

Geoscience – Canada's Profession: A Review of Professional Geoscience in Canada, and the Development, Activities and Relationships of Geoscientists Canada

Oliver Bonham

Volume 37, numéro 4, december 2010

URI : https://id.erudit.org/iderudit/geocan37_4art01

[Aller au sommaire du numéro](#)

Éditeur(s)

The Geological Association of Canada

ISSN

0315-0941 (imprimé)

1911-4850 (numérique)

[Découvrir la revue](#)

Citer cet article

Bonham, O. (2010). Geoscience – Canada's Profession:: A Review of Professional Geoscience in Canada, and the Development, Activities and Relationships of Geoscientists Canada. *Geoscience Canada*, 37(4), 180–189.

Résumé de l'article

La reconnaissance de la société envers l'importance des services fournis par les géoscientifiques est due en grande partie aux initiatives de mise en œuvre de systèmes d'inscription professionnelle menées par les gouvernements pour assurer des compétences de base et une transparence professionnelle. Et c'est la nature complexe et spécialisée du travail du géoscientifique qui a incité les autorités à conférer à la profession des géosciences le pouvoir légal de s'autoréguler.

À l'instar des autres professions au Canada, la géoscience est régulée aux niveaux provincial et territorial. Ses règlements définissent la constitution des organismes de réglementation; déterminent les cadres de la pratique géoscientifique et assurent un titre protégé de professionnel aux praticiens de la géoscience.

La géoscience est une profession réglementée dans 11 des 13 provinces et territoires présentement au Canada. La pratique de la géoscience n'est pas encore réglementée au Yukon et à l'Île du Prince Édouard.

Géoscientifiques Canada – qui est la raison sociale du Conseil Canadien des Géoscientifiques Professionnels – est une organisation constituée des 10 organismes de réglementation qui gouvernent la pratique de la géoscience au Canada dans l'optique de travaux collaboratifs et collectifs. À la fin de l'année 2009, on comptait 8 872 géoscientifiques professionnels inscrits à travers le Canada.

Cet ouvrage fait le point sur le contexte de la régulation de la géoscience au Canada et commente sur les développements qui ont eu lieu au sein de la profession. Cette étude est également une mise à jour sur les récents travaux et projets achevés, ceux qui sont présentement en cours et ceux qui sont en étape d'élaboration par Géoscientifiques Canada, en tant que représentant de ses organismes de réglementation et de la profession en général, aux deux niveaux national et international.

ARTICLE



Geoscience – Canada's Profession: A Review of Professional Geoscience in Canada, and the Development, Activities and Relationships of Geoscientists Canada

Oliver Bonham

Chief Executive Officer

Geoscientists Canada¹

200-4010 Regent St.

Burnaby, BC, Canada, V5C 6N2

Email: obonham@ccpg.ca

SUMMARY

Part of the recognition by society of the reliance the public places on the services that geoscientists provide, is the move by governments to assure competence and achieve accountability through professional registration; and it is because of the complex and specialized nature of the work of geosci-

entists that authorities have entrusted the profession with the legal power to self-regulate. As with other professions in Canada, geoscience is regulated at the provincial/territorial level under statutes that establish the regulatory bodies, define scopes of practice for geoscientists and secure protected title for individuals who practice geoscience. Currently, geoscience is a regulated profession in 11 of Canada's 13 provinces and territories. The practice of geoscience is not yet regulated in either Prince Edward Island or Yukon.

Geoscientists Canada, the business name of the Canadian Council of Professional Geoscientists, was established as a focus for collective and collaborative work by the 10 regulatory bodies that govern geoscience practice in Canada. At the end of 2009, there were 8872 professional geologists registered in Canada. This paper reviews the context of the regulation of geoscience in Canada and reports on developments concerning the profession. It also provides an update of the work that has recently been completed, is underway and is planned, by Geoscientists Canada on behalf of the regulatory bodies and the profession as a whole, both at the national and international level.

SOMMAIRE

La reconnaissance de la société envers l'importance des services fournis par les géoscientifiques est due en grande partie aux initiatives de mise en œuvre

de systèmes d'inscription professionnelle menées par les gouvernements pour assurer des compétences de base et une transparence professionnelle. Et c'est la nature complexe et spécialisée du travail du géoscientifique qui a incité les autorités à conférer à la profession des géosciences le pouvoir légal de s'autoréguler.

À l'instar des autres professions au Canada, la géoscience est réglementée aux niveaux provincial et territorial. Ses règlements définissent la constitution des organismes de réglementation; déterminent les cadres de la pratique géoscientifique et assurent un titre protégé de professionnel aux praticiens de la géoscience.

La géoscience est une profession réglementée dans 11 des 13 provinces et territoires présentement au Canada. La pratique de la géoscience n'est pas encore réglementée au Yukon et à l'Île du Prince Édouard.

Géoscientifiques Canada – qui est la raison sociale du Conseil Canadien des Géoscientifiques Professionnels – est une organisation constituée des 10 organismes de réglementation qui gouvernent la pratique de la géoscience au Canada dans l'optique de travaux collaboratifs et collectifs. À la fin de l'année 2009, on comptait 8 872 géoscientifiques professionnels inscrits à travers le Canada.

Cet ouvrage fait le point sur le contexte de la régulation de la géoscience au Canada et commente sur les développements qui ont eu lieu au sein

¹The Association of Professional Engineers and Geoscientists of the Province of British Columbia, The Association of Professional Engineers, Geologists and Geophysicists of Alberta, Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists, Association of Professional Engineers and Geoscientists of Saskatchewan, The Association of Professional Engineers and Geoscientists of the Province of Manitoba, Association of Professional Geoscientists of Ontario, Association of Professional Engineers and Geoscientists of New Brunswick, Professional Engineers and Geoscientists of Newfoundland and Labrador, Ordre des géologues du Québec, Geoscientists Nova Scotia.

de la profession. Cette étude est également une mise à jour sur les récents travaux et projets achevés, ceux qui sont présentement en cours et ceux qui sont en étape d'élaboration par Géoscientifiques Canada, en tant que représentant de ses organismes de réglementation et de la profession en général, aux deux niveaux national et international.

INTRODUCTION

If one were to associate a particular country with a particular profession or propensity, many, if asked, would probably associate Holland with horticulture, Germany with engineering, Sweden with forestry, and Canada with geology and/or geophysics – i.e. geoscience. Geoscience as a profession has deep historic roots and prolonged service to both society and economy in Canada. Canada is the world's second largest country by surface area; it is bounded by 3 oceans covering differing plate boundary types; it has an enormously expansive and very well represented geologic record, extending over 4 billion years; and it has a rich and diverse endowment of natural Earth resources, including renewable and non-renewable energy, metallic and non-metallic minerals, and water. The association that Canada has with geoscience and the work of geoscientists has been (and continues to be) integral to its development, and some would argue its very identity. After all, what other country has seen fit to name its highest mountain, Mt Logan, after a geologist (Sir William Logan)?

This association has its roots in frontier geological mapping, resource exploration and development, and invention of pioneering ground and airborne geophysical surveying systems; it continues today in the sophisticated practice of Canadian geoscientists. Today's geoscientists provide, for example, quality data and expert opinions on the predicted behaviour of an active seismic zone or a natural channel or slope system, or the estimated resource inventory of a mineral deposit, an oil and gas reservoir or a groundwater supply source. Others, from First Nations, to governments, to the investing public, rely upon such opinions to make decisions involving public safety and welfare, decisions

that are often of significant economic consequence. The evolution and sophistication of Canada's capabilities in geoscience has established this country as a well-regarded global centre for the financing, management, servicing and independent technical due diligence for Earth resources exploration and development activity all around the world. Simply put, geoscience can be considered Canada's profession.

Part of the recognition by society in Canada of the reliance it places on the services of geoscientists is the move by governments to require professional registration and public accountability of individual geoscientists. And it is a reflection of the specialized and sophisticated nature of the work it does that authorities have entrusted the profession with the legal power to regulate itself.

Self-Regulation of the Professions In Canada

As with other professions in Canada, geoscience is regulated at the provincial/territorial level under statutes that establish each of the regulatory bodies, define the scope of practice for geoscientists, and establish protected title for individuals who practice geoscience.

The origin of the placing of responsibility for the regulation of professions at the provincial/territorial level dates back to 1867 and the passing of the British North America Act (now called the Constitution Act). In that Act, as explained by Casey (2006), power is given to the provinces regarding regulation of the professions (e.g. restrictions on entry, professional rules of conduct and self-administration by a governing body), by virtue of Section 93(13), which gives provinces the authority to make laws in relation to 'property and civil rights' within their boundaries. Taking Ontario as an example, there are currently 40 regulated professions in that province, 27 of which are health professions; the balance is made up of 13 other professions, including geoscience (Office of the Fairness Commissioner 2010).

In most cases, the provincial/territorial acts establish a single college, institute or professional association ('regulatory body') to govern a single profession. However, in

some provinces and territories professions are grouped under one act and different regulatory bodies are created for each profession in the group (as is the case with many of the regulated health professions acts), whereas in others, two or more professions are grouped under one act and a single regulatory body is established to regulate those grouped professions (as is the case with the combined engineering and geoscience acts in place in most of Canada's provinces and territories).

Under each act there are usually government regulations that govern the administration of the profession, and association bylaws that govern the administration of the regulatory body. Included among these, either in regulation or bylaw, are the codes of ethics to which all practitioners are bound. The legislation defines what constitutes practice, sets up a registration scheme, requires that a public register of professional licensees be maintained and provides for a complaints and discipline process. It is in essence a delegation of power by government to each profession to self-regulate in the public interest. Powers include the authority to sanction a practitioner for unethical or incompetent practice and the authority to prosecute those who are practising without being appropriately registered; the powers also usually include the ability to impose and collect fines, and to recover legal costs. Decisions on discipline matters, and increasingly, decisions on registration matters, are open to appeal. Initially, appeals are directed to the regulatory body; appeals at a secondary level are to the courts, usually at divisional court, or equivalent.

Professional designations issued in Canada are often referred to as 'licence to practise' designations, i.e. a licence is required in order to practise and it is illegal to practise without a licence. This is distinct from voluntary, 'right to title' types of professional designation, whereby a person may choose to apply to and be awarded a designation from a recognized, peer-based organization. The difference is that voluntary peer-based organizations are not enabled by legislation, hence a practitioner is not required by law to hold the designation of that organiza-

tion in order to practise, and it is not illegal to practise without that designation.

Referring to the work of CLEAR (Council on Licensure, Enforcement and Regulation) (2006), Tepel (2010) reviews the different models used to regulate professionals around the world in the context of his discussion about the regulation of geoscience in the United States. According to Tepel (2010), regulation of the professions in Canada can be characterized as following a Semi-Privatized Self-Regulatory Model. This is in contrast to, and somewhat mid-position between a Government Agency Model (which applies with respect to state licensure for professionals in the United States), and a Voluntary Self-Regulatory Model used in a number of other countries.

Under the Government Agency Model in the United States, state boards operated directly by government regulate each profession in the public interest. In Canada, under the Semi-Privatized Self-Regulatory Model, the regulatory bodies, although mandated by government under enabling legislation and having statutory powers given by government, are, in fact, independent entities that operate in the public interest as self-governing professional associations or colleges. Elsewhere, organizations following the Voluntary Self-Regulatory Model may be authorized by government to exist, but they do not have sovereign or statutory powers assigned to them. Many Voluntary Self-Regulatory Model organizations have established protection of the public as their primary focus, but as Tepel (2010) suggests, because they are not vested with statutory powers, their ability to actually assert authority and protect the public by imposing sanctions on individual practitioners is limited.

Geoscience Regulation in Canada

Currently, geoscience is a regulated profession in 11 of Canada's 13 provinces and territories (note: there are only 10 regulatory bodies, as Nunavut and Northwest Territories are regulated by a single association). Williams and Pearson (2001) summarized the history of geoscience licensure in Canada. In 1960, Alberta

became the first province to introduce licensure for geologists and geophysicists and remained the only province to do so for the next 21 years, until 1981, when the Northwest Territories introduced licensure. From then until 2003 (Fig. 1), licensure was progressively introduced across Canada. In 8 of the 11 jurisdictions in which legislation has been introduced, the regulation of geoscience was grouped with engineering under a combined professions act. In contrast, in the three most recent jurisdictions to introduce licensure – Ontario, Québec and Nova Scotia – geoscience became a stand-alone profession under a separate act.

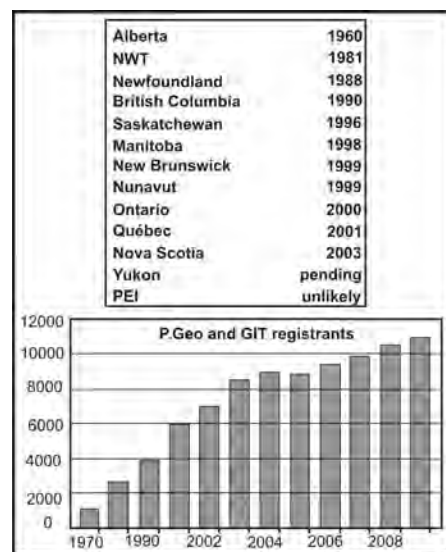


Figure 1. Top: History of introduction of geoscience licensure. Bottom: Growth of geoscience registration in Canada, 1970 to 2009. Source: Geoscientists Canada.

The combined regulation of geoscience and engineering is, with a few exceptions, peculiar to Canada. In most other countries, geoscience is regulated either as a stand-alone profession, or together with other science disciplines. In South Africa for example, the South Africa Council for Natural Scientific Professions (2010) regulates 16 sciences, including geological science. In the United Kingdom, the Science Council (2010) designates 'licenced body' status to 21 organizations covering the full range of science disciplines; the Geological Society is the 'licenced body' responsible for geoscience and the Chartered Geologist

designation. In both South Africa and the United Kingdom, there are separate 'umbrella' entities for all engineering disciplines: the Engineering Council of South Africa and the Engineering Council, respectively. Examples of co-regulation of geoscience and engineering occur in 6 of the 28 states with geoscience licensure in the United States (National Association of State Boards of Geology 2010), and in some Voluntary Self-Regulatory Model institutes covering grouped professions servicing a particular industry sector. An example of the latter is the Australasian Institution of Mining and Metallurgy (2010), whose memberships cover the full spectrum of disciplines in the mining sector – mining engineering, metallurgy, geology, environment, management and geotechnical (mining).

In most of Canada, the designation 'professional geoscientist' is used, abbreviated 'P.Geo'. In Alberta, for historical reasons, there are two designations: professional geologist (P.Geol), and professional geophysicist (P.Geoph). The regulatory body in Alberta has recently requested an act change to move to a single designation, professional geoscientist (P.Geo). In Québec, the designation is géologue (géo) and in New Brunswick and Ontario, the bilingual French designations and abbreviations are géoscientifique (géosc), and géoscientifique professionnel (G.P.), respectively.

Based on figures provided by the regulatory bodies, as of December 31, 2009, there were 8872 P.Geo registrants across Canada (Fig. 2), and an additional 1555 persons enlisted as geoscientists-in-training (GITs), for a total of 10 427 registrants. Geoscientists-in-training are those whose academic training has been found acceptable, but who lack the 48 months of progressive experience in geoscience needed to practise independently. It is important to note that this is the total of all registrants reported by all 10 regulatory bodies and includes multiple registrations with two or more bodies; the real number of individual P.Geos and GITs in Canada is therefore estimated to be less than 10 000. In addition, most of the regulatory bodies in Canada licence practitioners who are non-resident and/or not practising in

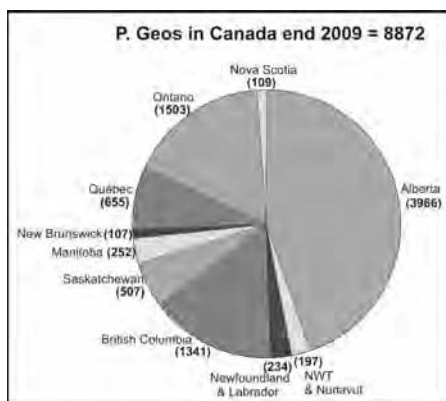


Figure 2. Distribution of P. Geo licences in Canada by province and territory. Source: Geoscientists Canada.

Canada, so the numbers need to be further reduced to better reflect the true size of the working profession in the country.

With respect to the proportion of geoscientists who are professional registrants, it is similarly difficult to get reliable information on the total number of geoscientists in Canada. The Canadian Federation of Earth Science (CFES 2008), in its report on the results of a survey of human resources needs for the geosciences in Canada, states that there are approximately 15 000 geoscientists in Canada.

Regarding age demographics, data supplied by the regulatory bodies for the 2008 CFES survey (CFES 2008) shows (Fig. 3) that the profession in Canada has a baby boomer age spike, consistent with the national workforce. That said, the relatively high number of younger geoscientists-in-training reported by the regulatory bodies is noteworthy. Geoscientists Canada recently started tracking the gender split for registrants and as of December, 2009, 17% of registrants were female geoscientists. Although well below their representation in the Canadian population as a whole, the proportion of females in geoscience is notably higher than for some of the other regulated professions, such as engineering, which reports only 9% female practitioners (Engineers Canada 2010).

GEOSCIENTISTS CANADA

Geoscientists Canada – the business name of the Canadian Council of Pro-

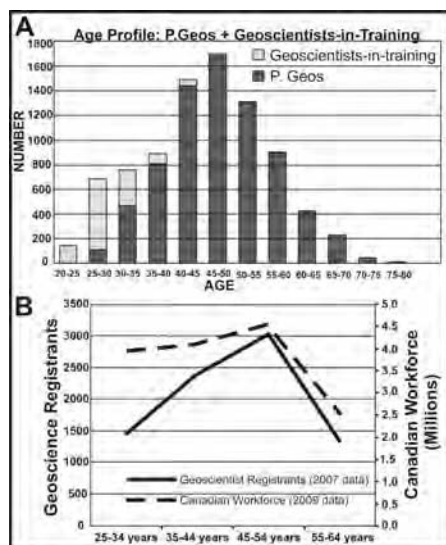


Figure 3. A. Age profile (2007 data) for P. Geos and Geoscientists-in-training. B. Geoscience registrants age profile (2007 data) as compared to Canadian workforce (2009 data). Sources: Geoscientists Canada and Statistics Canada.

fessional Geoscientists – is the national organization of the 10 regulatory bodies that govern geoscience practice in Canada. It was established as a focus for collective and collaborative work. It is a not-for-profit corporation created in 1996 and constituted under Part II of the Canada Corporations Act. Geoscientists Canada is governed by a board of directors made up of professional geoscientists, one appointed by each of the 10 regulatory bodies, plus a president, president-elect and past-president. The president-elect is elected by the members and must have previously served as an appointed director for at least one year. The members (shareholders) of the corporation are the regulatory bodies, usually represented by their respective presidents. The mission of the organization is “to develop consistent high standards for licensure and practice of geoscience, facilitate national and international mobility and promote the recognition of Canadian professional geoscience.” The principal objectives of Geoscientists Canada, as cited in Williams and Pearson (2001), are set out in its letters patent, which can be viewed on the organization’s website [www.ccpge.ca].

Geoscientists Canada receives its operational funding through annual

assessments to the regulatory bodies on a per registrant basis. The organization is staffed by one full-time professional. Currently, the office, which includes dedicated executive assistance on a half-time basis, together with specialized IT and bookkeeping support, is supplied through a generous hosting arrangement with the Association of Professional Engineers and Geoscientists of BC (APEGBC). Prior to becoming a staffed organization in 2006, it was entirely volunteer-run and received administrative support from the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA) in Calgary. Geoscientists Canada is indebted to APEGBC for its current support and to APEGGA for support during its formative years.

Over and above activities funded on an operational basis, Geoscientists Canada has been successful in obtaining funding, mostly from federal government agencies, for specific projects aimed at addressing such matters as national labour mobility and the recognition of international credentials. Details of these, and other, projects are provided below.

As an active network of volunteer professionals drawn from all parts of Canada and representing all types of geoscience practice, Geoscientists Canada has a large and active base of committees that report to the board of directors. Committees include those formally mandated in the bylaws (the Canadian Geoscience Standards Board, and Executive and Audit committees), standing committees, steering committees for projects, and task forces established by the board on a short-term basis to address specific matters. A complete list of Geoscientists Canada’s committee and task forces, together with their terms of reference, can be found on its website.

Canadian Geoscience Standards Board

The Canadian Geoscience Standards Board (CGSB) is Geoscientists Canada’s principal advisory committee. Its mandate is to assist in working with the regulatory bodies to coordinate, correlate and harmonize practices concerning the registration of geoscientists, mobility of licensed professionals,

and inter-provincial practice (Williams and Pearson 2001). A key function of CGSB is the assessment of geoscience education across Canada to keep Geoscientists Canada and the regulatory bodies informed of the extent to which university geoscience degree programs provide the knowledge content necessary to prepare individuals for independent professional practice. Similarly, CGSB is mandated to provide guidance on the assessment of equivalency of international geoscience degree programs. The CGSB is made up of one appointee from each regulatory body, plus a chair appointed by the board of directors. Its members are, for the most part, senior faculty members drawn from earth science departments across Canada. The CGSB also benefits from the attendance, as observers, of staff members from the regulatory bodies having responsibility for admissions.

PROJECTS AND INITIATIVES

In its first strategic plan covering the period 2004 – 2009, Geoscientists Canada set itself the task of moving from an organization entirely dependent upon volunteers to one with sufficient funding to support a small staff comprising one full time professional, and to undertake initiatives that support professional geoscience. This change was achieved in 2006 when all regulatory bodies agreed to an increase in the assessment rate, the appointment of a full time CEO, and the opening of an office in Burnaby, B.C. Since that time, several important projects have been completed and others are in progress; recently, the board of directors approved its second strategic plan (for 2010 – 2015), which is built around six new strategic objectives.

Completed Projects

Geoscience Knowledge and Experience Requirements for Professional Registration in Canada

An immediate task for Geoscientists Canada after stepping up operations in 2006 was to undertake a complete review of documentation on requirements for professional registration in Canada. The first effort at defining requirements, mutually agreed-upon by all the regulatory bodies, was undertaken

in the late 1990s and released in 2000 (Canadian Council of Professional Geoscientists 2000). After close to 5 years of use, during a period when large numbers of applicants went through the admission process, it was recognized that modifications were required. This work commenced in 2005 and involved an extensive re-examination, not only of the requirements themselves, but also how the requirements can be better articulated so they are clear, concise, and easy to follow, while at the same time providing appropriate flexibility.

The re-examination also included a concept study (Bonham and Cane 2007) that investigated the feasibility of using competency-based assessments as part of the revised requirements. At that time it was decided not to pursue competency-based assessment because of the associated problems of developing appropriate tools, such as exams, to test competencies. The study did, however, trigger the addition of outcome-based descriptors for each of the knowledge components in the new requirements.

The work of re-examining the requirements, including internal and external consultations, was undertaken by the CGSB in close collaboration

with admissions officials from all the regulatory bodies. Formal external consultation was held with stakeholders drawn from across the geoscience community, incorporating all of the technical and learned geoscience societies, the Canadian Federation of Earth Sciences and the Canadian Council of Chairs of Earth Science Departments. The regulatory bodies themselves participated in two formal internal rounds of consultation in addition to the informal consultations occurring throughout the project. Final revisions to the requirements were approved by the board of directors in May 2008, and in April 2009 the booklet (Fig. 4), entitled *Geoscience Knowledge and Experience Requirements for Professional Registration in Canada/ Connaissance et expérience des géosciences requises pour l'inscription à titre de professionnel au Canada* was published (Canadian Council of Professional Geoscientists 2009a).

The booklet sets out, in full detail, the areas of knowledge and types of experience that are expected of an applicant seeking registration to practice professional geoscience in Canada. The requirements articulate expected study outcomes in the areas of compulsory foundation science, additional foundation science, compul-

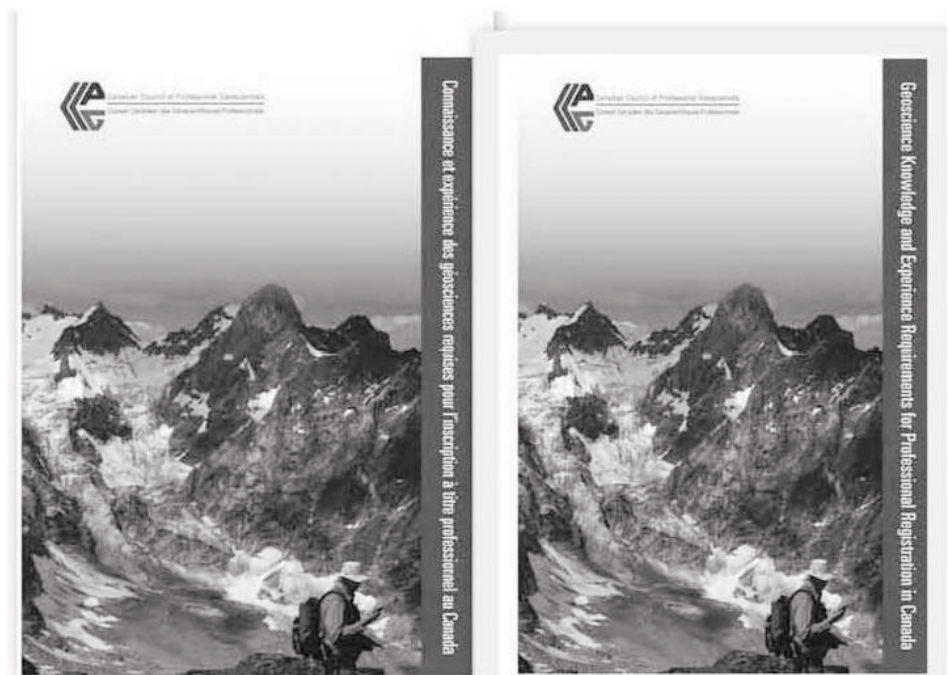


Figure 4. *Geoscience Knowledge and Experience Requirements for Professional Registration in Canada/ Connaissance et expérience des géosciences requises pour l'inscription à titre de professionnel au Canada* published by Geoscientists Canada, 2009.

sory geoscience, additional geoscience, and other geoscience/science. Three distinct streams are covered: geology, environmental geoscience and geophysics. It also sets out ten guiding principles for obtaining and for assessing geoscience practice experience.

In addition to serving as a common reference for the regulatory bodies, the booklet is designed to serve as a key reference for geoscience students, geoscience educators and career guidance counsellors, and members of the public who may require general information on professional registration in Canada. It must be emphasized that the booklet serves as a summary only, and that requirements for registration are set out by legislation in each province and territory. It is important that those seeking registration should refer to the regulatory body in the province or territory in which they intend to register.

Following the acceptance of the new requirements by Geoscientists Canada, all ten regulatory bodies signed a Memorandum of Understanding (MoU) on their use (Canadian Council of Professional Geoscientists 2009b). Under the terms of the MoU, the regulatory bodies agreed to a system whereby all candidates accepted for registration will have demonstrated geoscience knowledge and experience that is equal or equivalent to that set out in the new requirements, and to periodically advise each other of their progress toward that goal.

Inter-Association Mobility Agreement

Work was also undertaken to seek improvements to the Inter-Association Mobility Agreement (IAMA) in place since 2001 (Williams and Pearson 2001; Boivin 2006); this agreement among the regulatory bodies addressed registration transfers by way of 'accommodation'. Improvements were required as this IAMA contained a notwithstanding clause and was therefore deemed non-compliant under Canada's Agreement on Internal Trade (AIT). During 2007 – 2008 Geoscientists Canada and the regulatory bodies worked together to achieve a revised IAMA that would be both acceptable and functional, and at the same time maintain appropriate protection of the

public. Ultimately, a solution was imposed externally following significant revisions to the AIT (Chapter 7, Labour Mobility) that were agreed upon by the provincial and territorial governments and ratified by the Council of the Federation in August 2009 (Internal Trade Secretariat 2009). Article 706 of AIT now provides for virtual automatic transfer of professional licensees between provinces and territories provided the individual is a licensee in good standing, with no discipline matters pending and a clear criminal record. As a result, in June 2009 it was agreed by the regulatory bodies and supported by the board of directors that an IAMA for geoscience in Canada was no longer required and the existing IAMA should be allowed to lapse.

New Bylaws

In 2009, following two years of review and revision, a new set of bylaws for Geoscientists Canada was completed and adopted by the board of directors and approved by the member bodies. The new bylaws, which follow model bylaws for not-for profit corporations, have since been submitted to and approved by the Minister of Industry, Canada.

Current Projects

Licensure Compliance Awareness Campaign

Commencing in 2009, Geoscientists Canada has been undertaking development of a major national campaign designed to raise awareness among those geoscientists in Canada who are not yet registered as professional geoscientists of their legal obligation to become registered. Work has recently been completed on designing materials and developing a campaign plan. The plan will see awareness being raised by prominent geoscientists at the provincial, territorial and national levels, and campaign material being widely circulated across all sectors of the geoscience community, using a range of media, commencing in the fall of 2010. The campaign will be implemented with a logo that uses the 'PGeo' designation and the tag line *Compétence + Intégrité* ('géo' and *compétence + intégrité* in French; Fig.5). Phase 1 of this cam-



Figure 5. Logo and tagline/slogan for the national licensure compliance awareness campaign, to commence in late 2010.

paign was funded by Geoscientists Canada, whereas the cost of phase 2 is being shared among 9 of the regulatory bodies.

Geoscience Professional Practice Guidelines

In 2009, Geoscientists Canada (Canadian Council of Professional Geoscientists 2009c) announced an initiative aimed at creating a framework for the development of geoscience professional practice guidelines. Practice guidelines are required to articulate a common level of expectation for the client, the practitioner, the public, the profession, government and other entities. The impetus for this work arose from the recognition that, although some regulatory bodies in Canada have already developed professional practice guidelines for their jurisdictions, the consistency and content vary. It was agreed that a shared framework for developing and maintaining practice guidelines would ensure the creation of consistent, high-quality guidelines covering similar areas of geoscience practice, across all jurisdictions. Guideline consistency will also facilitate and improve professional practice among geoscientists transferring between, or working in multiple, jurisdictions. After close to one year in development, a working version of the proposed framework document has been

circulated to all regulatory bodies as part of a formal request for comments. It is expected that the final framework will be ready for public release in early 2011.

Internationally-trained Geoscientists

This major new project (Geoscientists Canada 2010), which began in February 2010, is focused on obtaining a collective understanding of how credentials are assessed when internationally-trained geoscientists (ITGs) are considered for admission at any of the 10 regulatory bodies, and to developing similar assessment policies and practices. Termed the 'ITG project', it will continue for 24 months and comprises four phases:

- i) Mapping and analyzing how the credentials of ITG applicants are currently assessed by the 10 regulatory bodies;
- ii) Facilitating debate and consensus building among the regulatory bodies in an effort to develop similar policies and assessment tools;
- iii) Performing due diligence on a select number of geoscience regulatory bodies in other countries to assess the possibilities for Mutual Recognition Agreements; and
- iv) Establishing a set of mutually agreed policies and assessment tools for the consideration of applications for professional registration from ITGs.

Funding for this project, provided by the federal government's Foreign Credentials Recognition Office, is part of a larger effort across all of the regulated professions in Canada to ensure fair, consistent and transparent systems of admissions for licensure, while at the same time maintaining all necessary measures to adequately protect the public.

With many seasoned geoscientists expected to retire over the next 10 – 15 years, in Canada and most of the developed world, international migration of, and global competition for, mid-career experienced geoscientists is expected to increase. In addition, as globalization of commerce continues, international practice is becoming commonplace among geoscientists in all sectors. These realities reinforce the need for international mobility and

recognition of international professional credentials. The ITG project will allow the regulatory bodies to increase understanding, consensus building, and collaboration. It also has the potential to reduce barriers to entry into the Canadian profession for suitably qualified international geoscientists and will facilitate international acceptance of the credentials of Canadian geoscientists practising abroad.

Since the inception of this project, a comprehensive survey of Canadian regulatory bodies' admission practices for internationally trained applicants has been completed. Due diligence has commenced on admissions and governance practices among professional geoscience organizations in other parts of the world.

ONGOING ACTIVITY

With the professional side of geoscience now 'mainstream' both in Canada and overseas, Geoscientists Canada has become an active participant in the Canadian geoscience community and is developing strategic alliances within and beyond those communities. These activities can be broadly grouped under:

- i) International relations – interfacing with other national and multinational organizations involved in the regulation of geoscience practice;
- ii) Greater geoscience community – playing an active role as a stakeholder and a corporate citizen in Canada's geoscience community;
- iii) Other professions – geoscience can benefit by working closely with the other 40 or so regulated professions in Canada, particularly with engineering and regulated science professions such as forestry, agrology and biology; and
- iv) Public outreach – raising the level of knowledge among the general public about the role Earth sciences and Earth resources play in everyday lives; efforts in this area are also directed toward encouraging youth to consider geoscience as a challenging and rewarding career path.

International Relations: Regulated Geoscience outside Canada

Geoscientists Canada has 6 interna-

tional co-operation agreements in place with similar geoscience organizations in other parts of the world and is working to expand that list to include non-English speaking jurisdictions. The agreements are general high-level undertakings to share and exchange on matters of common interest and concern.

Cooperation agreements are currently in place with the American Institute of Professional Geologists (AIPG), Australian Institute of Geoscientists, European Federation of Geologists (EFG), The Geological Society, The Institute of Geologists of Ireland, and the National Association of State Boards of Geology (ASBOG®). Geoscientists Canada regularly attends meetings of AIPG and ASBOG® in the United States, and vice versa. On occasion, it has been possible for Geoscientists Canada to attend EFG meetings in Europe, and for EFG representatives to come to Canada.

In 2008, at the 3rd International Professional Geologic Conference, Geoscientists Canada signed the Flagstaff Declaration (2008) with 5 other national professional geoscience organizations – a broad undertaking to foster professionalism in geoscience and improve international co-operation.

Geoscientists Canada participates with ASBOG® in its Task Analysis Survey, a comprehensive survey of practitioners that is undertaken every five years to determine the nature of work performed by geoscientists in their daily practice. The most recent survey was performed in late 2009. ASBOG® uses the survey results to review and adapt its national licensing exam to reflect the tasks performed by practicing geoscientists in the United States. Geoscientists Canada uses the survey results to assist the CGSB in its advisory work on geoscience knowledge and experience requirement for registration, and to determine differences in the nature of geoscience practice across Canada.

Greater Geoscience Community

In the context of the greater geoscience community, Geoscientists Canada has a strong working relationship with the Canadian Federation of

Earth Sciences (CFES 2010). Each organization is a frequent and active observer at the other's meetings, and there has been joint participation on various working committees, as well as other collaboration. Geoscientists Canada is not a member of CFES because it is, in itself, a similarly structured organization made up of member bodies that in turn have individual geoscientist members. The relationship that has been developed with CFES is an important and mutually beneficial one that directly supports each entity's respective member organizations.

Geoscientists Canada distributes copies of all its public communications to Canada's geoscience technical and learned societies². It also routinely invites these societies to send observers to its meetings, as a result of which several have responded and some attend on a regular basis.

In 2009, Geoscientists Canada provided seed funding to the Geological Association of Canada (GAC), to support GAC in providing continuing professional development workshops of relevance to practitioners.

Other Professions

A close association between engineering and geoscience arises directly from the grouped regulation of the two professions in 7 of the 10 regulatory bodies. This, in consort with the extensive collaboration between the two professions at the practice level, principally in the resources sectors, predicated a close working relationship between Geoscientists Canada and Engineers Canada, the national organization for the engineering profession. This relationship extends to standing invitations to attend each other's meetings as observers, staff liaison, committee work, and other collaborations on matters common to both professions. Bi-annually, the respective presidents of the two organizations hold a conference call to share experiences and to discuss topics at the national and inter-

national level that are of common concern.

Geoscientists Canada has also been developing alliances with other science professions in Canada. These alliances are advantageous for two reasons: first, the other science professions are like-sized professional communities; and second, like geoscience, they too base their practice on the scientific method.

Geoscientists Canada is a member of CNNAR, the Canadian Network of National Associations of Regulators, which holds regular conferences on topics of national and international importance concerning the regulated professions in Canada. Through CNNAR contacts, Geoscientists Canada in 2009 – 2010 assisted the Canadian Federation for Economic Education with the addition of geoscience to the group of professions in the P2P (From Potential to Prosperity) project. Their website [<http://www.cfeep2p.com>] provides realistic information for prospective immigrants about specific professions in Canada, through work/life video interviews with recently settled individuals, their families and their employers. The site now features the stories of six geoscientists from different parts of the world who have settled and are now successfully practising in Canada.

Public Outreach

To keep abreast of geoscience public outreach activities across Canada and to be in position to alert the regulatory bodies to opportunities that may be useful at the local level, Geoscientists Canada is a member of the Canadian Geoscience Education Network (CGEN). It also sits on the Canadian Federation of Earth Sciences' Outreach Liaison Committee, which is charged with coordinating public outreach among all geoscience societies and industry associations across Canada. This committee also includes members representing parks, museums and other public educational organizations.

Canadian Professional Geoscientist Award

Geoscientists Canada sponsors the Canadian Professional Geoscientists Award. This award, first presented in 2006, is given to recognize an individual who has made an outstanding contribution to the development and practice of professional geoscience and who has advanced public recognition of the profession in Canada. Nominees must demonstrate a solid career as a professional geoscientist, an outstanding record of voluntary service to the community, and service to Geoscientists Canada or to one of the geoscience regulatory bodies. Recipients of the award are: Gordon Williams, P.Geol (2006); Dwight Ball, P.Geo (2007); Hugh Miller, P.Geo (2008); William Pearson, P.Geo (2009); and George Cavey, P.Geo (2010).

FUTURE INITIATIVES

The Geoscientists Canada strategic plan for 2010 – 2015, approved in June 2010, comprises 6 strategic objectives, in 3 areas of activity:

Service to the Public: to ensure

- i) that all practicing geoscientists are registered as professionals (P.Geos); and
- ii) that professional practice is conducted with consistent and high standards;

Service to the Regulatory Bodies: to ensure

- iii) that Geoscientists Canada activities are relevant and responsive to the needs of the regulatory bodies; and
- iv) that Geoscientists Canada activities are visible and widely recognized, nationally and internationally

Service to Geoscience: to ensure

- v) that mobility of professional geoscientists within Canada is enhanced; and
- vi) that international trade in professional services and international employment movement for professional geoscientists is enhanced.

These 6 objectives, which are consis-

²Canadian Society of Exploration Geophysicists, Canadian Federation of Earth Sciences, Canadian Geotechnical Society, Canadian Institute of Mining, Metallurgy and Petroleum, Canadian National Chapter of the International Association of Hydrogeologists, Canadian Society for Coal Science and Organic Petrology, Canadian Exploration Geophysical Society, Canadian Society of Petroleum Geologists, Geological Association of Canada, Mineralogical Association of Canada, Prospectors and Developers Association of Canada.

tent with Geoscientists Canada's letters patent and mission, are interrelated and will guide the organization over the next five years in its overall goal of supporting Canada's geoscience regulatory bodies. Geoscientists Canada has developed a comprehensive list of broad directions, initiatives and underlying tactical actions to achieve these six objectives, with further refinement as work gets underway. Two ongoing projects – the licensure compliance awareness campaign and the development of a collective framework for geoscience professional practice guidelines – are directly focused on objectives i) through iv) above.

4th International Professional Geologic Conference

Geoscientists Canada will host the 4th International Professional Geologic Conference (4IPGC) in Canada in 2012. Previous conferences were held in Alicante, Spain in 2000; London, England in 2004 and Arizona, USA in 2008. The quadrennial IPGC conferences focus on professional issues facing geoscience practitioners. Recent conferences have been linked to locally based geoscience events, specific areas of practice, and topical issues in the host country; for example, 3IPGC in 2008 was held in collaboration with the Arizona Hydrological Society and the conference theme was 'Changing Waterscapes and Water Ethics'. It is expected that the 2012 event will be held in conjunction with one of the conferences that form part of the annual Canadian geoscience events calendar.

CONCLUSIONS

Although the establishment of geoscience as a regulated profession in Canada has come to the forefront over the last two decades, the underlying importance of geoscience to society and the national economy is no different now than it has been throughout the country's history. Licensure is a direct result of the recognition by society of the reliance the public places on the services that geoscientists provide and the inherent risks associated with unskilled and unethical practice. It is because of this that governments now require professional registration and individual accountability; and it is

because of the complex and specialized nature of the work of Canadian geoscientists – locally, nationally and internationally – that authorities have entrusted the profession with the legal power to self-regulate.

Licensure has led to an important change in focus within the geoscience community, such that the professional status and professional life of the individual geoscientist is now more central to their work and position in the broader geoscience community than it has been heretofore. As some would say, professional geoscience is now 'mainstream' geoscience in Canada. The evolution and development of the work of regulatory bodies and the part these organizations now play in their geoscience communities, is a testament to this mainstreaming of professionalism in geoscience.

From its beginning in 1996 as a fledgling organization administered by volunteers, the Canadian Council of Professional Geoscientists – now Geoscientists Canada – has evolved into an active and involved national entity. Geoscientists Canada has undertaken and completed several important projects on behalf of the regulatory bodies, and on behalf of the profession in Canada. Other projects are either underway or in the planning process, notably a campaign to raise awareness among those geoscientists across Canada who are not yet registered as professional geoscientists of the necessity and legal obligation to become registered. Geoscientists Canada is also active in developing strategic alliances with the profession outside Canada, with other allied professions in Canada, and with the greater geoscience community. It is also doing its small part in public outreach.

With self-regulation come both the duty of *service to* and the duty of *care of* one's profession. Professionals recognize this by volunteering for their regulatory bodies or for Geoscientists Canada. However, as professionals, it is equally important that we continue to volunteer for and support the technical and learned geoscience societies across Canada, some of which may not be seeing the level of support and involvement that they had in the past because of the growth in the professional 'dimension' of geo-

science.

Although the title of this article, 'Geoscience – Canada's Profession', may come across as somewhat flippant, there is no doubt that the association between the country and the geoscience profession is strong and long-lived. And as this update has illustrated, it is an association that is only getting stronger and more publically visible as time progresses.

ACKNOWLEDGEMENTS

The author would like to thank his many colleagues in the regulatory bodies involved in geoscience regulation across Canada and other parts of the world, and the many volunteer professional geoscientists associated with Geoscientists Canada. He thanks Rakesh Kumar for aid with the figures. Derek Doyle, Greg Finn and Bruce Broster are also thanked as internal reviewers of this manuscript.

The work at Geoscientists Canada described under the knowledge requirements and IAMA improvements projects (completed) were funded in part by contribution agreements # 4611463 with Human Resources and Skills Development Canada ("HRSDC") – Labour Mobility Program. Work on the guidelines framework project (ongoing) is funded in part by contribution agreement #8300725 with HRSDC – Labour Mobility Program. The internationally trained geoscientist's project (ongoing) is work that is part-funded by contribution agreement #8856957 with HRSDC – Foreign Credentials Recognition Program. Geoscientists Canada gratefully acknowledges all three contributions.

REFERENCES

- Australasian Institution on Mining and Metallurgy, 2010, Chartered Professional Accreditation: [<http://www.ausimm.com.au/Content/default.aspx?ID=139#current>].
- Boivin, M., 2006, Mobility of Professional Geoscientists in Canada: Geoscience Canada, v. 33, p. 3-4.
- Bonham, O., and Cane, D., 2007, Entry-to-Practice Competencies for Geoscience in Canada? – Report on Concept Study: Canadian Council of Professional Geoscientists, unpublished internal report.
- Canadian Council of Professional Geosci-

- entists, 2000, Recommended Minimum Requirements of Geoscience Knowledge and Work Experience for Professional Practice: [http://www.ccpge.ca/pgeoreg/en/Documents/Recommended Minimum Requirements of Geoscience Knowledge and Work Experience for Professional Practice.pdf].
- Canadian Council of Professional Geoscientists, 2009a, Geoscience Knowledge and Experience Requirements for Professional Registration in Canada: [http://www.ccpge.ca/pgeoreg/en/Documents/4214CCPGRequirements-BookletWeb.pdf].
- Canadian Council of Professional Geoscientists, 2009b, CCPG Constituent Associations sign a Memorandum of Understanding on use of CCPG's Geoscience Knowledge and Experience Requirements for Professional Registration in Canada: Press release, October 19, 2009, [http://www.ccpge.ca/news/en/Documents/CCPG Press Release-CCPG CAs sign MoU on use of GKER for Professional Registration in Canada 19 Oct 2009_E.pdf].
- Canadian Council of Professional Geoscientists, 2009c, Professional Geoscientists obtain funding to support the development of a collective framework for geoscience professional practice guidelines: Press release, August 17, 2009, [http://www.ccpge.ca/news/en/Documents/Final CCPG GPPG Press release for 14 August 2009.pdf].
- Canadian Federation of Earth Sciences, 2008, Human Resources Needs in Earth Sciences in Canada – a preliminary survey: CFES Report 2008-01, 17 p., [http://www.geoscience.ca/CFES_HR_requirements_Canadian_earth_sciences.pdf].
- Canadian Federation of Earth Sciences, 2010, [http://www.geoscience.ca].
- Casey, J., 2006, The Regulation of Professions in Canada: Release 2: Thomson Carswell, Toronto, ISBN 0-459-55834-X.
- CLEAR, 2006, Council on Licensure, Enforcement and Regulation – Regulatory Models: [http://www.clearhq.org/Default.aspx?pageId=482823].
- Engineers Canada, 2010, Women in Engineering: [http://www.engineerscanada.ca/e/pr_women.cfm].
- Flagstaff Declaration, 2008, [http://www.ccpge.ca/news/Documents/Flagstaff Declaration.pdf].
- Geoscientists Canada, 2010, Professional Geoscientists obtain funding to facilitate harmonization of admissions for registration and licensure in Canada of internationally-trained geoscientists: Press release, April 13, 2010, [http://www.ccpge.ca/news/en/Documents/Geoscientists Canada Press release-ITG Project 13 April 2010_E.pdf].
- Internal Trade Secretariat, 2009, Agreement on Internal Trade – Consolidated Version: Internal Trade Secretariat, [http://www.ait-aci.ca/en/ait/ait_en.pdf].
- National Association of State Boards of Geology, 2010, State Member Boards: [http://www.asbog.org/member.htm].
- Office of the Fairness Commissioner – Ontario, 2010, Professions: [http://www.fairnesscommissioner.ca/en/professions/index.php].
- Tepel, R., 2010, Licensure administration models: Would self-regulation work for geology licensure in the United States?: Association of Environmental and Engineering Geologists, AEG NEWS, v. 53, p. 23-28.
- The Engineering Council, 2010, Professional Engineering Institutions: [http://www.engc.org.uk/about-us/our-partners/professional-engineering-institutions].
- The Engineering Council of South Africa, 2010, [http://www.ecsa.co.za/default.asp].
- The South African Council for Natural Scientific Professions, 2010, How to Apply and Registration Requirements, 2010/2011: [http://www.sacnasp.org.za/documents/information_brochure_2010_2011.pdf].
- The Science Council, 2010, Chartered Scientist Licensed Bodies: The Science Council, [http://www.charteredscientist.org/licensed_bodies/links.html].
- Williams, G.D., and Pearson, W.N., 2001, Professional licensure (registration) of geoscientists in Canada – An update for 2001: Canadian Institute of Mining and Metallurgy Bulletin, v. 94, p. 58-61.