

GEOLOGICAL SURVEY BRANCH

1993-1994

BUSINESS PLAN



Province of British Columbia
Ministry of Energy, Mines
and Petroleum Resources

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1993/94 GEOLOGICAL SURVEY BUSINESS PLAN

INTRODUCTION

The Geological Survey Branch (GSB) of the Ministry of Energy, Mines and Petroleum Resources (the "Ministry") is charged with providing the geological inventory required to develop British Columbia's mineral resources and to manage and protect Crown lands. This Business Plan outlines the Branch's programs and activities for meeting our mandate over the coming year.

The Plan begins with some background on the province's mineral resources and related issues facing the B.C. mining industry, as well as a brief discussion of government and Ministry priorities which directly affect Branch business. Based on the Branch's current mandate and a vision of our future role, several programs and initiatives are described. Finally, the business strategies to deliver these programs are discussed, with information on financial and human resources, marketing and communications, partnerships, and external review.

THE B.C. MINERAL SECTOR: RESOURCES AND ISSUES¹

British Columbia is blessed with valuable geology, providing economic opportunities for all of its regions. The province is particularly well-endowed in base metals (copper, lead, zinc, and molybdenum), coal, and gold, as well as a number of industrial minerals (e.g., limestone and gypsum). Mining has been central to the provincial economy for over 100 years, as an important source of jobs, government revenues, and regional development. Recently, the B.C. mineral sector has faced some tough challenges in the form of lower metal prices and earnings, increased global competition, and changing public values and policy here at home.

BASE METALS

- Exploration for base metals in the province has reached a crisis point: unless new discoveries are made, known economic reserves will be depleted in about 20 years. Despite a rich mineral inheritance, base metal reserves are in serious decline, as the number of existing mines closing exceeds the projection of new mines opening. Private sector exploration has reached critically low levels due to a combination of factors including: depressed metal prices, the flight of exploration capital to other countries (e.g., Mexico and Chile), and uncertainty about land access and tenure as the government moves to establish a provincial land use plan. An attractive climate for exploration investment and an inventory of lucrative geological targets and opportunities that could become the mines of tomorrow is essential to the long-term health of the B.C. mining industry.

1 For a more detailed discussion of the province's mineral endowment and development opportunities see Ministry of Energy, Mines and Petroleum Resources, *British Columbia's Mineral Sector: Prospects for the 1990s* (Victoria: Geological Survey Branch, February 1993).

COPPER METAL RESERVES IN B.C.

(Calculated from producing mines and deposits committed to production)

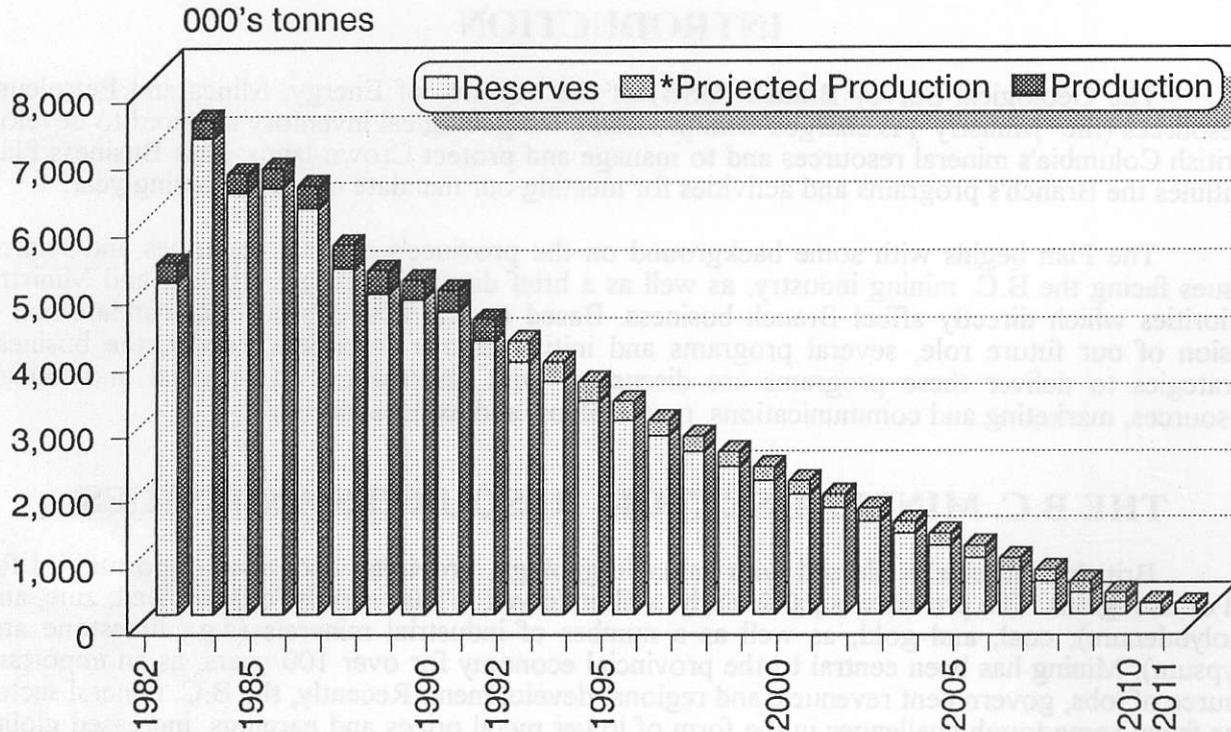


figure 1

COAL

- Especially hard hit by low prices and competition, B.C. coal producers are struggling to maintain and expand their markets, while remaining profitable at the same time. Coal makes up over half of British Columbia's mineral exports and plays a major role in the economies of the Elk Valley and the Northeast. Unlike base metals, the province has ample reserves of both metallurgical coal (for steel making) and thermal coal (for power generation) extending well into the 21st century. Coal quality attributes, such as low sulphur content and low ash basicity, make B.C. supplies attractive in global markets and can help maintain the province's position among world suppliers over the long term.

INDUSTRIAL MINERALS AND STRUCTURAL MATERIALS

- The current challenge for this sub-sector is to raise private sector investor awareness of the development opportunities in such minerals as aggregate, dimension stone, refractory and advanced ceramic minerals, talc, vermiculite, garnet, and kaolin. Urbanization of the province and a developing industrial sector are opening up new opportunities for construction materials and industrial minerals. Demand has grown steadily over the past decade, because of British Columbia's proximity to markets in the Pacific Northwest and

Pacific Rim. For some high unit value commodities (e.g., magnesite, jade), the province has also been able to serve wider world markets.

GOVERNMENT AND MINISTRY PRIORITIES

This fiscal year is emerging as one of significant change for the Geological Survey Branch, as it responds to new government and Ministry priorities. Provincial goals with respect to economic development, land use planning, resource management, and First Nations interests all have implications in our programs, staffing, and services. In particular, two major initiatives recently announced by the Ministry will affect Branch operations during 1993/94.

MINERAL STRATEGY²

- The government's new Mineral Strategy singles out geological surveys in areas of high mineral potential as one of the most cost-effective means of attracting exploration investment to the province. In addition, surveys at or close to existing mines are identified as one way to help find more ore and ensure stability in communities that are threatened by mine closures (e.g., Port Hardy and Kimberley). Announced in March 1993, the Mineral Strategy represents the province's plan to revitalize mineral exploration and improve competitiveness in the B.C. mining industry.

PLANNING AND RESOURCE MANAGEMENT

- In April 1993, the Ministry's Mineral Resources Division was reorganized to increase its regional presence and to enable a more proactive role in land use planning. Under this reorganization, responsibility for the District Geology Section passes from the GSB to the new Land Management and Policy Branch. The District Geologists have increasingly become involved in regional land use planning initiatives and this transfer allows the GSB to concentrate on providing the geoscience data required by the other Branches, the private sector, and aboriginal groups for the development and management of the Province's mineral lands.
- The Geological Survey Branch is the main supplier of mineral and coal inventory data to provincial land use planning initiatives, such as CORE (Commission on Resources and Environment). Since 1992/93, the Branch has taken part in the inter-ministry Corporate Resource Inventory Initiative (CRII) to produce better resource inventories for land use planning and integrated resource management. Under this initiative, the Branch is currently receiving funding to prepare updated mineral potential maps of the CORE planning areas.

²*A Mineral Strategy for British Columbia* is a discussion paper released by the Ministry of Energy, Mines and Petroleum Resources in March 1993.

THE GEOLOGICAL SURVEY BRANCH³

British Columbia's mineral resources are owned by the province. The Ministry is responsible for the stewardship of those resources to meet the government's sustainable development goals including economic development, protection of the environment, and the generation of wealth for British Columbians. The Geological Survey Branch contributes to provincial goals by supplying the inventory of the province's geology and the mineral resources contained therein.

The Geological Survey Branch works to maintain and expand British Columbia's geoscience database, through targeted geological surveying, in order to attract and guide private sector exploration investment. A centrally-funded geological survey ensures that geological data are high-quality and easily accessible. It also ensures that government receives the expert, objective advice needed to manage Crown lands, and the mineral resources contained within, and to develop policy. In return for its investment in surveying, the province benefits from private exploration spending, mine discoveries and developments, and the associated tax revenues from these activities. In 1991 mining companies in B.C. and their employees paid over \$401 million to governments.

MANDATE

The Branch's mandate is to:

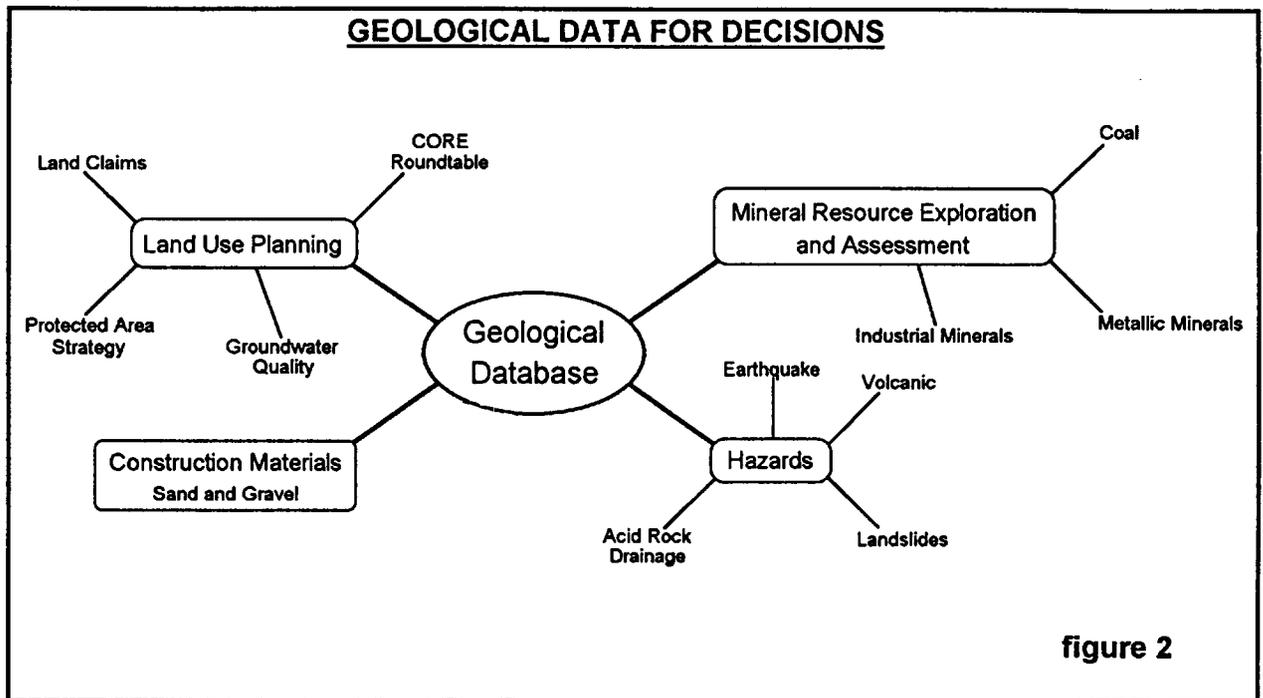
Assemble, maintain, and market a comprehensive geoscience database for British Columbia, so as to provide a sound base for (1) exploration and development of the province's mineral resources, (2) planning and resource management decisions by government, and (3) public information.

In pursuing its mandate, the Branch serves three key objectives:

ECONOMIC DEVELOPMENT

- A critical aspect of the GSB's mandate is to support provincial and regional economic growth by collecting and marketing geological data to mineral exploration companies and investors. The province must offer a competitive geoscience database, if it is to compete effectively for high-risk capital from globally active exploration firms.
- A reliable, publicly accessible geological inventory is itself a valued resource, key to successful mineral exploration and, thus, to the long-term viability of B.C. mining. Most of British Columbia's mining activity in the past has derived from mineral deposits located on or near the surface. Today, mine finding is a sophisticated process that uses new technologies to make discoveries at greater depths, or in areas with thick overburden. High-quality, integrated geoscience data lie at the heart of this more risky, technologically-advanced exploration.

³ For more detail on the Survey's mandate and role see Ministry of Energy, Mines and Petroleum Resources, *Discussion Paper on the Role and Scope of the Geological Survey Branch* (Victoria: GSB, November 1992).



RESOURCE MANAGEMENT

- Another core service of the Branch is to supply mineral inventory data to government for the development of mineral policy, land use planning, and the protection of other resource values. The GSB's survey maps and mineral evaluations are important inputs into the valuation of land and competing resource uses.

PUBLIC INFORMATION

- As part of government, the GSB exercises a wider role in providing information to the general public. The geoscience database can be used in such diverse areas as urban planning, management of the effects of natural hazards (e.g., earthquakes, slope failures, and radon gas), and education.

VISION

The Branch's vision is:

To provide the geoscience data and expertise required to meet the needs of the mineral exploration sector and government's economic development and environmental objectives. We will be a full player in the process of government so that mineral values and geological risks are considered in decision making. We will expand our role in communicating geoscience issues that affect the everyday lives of British Columbians.

Geological surveys the world over are being challenged to go beyond their traditional function of supplying data for the continued development of mineral resources. The need for

timely information for decisions on land management and protection of the environment is becoming widespread. Broadening the role of geological surveys was a theme of an international conference on "Geological Surveys in the 21st Century" held in Ottawa in April 1992.

To achieve our vision of an expanded use of geoscience data will require that the Branch:

- continues to ensure the B.C. geological database is high-quality, accessible, and understandable, employing *state-of-the-art data collection and management methods*; and
- undertakes *strategic marketing of our database* to the mineral sector, government planners, and the public.

CORPORATE VALUES

As part of the Ministry's Mineral Resources Division, the Geological Survey Branch belongs to a team charged with the stewardship and management of British Columbia's minerals. The Branch is committed to providing data and services in support of Division, Ministry, and government objectives. At the same time, we strive to create a rewarding work environment for staff in the scientific fields of geological surveying and related applied research.

The Branch's values are:

INTEGRITY

- GSB staff are dedicated to supplying reliable geological data in a timely manner, and to providing professional, objective advice on mineral matters to industry, government, and other clients.

TEAMWORK

- Strong teamwork within the Branch, with other Divisional staff at head office and in the regions, as well as with other government bodies, is crucial to realizing our mandate and vision.

LEADERSHIP

- Staff are encouraged to show leadership in carrying out their survey activities, pursuing joint initiatives with other ministries and agencies, and in representing the Division's mineral interests in government planning and policy making.

INNOVATION

- All effort is made to employ the most modern techniques for gathering, integrating, and interpreting geological information, and to keep abreast of the latest developments in geoscientific fields.

The Branch's motto is "Geoscience Data for Decision Making."

1993/94 BRANCH PROGRAMS AND INITIATIVES

The Geological Survey Branch plans a number of programs and initiatives to meet our key roles in economic development, land and resource management, and public information. These activities are outlined below. A Branch Action Plan containing more specifics on budget, staff allocation, products, target dates, and performance criteria is presented in Appendix 1.

ECONOMIC DEVELOPMENT PROGRAM

- The Branch's Economic Development Program takes into account both current priorities and anticipated changes over the next ten years for British Columbia's various mineral commodities. At present, the program centres on metals and industrial minerals. It is directly linked to Strategy Element #4 of the province's Mineral Strategy: to encourage exploration investment through targeted geological studies in areas of high mineral potential.

Base Metals Initiative

The drastic decline in copper and other base metal reserves has made exploration for these valuable minerals a priority in the province. Surveying projects under the Economic Development Program focus primarily on areas with metal mines that are nearing the ends of their lives, and on accessible areas with untested high potential for base metals.

Based on a screening process (figure 3), five projects have been selected for delivery in 1993/94:

- Northern Vancouver Island;
- Interior Plateau;
- East Kootenays (Yahk/Creston);
- Northern Selkirk (Goldstream); and
- Tulsequah (Northwest).

The Interior Plateau Project has been jointly planned with the Geological Survey of Canada (GSC), and will be supplemented by the GSC's own geophysical surveying.

Industrial Minerals Promotion

Industrial minerals offer an excellent diversification opportunity for British Columbia's mining industry. While the province is richly endowed in these minerals, historically more attention has been given to higher value metallic deposits. During 1993/94, the Branch will work to increase awareness of the development potential of industrial minerals, and will continue to identify opportunities in provincial and international markets. Partnerships with B.C. Trade Development Corporation and the Ministry of Economic Development, Small Business and Trade will help us to promote British Columbia's industrial minerals more effectively.

BASE METAL PROJECTS	NEAREST MINE AND PRODUCTION LIFE	MINERAL POTENTIAL	AGE & QUALITY OF DB	INFRA STRUCTURE	LAND USE CONFLICTS	POTENTIAL IMPACT
N. VAN. ISLAND	ISLAND COPPER, 3 YEARS	HIGH	15 YEARS OLD; POOR	VERY GOOD, EXCEPT IN NW	NEARBY, BUT NOT IN SURVEY AREAS	HIGH
INTERIOR PLATEAU	EQUITY MINE (100 KM), 1 YEAR	UNTESTED	20 YEARS OLD; POOR	MODERATE	LOW	MODERATE TO HIGH
KOOTENAY (YAHK CRESTON)	SULLIVAN MINE 7 YEARS	HIGH	25 YEARS OLD IN AREA SELECTED; POOR	VERY GOOD	LOW IN AREA SELECTED; PLANNING AREA TO NORTH	HIGH
NORTHERN SELKIRK (GOLDSTREAM)	GOLDSTREAM MINE, 3.5 YEARS	MODERATELY HIGH	SPOTTY, GOOD TO POOR; NEW TO 30 YEARS OLD	MODERATE	SOUTH HALF COVERS SERENITY PEAK STUDY AREA	MODERATE
TULSEQUAH	TWO FORMER MINES UNDER ACTIVE EXPLORATION	HIGH WITH UNTESTED AREAS	POOR, LOCALLY GOOD; 20 TO 40 YEARS OLD	AIR STRIP, RIVER ACCESS	LOW	HIGH

figure 3

Coal Quality

Given the challenges facing B.C. coal producers, the GSB has two initiatives:

- compiling coal quality data to assist innovative production and marketing of B.C. coals; and
- participating with coal companies in cooperative, minescale projects, to solve specific geoscience problems affecting production.

In 1993/94, the Branch will continue to update and publish coal quality data. Discussions are ongoing with the coal industry to identify and work on geological problems that influence the competitiveness of British Columbia's coal.

RESOURCE MANAGEMENT PROGRAM

The key objective of the Branch's 1993/94 Resource Management Program is to produce GIS-compatible⁴ mineral potential maps for use in the CORE Round Table process. This information will be used to categorize the province's land base and to make assessments concerning future use. Over the longer term, mineral potential data are needed for the entire province, to be used by other planning bodies, resource ministries, and the Ministry of Aboriginal Affairs (for land claims). To ensure a strong, thriving mineral sector, areas of high mineral potential must be identified, and mineral values must be properly represented in land use decision making.

Regional Mineral Potential Evaluations

Maps required for the CORE process are at the 1:250,000 or regional scale. The Commission selects the regions to be covered, with funding for the mineral potential maps provided under the Corporate Resource Inventory Initiative. For 1993/94, the priorities are: completion of the Vancouver Island, Kootenays, and Cariboo Region evaluations; and initiation of the Nass-Skeena, Thompson-Okanagan, and Mid-Coast Region evaluations. The remainder of the province will be covered in 1994/95.

Subregional Evaluations

In addition, the Branch carries out subregional mineral potential evaluations. These studies are an integral part of our 1:50,000 scale geological mapping program. Evaluations are also conducted on a custom basis for clients such as the Ministry of Environment, Lands, and Parks and the Ministry of Aboriginal Affairs. In 1993/94, the Branch will prepare final reports for the Nisga'a and Kakwa Recreational Areas.

Regulatory Program

As part of its resource management mandate, the Ministry regulates the private sector mining industry through a variety of Acts and Regulations. The GSB delivers several services in support of this role:

Assessment Report Approvals

- In order to maintain mineral and coal tenure, the B.C. mining industry is required to submit Assessment Reports documenting the results of its exploration programs. Branch staff review these reports, ensure that they meet legislated standards, and microfilm and distribute them throughout the province for client use. As a result of this activity, a first-rate library of over 24,000 reports submitted since 1946 forms the backbone of British Columbia's mineral inventory database. In 1993/94, the Branch will continue to computerize products and improve their delivery.

⁴ GIS (Geographic Information Systems) refers to computerized data systems that allow for the integrating or "layering" of different kinds of information -- for example, data on the geology, geochemical & geophysical signatures and mineral resources of a given parcel of land.

Prospector Training

- Historically British Columbia's proven mine finders, prospectors, continue to make new discoveries based on modern exploration techniques and traditional perseverance. This year, the GSB will ensure delivery of the popular Petrology for Prospectors Course in Nelson, sponsored in partnership with the Chamber of Mines of Eastern B.C. The Branch will also offer basic workshops on MINFILE and RGS, our extensive mineral inventory and geochemical databases, to help prospectors develop exploration programs.

Assayer Certification Program

- The province's unique Assayers Certification Program has seen more than 600 assayers certified since 1895. In part due to the program, British Columbia is now a world leader in the assaying industry, with over 80 percent of its business in export services. Based on the results of an independent review conducted in 1992, minor changes to the program will be made during 1993/94.

Mineral Tenure Reform Project

Under the Mineral Strategy (Strategy Element #2), the Division has embarked on a project to modernize the provincial system for managing mineral tenures. The Branch will participate in this project by developing revised regulations for Assessment Reports. In consultation with industry, the Branch will investigate the feasibility of having reports submitted in digital format.

PUBLIC INFORMATION AND MARKETING PROGRAM

- In order to meet growing public policy needs, the GSB's data outputs must be timely, reliable, and easily understood by both decision makers and people affected by their decisions. An open dialogue between Branch staff and those using geological data is essential. During 1993/94, the Branch will continue to: improve the format and delivery of geological data to traditional clients in industry; identify new clients and develop information packages adapted to their needs; and communicate the importance of geoscience data to the general public.

Urban Geology Program

Geological data and expertise are increasingly used by municipal, regional, and provincial planners. Most are non-specialists and require geoscience data interpreted in easily understood ways. Maps can be produced on various themes including type of bedrock, depth of overburden, seismic risk, slope stability, and sand and gravel inventory. In 1993/94, the Branch will assess the cost-effectiveness of implementing an Urban Geology Program, investigate opportunities for outside funding, and make final recommendations on these matters to Ministry Executive.

BUSINESS STRATEGIES

Delivering Branch programs will involve a number of business strategies for 1993/94. These strategies are outlined below. Generally, in carrying out our functions, the Branch continues to emphasize:

TEAMBUILDING

- To improve the effectiveness of our geological surveys, specialists from the different geoscience disciplines of bedrock mapping, surficial mapping, geochemistry, and mineral deposits work together to assess the geology and mineral potential of a region.

INNOVATIVE METHODS

- Branch staff use up-to-date techniques, such as GIS mapping, to integrate geoscience and other land use data. For our mineral evaluations, the Branch has developed an innovative approach, using a panel of experts from government and industry, to estimate the potential of undiscovered minerals in a given tract of land.

DATA INTEGRITY

- The GSB's highly-regarded databases, including MINFILE, COALFILE, ARIS, and RGS, are continually updated, refined, and made more accessible. Two of our databases, mineral potential and MINFILE, have been identified by Crown Lands as candidates for inclusion in Phase 3 implementation of Land Data B.C. Land Data B.C. is a government initiative to provide the technology to enable sharing of land information amongst the various Ministries and the private sector. In 93/94 the Branch will work with the Surveys and Resource Mapping Branch, MELP, to ensure these two databases meet Government's interchange standards.⁵

ACCOUNTABILITY

- Branch work is geared towards a series of "deliverables," such as journal articles, Open File maps, workshops, lectures, stakeholder contacts, and poster sessions at trade shows (e.g., the Cordilleran Roundup in Vancouver, Northwest Mining Convention in Spokane and the Prospectors and Developers Convention in Toronto.) Survey projects are followed by an evaluation of impact and effectiveness.

BRANCH RESOURCES

For 1993/94, the Geological Survey Branch has a total budget of \$6.099 million and a staff complement of 81.5 positions, of which 60 are full-time.⁶ The Branch's base budget is \$5.63 million. On top of our base budget, the GSB has been allocated \$0.469 million under the government's Corporate Resource Inventory Initiative.

In keeping with government's fiscal management objectives, the Branch has reduced or eliminated programs that are not critical to short term resource management or economic development. Resources have been redeployed to priority programs, such as the base metals

⁵ The current state of the province's geoscience database is discussed in Appendix 2.

⁶ Appendix 3 presents a breakdown by function of Branch budget and staff. Our organization is outlined in Appendix 4

initiative and regional and subregional mineral potential evaluations. We will continue to examine ways to increase efficiency, and reorient existing resources to meet Ministry and government objectives.

MANAGEMENT LEADERSHIP

- In its commitment to empower our highly skilled and experienced staff, the Branch has adopted a new project leadership approach for this year's base metals initiative. Each multi-disciplinary team of geoscientists has been empowered to choose its project leader, design the field program, and plan outputs and products to communicate results to clients. The team will include a manager who will focus on administrative support, leaving scientific leadership largely to the project leader. This increased delegated management style, in turn, will enable Branch managers to pursue new clients and develop partnerships with other agencies.
- The transfer of the District Geologists means that the Branch will be somewhat removed from our traditional industry client base in the regions. As a result, our management and staff will have to work diligently to maintain close ties with the District Geologists, so that both the Division and Branch can be properly represented to our common clients.

STAFF DEVELOPMENT

- During the coming year, the Geological Survey Branch will continue our commitment to provide staff training and development. Training is essential to increase productivity, boost morale, and keep pace with changes in geoscience, public relations, the work environment, and other areas. Individual training needs are identified, and form part of each employee's annual performance appraisal.
- Special emphasis will be placed on team building, marketing skills, communication, and media relations. Comprehensive field safety training will remain a priority, and will continue to be scheduled annually. Some \$30,000 of the Branch's budget has been allocated for training in 1993/94.

MARKETING STRATEGY

- Increased awareness and use of the Branch's databases and expertise requires strategic marketing to clients in industry, government, and the general public. Branch staff will prepare a detailed Marketing and Communications Plan listing upcoming events, such as trade shows, commodity forums, and technical meetings, in which the Branch could participate singly or as part of a Division team.

Clients

British Columbia's mineral exploration industry relies on the prompt release of new inventory data and other geoscience information. The GSB strives to ensure that our products meet the demands of traditional clients in terms of both format and timeliness. In 1993/94, the Branch will conduct an audit of current and planned publications, to determine the best format for data releases.

In an effort to expand our service base and better meet public policy needs, the Branch will also pursue non-traditional or new clients. This year, we will prepare geoscience information targeted at non-technical audiences. Existing information packages will be reformatted to serve potential new clients.

Partnerships

During 1993/94, the GSB will develop partnerships with other public and private agencies. Joint initiatives will be pursued in areas such as resource inventories, geological hazards, and community planning.

The Branch will continue its cooperative efforts with the Geological Survey of Canada (GSC), whose mandate and programs are broader than the GSB's. Under a Memorandum of Understanding signed in 1991, a Joint Cooperation Committee was formed to oversee the development of joint annual and long-term plans for geoscience studies. For 1993/94, a strategic planning session with the GSC is proposed to more effectively integrate long-term geoscience activities in the province.

EXTERNAL REVIEW

- Outside advice on Branch programs and resource allocations is essential to ensure our accountability. Two comprehensive, independent audits of the GSB's programs and future directions were undertaken in 1981 and 1990. Following the 1981 review, a Technical Liaison Committee was appointed, composed of representatives from industry, academia, and the GSC, to provide ongoing advice to the Minister and Ministry Executive. This committee plays an active and important role in the Branch's program planning and evaluation cycle.
- During 1993/94, the Committee will be consulted in the spring to review the proposed work program, and in the fall to evaluate progress and achievements. In addition, a planning retreat will be held to discuss broadening of the mandate and future directions for the GSB.

ACTION PLAN

The Branch has developed an Action Plan (see Appendix 1), which details all of the major projects we will undertake this year. It has been developed by staff to help translate our goals and objectives into measurable, achievable outputs.

Comments and questions on this Business Plan, or on the activities of the B.C. Geological Survey Branch, are welcome and should be directed to the Chief Geologist, Dr. Ron Smyth.

APPENDIX 1

**ECONOMIC DEVELOPMENT
AND
RESOURCE MANAGEMENT
PROGRAMS**

ECONOMIC DEVELOPMENT PROGRAM

A. BASE METALS INITIATIVE

1. NORTHERN VANCOUVER ISLAND

Team Leader: A. Panteleyev
Overall Budget: \$250,000.00

Project Statement:

- Northern Vancouver Island is richly endowed with mineral resources, but the existing geoscience database is incomplete and badly needs updating. The region is a high priority on CORE's planning agenda. As well, the Island Copper Mine which has operated continuously for the past 21 years with major economic benefit to the region is nearing the end of its life.
- As part of the Base Metal Initiative this project will update the geoscience database, assess the mineral potential of the region and attempt to identify clues to discovering other deposits. This will be achieved by integrating the results of mineral deposit studies, bedrock and surficial geological mapping, and geochemical surveys, described below.

a) Bedrock Mapping Component

Team Leader: G. Nixon / N. Massey
Budget: \$132,700.00

1993-94 Work Plan: 1:20,000 scale geological bedrock map of 092L/12 and 092L/11 W and compilation at 1:50,000

Outputs: Geological Fieldwork 1993 article, and 1:50,000 scale Open File map. A workshop will be held at the end of fieldwork and a poster prepared for Cordilleran Roundup, 1994.

b) Surficial Mapping Component

Project Leader: P. Bobrowsky
Budget: \$47,000.00

1993-94 Work Plan: Surficial Mapping and till geochemistry survey of 092L/5 E1/2, 092L/6 W1/2 and 092L/11.

Outputs: Surficial Geology and till geochemistry maps for the above areas.

c) Mineral Deposits Studies Component

Project Leader: A. Panteleyev
Budget: \$37,297.00

1993-94 Work Plan: Geological mapping at 1:20,000 scale and study of hydrothermal effects in the highly altered and mineralized Bonanza Volcanic rocks in Quatsino map area 092L/12 with particular reference to the Red Dog, NW Expo, Hushamu and Mt. McIntosh deposits.

Outputs: Geological Fieldwork 1993 report, and appropriate external publications.

d) Exploration Geochemistry Component

Project Leader: S. Sibbick
Budget: \$33,400.00

1993-94 Work Plan: Stream geochemical anomalies in Northern Vancouver Island (092L) will be investigated in those drainages that do not contain known mineralization to discover the sources of each anomaly.

Outputs: Geological Fieldwork 1993 report and Open File Map, Field workshop and Cordilleran Roundup 1994 poster.

2. INTERIOR PLATEAU

Team Leader: L. Diakow
Overall Budget: \$245,000.00

Project Statement:

- The geoscience database in the Interior Plateau region is incomplete and out of date in part because of an extensive overburden cover. The region, is considered to have significant mineral potential; it is also a high priority on CORE's planning agenda.
- This project will update the geoscience database, assess the region's mineral potential and provide guidelines for effective prospecting in this heavily glaciated region.
- This will be achieved by integrating the results of bedrock and surficial geological surveys, mineral deposits and geochemistry studies in Fawnie Creek (092F/03) and Tsacha Lake (093F/02) map areas as described below.
- **Outputs:** All components will contribute Open File Maps, Geological Fieldwork 1993 reports, and Cordilleran Roundup 1994 posters.

a) Bedrock Mapping Component

Project Leader: L. Diakow
Budget: \$108,390.00

1993-94 Work Plan: Bedrock mapping at 1:50,000 scale of the remainder of Fawnie Creek (094F/3) and of the western half of Tsacha Lake (093F/2, W 1/2) map areas.

b) Geochemistry Component

Project Leader: S. Cook
Budget: \$69,375.00

1993-94 Work Plan: Lake sediment survey of the entire Fawnie Creek (093F/3) and Tsacha Lake (093F/2) map areas. This will involve approximately 340 sample sites. Analysis of samples for gold and 34 other elements by INAA and AAs techniques.

c) Surficial Geology Component

Project Leader: V. Levson
Budget: \$64,735.00

1993-94 Work Plan: Surficial mapping and till geochemistry survey for Nataalkuz Lake (093F/6), Fawnie Creek (093F/3) and Tsacha Lake (093F/2) map areas.

d) Mineral Deposit Studies Component

Project Leader: R. Lane
Budget: \$2,500.00

1993-94 Work Plan: Examine the most important mineral occurrences, map in detail representative deposits, and develop descriptive models to guide exploration.

3. TULSEQUAH (N.W. B.C.)

Project Leader: M. Mihalynuk
Budget: \$189,200.00

Project Statement:

- Geological mapping in the region hosting the important volcanogenic massive sulphide Tulsequah Chief and the nearby Polaris Taku gold deposit is out of date and poorly

addresses the mineral potential of this active precious-base metal camp. An update is needed to facilitate and stimulate mineral exploration in the region.

1993-94 Work Plan: Update and expand mapping in areas 104K/13 and 104K/12 to produce 1 1/2 new 1:50,000 map sheets with particular reference to the hosting lithologies and potential for massive sulphide and gold deposits.

Outputs: Geological Fieldwork 1993 report, two 1:50,000 Open File maps, Cordilleran Roundup 1994 poster display.

4. EAST KOOTENAY (YAHK/CRESTON)

Project Leader: D. Brown
Budget: \$75,000.00

Project Statement:

- The Creston area (082F/01, 082F/02 E 1/2 and 082G/04) has high potential for base metal deposits. It is underlain by the same rock succession which elsewhere contains a number of significant deposits, including the Sullivan at nearby Kimberley, one of the world's largest lead-zinc-silver deposits; the Troy copper-silver deposit in Montana, until recently one of the largest silver producers in the United States; and the Sheep Creek copper-cobalt deposits, also in Montana. The most recent geological mapping in the area was published in 1941 and badly needs updating.

1993-94 Work Plan: Geological mapping at 1:100,000 scale of Creston map area (082F01). Detailed studies of selected deposits by T. Hoy. Detailed stratigraphic studies by A. Legun.

Outputs: Geological Fieldwork 1993 report, Open File map, Cordilleran Roundup 1994 poster display.

5. NORTHERN SELKIRK (GOLDSTREAM)

Project Leader: J. Logan
Budget: \$55,000.00

Project Statement:

- The Goldstream area, that part of 082M east of the Columbia River, contains numerous base metal volcanogenic massive sulphide deposits, including the operating Goldstream Mine.

- Existing geological mapping is either of small local areas or of insufficient detail to effectively guide mineral exploration. Detailed studies of deposits are limited. As part of the base metal initiative, this information needs extending and updating.

1993-94 Work Plan: The mineral potential of the area will be assessed and promoted by:

- Updating and expanding mapping at 1:100,000 scale as needed.
- mapping and describing mineral occurrences
- refining the absolute age of various deposit types.

Outputs: Geological Fieldwork 1993 report, Exploration 1993 Part B deposit descriptions, Open File map at 1:100,000 scale, Cordilleran Roundup 1994 poster display.

6. AIKEN LAKE

Project Leader: F. Ferri
Budget: \$40,000.00

Project Statement:

- The northern Quesnel Trough, site of the recently discovered large-tonnage Mt. Milligan copper-gold porphyry, has recently undergone aggressive exploration. There is concurrent interest in carbonate-hosted lead-zinc deposits to the east, in the Cassiar Terrane. The existing geological database at 1:250,000 scale was inadequate to delineate areas of higher than average mineral potential.

1993-94 Work Plan: Preparation of a Paper Series final report, Geoscience Series maps and mineral potential maps for the outstanding areas.

B. INDUSTRIAL MINERALS

1. PROMOTION

Project Leaders: D. Hora / G. Simandl
Budget: \$34,500.00

- GSB, plus contributions, to be determined, from BC Trade and Western Diversification Office

Project Statement:

- British Columbia enjoys a rich industrial mineral endowment, good infrastructure in the south, competitive energy prices and a strategic location. This offers an opportunity to promote our industrial minerals.

1993-94 Work Plan: Analysis of market potential, identification of target companies, publication of brochures and catalogues on opportunities, feasibility reviews and education of professional and technical groups will be undertaken to increase investment and exports in the industrial minerals sector.

2. MAGNESITE PROJECT

Project Leader: G. Simandl
Budget: \$2,500.00

Project Statement:

- Magnesite is an important source of various types of magnesia and of magnesium metal. Baymag is a major magnesite mine. The geoscience database on this important deposit type needs updating.
- This project will document resources, economic potential, and develop a model for this type of deposits.

1993-94 Work Plan: Produce a bulletin report on the sedimentary hosted magnesite deposits of SE British Columbia and descriptions of the five main deposits.

C. COAL

1. COAL QUALITY, PHASE 3

Project Leader: D. Grieve
Budget: \$13,000.00

Project Statement:

- Coal quality is a critical factor in coal resource evaluation. This phase of the project is the summarization and publication of results of previous phases of the project.

1993-94 Work Plan: Summarize and write up results of phases 1 and 2. Supplement trace elements and phosphorous results with SEM-EDX analyses. Visit all coal mines to discuss quality issues.

Outputs:

- Coal Quality in BC paper
- Trace Elements in BC Coals open file
- Promotional brochure

2. COAL STRATEGY

Project Leader: A. Matheson

Project Statement:

- Thermal coal is re-emerging as a significant source of energy. Further to recommendations in the Coal in BC Strategy report, our thermal coal resources will be assessed and promoted.

1993-94 Work Plan:

- Prepare a summary report on thermal coal basins.
- An inventory of thermal coal deposits at or near tidewater will be made and potential for small tonnage production assessed.

3. DEPOSIT SCALE STUDIES

Project Leader: B. Ryan
Budget: \$15,000.00

Project Statement:

- Coal companies are seeking mining and processing information that will reduce costs. Ministry staff have access to deposits owned by competing companies. Studies will be carried out on a number deposits.

1993-94 Work Plan: Distribution and genesis of calcite at Quinsam coal will be assessed, remedial action suggested, report published.

4. COALBED METHANE (CBM)

Project Leader: B. Ryan
Budget: \$5,000.00

Project Statement:

- CBM is an undeveloped energy resource in the Province. An appropriate database is required to attract exploration and development. Controls on methane adsorption/desorption must be understood before the resource can be documented.

1993-94 Work Plan:

- Micro permeability of coals in SE BC mines will be assessed.
- Description characteristics of Quinsam and Telkwa coals will be assessed.

5. COAL WASHABILITY

Project Leader: M. Holuszko

Project Statement:

- Washability characteristics of coals are critical in coal resource evaluation because they affect recovery, beneficiation and end use. Washability is one of the parameters used in the new Universal Coal Classification Scheme. Washability assessment of BC coals has been done on a region by region basis. This final phase of the project will publish the results of previous work.

1993-94 Work Plan: Preparation of final report summarizing and interpreting results of washability study.

RESOURCE MANAGEMENT PROGRAM

MINERAL POTENTIAL INITIATIVE

Team Leader/Manager: Ward Kilby
Budget: \$469,700.00 (CRII)

Project Statement:

- Current, easily accessible mineral resource inventory and potential inventory information is critical to sound land use decision making. The Mineral Potential Initiative will produce regional scale (1:250 000) mineral inventory and mineral potential analysis of the province. The priorities and schedule of the initiatives are dictated by the needs of the CORE regional land use planning process.
- A new compilation of the province's geology will be combined with the most current mineral statistics information, known resource endowment and estimates of future discoveries by industry experts to produce a quantitative assessment of the mineral endowment of BC.

A. VANCOUVER ISLAND REGION

Project Leader: N. Massey

1993-94 Work Plan: Complete final assessment maps and formal report for Vancouver Island.

Outputs: Digital and paper versions of geology and mineral potential maps and a written report documenting procedure and results.

B. KOOTENAY REGION

Project Leader: T. Hoy

1993-94 Work Plan: Obtain industry expert estimates, produce final maps and reports.

Outputs: Digital and paper versions of geology, mineral potential maps and a written report documenting procedure and results.

C. CARIBOO - CHILCOTIN REGION

Project Leaders: A. Panteleyev / P. Schiarizza

1993-94 Work Plan: Obtain industry expert estimates, produce final maps and reports.

Outputs: Digital and paper versions of geology, mineral potential maps and a written report documenting procedure and results.

D. NASS - SKEENA REGION

Project Leader: D. MacIntyre

1993-94 Work Plan: Complete geology compilation, obtain industry expert estimates of future discovery potential, produce digital and paper geology, mineral potential maps and a written report documenting procedure and results.

Outputs: Digital and paper versions of geology, mineral potential maps and a written report documenting procedure and results.

E. MID-COAST REGION

Project Leader: D. Alldrick

1993-94 Work Plan: Complete geology compilation, obtain industry expert estimates of future discovery potential, produce digital and paper geology, mineral potential maps and a written report documenting procedure and results.

Outputs: Digital and paper versions of geology, mineral potential maps and a written report documenting procedure and results.

F. THOMPSON-OKANAGAN REGION

Project Leader: P. Schiarizza

1993-94 Work Plan: Complete geology compilation, obtain industry expert estimates of future discovery potential, produce digital and paper geology, mineral potential maps and a written report documenting procedure and results.

Outputs: Digital and paper versions of geology, mineral potential maps and a written report documenting procedure and results.

G. B.C. MINERAL DEPOSIT PROFILES

Project Leaders: D. Alldrick, E. Grunsky, D. Lefebure and V. Preto

1993-94 Work Plan: Produce deposit profiles for all B.C. mineral deposits. Compile and classify grade and tonnage data for these deposit types and present the data graphically.

Outputs: Deposit descriptions and grade and tonnage curves with approximately one hundred profiles and related data and statistics.

APPENDIX 2
STATE OF THE GEOSCIENCE DATABASE

STATE OF THE GEOSCIENTIFIC DATABASE

The 1990 external audit ⁷ concluded that the GSB has a major task ahead to catch up with the level of geological mapping developed in other parts of Canada.

The Committee identified that the need for mapping data is chronic. Despite its mineral endowment, BC is the least geologically mapped province in Canada. Eight hundred of the 1,050 mapping areas at 1:50,000 scale in BC have enough rock exposures and high enough mineral potential to be important for mineral mapping. Of the 800 areas, only about 11 percent have been satisfactorily mapped to date. Mapping at a scale of 1:50,000 is the smallest that is directly useful, because only at that scale can a geologist break down formations into their constituent lithologies.

The Review Committee was convinced that the level of activity in support of the mineral industry was barely a minimum, and feared that the effort was not up to the task of facilitating the industry find sufficient ore to replace mined reserves in BC. The Committee recommended that immediate steps be taken to rectify the shortfall. The areas recommended for additional GSB resources aimed at facilitating the mineral discovery process are:

- Enhance scope of 1:50,000 geological mapping;
- Develop a Geological Information System (GIS) to integrate geoscience information and make it available to all stakeholders;
- Participate in joint research with industry and university departments to expedite new exploration technology.

In response to the above recommendations and to the budget pressures, the Branch eliminated programs in 1993/94 that do not meet shorter term economic development goals. Resources have been re deployed to projects under the base metals initiative.

ELECTRONIC ACCESS TO MINERALS INFORMATION

A Branch goal is to have all our databases available to the public in digital form, and, perhaps, on line through LandData BC. In accordance with this goal, we are working with government's Resource Inventory Committee (RIC) to clearly define bedrock and surficial mapping and other standards that apply to our products. We are also working with other government agencies to ensure that our inventory data is compatible with and accessible through government wide standards that are being developed.

⁷ The Future Mandate, Organizational Structure and Recommended Resource Distribution for the B.C. Geological Survey. Canadian Geoscience Council, March 1990. MEMPR Information Circular 1990 - 8.

APPENDIX 3
BRANCH RESOURCES AND ORGANIZATION

BRANCH RESOURCES AND ORGANIZATION

The Branch is currently organized into six sections; five technical and one administrative.

The Branch has 81.5 staff in Fiscal Year 1993/94 plus 2 FTE's allocated under the CRII program. 19 staff are working on time limited field survey projects.

The base budget for the Branch in Fiscal Year 1993/94 is \$5.6 million. This is supplemented by \$0.469 million from CRII to deliver the mineral potential mapping project.

To meet its budget target the Province deferred spending in 93/94 on the Canada-British Columbia Partnership Agreement on Mineral Development (MDA-2). Geoscience projects initiated under this program in 1992 have been put on hold.

1993/1994 Geological Survey Branch Budget

Operational Group

Chief Geologist Office	\$606,000
Scientific Review	\$445,000
Mapping and Resource Evaluation	\$908,000
Economic Geology	\$1,120,000
Geoscience Information	\$632,000
Vancouver Office	\$207,000
Environmental Geology	\$579,000
Economic Development Field Projects	<u>\$1,133,000</u>
TOTAL	\$5,630,000
<u>Mineral Potential Initiative (CRII)</u>	<u>\$469,000</u>
GRAND TOTAL	\$6,099,000

GEOLOGICAL SURVEY BRANCH

