CERTIFICATION OF HYDROLOGISTS

Background

At previous annual meetings of CSHS concerns have been raised about persons representing themselves as hydrologists and offering hydrological services to the public. This may bring the hydrological profession into disrepute and harm the public good.

The problem is further compounded because operational hydrologists are often professional engineers and subject to registration and licensing requirements of provincial bodies. Engineering hydrologists, however, are only a subset of the hydrological scientists. Hydrology really should be considered as an earth science that encompasses a broad range of activities. Langbein expressed it as:

> *Hydrology is the Science that treats of the waters of the Earth, their occurrence, circulation and distribution, their chemical and physical properties, and their reaction with their environment, including their relation to living things. The domain of hydrology embraces the full life history of water on the earth.*

Consideration of how best to protect the public interest from unqualified hydrologists is therefore not a simple task. The following sections consider three models for protecting the public interest: legislation, voluntary industry-led, and an imported. A brief mention of learned societies is also included. This paper ends with some discussion and recommendations for consideration by CSHS members.

Provincial Associations of Professional Engineers and Geoscientists (P Eng. & P Geo.)

Each province and territory in Canada has a process for licensing practising professional engineers and geoscientists under law. The bodies established to administer the law provide for self-regulation of the profession. Many of these organizations make specific provision for licensing of consultants. Although mobility among the various licensing bodies is becoming easier there are differences among them that make registration of hydrologists who do not have an engineering degree particularly difficult. The various licensing bodies are shown in the box below. There are also national professional bodies, the Canadian Council of Professional Engineers and the Canadian Council of Professional Geoscientists, that provide co-ordination among the provincial bodies but that cannot give direction.

Association of Professional Engineers and Geoscientists of British Columbia
Association of Professional Engineers, Geologists and Geophysicists of Alberta
Association of Professional Engineers and Geoscientists of Saskatchewan
Association of Professional Engineers and Geoscientists of Manitoba

Professional Engineers of Ontario
Association of Professional Geoscientists of Ontario

Ordre des ingénieurs du Québec
Ordre des Géologues du Québec

Association of Professional Engineers and Geoscientists of New Brunswick
Professional Engineers and Geoscientists of Newfoundland and Labrador
Association of Professional Engineers of Nova Scotia
Association of Professional Engineers of Prince Edward Island

Association of Professional Engineers of Yukon
Association of Professional Engineers, Geologists and Geophysicists of the Northwest Territories

Note that both Ontario and Quebec have separate licensing bodies that register engineers and geoscientists while other jurisdictions with the exception of Nova Scotia, Prince Edward Island and Yukon have single bodies that register both professions. (Nova Scotia is working on a combined body, but appears to currently have a separate Association of Professional Geoscientists. Its status is not clear to this writer. It is understood that Nunavut professionals are administered by the NWT body.) It is unlikely that Prince Edward Island and Yukon could certify a non-engineer hydrologist, while in other jurisdictions the definition of geoscientist may or may not be broad enough to include hydrologists.

Unlike the practice of engineering where a Canadian undergraduate degree can almost certainly lead to registration as a P Eng. when combined with adequate professional experience, registration as a P Geo is more complex as not all people completing a four-year science degree will satisfy the requirements of registration. Registrants must meet the knowledge standard of the Canadian Geoscience Standards Board (CGSB) by completing defined studies in one of three areas: geology, geophysics or environmental geoscience. Hydrology and hydrogeology are included as part of environmental geoscience. Interestingly, the CGSB specifically excludes courses in atmospheric science, meteorology and oceanography as relevant to the required syllabus; they are counted as science other than geoscience.

Not all provinces licensing geoscientists have adopted the CGSB Knowledge Standard - Saskatchewan won't until January 2005, for example - and that impedes mobility to some extent. Some professional associations also offer a Limited Licence in a specific field of practice, for example, hydrology, that would allow an individual who did not meet all the registration requirements to obtain

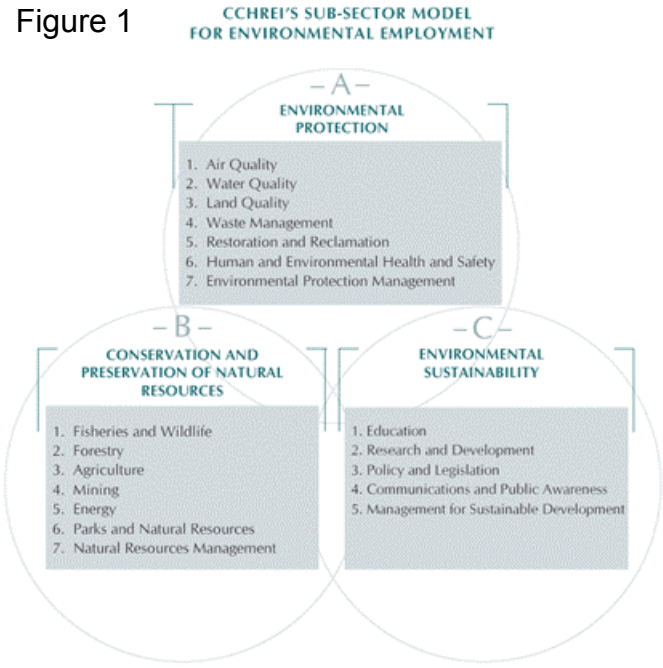
permission to consult in that field. Adding to the problem is that the CGSB has a small budget and has been relatively inactive.

In summary, it is evident that a qualified hydrologist who is not an engineer may not be able to be professionally certified in at least some Canadian jurisdictions (Prince Edward Island, Yukon). In those same jurisdictions, there would be no legal mechanism to protect the public from unqualified, non-engineer hydrologists. Non-registered persons in the other jurisdictions offering services as hydrologists could be subject to quasi-criminal prosecution.

Certified Canadian Environmental Practitioner (CCEP)

Another model for certification of hydrologists is the CEP designation administered by the Canadian Environmental Certification Approvals Board (CECAB). The CECAB is a national industry-led body established by the Canadian Council for Human Resources in the Environment Industry (CCHREI) in 1997 as a professionally autonomous body responsible for the certification of competent environmental practitioners in Canada. It uses Canada's national occupational standards for environmental employment (see Figure 1) as the foundation of the evaluation process. Note that the CECAB does not grant certification in hydrology. A CECAB office based in Calgary is responsible for the general operations and initiatives for the CCEP and CEPIT certification programs.

Figure 1



As the primary certification issued by CECAB, the CCEP - "Certified Canadian Environmental Practitioner" designation formally recognizes the competencies held by practitioners who possess more than five years career experience. Recipients of the CCEP designation have demonstrated that their competencies have met or exceeded the National Occupational Standards within the sub-sector(s) of expertise in which the designation has been awarded. Persons not meeting the standard may be registered as CCEPs in Training (CEPIT). CCEP recipients are required to adhere to a code of ethics and to maintain their competencies by fulfilling the annual "CCEP Professional Development Requirement".

American Institute of Hydrology

The third model is one used in the United States. Because of the concern that unqualified individuals could practice as hydrologists and hydrogeologists, the American Institute of Hydrology was incorporated according to the laws of the state of Minnesota in 1981 to provide a mechanism for certifying competent and responsible professionals. The purpose of AIH is to enhance and strengthen the standing of hydrology as a science and a profession by:

- "Establishing standards and procedures to certify individuals qualified in surface-water, groundwater and water-quality hydrology.
- "Establishing and maintaining ethical standards to protect the public from irresponsible work.
- "Providing education and training in hydrology.
- "Providing the public and government advice and guidance concerning activities related to the hydrologic profession."

Professional members are individuals who meet the educational, professional experience, publications, and professional conduct requirements, and have passed a professional examination, as prescribed by the Board of Registration. If all the requirements are met, the applicant will be certified and registered as a Professional Hydrologist (H), Professional Hydrogeologist (HG), Professional Hydrologist (Ground Water) (HGW), or Professional Hydrologist (Water Quality) (HWQ). The certificate must be renewed annually. Re-certification must be done every five years. The professional examination is one developed by the state of Wisconsin.

There is provision for associate members who do not meet professional qualifications and for student members, who are seen as the primary source of new members. The AIH produces a newsletter, has an annual conference, and publishes a journal, Hydrological Science and Technology, once a year, which appears to be the proceedings from the annual conference.

According to its annual report for 2001, the latest available on its website, the AIH has 985 members in all categories (including 424 hydrologists, 310 hydrogeologists, 98 ground water, 11 water quality). Although there is a provision for state chapters, only Oregon has one. About 10 percent of the membership is in 43 foreign countries. In most cases there are only one or two foreign members, but the current membership includes 17 Canadians from five provinces, 14 Russians and 8 Japanese.

Learned Societies

In Canada there are three learned societies having some relation to hydrology. The CSHS, part of the CWRA, tends to draw its membership from government and private sector engineering hydrologists. For the most part members are

hydrological practitioners; researchers and academics are under-represented in the membership. On the other hand the Hydrology Section of the Canadian Geophysical Union (CGU) has strong membership from the university and research sectors but relatively few members from government and industry. The third (and relatively small) group is the hydrology section of the Canadian Meteorological and Oceanographic Society (CMOS). In none of these organizations has there been any attempt to accredit hydrologists. CSHS has been the only forum in which the question has been raised. (The reason for the plethora of Canadian hydrological organizations lies in the demise of the Associate Committee on Hydrology, which was supported by the National Research Council and Environment Canada.)

The British Hydrological Society (BHS) is a learned society similar to the Hydrology Section of CGU. It was established in 1983 to promote the hydrological sciences in the United kingdom. The BHS organizes conferences, distributes a periodic newsletter, and sells publications. It does not certify hydrologists.

A web search of other learned societies related to hydrology was unable to locate any that certified hydrological competence.

Discussion and Recommendations

Provincial/territorial professional engineering and geoscientist organizations may not be particularly well equipped to consider certification of non-engineer hydrologists. One approach would be to determine the extent of the problem by contacting each engineering association (or geoscience association in the case of Ontario and Quebec) explaining the problem and specifically asking if the definitions under their legislation would allow the certification of a non-engineer hydrologist. A precursor may be to have a meeting between the CSHS executive and the new chair of the Canadian Council of Professional Geoscientists, the national umbrella body for geoscientists to review current status. The responses would allow the CSHS membership to determine the full extent of the problem. A second step would be to enter into a dialogue with those professional organizations who are now unable to register hydrologists to determine their interest in changing legislation or practice to permit registration.

A second approach would be to explore the possibility of an industry-led approach similar to that of CECAB. This could be a stand-alone organization or a new function for CSHS or some other existing group. Given the number of hydrologists in Canada, it is difficult to envisage a stand-alone body being financially viable. Note that the AIH can attest to only a few hundred members in the United States and seems to depend to a considerable extent on a large membership drawn from hydrogeologists.

A third approach would be to promote Canadian membership in the AIH, perhaps establishing a Canadian chapter. Such a chapter could subsume the CSHS.

These latter two approaches would also run the risk of running afoul of provincial licensing bodies that can certify hydrologists and maybe even those that can only register engineering hydrologists. At this point it seems preferable to work with existing Canadian licensing bodies to ensure that their procedures are effective in protecting the public good.

Based on the investigation carried out for this paper, there could well be an educational need in the licensing bodies so that they are more fully informed of the scope of work of hydrology. Many may see this solely in the context of engineering hydrology. In Britain, for example, there are a significant number of non-engineering hydrologists and the perception problem may not be as significant.

The following recommendations are offered for discussion:

1. CSHS members may wish to identify other options or mechanisms for certification of hydrologists.

2. CSHS members should be encouraged to seek professional registration as P Eng. or P Geo., as appropriate. Persons having difficulty in obtaining registration as a P Geo. should inform the CSHS executive.

3. The CSHS executive should meet with the Chair of the CGSB, and the Chair elect of the CCPG, to review matters concerning licensing of hydrologists.

4. The CSHS executive should write each provincial engineering/geoscience association where there is an identified problem explaining the problem and asking how they might register non-engineer hydrologists.

5. CSHS members in each jurisdiction may wish to inform their provincial/territorial licensing body of issues related to professional practice by hydrologists.

6. CSHS members may wish to identify obvious cases of poor professional practice by non-registered hydrologists and report them to licensing bodies.

References

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