

D. Heon

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**M E M O R A N D U M**

CONFIDENTIAL

**TO:** Maurice Albert, Deputy Minister F - 1  
**FROM:** Jesse Duke, Mining Facilitator F - 1  
**DATE:** Friday, June 06, 1997  
**SUBJECT:** Departmental involvement in the development of Protected Areas.

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After extensive internal consultation, I would like to propose the following departmental strategy for our involvement in the development of protected areas:

The identification of any protected area has important implications for the ability of the government to effectively manage and benefit from future resource development. Outlined below are principals and recommendations for implementation of the Protected Areas Strategy, and other existing processes which may propose protected areas.

Implementation of these principles and recommendations should assist the government to achieve its objective towards protected areas without unduly compromising future opportunities associated with other natural resource values.

**BASIC PRINCIPALS:**

Whitehorse Mining Initiative: The Protected Areas Strategy (PAS) should incorporate the principles and goals for protected areas, as agreed in the Whitehorse Mining Initiative Leadership Accord.

The Yukon Government has endorsed the Whitehorse Mining Initiative Leadership Accord. This Accord was the product of a broad-based national effort that was initiated at the national Mines Ministers Conference when it was held in Whitehorse in 1992. The principles and recommendations suggested below are consistent with the broad based agreement achieved in the Whitehorse Mining Initiative for protected areas. Key items include:

- Completion by the year 2000.

- Clear, scientifically based criteria for determining number and amount of regions selected.
- Final selection taking into account appropriate economic, environmental and social information.
- Clear government policy that mining is an acceptable and permitted activity in non-protected areas.
- Aboriginal peoples should be involved in the selection and management of protected areas
- The selection of protected areas across jurisdictions should be coordinated to achieve representation without undue duplication.

PAS is a component of land use planning. Decisions to protect an area, should be done in the context of a full understanding of all other resource values and the opportunity costs that may be associated with a decision to protect an area.

Public interest: It is the Yukon Government's ultimate responsibility to ensure that any land use decision, including the establishment of protected areas, are in the general public interest. Part of this responsibility includes an assessment of all the monetary and non-monetary costs and benefits of establishing protected areas.

Sustainable Development: Land use decisions should be done in the context of Sustainable Development: they must not impede the ability of present and future generations to meet their needs.

Maximizing Benefits: Any area selection should be done in the context of maximizing the long term potential benefit to Yukon residents from Yukon's natural resource endowment, including protected areas, minerals, oil and gas, forestry, tourism and recreation. A decision to protect an area may exclude Yukoners enjoyment and benefit from many other natural resources of the area if any decision is made to withdraw areas from disposition for development of mineral, oil and gas or forestry resources. Area selections must be made to ensure the impact on Yukon's ability to profit and benefit from the natural resources is minimized.

UFA responsibilities: The process should be linked with the land use planning processes, as mandated by the Land Claims Umbrella Final Agreement. Community involvement, particularly through regional resource and land use planning councils, will be critical to the success of the strategy.

Land Selections and Withdrawals: It is essential for the protected areas strategy to include an explicit commitment to the following:

- No land will be permanently withdrawn from disposition until a comprehensive resource inventory and potential assessment has been completed.

Lands that are withdrawn will be of the size required to provide appropriate ecoregion representation or protection of the particular special feature under consideration. withdrawal of lands that are not necessary to achieve representation should be avoided.

## **ECONOMIC DEVELOPMENT'S COMMITMENT TO SUPPORT THE DEVELOPMENT OF PROTECTED AREAS:**

To assist the Yukon Government achieve the objectives of identifying areas appropriate for protection we are proposing a new method of conducting mineral resource assessments. **This method would incorporate mineral resource information in the initial selection process.**

The Yukon Geology Program Management Committee has approved a plan to conduct a Yukon-wide compilation of mineral resource information. This information will provide the basic database from which resource management decisions can be made, including identification of areas where insufficient information exists and further study will be required before a mineral potential assessment can be completed. The primary purpose is to ensure the government has all available information on mineral resources prior to recommending areas for withdrawal from future development opportunities. This work is to begin immediately, with completion expected in the late spring of 1998.

This mineral resource compilation will become an important tool to assist in all land-use planning processes in the future. To be effective, use of this information must be considered effectively in the land use planning decision process. The PAS should clearly address this issue.

## **RECOMMENDATIONS FOR THE PROTECTED AREAS STRATEGY:**

1. Clear methodology: A clear methodology for identifying all resource values needs to be established (for all resources). The strategy should clearly recognize and commit to integrating resource assessment information into the initial selection of protected areas.
2. Resource Sector Steering Committee: A Yukon Government 'Steering Committee' that includes departments with specific resource responsibilities should coordinate resource value assessments, and jointly recommend appropriate areas for protection based on clearly defined principals (as suggested above). Yukon Government interests include protected areas, oil and gas, minerals, tourism and recreation and traditional First Nations uses.
3. Integration with other Land Use processes: The roles and responsibilities of the other groups, particularly those mandated under the Land Claims UFA, should be clearly identified and integrated into the process. The Land Use Planning Commission and various regional resource councils should play an active role in the development of protected areas.
4. Areas presently under consideration under the Parks Implementation Plan and the land claims negotiations under the UFA for special protection also should be subject to these principals and recommendations.

## BACKGROUND :

Status of the Protected Area Strategy: It is our understanding a final Protected Areas Strategy should be ready for cabinet approval early next year. The process of developing this Strategy will involve extensive public and stakeholder consultation over the next few months. A draft strategy will be developed by Renewable Resources this summer, and vetted through a consultation process this fall for finalisation in the Winter.

The PAS will not include specific area recommendations for protection. This would occur after the PAS is approved.

The Government Leader has made a commitment to completion of the process by the spring of 1998.

Protection under other processes: Given the government's commitment to protected areas, we expect there to be considerable progress towards identifying areas for protection prior to the implementation of a PAS under the existing Parks Implementation Plan and through Special Management Areas as part of ongoing land claims negotiations.

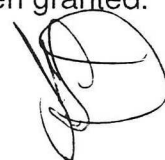
Departmental concerns and observations: Based on this department's present and previous experiences with the development of protected areas, a number of concerns should be noted:

Offers by geological staff to engage actively in the PAS have been received with a 'lukewarm' response. The steering committee set up Renewable Resources to guide the PAS does not have any other departmental representation at this time.

There is a strong sense among staff the final decisions for a PAS will be community based and driven by First Nations, under the authority of the UFA Land Use Planning processes. It is not clear how integration of the various interests and responsibilities can be accomplished.

Renewable Resources has not offered to involve Ec Dev. in the decision process for recommending a protected area under existing processes. Some staff anticipate considerable difficulty in achieving active participation. Information about potential candidates for protection have 'traditionally' been very difficult to obtain. Geology staff have in the past requested the ability to 'revisit' park selections, not just fiddle with the boundaries, when mineral resource values are at stake. This has not been granted. The commitment to involve Ec.Dev. in the initial planning process is missing.

cc: Bob Holmes, Senior Director, Mines and Resource Development  
Rod Hill, Manager, Mineral Resources  
Grant Abbott, DIAND Staff Geologist  
Danielle Heon, Mineral Assessment Geologist  
Scott Milton, Senior Planner, Resource Development



Attachments: Whitehorse Mining Initiative: Protected Areas Strategy  
Yukon Mineral Potential Project: Proposal

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## PROTECTED AREAS

In response to accelerating habitat loss, species extinction and the human-related disruption of ecosystems throughout the world, Canada has joined the global initiative to identify and protect representative portions and special features of all natural regions as evidenced by the Tri-Council Statement of Commitment to Complete Canada's Networks of Protected Areas. It is also recognized that access to land is a fundamental requirement to the mining industry and that the cumulative impact of setting land aside from exploration and development can have serious economic consequences. Notwithstanding this, there is a consensus amongst stakeholders that Canada does need to protect representative samples of both its natural regions and its critical wildlife habitats. There is also consensus on the need for clear, scientifically based criteria for the identification of protected areas and for all stakeholders to be involved in the final selection of protected areas. However, there is not yet agreement amongst stakeholders regarding the number of regions and the amount of a region that need to be protected in order to achieve representativeness. A timely and definitive establishment of those protected areas required to achieve representativeness in Canada's natural regions, and clarification of permitted uses elsewhere, will allow governments to meet their environmental objectives and provide the mining industry with greater certainty regarding access to land for exploration and development.

### **Our Principle**

Protected area networks are essential contributors to environmental health, biological diversity, and ecological processes, as well as being a fundamental part of the sustainable balance of society, economy, and environment.

### **Our goals**

To create and set aside from industrial development by the year 2000 those protected areas required to achieve representation of Canada's land-based natural regions.

To use, after establishing where they do not already exist, clear scientifically based criteria for determining both the number of regions and the amount of a region that need to be protected in order to achieve representativeness.

To ensure that the selection of protected areas is undertaken consistently across all jurisdictions, including an identification of candidate protected areas by government, based upon scientific criteria, followed by consultation with the mining industry and all other stakeholders, and final selection taking into account appropriate economic, environmental and social information.

To have government policies clearly state that, subject to complying with all applicable legislation and regulatory requirements, mining is an acceptable and permitted activity in non-protected areas.

To provide that mining may be an acceptable and permitted activity in conservation-related areas not required to achieve representativeness so long as such development is compatible with the objective of such an area and is congruent/consistent with relevant legislation and management policies.

To ensure that Aboriginal peoples are involved in the selection and management of protected areas, benefit from economic opportunities related to development and operation of protected areas and have access to protected areas consistent with management plans for traditional economies and ceremonial, cultural, subsistence, and social practices.

To coordinate the selection of protected areas across jurisdictions so as to achieve representation without unnecessary duplication.

## CHAPTER 4

# COMPLETION OF CANADA'S PROTECTED AREAS NETWORKS

### 1. BACKGROUND

Protected areas serve many functions globally and domestically. In concert with responsible development activity throughout the country, protected areas networks are recognized as contributing substantially to environmental health, biological diversity and ecological processes. As a fundamental part of a sustainable balance of economy and environment, protected areas hold scientific, educational, recreational, economic and inspirational values for current and future generations.

As with mineral development, the issue of certainty is central to achieving the goals of protected areas initiatives. Long-term protection that is legislated, or formalized in other ways by governments, is critical for the maintenance of representative areas within each ecosystem, and critical wildlife habitat.

The mining industry, environmental groups, and other stakeholders endorse the completion of the protected areas networks, as agreed to in the *Tri-Council Statement of Commitment* (See the discussion below and Appendix 5).

There is, however, a shared concern about the continuing uncertainty surrounding the completion of these networks.

The mining industry is concerned, in part, because it is not clear what areas will be withdrawn or restricted, nor is it clear how large those areas will be, or how adjacent areas will be managed. Second, the longer it takes for protected area candidate sites to be identified and publicized, and for the final selection to be completed, the longer the uncertainty will inhibit the industry's ability to plan its exploration and development activities. Third, the industry is concerned that decisions on protected areas are sometimes being made without complete information being available regarding the mineral resource potential of the area in question. Many of the areas considered for protected areas have been subject to little or no government geological mapping or industry mineral exploration. This factor, in combination with the limitations of geological deposit models, makes it extremely difficult, if not impossible, to identify areas of high mineral potential. Better information could help decision-makers to select protected areas that achieve the goals of the protected areas networks, while minimizing the impact on the mining industry to find and develop economic mineral deposits.

All Aboriginal groups are concerned that there be full consultation in the process used to complete Canada's protected areas networks.

Environmental groups are concerned about similar, process-related issues, such as the slow progress of governments in getting candidate areas on the table and in establishing the protected areas. Environmental groups are also concerned about: the loss of potential candidate areas to development; compromises on protected area boundaries to accommodate other interests; provincial governments changing their protected area policies to allow resource development in some protected areas; and the impact on protected areas of incompatible resource development on adjacent lands.

The urgent need for the protection of representative natural regions is reflected in the *Tri-Council Statement of Commitment to Complete Canada's Networks of Protected Areas*, endorsed by the federal, provincial and territorial Ministers of Environment, Ministers of Parks, and Ministers of Wildlife, in Aylmer, Quebec, in November 1992. The *Tri-Council Statement of Commitment* was also endorsed by Canada's Forest Ministers and representatives of the four national Aboriginal organizations. The five commitments are:

- Complete Canada's networks of protected areas representative of Canada's land-based natural regions by the year 2000 and accelerate the protection of areas representative of Canada's marine natural regions.
- Accelerate the identification and protection of Canada's critical wildlife habitat.
- Adopt frameworks, strategies, and time-frames for the completion of the protected areas networks.
- Continue to cooperate in the protection of ecosystems, landscapes and wildlife habitat.
- Ensure that protected areas are integral components of all sustainable development strategies.

One impetus for the *Tri-Council Statement of Commitment* was the **Canadian Wilderness Charter** (see Appendix 6), which led to the launch by the World Wildlife Fund of the Endangered Spaces campaign. The goal of the Endangered Spaces campaign is to achieve the representation of each of Canada's natural regions within a defined protected areas network. As of the end of 1993, 32 of these 422 natural regions were fully represented, 52 were moderately represented, 112 were partially represented, and 226 had little or no representation at all (see Appendix 8). In total, the percentage of Canada that is set aside as protected areas, where mining is prohibited, is 4.9 per cent.<sup>5</sup>

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<sup>5</sup> The statistics in this paragraph are taken from the *Endangered Spaces Progress Report, 1993, No. 4*, published by the World Wildlife Fund, except for the figure of 4.9 per cent, which is explained in Appendix 2.

There is a range of protected areas, from those that are most stringently protected, to those that are less so. However, the heart of a protected areas network lies in lands free from industrial development and managed to maintain the natural ecological integrity in perpetuity. In addition, lands adjacent to protected areas also play an important role as buffer zones or management areas, where exploration and mining, among other land uses, may be regulated more intensively.

In establishing the protected areas networks, the rationale, scientific criteria and traditional ecological knowledge are critical in defining explicit and defensible selection criteria. Criteria and methods for achieving representation that are based on scientific research have been developed. One such method is discussed in Appendix 7.

The early identification of candidate protected areas should provide the mining industry with a greater degree of certainty with respect to access to mineral bodies. To help reduce potential land use conflicts, governments are therefore encouraged to identify **and make public** their candidate sites as soon as possible. These sites should be carefully tailored to meet the need for representativeness without withdrawing land from other land uses where it is not necessary. Working with relevant stakeholders, those governments that have not already done so, should release the criteria that will be used to select and review preliminary lists of candidate areas, from which a final list of candidate areas will be drawn.

To guide their actions to complete a network of protected areas, most jurisdictions have developed a map of natural regions. The goal is to protect an area that represents the range of elements found in that natural region. However, because of a lack of inter-jurisdictional cooperation in drawing the natural regions, there is little coordination across political boundaries. Hence, it is possible that the same natural features will be represented twice within the protected area networks on both sides of a political boundary. The LAIG therefore urges all governments to coordinate their efforts across political boundaries to avoid unnecessary duplication of efforts and the removal of more land than is required for conservation purposes.

Another issue related to the establishment of protected areas is the provision of interim protection/management measures for candidate sites, in use in some jurisdictions in Canada.

From the perspective of the environmental sector, interim protection/management measures are an important means of ensuring the preservation of the value of candidate sites as protected areas during the evaluation and selection process. These measures will normally require closure of candidate sites, or the restriction of access to them, for industrial purposes, during the period of evaluation and selection. As part of these measures, recognition should also be given to the concern of potential or existing industrial or commercial users that such closures or restrictions

not be in effect for any longer than is necessary. Overall, the process of nomination and selection of protected areas ought to be speedy. In addition, special measures could be devised, such as shorter time-lines (fast tracking) for candidate sites where industry indicates that it has a special interest in a candidate site.

The mining industry is also concerned about the use of interim protection/management measures for candidate protected areas sites. These concerns include: the nature of the protection; the length of time involved; the size and extent of the areas involved; the criteria used to select such sites; treatment of the existing third-party rights and interests; and the signals sent to investors, especially if the areas involved are extensive.

Finally, better understanding would also be promoted by having and effectively communicating common standards and terminology across jurisdictions. One such set of standards and terminology that may assist in promoting understanding is the standard classification system adopted by the International Union for the Conservation of Nature (IUCN) (see Appendix 9). While Canada's different jurisdictions may follow the content of those standards, the use of different terminology can confuse prospective land users.

## 2. PRINCIPLES

1. The WMI LAIG endorses the five commitments in the November 1992 Tri-Council Statement of Commitment to Complete Canada's Networks of Protected Areas, which calls on governments to:
  - Complete Canada's networks of protected areas representative of Canada's land-based natural regions by the year 2000 and accelerate the protection of areas representative of Canada's marine natural regions.
  - Accelerate the identification and protection of Canada's critical wildlife habitat.
  - Adopt frameworks, strategies, and time-frames for the completion of the protected areas networks.
  - Continue to cooperate in the protection of ecosystems, landscapes and wildlife habitat.
  - Ensure that protected areas are integral components of all sustainable development strategies.
2. It is important for governments to complete an early identification of all candidate protected areas, and then, in part, to avoid potential land use conflicts, to initiate full consultation with all stakeholders during the final selection phase of the selection process.

3. Governments should create and set aside from industrial development by the year 2000 those protected areas required to achieve representation of Canada's land-based natural regions.<sup>6</sup> Elsewhere, protected areas may be open for development, as long as this development is compatible with the objectives of the protected area and consistent with relevant management policies and legislation in that particular jurisdiction.
4. Aboriginal communities must be involved in the selection and management of protected areas. These communities should have access to protected areas for traditional, ceremonial, cultural, subsistence and social practices. Aboriginal communities should benefit from economic opportunities related to the development and operation of protected areas consistent with management plans for those areas.

### 3. OBJECTIVES

1. That for all jurisdictions, the rationale and criteria for the identification and selection of the networks of protected areas, as set out in the Tri-Council Statement of Commitment, are defined and candidate sites made public as soon as possible.
2. That the selection of sites be coordinated among jurisdictions so as to achieve representation while avoiding duplication wherever and to the extent possible.

### 4. RECOMMENDATIONS

1. Governments should enhance efforts to ensure that all parties with an interest in land use, including Aboriginal communities, environmental groups, labour and the mining industry, have equal access to, and can participate meaningfully in all stages of the completion of Canada's protected area networks (e.g. determining protected area criteria and management regimes; candidate site selection; evaluation of candidates, etc.).
2. Governments should coordinate and integrate, to the extent possible, their processes for the selection of sites for protected areas, so that natural regions are adequately represented without being duplicated across jurisdictions.
3. For all jurisdictions, the criteria and process for the identification and selection of protected areas should be defined and the candidate sites made public as soon as possible.
4. Mineral information inventories should be conducted and evaluated prior to the final selection of a protected area.

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<sup>6</sup> Industrial development includes: mining, logging, oil and gas, and hydro-electric development.

5. All stakeholders should work to understand and disseminate information regarding the criteria and process for the identification and selection of protected areas.
6. Governments should consider what interim protection management measures for protected area candidate sites, if any, would be appropriate, to ensure that these sites are not compromised by development.
7. Where governments are using or considering using interim protection/management measures, such as full closure or restricted access, for candidate protected areas sites, they should first carefully determine the need for and likely impact of such measures on all affected stakeholders, as well as the local, regional or national economy. Consideration must also be given to when these measures should be applied and their duration. Any interim protection/management measure should only be applied following full consultation with all affected stakeholders.

**PROPOSAL**  
**Yukon Mineral Potential Project**

**Background**

In spite of Yukon's small population, Yukon land is coming under increasing pressure from competing and commonly conflicting interests. These include First Nation land claims, ongoing mining exploration and development, increasing wilderness tourism and demand for parks and recreational areas, and general concern for the environment and wilderness preservation. Two initiatives which have begun to address these concerns are: 1) the Territorial Government's commitment to implement a Protected Areas Strategy by the 2000 through the Parks System Plan, and 2) the establishment of a Land Use Planning Commission as called for in the Umbrella Final Agreement for Native Land Claims. During the next several years, pressure will increase to withdraw certain lands from disposition.

One of the most important considerations in selecting land for withdrawal is mineral potential. The Yukon Government has committed to doing mineral assessments prior to land being set aside for territorial parks. Typically, candidate areas are chosen by Parks, solely on ecological grounds, and then the Department of Economic Development evaluates their mineral potential using the two-phase approach outlined in "Mineral Assessments for Proposed Territorial Parks: Method" by the DIAND/YTG Mineral Assessment Steering Committee. A Phase 1 assessment produces a comparative ranking of the mineral potential of candidate areas based on analysis of existing data and some new fieldwork. A Phase 2 assessment, involving additional fieldwork and further evaluation and report writing, could be needed to refine park boundaries or in areas of potential resource conflict. Phase 1 alone is a process which requires one full-time geologist, a budget of about \$150 000, and 12-15 months to complete - for each candidate area.

Clearly, with the anticipated increase in the number of areas proposed for some type of withdrawal and a short time frame, this selection process will not be feasible without a large increase in budget and staff. A different approach and method will be necessary to meet YTG's goals. One way of streamlining the process would be to include consideration of mineral potential alongside ecological values in the early stage of the selection process. If mineral potential was included in the initial screening, the choice of candidate areas would be more straightforward as areas of high mineral potential could be immediately avoided in favour of lower potential areas of similar ecological character. No Yukon-wide mineral potential assessment exists. However, expertise, the tools and personnel are now available to undertake one. Once completed a Yukon mineral potential assessment would provide a way to streamline the selection process.

**Proposed New Method**

We are proposing a new method for selection of protected areas that would incorporate mineral potential into the initial screening process. The new method is one which has been applied in British Columbia in support of a comprehensive land-use plan (CORE process) and is used throughout Canada and the United States. The assessment process in these jurisdictions follows

several steps process such as those described above but is different in that large tracts of land are covered by the assessments, not specific target areas. The whole province of B.C. was ranked by this method. In Alaska, half of the lands selected for state ownership were chosen on the basis of their mineral potential.

By the proposed method, rankings of the relative potential of specific areas derive from computer-modelled probabilistic estimates. Following digital compilation of all available data, an expert panel is convened and each expert is asked to estimate the probability of finding one or more mineral deposits of a specific type within a certain area. The experts also give their level of confidence for their predictions. The results are tabulated using the Monte Carlo computer program that converts the experts' estimation into probability graphs. The program then combines the estimates with known grade and tonnage data to predict the amount of each commodity that can then be assigned a monetary value. The value of all commodities in each area are totalled and used to rank areas relative to one another.

Normally, this project would require a great amount of time and effort to compile a consistent and current regional geological map, data on mineral deposits and occurrences, and a set of mineral deposit models and grade/tonnage models upon which to base the assessment. For example the British Columbia assessment took 5 years to complete. In the Yukon, however, most of the necessary compilation for such an assessment in the Yukon is, or soon will be, available. In January 1998, a working copy of a digital geological map of the Yukon, commissioned from the Geological Survey of Canada by the Yukon Geology Program in 1996, will be available. Yukon MINFILE contains an adequate description of most mineral deposits and occurrences. Mineral deposit models developed by the B.C. Geological Survey Branch (B.C.G.S.B.) for their mineral resource assessment require minor modification for use in the Yukon. Experts are now in place in the Yukon to lead the work and B.C.G.S.B. personnel may also be available to assist with the assessment process. These factors combine to provide the opportunity to undertake a mineral potential assessment at minimal cost and in a relatively short period of time.

The proposed new Phase 1 method would involve a 3-steps:

- Step 1- Digital compilation of geoscientific data, tract selection and preparation of deposit models and grade and tonnage data
- Step 2- Expert estimator's workshop, production of a mineral potential map of the Yukon
- Step 3- Following initial selection of park candidates, review of that selection, recommendation to support selection or to go on to a phase 2 if more work is needed or if conflicting interests could be resolved or refined with further work

Phase 2 method would remain unchanged, but the level of detail and type of fieldwork would be evaluated case-by-case.

## **Limitations**

Mineral potential studies offer a valuable tool in any comprehensive land use planning process by providing an unbiased scientific perspective on mineral potential. By incorporating essential

information on mineral resources into a multidisciplinary approach, they contribute to informed decision making and help alleviate potential land use conflicts. Through this process, adequate ecoregion representation can be obtained without compromising the access to the potential mineral wealth.

Mineral assessments are based on the best geoscientific information available when the assessment is made. Assessments must be revised and updated as the state of knowledge of mineral deposits evolves, new geological information becomes available, technological advances modify the way we find and exploit mineral deposits and socio-economic conditions change (e.g.: metal prices, infrastructures, etc.). Several pertinent examples serve to remind us that the ever-evolving nature of our geological knowledge affects our ability to predict the occurrence of mineral deposits. One such example is the present interest in diamonds in the NWT. Nobody would have thought 6 years ago that that area would be so rich in diamond-bearing kimberlite pipes (the host rock to the diamond deposits). Improving the geoscientific data base can lead to spectacular results as witnessed by the present activity and the discovery of significant mineral deposits in the Finlayson Lake area. New exploration ideas have led to the discovery of the ICE massive sulphide deposit, which is located in rocks that were, until the discovery in 1996, thought to be of low potential for this type of mineralization.

These examples are reminders that the concept of mineral potential is dynamic and this type of tool is best used when realizing its limitations. This type of study represents a “best guess at the time” on a resource that is hidden in the ground and cannot be quantified with absolute certainty. Conclusions derived from such a study are only as good as the data that are available for the evaluation.

### **Benefits and Products**

A Yukon-wide mineral potential assessment will benefit implementation of the protected area strategy, and also provide fundamental data for: other land use planning initiatives, the mineral industry through generation of new exploration ideas, and the Yukon Geology Program through better planning and product development. We anticipate the following products and benefits.

- The main products will be 1:250 000 scale mineral potential maps of the Yukon, which rank geological tracts for use during initial selection of protected area candidates.
- An important secondary product will be a map showing the quality and completeness of information upon which the assessment is based. This information will be important not only for evaluating the reliability of the assessment, but also for planning future work by the Yukon Geology Program
- The process for selection of protected areas will be faster and more efficient if initial land selections are made with mineral potential in mind. Since the new Phase 1 assessment is not as rigorous or as detailed as the present Phase 1 assessment, we stress the need to make greater use of Phase 2 studies in areas where the potential of an area is contentious, but these too should be less expensive and more efficient.
- Staff from the Yukon Geology Program and other experts from the mineral industry and government will participate in the assessment. This will be a learning process that is

expected to lead to new mineral exploration ideas, and to identify gaps in the geoscience data base. The resulting new ideas and their possible applications will be published as a bulletin which would serve to stimulate mineral exploration. An analysis of gaps in the data base will be used as a guide to plan future work by the Yukon Geology Program.

- The assessment process requires that available geological, mineral occurrence, geochemical and geophysical data be compiled and integrated on a geographic information system. This exercise is an opportunity to upgrade the Yukon geoscience data base and to make much of it available in a digital format. Digital geological data is in demand from the mineral exploration community, and will be of use to other government agencies involved in land use issues.

## **Process**

### Develop GIS Capability (begin April 1, 1997)

- Hire a GIS technician
- Undertake a GIS needs assessment
- Purchase GIS System and software
- Develop GIS-based system for internal and public access to: the geological map of Yukon, regional geochemical surveys, regional geophysical surveys, and MINFILE
- Produce maps for workshops
- Other products as required

### Compilation (October 31, 1997 - February 28, 1998)

The co-ordinator, who is expected to be Danièle Héon, will have the following duties:

- Co-ordinate the entire process
- Consult with public interest groups such as the Yukon Chamber of Mines, C.Y.F.N.
- Oversee the GIS technician and data compilation
- Organise expert estimators meetings and workshops
- Complete final reports and maps
- Manipulate geochemical and geochemical data to highlight anomalies

It is assumed that the geological map of the Yukon (now being prepared by S. Gordey, at the Geological Survey of Canada), regional stream geochemistry, and geophysics is available digitally and that there will be minimal cost in obtaining and using these data.

The compilation phase will consist primarily of:

- Altering British Columbia deposit models, median tonnage and grades to fit the Yukon situation
- Selecting tracts consisting of rocks with common geological and metallogenic characteristics
- Plotting of tracts on geological map
- Deciding which deposit models are likely to occur in which tracts
- Compilation of digital topography, geology, geochemistry, geophysics, mineral deposit

information in digital layers that can be superimposed and analysed

Tract selection, deposit model fine tuning, and selection of deposit models will be a co-ordinated effort by Yukon Geology Program Staff. This phase would require about two weeks to complete, starting February 1. Digitizing of tracts will follow.

#### Estimators Workshops (March 1998)

This key phase of the project requires the bringing together of various experts from industry and government to solicit their input. A typical British Columbia workshop for estimating a region 1/5 the size of the province would last five days and cost \$30K. A number of these people live locally in the Vancouver area and experience has found that some companies pay for participation by their staff in the workshops. The worst case for here, using ten outside people paid at consultants wages including airfare, meals, and accommodation for a five day workshop would be in the order of \$45K.

#### Planning Workshop (late March 1998)

Yukon Geology Program Staff will meet to discuss Metallogeny and Exploration Targets Bulletin and work plan for the Yukon Geology Program in light of the results of the estimators workshop.

#### Synthesis of Estimators Workshop Results (April, 1998)

This phase is time consuming. Compiling the estimators results and enter these data into spreadsheets for processing in the Monte Carlo Simulation can be done by a local contractor, under supervision of the co-ordinator.

### **Products**

- Evaluation map of geoscience database (to be completed March 1998)
- Proposal for future work by the Yukon Geology Program (to be completed April 1998)
- Final assessment maps ( to be completed May 31, 1998)
  - compiled and plotted by the co-ordinating geologist
- Yukon Metallogeny and Exploration Targets Bulletin (to be completed Nov. 1998)
  - staff geologists write contributions in April, May 1998
  - co-ordinator compiles into bulletin over the summer
- Geological map of the Yukon (to be completed Nov. 1998)
  - compiled by S. Gordey, Geological Survey of Canada
  - joint G.S.C./Yukon Geology Program publication
- GIS database (ongoing, to be available to public Nov. 1998)
  - for public and internal use, containing geological map of the Yukon, regional geochemical surveys, regional aeromagnetic surveys, MINFILE, digital topography, and other data

**Budget (does not include salary of current permanent staff)**

**1997/98**

Compilation phase

- GIS needs assessment \$15 K
- Computer workstation, and GIS software \$30 K
- GIS technician \$40 K
- Miscellaneous items required for this phase (no labour included): \$10 K

Estimators Workshop

- Estimator's wages, travel costs for participants etc. \$45K
- Miscellaneous material for workshop 5K

TOTAL

**145 K**

**1998/99**

- GIS technician \$50 K

Synthesis of Results

- Contract to compile data \$5 K

Products

- Miscellaneous administrative needs \$10 K

TOTAL:

**\$65 K**

**Budget (does not include salary of current permanent staff)**

**1997/98**

Compilation phase

- GIS needs assessment \$15 K
- Computer workstation, and GIS software \$30 K
- GIS technician \$40 K
- Miscellaneous items required for this phase (no labour included): \$10 K

Estimators Workshop

- Estimator's wages, travel costs for participants etc. \$45K
- Miscellaneous material for workshop 5K

TOTAL

145 K

**1998/99**

- GIS technician \$50 K

Synthesis of Results

- Contract to compile data \$5 K

Products

- Miscellaneous administrative needs \$10 K

TOTAL:

\$65 K