

RESPONSE

Geological Survey of Canada response to the Summary Report of the Review Committee on GSC'S Minerals Geoscience Program

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SUMMARY

The Geological Survey of Canada accepts most of the Canadian Geoscience Council Review Committee's recommendations and is already acting on some of them. Integration of mapping and metallogenic activities should be facilitated by the new Project Approval System, which will help achieve the cultural change called for by the Committee. We agree that there is a need to recruit new young scientists, and that digital data bases need to be made available, and we are active in both areas. Increased funding for minerals research is being sought; some new funds have been attained for the 2000-2003 period. The GSC is grateful for the useful insights and recommendations provided by the Review Committee.

RÉSUMÉ

La Commission géologique du Canada approuve la plupart des recommandations du Comité de révision et a déjà pris des mesures à l'égard de certaines d'entre-elles. Ainsi, le nouveau système d'approbation des propositions de projets devrait-il faciliter l'intégration des activités dans

les domaines de la cartographie et de la métallogénie, favorisant ainsi le changement de culture administrative souhaité par le Comité. Nous convenons qu'il est nécessaire de recruter de jeunes scientifiques, que des bases de données numériques doivent être disponibles, et nous y travaillons. Nous explorons diverses possibilités d'accroître nos budgets de recherches minérales; de nouveaux modes de financement sont déjà en place pour la période 2000 à 2003. La CGC est remercié le Comité de révision pour les idées nouvelles et ses recommandations.

INTRODUCTION

Minerals geoscience has been central to the mission of the Geological Survey of Canada (GSC) since its founding in 1842, and the Survey is proud of the many contributions that it has made to both economic development and scientific understanding in this area during the intervening 158 years. However, the context in which the GSC operates has changed profoundly over the last decade. In 1994, the federal government announced that it would withdraw from mining and, accordingly, would not renew the Mineral Development Agreements which had accounted for a significant portion of GSC funding. This, coupled with the government-wide Program Review beginning in 1995, resulted in an overall reduction of the GSC's budget of more than 40% as compared with 1990.

The Intergovernmental Geoscience Accord, signed in 1996, defined principles and mechanisms of co-operation between the GSC and its sister agencies in the provinces and territories. The 1990s have also seen the globalization of the mineral exploration industry, with Canadian companies becoming much more active internationally, and the

emergence of global environmental issues such as climate change, toxic substances, and natural disasters. In light of all these changes, it seemed appropriate for the GSC to ask the Canadian Geoscience Council (CGC) to provide advice on the state and future directions of the GSC's Minerals Geoscience Program. The GSC is very pleased with the report assembled by the Review Committee appointed by the CGC, and can accept the majority of its recommendations, either in whole or in part.

ORGANIZATION AND ROLE OF THE GEOLOGICAL SURVEY OF CANADA

The Survey is moving from a science program defined in terms of geoscience disciplines and activities to one more closely aligned with the goals and objectives of Natural Resources Canada, the Federal Department of which the GSC is a part. This is not an abstract exercise. The Departmental Goals are the basis of the Minister's accountability to Parliament and it is believed that by extending the alignment down to the level of individual projects, the linkage between government policy, on the one hand, and scientific activities, on the other, will be better understood from both perspectives.

Although the Minerals Geoscience Program *per se* will cease to exist as a result of the new accountability structure, minerals geoscience activities will continue to be an important part of the overall GSC program. Specifically, work of the type envisaged by the Canadian Geoscience Council Review Committee will be carried out largely within the GSC's new Sustainable Development Portfolio. Indeed, GSC management believes that this new approach will facilitate implementation of the Review Committee's more important recommen-

dations, as outlined below.

While GSC management acknowledges that enhanced funding is required for minerals geoscience, there is little likelihood that this can be achieved within the existing Abase budget, which is the GSC's main source of funding. In common with most national geological surveys, the GSC is being increasingly required to address issues beyond its traditional mandate, particularly in the areas of environmental stewardship and public health and safety. This does not mean that there will not be opportunities to acquire new funding for minerals geoscience. For example, the most recent federal budget allocated \$5 million per year over the next 3 years to the GSC for the Targeted Geoscience Initiative (TGI), with the specific goal of stimulating mineral exploration (see the GSC's Targeted Geoscience Initiative, 2000). This incremental funding amounts to an increase of about 40% in GSC expenditures on minerals-related mapping and research, albeit for only 3 years.

PROJECT SELECTION AND STRATEGIC PLANNING

The Earth Sciences Sector of Natural Resources Canada has recently published a Strategic Plan for the 2000-2005 period (Earth Sciences Sector, 2000) and the GSC is in the process of developing specific objectives for each program area, building on the foundation set out in the sector plan. Thus, the Sustainable Development Portfolio, which will incorporate most minerals-related geoscience, has the following strategic intent:

In close co-operation with the provinces and territories, to promote the discovery of new mineral, energy and water resources, in order to sustain currently producing areas and support new economic development and growth. This will be achieved through integrated, multi-disciplinary and partnered mapping and resource studies in areas of significant resource potential, as well as through national programs of thematic research and dissemination of data and knowledge to stakeholders.

We believe that this intent, as it pertains to minerals, captures some of the Review Committee's key recommendations with respect to mandate, planning, and, in particular, the need to integrate mapping

and metallogenic studies.

As noted by the Committee, the GSC's new Project Approval System (PAS) should promote a cultural change within the organization that will foster cross-disciplinary/cross-divisional co-operation. The Committee's proposal to establish a high-level advisory committee to comment on the program on an annual basis is under active consideration.

The PAS will also be used as the vehicle to rationalize the program and achieve more favourable ratios between salary and operating budgets. As part of the implementation plan for PAS, all previously existing GSC projects are being wound down in an orderly fashion over a 3-year period. Moreover, the various internally funded special GSC programs including NATMAP, a co-operative national bedrock and surficial geological mapping program; EXTECH, a program to stimulate new approaches to exploration in mature mining districts; the Metals in the Environment (MITE) program; and Hydrogeology will be integrated within PAS. Thus, after 3 years, virtually all GSC Abase project activities will undergo the same project selection process. The GSC will also move to ensure that externally funded projects are subject to similar review processes, consistent with, if not identical to, the Project Approval System.

MANAGEMENT

The GSC's Mineral Resources Division has introduced a simplified organizational structure with two rather than three subdivisions. However, GSC management does not believe that there would be much to be gained by changing the overall divisional structure of the Survey at this time.

Earth Sciences Sector is committed to improving project management practices across the organization. A set of project management criteria was established in 1999 and many of these are embodied in the PAS. An audit of performance will be undertaken in 2001. The provision of additional technical and administrative support to project leaders is seen as a desirable objective, but it is unlikely that such support can be deployed from central functions in the GSC. On the contrary, GSC management has concluded that insufficient support is

a problem that exists at the corporate as well as at the project level.

GSC management shares the Review Committee's conviction about the need to recruit younger scientists in priority areas and will proceed as resources permit. However, this will be difficult in view of the fact that the overall salary to operating ratio in the GSC is already higher than the optimum. Management is working actively with other federal science organizations to promote awareness in central agencies of the need to rejuvenate the scientific workforce, and is optimistic that the issue will receive attention.

PROGRAM EVALUATION

As noted above, the GSC is abandoning the activity-based program structure that existed at the time of the Committee's review, and implementing a new results-based management approach. Nevertheless, some of the Committee's key recommendations with respect to program priorities are reflected in the following statement from the GSC Prospectus (call for proposals under the GSC's Project Approval System, unpublished):

The GSC will work in two ways to promote new mineral discoveries. First, it will complement the work of the provinces and territories in filling key gaps in geoscience knowledge, both at the regional scale, through NATMAP-style projects, and in specific mining districts, through EXTECH projects. Regional metallogenic studies, geophysical and geochemical surveys will be integrated with the former, wherever possible. Second, GSC will also engage in thematic studies that are consistent with its role as the federal survey. Priorities in this respect include (a) studies that link ore-forming and post-mineralization processes to the tectonic setting, and (b) research on mineral deposit types of particular significance to Canada.

The Review Committee emphasized the importance of digital databases and identified the lack of systematic corporate data management practices as a serious gap. GSC management is committed to rectify this shortcoming, not only in minerals-related activities but throughout the Survey. Accordingly, the GSC will make all its metadata publicly

accessible by March 2002. Furthermore, the GSC plans to have its highest priority data sets available on-line by March 2002 as well.

PUBLICATION

The GSC is about to embark on a major reform of its publication process with the intent of making maps, data and reports more rapidly available to its clients at substantially lower cost. This will involve making many products available either through the Internet or "print-on-demand." The Review Committee recommends development of a policy whereby all data generated by GSC project work belong to the Survey. In fact, this has always been the case: the Crown retains title to all intellectual property resulting from the work of government scientists.

The Review Committee raises an interesting question about the relevance of GSC work published in the national and international literature. GSC believes that peer-reviewed literature will continue to be an important outlet for the results of its research. There are several benefits. It is one important way in which the Survey demonstrates the scientific excellence of its research. The national and international literature often reaches a wider audience than in-house publications. This route also removes much of the burden of publication costs from the taxpayer and, conversely, provides a source of potential revenue to the scientific societies. Recent examples from the Minerals Geoscience Program include results of three comprehensive research projects on world-class base metal deposits in Canada: the Kidd Creek and Bathurst volumes published by the Society of Economic Geologists, and the Sullivan monograph, to be published by the Geological Association of Canada. It is also important to understand that any given project normally results in a variety of products, ranging from preliminary results in Open File or GSC Current Research format, data compilations on CD-ROM, comprehensive syntheses in GSC or externally published monographs, and specialized research in the scientific journals. Notwithstanding these comments, GSC does agree that it needs to monitor and understand the impact of its products, and choose the most appropriate venue for any given output.

RESEARCH INFRASTRUCTURE

State-of-the-art laboratories are essential to many elements of the GSC program, not only minerals geoscience. However, the GSC recognizes the need to align laboratory activities with overall corporate priorities as has been done with project activities through introduction of the Project Approval System. To this end, the GSC will undertake a review of all its laboratories and other research infrastructure during the fall and winter of 2000. This may involve some rationalization of facilities and services, but perhaps more importantly, it will ensure that the cost of infrastructure is reflected in overall project budgets.

FUTURE INITIATIVES AND OPPORTUNITIES

The GSC agrees with the Committee's observations with respect to new directions, and has incorporated many of these in its new strategic plan (Earth Sciences Sector, 2000). In particular, regional metallogeny, geophysics and geochemistry will be integrated to the extent possible in new NATMAP-style regional mapping projects. EXTECH will be the preferred vehicle for studies at the scale of individual mining camps.

Collaboration is rapidly becoming the GSC's *modus operandi*. For minerals-related work in particular, the Intergovernmental Geoscience Accord sets out formal principles and mechanisms of cooperation with the provinces and territories. Partnerships lie at the heart of the recognized success of NATMAP and EXTECH. The recently instituted Earth Sciences Sector/Natural Sciences and Engineering Research Council (ESS/NSERC) Research Partnerships Program and Postgraduate Scholarship Supplement Program will facilitate collaboration with academia.

The desire to apply existing skills in new directions was one of the motivating factors underlying introduction of the GSC Project Approval System. This new approach allows scientists in any division to submit project proposals which address any of the GSC goals and objectives. The specific example of the use of exploration geochemical expertise to address environmental issues has been a reality for 4 years through the GSC's Metals in the Environment (MITE) program.

CONCLUSIONS

The GSC is grateful for the time and care that the CGC Review Committee devoted to the review of the Minerals Geoscience Program, and for the useful insights and recommendations contained in its report. The Survey accepts most of the recommendations and has already begun to implement some of them. Indeed, many of the recommendations are being adopted across the GSC. Other recommendations, particularly those related to increased funding, can be accepted in principle, but cannot be considered in isolation from other parts of the program. The GSC will actively seek new government funding for minerals-related work. It has already had modest success in this regard and was allocated \$15 million over 3 years for the Targeted Geoscience Initiative in the February 2000 federal budget.

REFERENCES

- Earth Sciences Sector, Natural Resources Canada, 2000. Strategic Plan, 2000-2005. Available in full in English and French at: www.nrcan.gc.ca/ess/StratDir_e.pdf [also available in summary form as a glossy brochure in English and French].
- GSC's Targeted Geoscience Initiative, 2000: Survey Update, *Geolog*, v. 29, pt.3, p. 32-34.

Accepted as revised 30 October 2000