronin	Vice President	-	-	-
John W. Hanselman	Vice President, Admin.	-	-	-
John C. Harned	Vice President	-	-	-
Marvin E. Lane	Vice President, Mining	-	-	-
John T. Leyden	Vice President, Taxes	-	-	-
L. Chase Ritts, Jr.	Vice President, Petroleum	-	-	-
Joseph G. Sevich	Vice President, Technology	-	-	-
Thomas N. Watthier	Vice President, Expl.	-	-	-
Leroy K. Wheelock	Vice President	-	-	-
John A. Wright	Vice President, Lead	-	-	-
Harold T. Read	Controller	-	-	-
Robert A. Sherman	Treasurer	-	-	-
John T. Afton	Assistant Secretary	-	-	-
Joseph J. Grzymski	Asst. Vice President Dir. of Corp. Auditing	-	-	-
Paul Kershon	Assistant Controller	-	-	-
C. Patrick Sharpe	Assistant Treasurer	-	-	-

M7 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUES		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
COAL	618.0	54	17.8	9	59.9	29	343.1	31	5.2
LEAD	243.8	21	140.7	72	7.1	3	119.3	11	117.9
ZINC	146.3	13	(1.5)	(1)	6.9	3	146.8	13	(1.0)
OIL & GAS	53.8	5	19.6	10	107.2	51	330.3	30	5.9
INTERNATIONAL MINERALS	70.0	6	19.5	10	28.3	13	144.0	13	13.5
OTHER	16.1	1	(.6)	-	1.4	1	25.1	2	(2.4)
TOTAL	1148.0	100	195.5	100	210.8	100	1108.6	100	17.6

M7 PROJECTS

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
M7 Petroleum Corp.		International	100	Oil & Gas							
Candel Oil Ltd.		Canada	92	Oil & Gas							
Coquina Oil Corp.		Domestic	100	Oil & Gas			oil-2,600,000 barrels gas-62.8 bil. cubic ft.				
M7 -A.F. Massey Coal Groups		W.Va., Kentucky Tennessee	100	Coal		<1% Sulphur	900,000 tons			12,800,000 tons	Utility
M7 Lead Co.		Missouri	100	Lead		5.36%	59MM tons	.48¢/lb.		224,091,000 tons	
M7		NY	100	Zinc						185,000 tons	
M7 -Compania Minera Aguilar		Argentina	100	Zinc lead, silver			80,700 tons 42,500 tons				
Energy Research Corp.		Connecticut	80	High-Tech Research							
Mansfield Carbon Products		Tennessee	100	Research							

M8 COMPANY

HEADQUARTERS: Stamford, Connecticut
INCORPORATED: NA
EMPLOYEES: 5,906
REGISTERED EXCHANGE: New York Stock Exchange

Stock as of December 31, 1979:

	Authorized	Issued
Common Stock	45,000,000	35,292,497
Preferred Stock	5,000,000	2,999,900
Number Equity/Holders		56,851
Options		190,250
Stock & Stock Equivalents for Dilution		NA

Financial Data For Year Ended December 31, 1979:

Total Revenue	$801.6MM	Assets	$1,648.0MM
Net Income	$136.9MM	Equity	$870.4MM
Market Value @$20/share	$705.8MM		
Market Value @$30/share	$1,058.8MM		
Market Value @$40/share	$1,411.7MM		
Market Value @$50/share	$1,764.6MM		

Exploration Division

Mineral Objectives
- Coal
- Sulphur
- Gold
- Copper
- Uranium
- Zinc
- Lead

Exploration Costs
1979 - $23.4MM
1978 - $17.8MM

Headquarters: Stamford, Connecticut

FIELD OPERATIONS

Chemicals
. Raleigh, North Carolina
. Aurora, North Carolina
. Moab, Utah
. Granger, Wyoming
. Newgulf, Texas
. Calgary, Alberta

Hard Rock Minerals
. Toronto, Ontario
. Timmins, Ontario
. Golden, Colorado

Energy Minerals
. Houston, Texas

Forest Products
. Johnsonburg, Pennsylvania

M8 OFFICERS

NAME	POSITION	12/31/79	EDUCATION	OFFICER
Charles F. Fogarty	Chairman of Board & Chief Executive Officer	58	-	7
Richard D. Mollison	Vice President of Board	63	-	1
Gino P. Giusti	President & Director	52	-	<1
P. Ray Clarke	Sr. Vice President & Pres. M8 Metals Company	61	-	2
Frank J. Claydon, Jr.	Vice President of M8 Chemicals Company	45	-	<1
Frank R. Moulton, Jr.	Vice President & Pres. M8 Oil & Gas Company	55	-	2
Robert J. Boyle	Vice President, Research, Engr. & Construction	50	-	<1
David M. Crawford	Secretary	64	-	16
David C. Edmiston, Jr.	Vice President, Special Projects	49	-	2
John W. Hall, Jr.	Vice President, Business Development	58	-	<1
Earl L. Huntington	Vice President and General Counsel	50	-	6
Kenneth J. Keetz	Vice President, International Division	53	-	7
George W. Mannard	Vice President, Minerals Expl. Division	47	-	1
Gordon N. McKee, Jr.	Vice President and Treasurer	49	-	8
Walter F. Meyer	Vice President and Controller	54	-	8
Leo J. Miller	Vice President and Asst. to Chairman	55	-	1
F. Wayne White	Vice President, Employee Relations & Administration	51	-	2

M8 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUES		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
CHEMICALS	464.1	59	130.2	58	44.6	27	763.7	46	17.1
METALS	298.8	38	109.2	49	68.3	41	637.7	39	17.1
OIL & GAS	23.6	3	1.4	1	51.1	31	97.7	6	1.4
OTHER	2.8	-	(17.8)	(8)	1.0	1	149.0	0	(12.0)
TOTAL	789.3	100	223.0	100	165.0	100	1648.1	100	13.5

MB PROJECTS

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
MB-Chemicals	50,000	N.C.	100	Phos. Rock	130'	13%	2.2MMM			3.85MM	
				Phos. Acid						1.27MM	
				Phos. Fertz.						668M	
				Feed Grade Phos.						96M	
		TX, Mexico		Sulphur			16.3MM			2.2M	Industrial Customers
		Wyoming		Soda Ash				$63.67		937M	
		UT, Saskatchean		Potash		26%	798MM	$56.34		702M	
MB-Metals Co. -Canada Ltd.		Ontario	100	Zinc	3000'	5.13%	101MM tons			342M Tons	Europe-Japan
				Silver		1.93 oz/ton				6.9MM oz.	Canada-U.S.
				Copper		2.82%				285.9M	Canada-U.S.
				Lead		.18%				13.7M	U.S.
MB-Oil & Gas Co.	295,164 (U.S.)	TX, OK, WY, Alberta, LA	100	Oil			3.9MM barrels			340M barrels	Local
				Gas			165.5 Bill. cubic ft.			15 bil. cu. ft.	
				Gas Liquid						2MM gal.	
Tomahawk Coal Mine		CO	100				11MM tons			73M tons	
Forest Products Div.	260,000	PA, Ontario		Timber						7.9MM board'	
Partnership w/Hancock and Wright		Australia	50%	Iron		62.2%					
				Phosporous		.06T					
				Silica		2.90%					
				Alumina		1.96%					
Robe River Operation		Australia	10.5%	Iron ore sinter fines			220MMT			1.0MM	Japan, Europe
				Iron ore pellets						3.5M	
MB & Silver King Mines		Iron Dyke,ID	50	Copper		2.7%					
				Gold		.25 oz/ton	325M tons				
				Silver		.7 oz/ton					

M9 COMPANY

HEADQUARTERS: New York, New York
INCORPORATED: Delaware
EMPLOYEES: 2,400
REGISTERED EXHANGE: NEw York Stock Exchange

Stock as of December 31, 1979:

	Authorized	Issued
Common Stock	40,000,000	22,575,659
Preferred Stock		-
Number Equity/Holders		28,011
Options		116,099
Stock & Stock Equivalent for Dilution		NA

Financial Data For Year Ended December 31, 1979:

Total Revenue	$487.7MM	Assets	$683.1MM
Net Income	$101.4MM	Equity	$379.9MM
Market Value @$50/share	$1,128.8MM		
Market Value @$60/share	$1,354.5MM		
Market Value @$70/share	$1,508.3MM		
Market Value @$80/share	$1,806.1MM		

Exploration Division

Objectives	Exploration Costs
- oil & gas	1979 - $33.1MM
	1978 - $28.4MM

Headquarters: New York, NY

FIELD OFFICES

NA

M9 OFFICERS

NAME	POSITION	12/31/79	EDUCATION	OFFICER
Benno C. Schmidt	Chairman of Board	67	-	5
Paul W. Douglas	President	53	-	5
Robert D. Duke	Sr. Vice President & General Counsel	51	-	6
Nils A. Kindwall	Sr. Vice President	56	-	6
David L. Marshall	Sr. Vice President	41	-	1
Milton H. Ward	Sr. Vice President	47	-	3
William J. Byrne, Jr.	Vice President	49	-	11
Ronald Grossman	Vice President	43	-	3
L. A. Nelson, Jr.	Vice President	59	-	11
Albert F. Rothwell	Vice President	53	-	7
Edward C. Stebbins, Jr.	Vice President	50	-	10
David H. Knutson	Secretary	45	-	5
Louis A. Clinton	Treasurer	43	-	2
Robert A. Kinsley	Controller	55	-	2

M9 COMPANY
1979 OPERATING DIVISIONS

DIVISION	REVENUES		EARNINGS		ADDITIONS TO PROPERTY		IDENTIFIABLE ASSETS		ROA
	$MM	%	$MM	%	$MM	%	$MM	%	%
AGRICULTURAL MINERALS	372.9	77	84.3	69	29.9	24	218.9	32	38.5
OIL & GAS	35.9	7	(3.1)	(3)	77.5	63	155.1	23	(2.0)
URANIUM OXIDE	29.2	6	11.2	9	1.7	1	35.9	5	31.2
OTHER	49.7	10	31.1	25	14.5	12	273.2	40	11.4
TOTAL	487.7	100	123.5	100	123.6	100	683.1	100	18.1

M9 PROJECTS

COMPANY	ACRES	LOCATION	%	PRODUCT	DEPTH	GRADE	Proven & Probable Reserves	Avg. 1979 Price	Reserves @ 1979 Value	1979 Production	Primary Market
M9		LA	100	Sulphur		23%	16.6MM	$130/ton		2.4MM tons	Dom. Industry
M9		LA		Phos. Acid			18.5MM tons	$385/ton		>750M tons	Dom. Industry
National Potash Co.		NM	100	Potassium	1700'	14.9%	26.9MM tons			334M tons	Dom. L-term Contr.
M9	1,080	Continental		Oil			859M bbls.	$1.86/McF		307M bbls.	
	33,022	U.S.		Natural Gas			105,207(MMcF	$14.12/barrel		16,943 (MMcF)	
M9-Kaolin Co.		GA	100	White Clay							paper, paint,Plastic In
M9-Indonesia		Indonesia	81	Copper				90¢/lb.		112MM lbs.	
				Gold				$292/oz.		52M oz.	
				Silver				$9.67/oz.		608M oz.	
M9-Queensland Nickel			50	Nickel						45MM lbs	
				Cobalt						3M lbs.	
M9-Uranium		LA	100	Uranium						619M lbs.	

BIBLIOGRAPHY PART I - MERGERS AND ACQUISITIONS

1-
TITLE UNITED TECHNOLOGIES' MASTER PLAN.
AUTHOR EHRBAR, A.F.
SOURCE FORTUNE, VOL.102, NO.6, SEPT. 22, 1980, P. 97-98.
ABSTRACT THE MANAGEMENT STRATEGY OF HARRY GRAY, CHAIRMAN OF UNITED TECHNOLOGIES, IS DESCRIBED. AREAS EMPHASIZED INCLUDE RESEARCH AND DEVELOPMENT, ACQUISITION STRATEGY AND EXECUTIVE PERSONNEL.

2-
TITLE DIGESTION TIME.
AUTHOR ANON
SOURCE FINANCIAL WORLD, VOL.149, NO.12, JUNE 15, 1980, P. 40-41.
ABSTRACT THE MANAGEMENT STRATEGY OF THE TIMES MIRROR CO., FEATURING MAJOR ACQUISITIONS OVER THE LAST THREE YEARS, IS DETAILED. THEY PLAN TO STAY IN THE MEDIA-COMMUNICATIONS AREA. THE PURCHASE OF THE HARTFORD COURANT IS EMPHASIZED.

3-
TITLE CHARTER CO.'S CHANCY DREAM.
AUTHOR ANON
SOURCE FORTUNE, VOL.102, NO.4, AUG. 25, 1980, P. 58-62.
ABSTRACT THE MANAGEMENT STRATEGY OF RAYMOND MASON, CHAIRMAN OF CHARTER CO., IS DESCRIBED. THE SLUMP IN PRODUCT PRICES IN THE OIL BUSINESS HAS FORCED MASON TO CUT BACK HIS AMBITIOUS EXPANSION PLANS. HE GIVES A LOT OF AUTONOMY TO OTHER MANAGERS.

4-
TITLE LUBRIZOL'S NEW COMMITMENT.
AUTHOR MCCANN, J.
SOURCE VENTURE, VOL.2, NO.7, JULY 1980, P. 20-21.
ABSTRACT LUBRIZOL ENTERPRISES IS A VENTURE CAPITAL COMPANY INVESTING IN NEW BUSINESSES. THEY PLAN TO INVEST 100 MILLION DOLLARS IN 5 TO 3 YEARS. THEY ARE NOT INTERESTED IN MERGERS OR ACQUISITIONS. DON MURFIN TRAVELS AROUND THE UNITED STATES EVALUATING ENTREPRENEURS FOR INVESTMENT POSSIBILITIES.

F-
ITLE HEDGING WITH FINANCIAL FUTURES.
UTHOR DERVEN, R.
URCE PENSION WORLD, VOL.16, NO.4, APRIL 1980, P. 20-23.
STRACT THE NEW YORK FUTURES EXCHANGE IS NOW UNDER CONSTRUCTION AS AN EXCHANGE DEALING IN FINANCIAL FUTURES. TREASURY BILLS AND BONDS, SWISS FRANCS, BRITISH POUNDS, CANADIAN DOLLARS, WEST GERMAN MARKS AND JAPANESE YEN WILL BE TRADED. FINANCIAL FUTURES CAN BE INVESTMENT OPPORTUNITIES FOR PENSION FUNDS, CORPORATIONS, COMMERCIAL BANKS AND ANY INVESTOR WHO WANTS TO GUARANTEE THE COST OF A PROSPECTIVE ACQUISITION.

F-
ITLE PLANNING AT THE CANADIAN DEVELOPMENT CORPORATION.
UTHOR HAMPSON, H.A.
URCE MANAGERIAL PLANNING, VOL.28, NO.5, MARCH/APRIL 1980, P. 3,6+.
STRACT THE CANADIAN DEVELOPMENT CORPORATION IS A PART PUBLIC, PART PRIVATE CORPORATION FORMED TO TAKE A LEADING FINANCIAL AND MANAGEMENT POSITION IN CANADIAN INDUSTRIES. THEIR SYSTEM OF PLANNING IS ON TWO LEVELS BUT EMPHASIZES PERSONNEL DEVELOPMENT AS WELL AS CORPORATE ACQUISITIONS. POLYSAR IS A SUBSIDIARY WITH EMPHASIS ON ADVANCED FORECASTING TECHNIQUES.

F-
ITLE COPPERWELD: A STEEL COMPANY BUILDS WITH ITS FRENCH CONNECTION.
UTHOR [illegible]ON
URCE BUSINESS WEEK, NO.2628, MARCH 17, 1980, P. 121-124.
STRACT PITTSBURGH STEELMAKER COPPERWELD CORP. FOUGHT A 1975 TAKEOVER ATTEMPT BY PARIS-BASED IMETAL AND LOST. TODAY BOTH COMPANIES ARE COOPERATING IN EFFORTS TO EXPAND IN FOREIGN MARKETS. IMETAL'S NATURAL RESOURCES BASE AND EXTENSIVE INTERNATIONAL MARKETING EXPERTISE ARE ESSENTIAL TO COPPERWELD'S AMBITIOUS PLANS TO TRANSFORM ITSELF FROM A RELATIVELY SMALL SPECIALTY STEEL PRODUCER INTO A DIVERSIFIED MULTINATIONAL. IMETAL IS OPEN TO NEW VENTURES AND ACQUISITIONS.

F-
ITLE HOW AN INVESTMENT BANKER PREPARES A COMPANY FOR A TENDER OFFER.
UTHOR STRICKLAND, D.B.
URCE MANAGEMENT ACCOUNTING, VOL.61, NO.8, FEB.

1980, P. 26-28.

ABSTRACT IN ANY ATTEMPT TO ACQUIRE A PUBLIC COMPANY THROUGH A TENDER OFFER, A TENDER OFFER TEAM IS ASSEMBLED, MOST IMPORTANT OF WHICH IS THE INVESTMENT BANKER. IN ADDITION TO RECOMMENDING A PRICE AND SERVING AS THE DEALER FOR THE OFFER, THE INVESTMENT BANKER CAN CALL UPON HIS CONTACTS AND EXPERTISE TO IDENTIFY THE SOURCES OF POWER WITHIN THE DESIRED COMPANY AND TO PLAN THE ACQUISITION STRATEGY. A CHRONOLOGICAL SEQUENCE FOR IMPLEMENTING AN ACQUISITION IS PRESENTED WHICH STRESSES THE INVESTMENT BANKER'S FUNCTION AT EACH STAGE.

9-
ITLE WHEN A NEW PRODUCT STRATEGY WASN'T ENOUGH.
UTHOR ANON
OURCE BUSINESS WEEK, NO.2624, FEB. 18, 1980, P. 142-146.

ABSTRACT STANDARD BRANDS INCORPORATED WAS KNOWN AS ONE OF THE FOOD PROCESSING INDUSTRY'S SLOWEST GROWING COMPANIES WHEN, FOUR YEARS AGO, F. ROSS JOHNSON TOOK OVER AS CHIEF EXECUTIVE. JOHNSON'S BOLD STRATEGY WAS AIMED AT PUMPING LIFE INTO ITS ESTABLISHED BRANDS, INCLUDING CHASE AND SANBORN COFFEE, CURTISS CANDY, AND PLANTERS NUTS, AND AT MOVING INTO ACQUISITION AND NEW PRODUCT DEVELOPMENT IN THE HOT SEGMENTS OF PACKAGED FOODS. UNFORTUNATELY, DURING THE LAST FOUR YEARS, JOHNSON HAS LEARNED THAT A GOOD STRATEGY WITHOUT EQUALLY GOOD EXECUTION, IS NOT THE ANSWER TO THE PROBLEMS.

10-
ITLE G. HEILEMAN BREWING: A HEADY GROWTH IN STATURE.
UTHOR ANON
OURCE SALES & MARKETING MANAGEMENT, VOL.124, NO.1, JAN. 14, 1980, P. 14-15.

ABSTRACT G. HEILEMAN BREWING COMPANY OF LA CROSSE, WISCONSIN ACQUIRED CARLING NATIONAL BREWERIES IN MARCH, 1979. IT WAS GIVEN A GRAND AWARD BY SALES AND MARKETING MANAGEMENT. THE AWARD RECOGNIZES HEILEMAN'S EXCELLENT MARKETING PLAN AND PERFORMANCE.

11-
ITLE ACQUISITIONS: LET'S DO THEM PROPERLY.
UTHOR PEKAR, P.P.JR.; ELLIS, D.J.
OURCE MANAGERIAL PLANNING, VOL.28, NO.4, JAN.-FEB. 1980, P. 20-22.

ABSTRACT A DISCUSSION OF THE PURPOSE OF MERGERS AND

THE PROBLEMS ENCOUNTERED IN MERGERS IS PRESENTED. PLANNING IS IMPORTANT IN CARRYING OUT DIRECTIVES. AN INDEPENDENT APPRAISAL IS SEEN AS AN IMPORTANT FACTOR IN SUCCESSFUL MERGERS. PLANNING CAN PROVIDE FOR THIS AND OTHER METHODS FOR AVOIDING MERGER PITFALLS.

12-
TITLE HOW TEXASGULF KEPT ITS INDEPENDENCE.
AUTHOR COOK, J.
SOURCE FORBES, VOL.125, NO.12, JAN. 21, 1980, P. 60-61.
ABSTRACT CHARLES F. FOGARTY DREW UP A PLAN FOR TEXAS GULF SULPHUR COMPANY, WHICH CHANGED ITS IMAGE AND DIRECTION. IT WAS SUCCESSFUL IN STOPPING A TENNECO MERGER ATTEMPT. UNDER ITS NEW NAME, TEXASGULF, IT IS DIVERSIFIED INTO MORE METAL PRODUCTION AND PHOSPHATE MARKETING. TEXASGULF PRESIDENT IS NOW GINO GIUSTI.

13-
TITLE STRATEGIC PLANNING AS AN ORGANIZATIONAL CHANGE PROCESS.
AUTHOR TAYLOR, D.E.
SOURCE LONG RANGE PLANNING, VOL.12, NO.5, OCT. 1979, P. 43-53, BIBLIOG. 12
ABSTRACT COMPANIES NEED TO ADAPT AND LEARN TO COPE WITH CHANGE IN TODAY'S WORLD - A CHANGE MAGNIFIED BY ITS RAPID PACE, ITS MAGNITUDE AND THE NUMBER OF DIRECTIONS IN WHICH IT IS OCCURRING. A COMPANY MAY NEED TO MAKE BASIC CHANGES IN ITS PHILOSOPHY, ORGANIZATION, STRATEGIES AND PRACTICES TO MEET THE CHALLENGES OF CHANGE. THE USE OF A MODIFIED APPROACH TO STRATEGIC PLANNING IN ORDER TO HELP A COMPANY ACQUIRE THE NORMS, STRATEGIES AND ORGANIZATION TO COPE WITH CHANGE, IS PRESENTED. THE APPROACH IS BASED ON EXPERIENCES IN REORGANIZING BUSINESSES IN THE TEXTILE, STEEL TUBE, LIGHT ENGINEERING AND DISTRIBUTION INDUSTRIES.

14-
TITLE PERSONNEL POLICY AND MANPOWER PLANNING IN BANKING.
AUTHOR LYONS, T.P.
SOURCE LONG RANGE PLANNING, VOL.12, NO.5, OCT. 1979, P. 2-7.
ABSTRACT MANPOWER PLANNING IS DEFINED AS "A STRATEGY TO ACQUIRE, UTILIZE, RETAIN, AND DEVELOP PEOPLE BY FORMULATING AND IMPLEMENTING SOUND MANPOWER POLICIES AGREED WITH EMPLOYEES AND THEIR UNIONS." FORCES OF RAPIDLY CHANGING TECHNOLOGY IN BANKING MAKE IT NECESSARY TO

CHANGE BUT AT THE SAME TIME TO PROVIDE SECURE EMPLOYMENT FOR STAFF. PERSONNEL POLICY SHOULD INCLUDE MANPOWER PLANNING, NOT AS AN ISOLATED ACTIVITY, BUT AS AN INTEGRAL PART OF THE TOTAL MANAGEMENT PICTURE.

5-
TLE EXCHANGE OF CORPORATE SHARES FOR MUTUAL FUND CAN PROVIDE DIVERSIFICATION WITH NO TAX.
THOR HARRISON, R.E.
URCE TAXATION FOR ACCOUNTANTS, VOL.23, NO.5, NOV. 1979, P. 274-277.
STRACT THE EXCHANGE OF CORPORATE SHARES FOR MUTUAL FUND CAN BE PLANNED TO CIRCUMVENT CAPITAL GAINS TAX LIABILITIES. THE REORGANIZATION MUST INVOLVE SHARES OF A CLOSELY-HELD CORPORATION. THE IRS HAS ASSUMED A NEGATIVE VIEW OF THE ACQUISITION OF SHARES OF A CLOSELY-HELD CORPORATION BY A PUBLICLY-HELD MUTUAL FUND.

3-
TLE OCCIDENTAL PETROLEUM'S ODD COUPLE.
THOR NAZEM, S.G.
URCE FORTUNE, VOL.100, NO.10, NOV. 19, 1979, P. 70-82.
STRACT ONLY ONE IN A LONG LIFE OF HEIR DESIGNATES TO DR. ARMAND HAMMER'S OCCIDENTAL PETROLEUM ZOLTAN MERSZEI IS PROVING THAT HE IS INDEED EXTREMELY QUALIFIED FOR THE JOB IF HE CAN ONLY MANAGE TO REMAIN IN FAVOR. WITH A REPUTATION AS A METICULOUS AND METHODICAL MANAGER MERSZEI IS COMMITTED TO ORGANIZING AND BRINGING MANAGEMENT DISCIPLINE TO OCCIDENTAL. OIL, COAL, AND CHEMICALS ARE THE MAIN BUSINESSES AND HE IS INTERESTED IN ACQUIRING GOOD SMALLER COMPANIES AND FILLING IN PRODUCT GAPS.

7-
TLE ANOTHER REGIONAL BREWER TRIES GOING NATIONAL.
THOR ANON
URCE BUSINESS WEEK, NO.2614, DEC. 3, 1979, P. 88-91.
STRACT FAMILY BREWING COMPANY STROH'S IS MAKING A BID FOR NATIONAL PROMINENCE BY EXPANDING ITS DISTRIBUTION SYSTEM IN THE NORTHEAST WITH THE ACQUISITION OF F & M SCHAEFER BREWING COMPANY. CONVINCED THAT IT IS A TOP QUALITY BEER STROH'S IS GOING INTO THE MAJOR MARKETS PRICED WITH THE OTHER PREMIUM BEERS. CAUTION IS BEING EXERCISED IN ITS PLANS FOR NEWER PRODUCTS.

18-
TITLE TRAILWAYS: ON/ITS OWN IN A DRIVE TO CATCH UP WITH GREYHOUND.
AUTHOR ANON
SOURCE BUSINESS WEEK, NO.2612, NOV. 19, 1979, P. 80-84+.
ABSTRACT JAMES L. KERRIGAN BOUGHT TRAILWAYS INCORPORATED FROM HOLIDAY INN INCORPORATED. HE HAS INITIATED EXPANSION PLANS TO INCREASE THEIR INTERCITY RIDERSHIP. HE HOPES TO CONVINCE THE INTERSTATE COMMERCE COMMISSION TO STOP ISSUING NEW ROUTES TO GREYHOUND AND TO ENCOURAGE GREYHOUND TO OPEN THEIR TERMINALS TO TRAILWAYS. HE HOPES TO EXPAND SERVICE BY ACQUIRING SMALLER INDEPENDENT BUS LINES.

19-
TITLE GETTY BUCKS THE TREND AND BIDS FOR MORE OIL.
AUTHOR ANON
SOURCE BUSINESS WEEK, NO.2609, OCT. 29, 1979, P. 43-44.
ABSTRACT GETTY OIL COMPANY HAS GOOD CASH FLOW, A CLEAN BALANCE SHEET, ALMOST NO LONG-TERM DEBT AND 600 MILLION DOLLARS IN CASH. WHEN THEY EXPAND AND DIVERSIFY GETTY LOOKS TO MORE OIL AND GAS. ON OCTOBER 11, 1979, GETTY ANNOUNCED PLANS TO ACQUIRE RESERVE OIL AND GAS COMPANY.

20-
TITLE STRATEGIC BUSINESS PLANNING: YESTERDAY, TODAY, AND TOMORROW.
AUTHOR SHANKLIN, W.L.
SOURCE BUSINESS HORIZONS, VOL.22, NO.5, OCT. 1979, P. 7-14, BIBLIOG. 16
ABSTRACT CORPORATE GROWTH IN THE 1960'S MEANT DIVERSIFICATION TODAY, CORPORATE PLANNERS CHOOSE PARTNERSHIPS THAT ARE COMPATIBLE WITH THEIR OWN COMPANIES. GIVEN THE SUCCESS OF INTERGRATIVE GROWTH VERSUS DIVERSIFICATION, IT SHOULD BE THE MODE OF GROWTH IN THE EIGHTIES. IN HIGH MARKET SHARE COMPANIES, CONTINUED SYNERGY-PRODUCING GROWTH WILL BE A TEDIOUS TASK AS CORPORATE PLANNERS REMAIN WARY OF INTERFERENCE FROM ANTITRUST ACTIONS.

21-
TITLE SOOTHING GENERAL FOODS' COFFEE NERVES.
AUTHOR ANON
SOURCE FINANCIAL WORLD, VOL.148, NO.20, OCT. 15, 1979, P. 40-41.
ABSTRACT GENERAL FOODS HAS UNDERGONE A RESTRUCTURING IN ORDER TO GROUP LIKE DIVISIONS TOGETHER.

THE CHIEF EXECUTIVE OFFICER IS JAMES L. FERGUSON. FERGUSON IS CHANGING THE CORPORATE IMAGE AS COFFEE CONSUMPTION DECLINES. ACQUISITION OF FOOD COMPANIES WILL BE A GOOD RESOURCE FOR INVESTMENTS DURING A RECESSION.

2-
ITLE MARRYING MONEY.
UTHOR TRACY, E.J.; MEYER, H.E.; MORRISON, A.M.; LEGGETT, R.; CURRAN, J.J.
URCE FORTUNE, VOL.100, NO.9, NOV. 5, 1979, P. 30.
STRACT RAYTHEON HAS RECENTLY BOUGHT BEECH AIRCRAFT CORPORATION. MRS. OLIVE ANN BEECH THE MANAGER OF BEECH SEES THE AGREEMENT AS ADDING MONEY AND TECHNOLOGY TO BEECH. RAYTHEON HAS ACQUIRED THIRTY-FOUR OTHER COMPANIES IN AN EFFORT TO BE MORE INDEPENDENT FROM GOVERNMENT CONTRACTS.

3-
ITLE MALAYSIA'S PLANTATION - GROWN CONGLOMERATE.
UTHOR KRAAR, L.
URCE FORTUNE, VOL.100, NO.8, OCT. 22, 1979, P. 106-123.
STRACT THE MALAYSIAN GOVERNMENT HAS FORMED A VERY SUCCESSFUL CAPITALISTIC PARTNERSHIP WITH AN OLD COLONIAL PLANTATION COMPANY SIME DARBY. NATIONAL ECONOMIC INTERESTS ARE RESPONSIBLE FOR THIS OFFICIAL POLICY WHICH HAS PERMITTED SIME DARBY TO GROW AND FLOURISH AND TO EVENTUALLY BECOME MALAYSIAN RATHER THAN WESTERN-MANAGED. EXPANSION AND ACQUISITION OF A NUMBER OF ENTERPRISES HAS SIME DARBY IN POSITION TO BE A MAJOR FORCE IN THE EMERGING CHINA MARKET.

4-
ITLE PHILIP MORRIS: THE SEVEN-UP STRATEGY.
UTHOR ANON
URCE FINANCIAL WORLD, VOL.148, NO.17, SEPT. 1, 1979, P. 46-47.
STRACT PHILIP MORRIS IS A MARKETING MARVEL WITH STOCK TRADING AT A HIGHER MULTIPLE THAN MARKET AVERAGE. INTERNATIONAL TOBACCO SALES ARE RISING AND CAPACITY IS BEING EXPANDED WITH MODERN PLANT CONSTRUCTION. THE MILLER BEER BUSINESS, ACQUIRED IN THE EARLY 1970'S IS EXPECTED TO TAKE 28.5 PER CENT OF THE MARKET BY 1982.

5-
ITLE VIDEO DISCO.
UTHOR MORRISON, A.M.; BERNSTEIN, P.; LEGGETT, R.; WINTHROP, G.F.

SOURCE FORTUNE, VOL.100, NO.7, OCT.8, 1979, P. 22.
ABSTRACT DISCO VISION ASSOCIATES IS A COMPANY PLANNING TO DEVELOP, PRODUCE AND SELL VIDEODISCS WHICH ARE RECORDS THAT HAVE SOUND AND PICTURES. MUSIC CORPORATION OF AMERICA AND INTERNATIONAL BUSINESS MACHINES ARE PARTNERS IN THE VENTURE. LEW R. WASSERMAN IS THE CHAIRMAN OF MCA AND SIDNEY SHEINBERG IS PRESIDENT OF MCA.

26-
TITLE A BRITISH GIANT GOES ABROAD FOR A CHIEF.
AUTHOR ANON
SOURCE BUSINESS WEEK, NO.2602, SEPT.10, 1979, P. 102-106.
ABSTRACT BOC INTERNATIONAL LTD. (FORMERLY BRITISH OXYGEN CO.) HAS LOOKED TO ITS UNITED STATES ACQUISITION AIRCO INC. FOR ITS NEXT CHIEF EXECUTIVE RICHARD V. GIORDANO. GIORDANO'S CAREER IS PROFILED FROM HIS START AS A LAWYER, THROUGH HIS MOVE TO AIRCO, RESISTANCE EFFORTS AGAINST BOC'S TAKEOVER AND PLANS FOR BOC'S FUTURE. EVENTS AT BOC LEADING UP TO GIORDANO BEING OFFERED THE SPOT ARE DESCRIBED.

27-
TITLE THE U.S. ISN'T SO RUDDY BAD AFTER ALL.
AUTHOR ANON
SOURCE FORBES, VOL.124, NO.5, SEPT.3, 1979, P. 60.
ABSTRACT SWIRE PACIFIC LIMITED IS A DIVERSIFIED HONG KONG TRADING COMPANY. THE COMPANY HAS PROFITABLE SUBSIDIARIES IN REAL ESTATE, AIRLINE SERVICE, OIL RIGS, AND CONTAINER SHIPPING. SWIRE HAS MOVED INTO THE UNITED STATES WITH INVESTMENTS IN LAND DEVELOPMENT, A COCA COLA BOTTLING PLANT AND REAL ESTATE DEVELOPMENTS.

28-
TITLE WHY MCGRAW-EDISON COVETS STUDEBAKER.
AUTHOR ANON
SOURCE BUSINESS WEEK, NO.2597, AUG. 6, 1979, P. 32.
ABSTRACT THE PLANS OF MCGRAW-EDISON'S ODELL E. POWERS TO ACQUIRE STUDEBAKER-WORTHINGTON ARE DESCRIBED. WHILE IT MAY BE DIFFICULT TO MANAGE THE COMBINED COMPANIES, THE MOVE HAS BEEN A GOOD DEFENSE AGAINST HOSTILE TAKEOVER.

29-
TITLE MUTUAL FUND MERGERS WITH CLOSELY HELD CORPORATIONS.
AUTHOR WESTIN, R.A.
SOURCE MERGERS & ACQUISITIONS, VOL.14, NO.2, SUMMER

1979, P. 32-38.

ABSTRACT A STRATEGY IS DESCRIBED, ESPECIALLY ATTRACTIVE TO THOSE INTERESTED IN ESTATE PLANNING, FOR TAX FREE MERGERS INTO MUTUAL FUNDS. TAX ASPECTS, THE DREYFUS APPROACH, THE OPPENHEIMER APPROACH, SECURITIES AND CORPORATE LAWS AND ACCOUNTING ARE EMPHASIZED.

AN-

TITLE FOR MONSANTO, A NEW DIRECTION: HEALTH CARE.

AUTHOR ANON

SOURCE BUSINESS WEEK, NO.2593, JULY 9, 1979, P. 25-28.

ABSTRACT THE CHEMICAL CORPORATION MONSANTO CO. IS PLANNING A MOVE INTO THE LIFE SCIENCES AND HEALTH CARE INDUSTRY FOR GROWTH, HAVING REVEALED RESEARCH IN THE ANTICANCER FIELD. YEARS OF RESEARCH IN HERBICIDES HAS GIVEN THE COMPANY CELL BIOLOGY EXPERTISE. LACKING A DRUG MARKETING NETWORK, MONSANTO HOPES TO ACQUIRE A SMALL DRUG FIRM AND IS WILLING TO PAY 589 MILLION DOLLARS FOR ONE.

BIBLIOGRAPHY PART II - JOINT VENTURES

TLE OH, HOW HE HATED TO SELL↑
THOR MILES, C.
URCE FORBES, VOL.126, NO.4, AUG. 18, 1980, P. 124.
STRACT DR. RALPH LANDAU HAS JUST RECEIVED A CHECK FOR 270 MILLION DOLLARS. ATLANTIC RICHFIELD CO. (ARCO) GAVE IT TO HIM FOR HIS HALCON INTERNATIONAL'S HALF INTEREST IN THEIR JOINT VENTURE OXIRANE. TO SALVAGE ITS INVESTMENT ARCO OFFERED TO BUY HALCON OUT, WHEN A TROUBLESOME PLANT WAS NOT OPERATING AT FULL CAPACITY AND HAD TO BE SHUT DOWN.

TLE DETROIT'S LATEST FOREIGN FLIRTATION.
THOR ANON
URCE BUSINESS WEEK, NO.2647, JULY 28, 1980, P. 48-50.
STRACT THE AUTO MAKERS ARE MAKING DEALS WITH FOREIGN CAR MANUFACTURERS TO HELP THEM IN ECONOMICALLY BAD TIMES. THE JAPANESE WANT TO BUILD OR BUY PLANTS IN THE UNITED STATES AS JOINT VENTURES. HONDA AND DATSUN ARE LOOKING TO MANUFACTURE CARS IN THE UNITED STATES AND BUILD THEIR OWN PLANTS.

TLE MOVING INTO REFINING AND PETROCHEMICALS.
THOR ANON
URCE BUSINESS WEEK, NO.2638, MAY 26, 1980, P. 66-67.
STRACT SAUDI ARABIA IS PREPARING A SERIES OF MULTIBILLION-DOLLAR, JOINT-VENTURE DEALS WHICH WOULD GIVE IT CAPACITY TO PRODUCE REFINED OIL PRODUCTS AND BASIC PETROCHEMICAL COMMODITIES. THE SAUDI'S AMBITIOUS PLANS SHOULD HAVE A MAJOR IMPACT ON THE WORLDWIDE PETROCHEMICAL BUSINESS. SOME OF THE COMPANIES INVOLVED INCLUDE: MOBIL CORP., EXXON CORP., AND THE ROYAL DUTCH/SHELL GROUP.

TLE STRUCTURING THE JOINT VENTURE.
THOR ROULAC, S.E.
URCE MERGERS & ACQUISITIONS, VOL.15, NO.1, SPRING

1980, P. 4-14, BIBLIOG. 67

ABSTRACT THE JOINT VENTURE OFFERS A MEANS OF PURSUING AN OBJECTIVE OR ACTIVITY OTHERWISE UNFEASIBLE. EQUITY DISTRIBUTION SHOULD WORK TOWARD THE SUCCESS OF THE VENTURE. KEY ELEMENTS OF ESTABLISHING A JOINT VENTURE ARE DISCUSSED, INCLUDING PROVISION FOR DISSOLUTION OF THE VENTURE. SEVERAL COMPLICATING FACTORS ARE ALSO EXAMINED.

AN-
TITLE THE DRIVE TO BUILD A SYNFUELS INDUSTRY.
AUTHOR ANON
SOURCE BUSINESS WEEK, NO.2633, APRIL 21, 1980, P. 74-76.

ABSTRACT WEST GERMANY IS PLANNING TO USE ITS COAL-PROCESSING TECHNOLOGY TO FIGHT THE ENERGY CRUNCH OF THE 1980'S. THEY PLAN TO EXPORT TWO COMMERCIALLY PROVEN COAL GASIFICATION TECHNIQUES, AND THE GOVERNMENT WILL SUBSIDIZE A DOZEN MAJOR COMPANIES TO BUILD UP A SYNFUELS INDUSTRY. ALSO, COMPANIES ARE HOPING TO STAY AT THE CUTTING EDGE OF COAL-USE TECHNOLOGY BY UNDERTAKING JOINT VENTURES WITH FOREIGN COMPANIES WHICH ARE DEVELOPING A SYNFUELS INDUSTRY.

AN-
TITLE SAUDI ARABIA: A COSTLY PLAN FOR RAPID GROWTH.
AUTHOR ANON
SOURCE BUSINESS WEEK, NO.2630, MARCH 31, 1980, P. 52-59.

ABSTRACT IN MAY 1980 SAUDIA ARABIA WILL REVEAL A NEW FIVE YEAR PROGRAM OF DEVELOPMENT. EMPHASIS WILL BE ON REORGANIZING THE EDUCATIONAL SYSTEM, CONSTRUCTING INDUSTRIAL PARKS (2 FOR HEAVY INDUSTRY AND 3 FOR LIGHT), AND A LARGE INVESTMENT IN AGRICULTURE. THE PLAN WILL COST OVER 300 BILLION DOLLARS. UNITED STATES PARTICIPATION IN JOINT VENTURES, INVESTMENT CAPITAL AND CONTRACTS WILL MEET STIFF COMPETITION. UNITED STATES TAX LAWS AND FINANCIAL INCENTIVES ARE NOT THAT FAVORABLE.

AN-
TITLE THE EARTH MOVERS MOBILIZE FOR WAR.
AUTHOR MURPHY, C.J.V.
SOURCE FORTUNE, VOL.101, NO.3, FEB. 11, 1980, P. 90-96.

ABSTRACT A GROUP OF CONSTRUCTION INDUSTRY MEN REPRESENTING DIFFERENT COMPANIES BEGAN WHAT LATER WAS ESTABLISHED AS A PRECEDENT. WITH GREAT EFFICIENCY AND SUCCESS THEY WORKED TOGETHER TO BUILD A SERIES OF DAMS, STARTING

WITH BOULDER, UNDER GOVERNMENT CONTRACT. THEY TOOK ON CEMENT, SHIPBUILDING, AND THE MAGNESIUM NEEDED FOR A WAR TIME PLANE PROGRAM WITH EQUAL ENTHUSIASM. TOGETHER THEY MOBILIZED TO PROVIDE FOR WARTIME PROJECTS.

:-
TLE IMPLEMENTING CHINA'S PLANS.
THOR ANON
URCE CHINA BUSINESS REVIEW, VOL.6, NO.6, NOV.-DEC. 1979, P. 47-48.
STRACT PLANNED ECONOMIC DEVELOPMENT, FOREIGN INVESTMENT, AND BETTER MANAGEMENT ARE MAJOR CONCERNS AND OBJECTIVES OF CHINESE LEADERS. ZHANG YANNING, STATE ECONOMIC COMMISSION DIRECTOR OF THE PRODUCTION, IS SPECIFICALLY CONCERNED WITH EFFECTIVE FACTORY PLANNING AND UTILIZATION OF FOREIGN INVESTMENT FUNDS. THE COMMISSION IS ACTIVELY NEGOTIATING NUMEROUS PRODUCTION JOINT VENTURES WITH WESTERN NATIONS.

:-
TLE BECHTEL: A BUILDER MOVES INTO FINANCING AND OPERATIONS.
THOR ANON
URCE BUSINESS WEEK, NO.2608, OCT. 22, 1979, P. 119-120.
STRACT BECHTEL IS THE NUMBER ONE CONSTRUCTION COMPANY. IT HAS BUILT NEARLY HALF THE NATION'S NUCLEAR POWER PLANTS, TRANS-ALASKA PIPELINE, HOOVER DAM AND IS NOW INVOLVED MORE THAN FIFTY PER CENT OVERSEAS. BECAUSE OF THE FOREIGN DEVELOPMENTS MANAGEMENT STRATEGY HAS CHANGED, AND BECHTEL IS MORE CONCERNED WITH FINANCING.

:0-
TLE ELECTRONICS: IBM'S VIDEO PLAY FOR CONSUMER DOLLARS.
THOR ANON
URCE BUSINESS WEEK, NO.2603, SEPT.17, 1979, P. 42.
STRACT INTERNATIONAL BUSINESS MACHINES CORPORATION (IBM), THE COMPUTER GIANT, HAS SHOCKED THE INDUSTRY BY ANNOUNCING A JOINT VENTURE WITH MCA, INC., THE CALIFORNIA ENTERTAINMENT CONGLOMERATE. THE CONSUMER MARKETPLACE IS NEW FOR IBM AND THEIR PLANS INCLUDE BUILDING AND MARKETING VIDEO DISCS AND VIDEO DISC PLAYERS, CALLING THE VENTURE, DISCOVISION ASSOCIATES. THE THRUST NOW IS IN THE INDUSTRIAL EDUCATION AND INFORMATION FIELDS, BUT THE LARGER VENTURE INTO THE HOME ENTERTAINMENT BUSINESS IS FORESEEN.

1-
TLE BUTTON-DOWN TOKYO.
THOR ANON
URCE FORTUNE, VOL.100, NO.5, SEPT.10, 1979, P. 30.
STRACT BROOKS BROTHERS WENT ABROAD FOR THE FIRST TIME LAST MONTH, OPENING A BRANCH IN TOKYO. THE JOINT VENTURE WITH JAPAN'S DAIDO WORSTED MILLS PLANS SEVERAL STORES. BROOKS IS NOW A SUBSIDIARY OF GARFINKEL, BROOKS BROTHERS, MILLER AND RHOADS.

2-
TLE CHINA'S DRIVE FOR CAPITALIST PROFITS IN HONG KONG.
THOR KRAAR, L.
URCE FORTUNE, VOL.99, NO.10, MAY 21, 1979, P. 110-114.
STRACT CHINA IS USING CONNECTIONS WITH HONG KONG TO SPEED UP SOME OF THE PROCESSES, PARTICULARLY BUSINESS AND FINANCIAL EXPERTISE AND CHANNELS, NECESSARY TO FURTHER HER AMBITIOUS PLANS FOR ECONOMIC DEVELOPMENT. CHINA IS INTERESTED IN ATTRACTING INVESTORS AND IS OPEN TO JOINT VENTURE PLANS BOTH OF WHICH WILL CONTRIBUTE TO CHINA'S MODERNIZATION.

3-
TLE IRAN: A NATIONALISTIC LOOK TO PETROCHEMICALS.
THOR ANON
URCE BUSINESS WEEK, NO.2585, MAY 14, 1979, P. 40,42.
STRACT FOLLOWING IRANIAN REVOLUTION PROBLEMS, THE STATE-OWNED NATIONAL PETROCHEMICAL COMPANY HAS HAD TO REORDER ITS SCHEMES AND FOREIGN INVESTMENT IN IRAN'S PETROCHEMICAL INDUSTRY IS DROPPING. FUTURE NPC PLANS INCLUDE TAKEOVER OF ITS FOREIGN PARTNERS IN JOINT VENTURES. NPC MANAGEMENT STRUGGLES FORWARD, AND ENTANGLEMENTS AND COMPLICATIONS RESULT.

4-
TLE CHINA AND CHILE: STRANGE ALLIES IN ANARCTICA.
THOR ANON
URCE BUSINESS WEEK, NO.2584, MAY 7, 1979, P. 63.
STRACT CHINA AND CHILE BOTH INTERESTED IN STRENGTHENING TIES AND INCREASING TRADE ARE MAKING PLANS FOR JOINT SCIENTIFIC RESEARCH IN THE ANTARCTIC. RESEARCH IS LIKELY TO INCLUDE FISHING, OCEANOGRAPHIC AND GEOLOGICAL SURVEYS.

5-
TLE USING AUDIOVISUALS TO EXPLAIN A COMPLEX

ISSUE.

THOR ANON

URCE ASSOCIATION MANAGEMENT, VOL.31, NO.3, MARCH 1979, P. 52-56.

STRACT THE SUBJECT OF PRODUCTIVITY WAS EXPLAINED TO GENERAL AUDIENCES BY THE AMERICAN INSTITUTE OF INDUSTRIAL ENGINEERS THROUGH A SLIDE-SOUND PRESENTATION WITH A *20,000* DOLLAR BUDGET ALLOCATION. PRODUCTION TIME WAS RESTRICTED WITH ONLY *90* DAYS TO PLAN THE MAXIMUM USE OF ACTION SLIDES, AND A SCRIPT ILLUSTRATING EXAMPLES OF PRODUCTIVITY GAINS APPLIED TO BROAD SEGMENTS OF THE ECONOMY. RESPONSES TO THE PROGRAM HAVE BEEN FAVORABLE.

6-

TLE WORLD ROUNDUP.

THOR ANON

URCE BUSINESS WEEK, NO.2567, JAN.8, 1979, P. 29.

STRACT ONE OF FRANCE'S STATE-CONTROLLED OIL GROUPS MAY HAVE WON A LAWSUIT WITH THE GOVERNMENT; WORRY OF ALGERIA'S PRESIDENT DYING IS SHOWING UP IN THE MARKET VALUE OF THE COUNTRY'S CURRENCY; COMPANIES HAVE BEEN INVITED TO PROSPECT FOR URANIUM IN KENYA; UNITED STATES COMPANIES ARE REDUCING THEIR PRESENCE IN THE SOVIET UNION; CHRYSLER CORP. IS WORKING ON A JOINT VENTURE WITH TAIWAN TO MAKE HEAVY TRUCKS; THE INDONESIAN GOVERNMENT IS PLANNING A MAJOR EXPORT DRIVE.

7-

TLE U.S. STEEL: GAMBLING HEAVILY ON THE PETROCHEMICAL BUSINESS.

THOR ANON

URCE BUSINESS WEEK, NO.2555, OCT.9, 1978, P. 68-*70*.

STRACT ALTHOUGH THE STEEL INDUSTRY IN THE UNITED STATES IS RECOVERING, UNITED STATES STEEL HAS RECENTLY ANNOUNCED A JOINT VENTURE TO BUILD A ONE BILLION DOLLAR PETROCHEMICAL COMPLEX. THE COMPANY WANTS TO DIVERSIFY AS A MEANS OF ACHIEVING GROWTH, BUT IT PLANS TO STAY PREDOMINANTLY A STEEL COMPANY.

8-

TLE FOUR WAYS TO STRETCH YOUR FACILITIES DOLLARS.

THOR KAUFMAN, S.P.; GALBERAITH, R.O.

URCE MANAGEMENT REVIEW, VOL.67, NO.8, AUG. 1978, P. 8-16.

STRACT FOUR APPROACHES FOR EXTENDING INVESTMENT FUNDS HAVE PROVEN SUCCESSFUL, THEY ARE: RELYING MORE ON OUTSIDE PROCUREMENT OF

SERVICES AND MATERIALS; CORRECTING PROBLEM AREAS IN EXISTING FACILITIES, OR ACQUIRING EXISTING ONES, INSTEAD OF CONSTRUCTING NEW ONES; AND INITIATING JOINT VENTURES OR PARTNERSHIPS WHEN A HIGH-RISK FACILITY MUST BE BUILT.

9-
TLE BOEING TAKES A BOLD PLUNGE TO KEEP FLYING HIGH.
THOR KRAAR, L.
URCE FORTUNE, VOL.98, NO.6, SEPT.25, 1978, P. 42-50.
STRACT OVER $3 BILLION IS BEING INVESTED BY BOEING ON NEW ECONOMY JET PLANES, WITH HOPES THAT OVER $70 BILLION WILL BE SPENT ON CHEAPER WIDE BODY 200 PASSENGER PLANES OVER THE COMING DECADE. THE RISK IS BEING TAKEN TO REMAIN IN THE BUSINESS.

10-
TLE WHY CARBORUNDUM IS CHANGING KENNECOTT.
THOR ANON
URCE BUSINESS WEEK, NO.2546, AUG.7, 1978, P. 54-60.
STRACT EVER SINCE ITS ACQUISITION OF CARBONUNDUM, KENNECOTT HAS BEEN UNDERGOING SOME DRAMATIC CHANGES. KENNECOTT'S MANAGEMENT STRUCTURE IS BEING REORGANIZED ALONG MORE CENTRALIZED LINES. IN ADDITION, THE PLANNING FUNCTION WILL BE MORE HEAVILY EMPHASIZED, IN AN EFFORT TO AVOID THE PROBLEMS CREATED IN THE PAST BY AN INORDINATE AMOUNT OF DIVERSIFICATION AND DIVESTMENT.

11-
ITLE HOW KEYSTONE'S HANDSHAKE TURNED GOLDEN.
THOR SCHUYTEN, P.J.
URCE FORTUNE, VOL.97, NO.5, MARCH 13, 1978, P. 78-82.
STRACT IN 8 YEARS KEYSTONE FOODS HAS BECOME A $200 MILLION BUSINESS, SELLING MCDONALD'S ALMOST HALF THEIR HAMBURGER PATTIES AND RUNNING A LARGE CATTLE FEEDING OPERATION. CHAIRMAN H. LOTMAN PLANS TO SELL FROZEN MEAT PORTIONS TO HOTELS, SCHOOLS AND PERHAPS MARKETS.

12-
TLE CADILLAC FAIRVIEW: CANADA'S REAL ESTATE GIANT MOVES SOUTH.
THOR ANON
URCE BUSINESS WEEK, NO.2537, JUNE 5, 1978, P. 146-147.
STRACT CANADA'S CADILLAC FAIRVIEW CORP. PLANS TO

BECOME INVOLVED IN A MAJOR EXPANSION IN THE U.S. OVER THE NEXT SEVERAL YEARS. THE REAL ESTATE COMPANY SHOWS GOOD EARNINGS, AND ITS CONSERVATIVE OUTLOOK SHOULD HELP ITS COMPETITIVE POSITION IN THE U.S. CADILLAC SPECIALIZES IN MIXED-USE LAND DEVELOPMENT, AND PREFERS JOINT VENTURE PROJECTS.

3-
TLE JOINT PRODUCTIVITY COMMITTEES: LESSONS OF RECENT INITIATIVES.
THOR GOLDOFF, A.C.; TATAGE, D.C.
URCE PUBLIC ADMINISTRATION REVIEW, VOL.38, NO.2, MARCH/APRIL 1978, P. 184-186.
STRACT PLANNING, UNION-MANAGEMENT ATTITUDES, COLLECTIVE BARGAINING VS. PRODUCTIVITY AND PROGRAM EVALUATION ARE ALL AREAS CRITICAL TO PROGRAM SUCCESS IN LABOR MANAGEMENT COMMITTEES. JOINT PRODUCTIVITY IS ENHANCED WHEN THESE PROBLEMS ARE DEALT WITH AT THE OUTSET.

4-
TLE SADAT TO ISRAEL: WE ARE READY FOR NORMALIZATION IN EVERY SENSE OF THE WORD.
THOR MICHAELS, J.W.
URCE FORBES, VOL.121, NO.8, APRIL 17, 1978, P. 34-37.
STRACT SADAT IS WILLING TO TRADE WITH ISRAEL ONCE TERRITORIAL SETTLEMENT IS ACHIEVED, HIS PEACE INITIATIVE IS STILL STRONG, NO ENERGY PROBLEMS EXIST, LABOR IS CHEAP, EGYPT COULD BE A VERY PROFITABLE PLACE TO INVEST. HE REMAINS OPTIMISTIC ABOUT EGYPT'S FUTURE.

5-
TLE SAUDI ARABIA: A CAMPAIGN TO LURE PETROCHEMICAL PLANTS. **ABSTRACTS** FEW REFINERIES WERE BUILT IN THE MIDDLE EAST IN THE WAKE OF THE OIL CRISIS AND THE RECESSION. HOWEVER, MANY AMERICAN COMPANIES ARE NOW ENTERING DEALS WITH SAUDI ARABIA. ALTHOUGH BUILDING REFINERIES IN THIS AREA IS RISKY, THE SAUDIS ARE OFFERING GOOD FINANCING TERMS, AND CONTRACTS WHICH WOULD PROVIDE OIL INTO THE 1980'S.
THOR AMCN
URCE BUSINESS WEEK, NO.2525, MARCH 13, 1978, P. 43-44.

6-
TLE PHILANTHROPY AND ESTATE PLANNING: JOINTLY-OWNED PROPERTY.
THOR TEITELL, C.

URCE TRUSTS AND ESTATES, VOL.116, NO.9, SEPT 1977, P. 600-602. BIBLIOG. 9

STRACT THE TAX REFORM ACT OF 1976 HAD DEFINED NEW PARAMETERS FOR DETERMINING JOINT OWNERSHIP ESTATE TAX LIABILITIES AS WELL AS TRUST CONTRIBUTIONS TO CHARITABLE INSTITUTIONS.

-
TLE MANAGING AGAINST EXPROPRIATION.
THOR BRADLEY, D.G.
URCE HARVARD BUSINESS REVIEW, VOL.55, NO.4, JULY-AUG 1977, P. 75-83.

STRACT REGIONAL, INDUSTRIAL AND INDUSTRIAL ANALYSIS OF THE RISKS OF EXPROPRIATION OF MULTINATIONAL CORPORATIONS INCLUDES A DISCUSSION OF GOVERNMENT CRITERIA FOR SELECTION OF THEIR TARGETS. A MORE ANALYTICAL APPROACH TO EXPROPRIATION SHOULD BE TAKEN BY INTERNATIONAL MANAGERS IN THE FACE OF THE GROWING POWER OF ECONOMIC NATIONALISM.

3-
TLE GENERAL DYNAMICS STRUGGLES TO BUILD A PLANE FOR ALL NATIONS.

THOR KRAAR, L.
URCE FORTUNE, VOL.95, NO.3, MARCH 1977, P. 180-192.

STRACT DESCRIBES NEGOTIATIONS AND DIFFICULTIES ENCOUNTERED IN CO-PRODUCING GENERAL DYNAMIC'S F-16 FIGHTER WITH NATO ALLIES.

9-
TLE FORECASTING ON A GLOBAL SCALE.
THOR VAN DAM, A.
URCE CANADIAN BUSINESS MAGAZINE, MARCH 1977, P. 44, 46, 49-50.

STRACT DESPITE THE ROUTINE NATURE OF CORPORATE ECONOMIC FORECASTING, THE INTERNATIONAL ECONOMIC CATASTROPHES OF THE LAST FEW YEARS WERE UNFORESEEN. MOST BUSINESS FORECASTERS ARE STRAIGHTJACKETED BY THE NARROW CONCERNS OF THEIR EMPLOYERS AND BY AN INSUFFICIENCY OF TRULY INTERNATIONAL DATA.

0-
TLE THE ARABS DIVERSIFY INTO THE ARMS BUSINESS.
THOR ANON
LACE BUSINESS WEEK, NO.2507, OCT. 31, 1977, P. 31-32.

STRACT THE ARAB ORGANIZATION FOR INDUSTRIALIZATION HAS ANNOUNCED THAT IT WILL SIGN CONTRACTS WITH BRITISH AND AMERICAN COMPANIES IN THE NEAR FUTURE. THESE CONTRACTS WILL PROVIDE THE ARAB NATIONS WITH THE TECHNOLOGY TO SUPPLY

THEIR OWN MILITARY EQUIPMENT NEEDS, AND TO BUILD A STRONG INDUSTRIAL BASE. MANY CRITICS WONDER WHETHER THE ARABS HAVE ENOUGH TECHNICIANS TO CARRY OUT SUCH A PLAN.

BIBLIOGRAPHY PART III - MINERALS E&P DEVELOPMENT

TLE UNEMPLOYMENT IN THE 1980'S.
THOR TIMBRELL, M.
URCE LLOYDS BANK REVIEW, NO.136, APRIL 1980, P. 15-29, BIBLIOG. 11

STRACT UNEMPLOYMENT IN GREAT BRITAIN IN THE 1980'S WILL INCREASE, IF THE CURRENT ECONOMIC POLICY OF THE GOVERNMENT IS NOT CHANGED. THE GOVERNMENT HAS TO WORK TO CREATE JOBS. SOME PROPOSALS FOR GOVERNMENT ACTION INCLUDE: SUBSIDY TO LOCAL GOVERNMENTS FOR JOBS CREATED IN ENERGY CONSERVATION, WASTE RECLAMATION AND ENVIRONMENTAL IMPROVEMENT, TAX RELIEF FOR PRIVATE ENTERPRISE FOR SIMILAR PROJECTS AND TAX RELIEF FOR EXPLORATION OF NON-OIL MINERALS IN THE UNITED KINGDOM.

TLE THE STATE RESPONSE TO MINERAL DEVELOPMENT.
THOR GULLEY, D.A.
URCE STATE GOVERNMENT, VOL.53, NO.1, WINTER 1980, P. 7-10.

STRACT THERE ARE DIFFERENT SITUATIONS FACED BY STATES CONCERNING MINERAL DEVELOPMENT. MINERAL EXPERTISE IS NECESSARY IN STATE AGENCIES. ALTERNATIVES ARE DISCUSSED.

TLE MINING CAPITAL.
THOR ANON
URCE FORBES, VOL.125, NO.11, MAY 26, 1980, P. 105-106.

STRACT THE JOINT VENTURE AGREED UPON BY SCALLOP COAL CORP., SHELL'S WHOLLY OWNED SUBSIDIARY, WITH ST. JOE MINERALS CORP. IS DESCRIBED. SCALLOP WILL PUT UP 680 MILLION DOLLARS TO DEVELOP ST. JOE'S APPALACHIAN COAL RESERVES, MOSTLY LOW-SULFUR STEAM COAL. ST. JOE'S DOES NOT HAVE A HUGE AMOUNT OF CAPITAL, BUT MAKES UP FOR IT WITH IMAGINATION AND GOOD MANAGEMENT.

TLE DEVELOPMENT PROBLEMS OF NONFUEL MINERAL EXPORTING COUNTRIES.
THOR NANKANI, G.T.
URCE FINANCE & DEVELOPMENT, VOL.17, NO.1, MARCH 1980, P. 6-10.

STRACT THE PROBLEMS OF THE NONFUEL MINERAL DEPENDENT ECONOMIES OF DEVELOPING COUNTRIES ARE EXAMINED. LOW AGRICULTURAL GROWTH AND LOW SAVINGS COMBINED WITH HIGH INDUSTRIAL WAGES AND EXPORT EARNING INSTABILITY ARE CHARACTERISTIC OF THESE ECONOMIES. POLICIES DESIGNED TO DEAL WITH THESE PROBLEMS ARE SUGGESTED.

TLE WHY THE BLOOM IS OFF OIL AND MINERAL STOCKS.
THOR ANON
URCE BUSINESS WEEK, NO.2629, MARCH 24, 1980, P. 51-52.

STRACT SHARES OF OIL AND MINERAL COMPANIES SUFFERED IN MARCH, 1980, REFLECTING THE STOCKS' OVERBOUGHT STATUS AND UNCERTAINTY OVER PRESIDENT CARTER'S REVISED ANTI-INFLATION PROGRAMS. THE SELL-OFF WAS CAUSED LARGELY BY MOBIL OIL CANADA LTD.'S LESS THAN ENCOURAGING REPORT ON CANADIAN EXPLORATION. THE BIG LOSERS INCLUDED THE TOUTED CANADIAN OIL STOCKS.

TLE BATTLE OVER ALBERTA'S ENERGY RICHES.
THOR MURRAY, T.J.
URCE DUN'S REVIEW, VOL.114, NO.4, OCT. 1979, P. 126-135.

STRACT THE CANADIAN EASTERN PROVINCES WANT TO SHARE IN A KITTY OF OIL AND GAS REVENUES WHICH HAS 5 BILLION DOLLARS AND IS GROWING AT 1 BILLION DOLLARS ANNUALLY. THE FUND HAS BEEN CRITICIZED FOR ITS LACK OF ENCOURAGEMENT OF MANUFACTURING DEVELOPMENT. ALBERTA IS THE SOURCE OF THE ENERGY SUPPLY AND ECONOMIC PROBLEMS AFFECT FISCAL AND MONETARY PLANNING BECAUSE THERE IS SO MUCH MONEY IN ONE PROVINCE.

ITLE WAR OVER THE WILDERNESS.
THOR HOWARD, N.; SIEGEL, M.
URCE DUN'S REVIEW, VOL.114, NO.2, AUG. 1979, P. 34-37.

STRACT COMMERCIAL DEVELOPMENT OF 600,000 ACRES OF LAND WITH OIL-AND-GAS POTENTIAL MAY BE PLACED OFF LIMITS BY THE ADMINISTRATION AT THE URGING OF CONSERVATION GROUPS. INDUSTRY IS LOBBYING AGAINST THIS UNAVAILABILITY OF THE WILDERNESS, CONTENDING THE VAST AREAS OF NATURAL RESOURCES ARE BEING WASTED. DESPITE ENERGY SHORTAGES, CONSERVATIONISTS MAY HAVE THE GREATER ADVANTAGE IN INFLUENCING

GOVERNMENT LAND POLICY.

TLE A FED ALUMNUS GUIDES BOTSWANA.
THOR ANON
URCE BUSINESS WEEK, NO.2592, JULY 2, 1979, P. 82-83.
STRACT EVER SINCE HUGE DEPOSITS OF DIAMONDS, COPPER, NICKEL, COAL ASBESTOS AND URANIUM WERE DISCOVERED IN BOTSWANA, CENTRAL BANK DIRECTOR BRENTON LEAVITT (FORMERLY WITH THE FEDERAL RESERVE BOARD) HAS HAD TO MAKE DECISIONS WHICH WILL AFFECT THE COUNTRY'S DEVELOPMENT FOR SOME TIME. LEAVITT ADVOCATES A GO SLOW PROGRAM.

TLE HOW TO UNLOCK THAT GROWTH POTENTIAL.
THOR ANON
URCE EUROMONEY, SOUTH AFRICA SUPPLEMENT, JUNE 1979, P. 2-10.
STRACT A BROAD ANALYSIS OF THE SOUTH AFRICAN ECONOMY AND THE GROWTH POTENTIAL ASSOCIATED WITH THIS COUNTRY'S NATURAL RESOURCES, IN PARTICULAR, PRECIOUS METALS INDUSTRY SUCH AS GOLD, URANIUM, DIAMONDS AND PLATINUM, ARE EXAMINED. THE BALANCE OF PAYMENTS SITUATION, CAPITAL INVESTMENTS AS WELL AS THE INFLATION AND UNEMPLOYMENT TRENDS EXHIBITED BY SOUTH AFRICA ARE ANALYZED.

TLE ITS NICE TO BE RIGHT.
THOR WIEGNER, K.K.
URCE FORBES, VOL.123, NO.9, APRIL 30, 1979, P. 64.
STRACT FOR THE TOSCO CORP. IT SEEMED THAT NOTHING WOULD GO RIGHT. IT SPENT 70 MILLION DOLLARS ON SHALE RESEARCH, BUT ENVIRONMENTAL CONSTRAINTS STRANGLED ITS HOPES. THEIR LUCK HAS CHANGED, THANKS TO DECISIONS MADE YEARS AGO.

TLE THE SHAKY SUPPLY OF KEY MINERALS.
THOR ANON
URCE BUSINESS WEEK, NO.2576, MARCH 12, 1979, P. 60-61.
STRACT THE U.S. IS HEAVILY DEPENDENT ON FOREIGN SUPPLIERS FOR 90 PER CENT OF ITS ANNUAL CONSUMPTION OF MANGANESE, COBALT, CHROMIUM AND BAUXITE. THE INSTABILITY OF THE COUNTRIES SUPPLYING THESE AND OTHER KEY IMPORTS REQUIRES A DEVELOPMENT OF DOMESTIC SOURCES AND TECHNOLOGY PERMITTING SUBSTITUTIONS.

2-
TLE TOUGH TRACKING IN THE NORTHWEST.
THOR ANON
URCE EXECUTIVE, VOL.20, NO.11, NOV. 1978, P. 40,42.
STRACT THE WHITE PASS AND YUKON TRANSPORTATION SYSTEM IS OPERATING AT A LOSS DUE TO INEQUITY BETWEEN COMPANY AND UNITED STATES DOLLARS AND LOSS OF CUSTOMERS. THE COMPANY WILL ATTEMPT COST REDUCTION BY CUTTING SERVICES AND COSTS IN OPERATING DIVISIONS AND CORPORATE REORGANIZATION. IN ADDITION TO A $6 MILLION GOVERNMENT SUBSIDY, AND ORDERS TO CARRY PIPE FOR THE ALASKA HIGHWAY GAS PIPELINE, THE COMPANY WILL NEED FURTHER MINERAL DEVELOPMENT IN THE NORTHWEST TO SURVIVE.

3-
TLE BIG OIL IS SWEATING IT OUT.
THOR ANON
URCE EXECUTIVE, VOL.20, NO.11, NOV. 1978, P. 38.
STRACT ALTHOUGH CONFIDENCE IN IMPERIAL OIL HAS BEEN FAILING AMONG INVESTMENT ANALYSTS, CHAIRMAN JACK ARMSTONE RECOMMENDS UNDERTAKING HEAVY OIL AND OIL SANDS PRODUCTION IN ADDITION TO CONVENTIONAL OIL AND GAS OPERATIONS AND MINERAL EXPLORATION.

4-
TLE PADLOCKING FEDERAL FORESTS.
THOR ANON
URCE BUSINESS WEEK, NO.2559, NOV.6, 1978, P. 147-148.
STRACT IN A MOVE THAT COULD AFFECT ENERGY AND MINERAL INDUSTRIES, AS WELL AS TIMBER INDUSTRY, THE GOVERNMENT MAY PADLOCK ONE-FIFTH OF THE NATIONAL FOREST SYSTEM INTO A WILDERNESS CLASSIFICATION WHICH BANS DEVELOPMENT. THE TIMBER INDUSTRY HAS THE MOST AT STAKE. FURTHER STUDIES ARE BEING CALLED FOR AND THERE IS A LAWSUIT POSSIBILITY.

5-
TLE PROMISES, PROMISES.
THOR ANON
URCE FORBES, VOL.122, NO.8, OCT.16, 1978, P. 99.
STRACT KERR-MCGEE CORP. HAS BEEN TURNED INTO A NATURAL RESOURCES COMPANY WITH $2 BILLION REVENUE BUT EARNINGS HAVE DECLINED. THE RATE OF DEVELOPMENT OF THE RESOURCES WILL DEPEND ON THE AMOUNT OF CASH AVAILABLE.

6-

TLE A SHARPER FOCUS FOR U.S. POLICY IN AFRICA.
THOR NICKEL, H.
URCE FORTUNE, VOL.98, NO.3, AUG. 14, 1978, P. 132-140.
STRACT HAVING DECIDED TO CONCERN ITSELF IN AFRICAN AFFAIRS, THE CARTER ADMINISTRATION HAS FOUND ITSELF WITH FEW POLICY PRECEDENTS TO RELY ON. BUT WHILE CUBAN AND SOVIET INTERESTS ARE IN SOME RESPECTS ADVANTAGED, ONLY THE WEST CAN GUARANTEE BOTH THE MARKETS FOR AFRICA'S RAW MATERIALS AND THE CAPITAL AND TECHNOLOGY NEEDED BY DEVELOPING ECONOMIES.

7-
TLE ZAMBIA TRIES TO SIDESTEP DISASTER.
THOR WALUSIKU, F.
URCE EUROMONEY, MAY 1978, P. 17-18.
STRACT THE ECONOMY OF ZAMBIA IS DEPENDENT UPON THE MINING INDUSTRY. THE RECESSION IN COPPER PRICES HAS CAUSED THE LANDLOCKED COUNTRY TO EXPERIENCE AN ECONOMIC CRISIS WHICH THE GOVERNMENT CAN ONLY REDUCE THROUGH LONG-RANGE POLICIES.

8-
TLE THE GREAT FOX POWELL, JOHN WAYNE, MAGIC-DIRT MEDICINE SHOW.
THOR ALEXANDER, T.
URCE FORTUNE, VOL.97, NO.6, MARCH 27, 1978, P. 64-72.
STRACT DESCRIBES THE DEVELOPMENT OF A MARKET FOR VITREOUS RHYOLITIC TUFF BEING MARKETED UNDER THE NAME OF PRODUCT 76. THE FULL POTENTIAL HAS NOT BEEN DISCOVERED, BUT IT IS RECOGNIZED AS A POWERFUL SEALANT AND ALTERNATIVE FOR ASBESTOS.

9-
TLE NORD STRIKES IT RICH ON OTHER PEOPLE'S MONEY.
THOR ANON
URCE BUSINESS WEEK, NO.2538, JUNE 12, 1978, P. 100.
STRACT NORD RESOURCES CORP. IS A COMPANY WHOSE PRIMARY BUSINESS INVOLVES THE EXPLORATION FOR, AND MINING OF MINERALS. NORD'S PRESIDENT EDGAR CRUFT HAS USED HIS FINANCIAL KNOWHOW TO GAIN A TREMENDOUS AMOUNT OF LEVERAGE, THUS ALLOWING THE COMPANY TO BECOME INVOLVED IN MUCH LARGER PROJECTS THAN THEY WOULD OTHERWISE HAVE BEEN CAPABLE OF. AS THE PROJECTS MATURE, NORD'S PROFITS WILL INCREASE.

0-
TLE WHO WILL FINANCE AUSTRALIA'S DEVELOPMENT.
THOR SHAPIRO, H.D.
URCE INSTITUTIONAL INVESTOR, VOL.12, NO.5, MAY 1978, P. 119-123+.
STRACT AUSTRALIA HAS VAST MINERAL RESOURCES, AND THERE IS A QUESTION AS TO WHO WILL DO THE FINANCING, DOMESTIC OR FOREIGN BANKS, FOR THE COUNTRY TO REALIZE ITS ECONOMIC POTENTIAL. THE MERCHANT BANKING SITUATION IN AUSTRALIA IS DESCRIBED.

1-
TLE ALBANIA: AN EYE TO THE WEST AS TRADE STAGNATES.
THOR ANON
URCE BUSINESS WEEK, NO.2521, FEB. 13, 1978, P. 45-46.
STRACT ALBANIAN OFFICIALS HAVE DISCOVERED THAT SINCE THEIR SPLIT WITH BOTH THE RUSSIANS AND THE CHINESE, THEY ARE HAVING A HARD TIME KEEPING THEIR NATION ECONOMICALLY HEALTHY. IN AN ATTEMPT TO ALLIEVIATE THE SITUATION, THE ALBANIANS ARE ATTEMPTING TO EXPORT SOME OF THEIR MINERALS TO WESTERN NATIONS OTHER THAN THE U.S. ALBANIA IS ALSO ATTEMPTING TO BUILD UP ITS TOURIST INDUSTRY.

2-
TLE SUDAN - ACID TEST FOR ARAB INVESTMENT.
THOR CAPLAN, B.
URCE THE BANKER, VOL.128, NO.623, JAN. 1978, P. 33-36.
STRACT SUDAN IS PLAGUED WITH DEBT BUT SOME VIEW THE PRESENT SITUATION OF SUSPENSION BETWEEN GROWTH AND FINANCIAL CONSTRAINTS WITH OPTIMISM. WITH THE POTENTIAL FOR BEING ONE OF THE WORLD'S GREAT FOOD GRANARIES, STEADY ANNUAL GROWTH OF 4 1/2-5% HAS BEEN GOING ON FOR 5 YEARS.

3-
TLE VENEZUELA'S DASH FOR SUPER-GROWTH.
THOR ANON
URCE MANAGEMENT TODAY, JAN 1977, P. 62-65+.
STRACT VENEZUELA HAS A NATURAL WEALTH IN OIL WHICH MAY REMAIN FOR 20 YEARS LONGER. ITS ECONOMIC GROWTH WILL DEPEND ON IMPROVEMENT IN DEVELOPING OTHER INDUSTRY SUCH AS MINERALS, PETROCHEMICALS AND IMPROVEMENT IN PUBLIC FACILITIES.

4-

;E 7 EXPLOR/TXT

'LE MULTINATIONAL CORPORATIONS AND THE CHANGING STRUCTURE OF INDUSTRIES SUPPLYING INDUSTRIAL COMMODITIES.
THOR MORAN, T.H.
JRCE JOURNAL OF CONTEMPORARY BUSINESS, VOL.6, NO.4, AUTUMN 1977, P. 121-131.
STRACT THERE IS OFTEN TENSION BETWEEN FOREIGN INVESTORS AND THE SPIRIT OF ECONOMIC NATIONALISM IN DEVELOPING COUNTRIES, ESPECIALLY IN THE AREA OF EXTRACTIVE INDUSTRIES. IT IS SUGGESTED THAT NATURAL RESOURCE COMPANIES BEGIN EXPERIMENTING WITH NONEQUITY FORMS OF RESOURCE DEVELOPMENT.

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;LE PETROMIN'S SINK OR SWIM STYLE.
THOR ARBOSE, J.
JRCE INTERNATIONAL MANAGEMENT, VOL.32, NO.8, AUG 1977, P. 54-56.
STRACT MANAGERS IN THE MIDDLE EAST ARE AT A PREMIUM AND IT RESULTS IN THE COMPETENT SHOWING OF THEIR ABILITIES IMMEDIATELY AS IN THE SITUATION DESCRIBED AT SAUDI ARABIA'S GENERAL PETROLEUM AND MINERAL ORGANIZATION.

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'LE EXTRACTIVE INDUSTRIES DISCUSSION MEMORANDUM.
THOR ANON
JRCE CPA JOURNAL, VOL.47, NO.7, JULY 1977, P. 59.
STRACT THE FASB IS PROPOSING NEW ACCOUNTING REGULATIONS FOR THE EXTRACTIVE INDUSTRIES, ESPECIALLY IN THE AREAS OF EXPLORATION AND DEVELOPMENT COSTS. AT THE PRESENT TIME, IT IS DEBATING WHETHER TO HAVE A STANDARD FOR ALL THE INDUSTRIES INVOLVED OR HAVE A STANDARD FOR EACH ONE.

;-
'LE BUILDING SAND CASTLES IN THE SEA.
THOR GOODMAN, E.
JRCE CANADIAN BUSINESS MAGAZINE, VOL.50, NO.4, APRIL 1977, P. 40-45.
STRACT DESCRIBES THE SUCCESS OF THE REVOLUTIONARY SAND ISLAND CONCEPT FOR OFFSHORE OIL EXPLORATION AND DRILLING. TESTS SHOWED IT TO WITHSTAND EXTREME CONDITIONS WELL AND TO BE ECONOMICAL. HYDROSTATICALLY SUPPORTED SAND ISLANDS OFFER MEANS OF RECOVERING SEABED MINERALS.

;-
'LE WHAT'S OTTAWA GOT AGAINST MINING.
THOR FRASER, H.R.
JRCE CANADIAN BUSINESS MAGAZINE, VOL.50, NO.2, FEB

1977, P. 22-25, 38.

TRACT THE RAPID POLICY REVERSES ON THE NATIONAL GOVERNMENT LEVEL, AND THE UNCOORDINATED AND FREQUENTLY CONFISCATORY POLICIES OF PROVINCIAL GOVERNMENT ARE CREATING HAVOC WITH THE CANADIAN MINING INDUSTRY. THE NATIONAL GOVERNMENT SEEMS TO BE SHOWING SOME NEW INTEREST IN A COORDINATED, RATIONAL MINERALS POLICY, WHICH SHOULD BE ENCOURAGED. SINCE DEVELOPMENT OF MINERAL RESOURCES REQUIRES LONG RANGE PLANNING AND LARGE INVESTMENTS, STABLE GOVERNMENT POLICY IS ESSENTIAL.

LE SOUTH AFRICA: CLOSER TO THE TOP AT ANGLO AMERICAN.

THOR ANON.

RCE BUSINESS WEEK, NO.2489, JUNE 27, 1977, P. 38-39.

TRACT ANGLO AMERICAN CORP. OF SOUTH AFRICA MAY PASS FROM FAMILY CONTROL FOR THE FIRST TIME SINCE ITS FOUNDING IN 1917 IF THE OPPENHEIMER SON CANNOT TAKE OVER. GAVIN RELLY AS EXECUTIVE DEPUTY CHAIRMAN IS TRYING TO BOOST PROFITS DESPITE DECREASE IN FOREIGN INVESTMENT RESULTING FROM SO. AFRICA'S DEEPENING ISOLATION.

LE HOUSTON OIL'S FREEHAND APPROACH TO GROWTH.

THOR ANON

RCE BUSINESS WEEK, NO.2487, JUNE 13, 1977, P. 97-101.

TRACT LOW OVERHEAD COSTS AND A MINIMUM MANAGEMENT COMBINED WITH BIG EMPLOYEE INCENTIVES HAVE ENABLED HOUSTON OIL & MINERALS CORP. TO DEVELOP THE HIGH-RISK EXPLORATION BUSINESS WITH SUCCESS.

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2. Glueck, William, Strategic Management and Business Policy, McGraw Hill

3. Higgins, Robert C., Financial Management, Science Research Associates

4. Khoury, Sarkis J., Trans National Mergers and Acquistions, Lexington Books

5. Kroncke, Charles, Managerial Finance: Essentials, second edition, West Publishing Company.

6. Managerial Finance, 6th edition, Western and Brigham

7. Smith, Jay, Intermediate Accounting, Southwestern Publishing Company

GREGORY CHRIS DALEY

R E S U M E

BIOGRAPHICAL DATA:

Date and Place of Birth: September 18, 1951 in Lafayette, Louisiana

Address and Phone: 953 Briarwood, Bartlesville, Oklahoma 74003
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Education:

	G.P.A.
Massachusetts Institute of Technology	
S.M. and S.B., Mechanical Engineering	3.7
S.M., Nuclear Engineering	3.7
Oklahoma State University (current)	3.7
39 out of 54 hours completed for Masters in Business Administration	

Certifications:
Registered Professional Engineer
FAA Commercial Pilot
FAA Instrument Flight Instructor
NAUI Certified Scuba Diver

Foreign Languages: Fluent Spanish, Some Norwegian.

Other Statistics: Married, 6'4", 170 pounds.

WORK EXPERIENCE:

Phillips Petroleum Company (9/79 - Present)
Natural Resources Group, Minerals Development Division, Bartlesville, OK.
Economic Evaluation Specialist performing planning and budgeting analyses, developing merger and acquisition analysis policies, and implementing a mini computer interface to Phillips' and others' computers.

Phillips Petroleum Company (2/78 - 9/79)
Natural Resources Group, Minerals Development Division, Bartlesville, OK.
Senior Project Engineer to the Geothermal, Uranium and Coal Companies. Executed project economic analyses, development schedules, and budgets.

Phillips Petroleum Company Norway (2/76 - 2/78)
Engineering Services, Stavanger, Norway
Offshore Construction Superintendent Eldfisk, 210 miles offshore Norway, supervising derrick barges and hook up of offshore platforms.

Phillips Petroleum Europe-Africa, London, England (7/75 - 2/76)
Project Engineer for the Ekofisk projects, including the Emden Germany gas plant and the Teeside England NGL plant. Duties included contract cost control, construction evaluation, and liaison between onshore design and offshore construction.

Phillips Petroleum Company, Bartlesville, OK (6/74 - 7/75)
Engineer Liaison between the Europe-Africa group in London and corporate head quarters. Evaluated equipment, contractors and techniques for the Ekofisk project.

Massachusetts Institute of Technology (2/73 - 5/74)
Research Assistant investigating nuclear technology (9/70 - 12/70)
impact on the energy economy using interfuel econometrics.

Breit Engineering (12/72 - 1/73)
441 Gravier Street, New Orleans, LA (6/73 - 9/73)
Consulting Engineer designing an anchor system for a large work vessel and executing an economic study of tank barges for the U.S. Department of Commerce.

Amoco Exploration U.K. (6/72 - 9/72)
88 South Denes Road, Great Yarmouth, England
Petroleum Engineer in the production offices and offshore in the Leman and Indefatigable fields. Assisted in the drilling, surveying, logging, completion, and testing of gas wells. Executed a plant efficiency test at the Bacton plant.

J. Ray McDermott & Company, Inc. (12/71 - 1/72)
1010 Common Building, New Orleans, LA
Mechanical Engineer developing tension and stinger requirements necessary for laying pipelines offshore. Shell Oil Company, One Shell Square, New Orleans,

Shell Oil Company (6/71 - 9/71)
One Shell Square, New Orleans, LA (6/70 - 9/70)
Mechanical Engineer designing and inspecting offshore structures.

Ingram Contractors, Ltd., Melbourne, Australia (6/69 - 9/69)
Junior Engineer offshore Australia on a 600-ton capacity derrick/lay barge.

PAPERS:

1974 ASME Paper 74-Pet-A "Optimization of Tension Level and Stinger Length for Offshore Pipeline Installations".

1975 ASME Paper 75-Pet-I "Physical Interpretation of the Instabilities Encountered in the Equations of the Unconstrained Pipeline".

1976 Offshore Technology Conference paper 2720 "Economic Models of Subsea Pipe-Connectors".

SHORT COURSES

Merger Week - Northwestern Univ. Reservoir Engineering - SSC
Lewis Allen - Middle Management

ACTIVITIES AND AWARDS

Rotary Club International, Sons of the American Revolution, Flying, & Sailing
M.I.T. Recipient, Scott Paper Company Foundation Award for Leadership
PI TAU SIGMA, Honorary Mechanical Engineering Fraternity
TAU BETA PI, Honorary Engineering Fraternity
SIGMA CHI, Social Fraternity

El Instituto Norteamericano para Relaciones Culturales. Spanish was studied in Mexico City while living with Eng. Barocio, a Director of Pemex - 1966.

De La Salle High School, 5300 St. Charles Avenue, New Orleans, LA
Graduated fifth out of 250 with an honors diploma.

References furnished upon request. December, 1980