GEOSCIENTISTS
NOVA SCOTIA

Association of Professional Geoscientists of Nova Scotia Member-in-Training Program Guide and the Components of Acceptable Geoscience Work Experience

THE ASSOCIATION OF PROFESSIONAL GEOSCIENTISTS OF NOVA SCOTIA est. 1997

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This MIT program guide has been developed, published and distributed by the Association of Professional Geoscientists of Nova Scotia (APGNS) to assist the APGNS Admissions Board, the Members-in-Training, their employers, supervisors, and mentors in the development of the Member-in-Training as a professional member of the Association.

Persons relying on this guide should be aware that it is intended as an aid and a reference and that conformance with the suggestions presented here-in does not constitute a guarantee of professional registration.

In all cases, the Member-in-Training, applicant or candidate for professional registration bears the onus and sole responsibility of meeting the requirements for professional registration to the satisfaction of APGNS.

This document has been approved by the APGNS Admissions Board and the APGNS Council for distribution and as a reference for the evaluation of applications for professional geoscience registration.

SECTION 1
APGNS Member-in-Training Program Guide

1.1 INTRODUCTION AND OBJECTIVES

The two fundamental components for registration as a professional geoscientist (P.Geo) by the Association of Professional Geoscientists of Nova Scotia (APGNS) are academic training and practical geoscience work experience. Each of these components must be acceptable to APGNS Council (the 'Council') and the Admissions Board (the 'Board).

Council has determined that the Board will use the Geoscientists Canada, Canadian Geoscience Standards Board, ***Geoscience Knowledge and Experience Requirements for Professional Registration in Canada*** (GKE) as the fundamental reference in the evaluation of applications for professional registration. The GKE sets the academic requirements as equivalent to a typical four (4) year degree in geoscience at a Canadian university. That academic training must be followed by a minimum period of forty-eight (48) months of supervised, practical, cumulative and progressive, geoscience work experience (the GKE document is available on the Association website www.geoscientistsns.ca).

The GKE is a robust document, setting high and consistent standards for the registration of professional geoscientists, and is currently used by each of the provincial and territorial regulatory associations in Canada with the exception of Quebec.

Applicants for professional geoscience registration may be registered as a Member-in-Training (MIT), if they have completed the academic requirements but are lacking all or a portion of the required geoscience work experience. The intent of registration as an MIT is to allow registrants to legally work on geoscience projects, to gain the required experience, under the supervision of a registered professional (P.Geo or P.Eng.).

The objective of this **Member-in-Training Program Guide** is to assist MIT's in gaining the required minimum forty-eight (48) months of work experience, acceptable to the Board. Participation in the APGNS MIT program, including accepting assistance from a mentor, is voluntary, however, it is recommended.

The MIT may apply to the Board through the Registrar to request assistance from a volunteer mentor. Alternatively, the MIT may identify a mentor and request approval from the Board. The Registrar will maintain a list of potential mentors, those volunteers who have been nominated to and approved by Council and the Board. The Registrar will, in cooperation with the Board, provide guidance to the mentors on their role and responsibilities.

It is anticipated that the objectives of the program will be achieved through three activities provided to the MIT by the mentor:

- by evaluating the on-going geoscience experience being undertaken by the MIT and providing feedback regarding whether that experience is likely to be acceptable to the Board;

- by providing guidance to the MIT in the preparation of documentation of their work experience (their diaries) to ensure that these illustrate the appropriate 'cumulative and progressive' elements of their work and training; and

- by providing feedback, and advising the MIT regarding how to proceed in completing the requirements for registration as a P.Geo.

1.2 MENTORS:

In order to be considered eligible as a mentor the following qualifications must be met:

- be a member-in-good-standing of APGNS, or in special circumstances dictated by the location of the MIT, a member-in-good standing of a professional association acceptable to the Registrar;

- have a minimum of 5 years of post-registration professional experience as a P.Geo. (*i.e.* 5 years beyond the minimum 4 years required for registration);

- be recommended by the Board and approved by Council;

- preferably not be the immediate supervisor of the MIT;

- ideally be practicing in the same stream of geoscience practice as the MIT;

- not be related to the MIT; and

- has indicated to the Registrar, in writing, that they are willing to serve as a mentor.

Note that APGNS members who serve as a mentor to an MIT will receive Continuing Professional Development (CPD) credits toward their annual continuing education reporting requirement.

1.3 MENTORS ROLE:

The mentor will serve the MIT and the Association:

- as liaison between the MIT, the Registrar and the Board, by encouraging and guiding the MIT through the registration process;

- by encouraging and confirming that the MIT is engaged in supervised work with acceptable geoscience content;

- by confirming that the work experience is accurately and adequately recorded and reported in the applicable MIT diary; and

- by confirming with the Registrar that the diaries submitted by the MIT are acceptable.

The Mentor will adhere to the following principles:

- lead by example through a demeanor of professional excellence;
- develop a comfortable and appropriate relationship with the MIT;
- display a positive and helpful attitude;
- encourage and guide the MIT towards setting and achieving goals and developing a successful career in professional geoscience; and
- provide suggestions and advice to avoid pitfalls in achieving professional goals.

1.4 GUIDANCE

To assist the mentor, the supervisor and the MIT in the above objectives, several resources are available including:

Geoscience Knowledge and Experience Requirements for Professional Registration in Canada; 2008, Geoscience Canada, Canadian Geoscience Standards Board;

National Guideline for Member (MIT) /Geoscientist (GIT)-in-Training Program, anticipated 2016; currently under development by Geoscientists Canada, MIT/GIT Task Group;

National Guideline for Engineer-in-Training Program, 2013, published by the Canadian Engineering Qualifications Board, Engineer-in-Training Committee;

A Structured Program for Members-in-Training, published 1996, updated 2010, Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists;

Strategies for Success in Mentoring: A Handbook for Mentors and Protégés, published by Association of Professional Engineers and Geoscientists of Alberta, 2003 and updated 2015;

Guideline on Work Experience Reporting for Members-in-Training, Supervisors and Mentors, 2015, Association of Professional Engineers and Geoscientists of Saskatchewan; and

Engineer-in-Training Mentor Program Guide, published 2014 by the Association of Professional Engineers of Nova Scotia.

1.5 ASSOCIATION STRUCTURE

The APGNS Member-in-Training Program is administered by the Registrar in consultation with the Council and the Board. The Registrar will:

- keep a roster of eligible volunteer mentors, who have been recommended by the Board and approved by Council;

- work with the Council and the Board to nominate and recommend appropriate mentors, in each stream of geoscience practice, to Council as potential mentors;

- maintain a record of members who have or are serving as mentors, and ensure that appropriate credit is applied in Continuing Professional Development (CPD) program records;

- endeavour to ensure that all members-in-good-standing of the Association have an opportunity to serve, and that they have an understanding of their professional obligation to mentor MIT's;

- facilitate and/or conduct the preliminary review of work experience diaries such that they conform to prescribed form and format, adequately describe the geoscience work experience of the MIT, are of an appropriate professional quality, and are properly notarized (signed and stamped) by the mentor and/or supervisor; and

- compile and submit the reviewed diaries to the Chair of the Board who will assign them an appropriate Board member or external reviewer as per the **APGNS Admissions Board Policy and Procedures**.

SECTION 2
Components of Acceptable Geoscience Work Experience

2.1 GENERAL

As noted in Section 1, Council has approved the use of the Geoscientists Canada, Canadian Geoscience Standards Board, ***Geoscience Knowledge and Experience Requirements for Professional Registration in Canada*** (GKE) in the evaluation of applications for professional registration (the GKE document is available on the Association website www.geoscientistsns.ca).

Applicants for professional geoscience registration are required to demonstrate a minimum of forty-eight (48) months of acceptable geoscience work experience. This experience must show cumulative and progressive technical capability, mature judgement, responsibility, and proficiency in communicating in the English language. If the Board determines that some, or all, of the experience is not acceptable, the MIT may be required to complete additional work of an acceptable nature in order to complete this requirement.

The objective of the **Member-in-Training Program Guide** and the documentation of the **Components of Acceptable Geoscience Work Experience**, is to assist MIT's in gaining the required minimum forty-eight (48) months of work experience, acceptable to the Board.

MIT's are encouraged to contact the Registrar to assist in identifying a Professional Geoscientist who may agree to serve as their mentor. The mentor may be selected from a list of approved volunteers or identified by the MIT. In either case, the selection of the mentor must be approved by the Registrar in consultation with Council and the Board.

It is a requirement of the ***Geoscience Profession Act*** that in order to offer or provide geoscience services or undertake work on a geoscience project in Nova Scotia, an individual must be registered as a P.Geo or an MIT working under the supervision of a registered professional (P.Geo or P.Eng.). Therefore, the MIT must complete the required geoscience work experience under the direct supervision of a professional geoscientist, or to have a mentor who is a professional geoscientist, acceptable to Council and the Board. Where, in the opinion of the Registrar, exceptional circumstances exist, the direct supervision or mentor requirement may be waived. A written request to the Registrar explaining the circumstances must be submitted in order for a waiver of the mentor requirement to be considered. The request must be approved by the Board and Council.

It is essential that the MIT keep accurate records of the geoscience work experience gained during the mandatory training period. The work experience is to be recorded on work experience record / diary forms and in the format approved by APGNS. Records must be signed and stamped by the MIT's supervisor and submitted to the mentor for review and approval.

The record of experience must describe the geoscience performed and calculate the percentage of experience gained in each of the components of acceptable geoscience work experience (see below).

The MIT should keep a copy of the work experience record and submit a copy to the mentor either manually or electronically. The reporting schedule will be as agreed by the MIT and the mentor. The suggested schedule for reporting work experience is every three months in year one and this may be revised to every six months in years two through four.

2.2 GUIDELINES FOR ACCEPTABLE WORK EXPERIENCE

The skillful application of geoscience knowledge is essential to earning professional registration and licensure. In order to be acceptable to the Board, the MIT's geoscience experience must include active and responsible participation in various elements. It should reflect that the candidate is applying their academic training and show evidence of both professional and personal development. The experience must include, but not be limited to, the components listed below. (Each of these components is described in more detail in the following sections, along with an indication of the relative or anticipated time which will be allotted to each; see also the Work Experience Diary Report forms.)

- application of geoscience theory – the knowledge of geoscience principles and practice;
- practical experience;
- management of geoscience projects;
- communication skills;

- professional accountability and ethical responsibilities; and

- awareness of the societal implications of geoscience.

As noted above, the candidate must show progression in technical capability, responsibility, maturity of judgement and communication proficiency. It is important to note that the candidate's work experience must demonstrate evidence of both professional and personal development. It is anticipated that this work experience can be gained through:

- on the job training; observing the work performance of practicing professional geoscientists; completing appropriate courses; participation in the activities of technical societies;

- exposure to practical geoscience problems in order to obtain a better appreciation of all pertinent considerations (*i.e.* technical, environmental, regulatory, etc.) to be taken in arriving at an acceptable solution;

- visits to locations where geoscience programs or work are being put into practice, *e.g.* field mapping projects, environmental site assessment or remediation operations, etc.;

- observation of project organization and management, including how the individual elements of a project are brought together to result in the completed project; and

- exposure to problems that arise during planning and/or implementation, such as the practicality and logistics of field programs, adjusting programs to solve practical problems, application of regulatory requirements, safety, health or environmental issues, QA/QC requirements, etc.

2.3 APPLICATION OF GEOSCIENCE THEORY – (anticipated time range 60% - 80%)

The application of technical theory is essential to geoscience experience, and it should include active and responsible participation and supervised responsibility in several aspects of geoscience practice. For example:

- Geoscience training and familiarization; applicable regulatory requirements, industry standards, practice guidelines, etc.

- Technical geoscience experience; collect information and data relevant to assigned tasks and responsibilities such as client specified or regulatory requirements, existing and historical conditions, readings/samples, numeric data, anticipated future conditions, constraints etc.

- Development of geological concepts, (*e.g.* preparation of maps, cross-sections or reports concerning deposits of rocks, minerals, or other naturally-occurring earth materials).

- Mapping and systematic geoscience evaluations (with specific reference to bedrock, unconsolidated earth materials, and/or snow, ice, ground-water, surface water and constituents thereof).

- Identification of geological hazards and the risk to the public and the environment.

- Project analysis, including scope and operating conditions, safety and environmental issues, economic feasibility, technical merit.

- Materials testing, including methodology and techniques.

2.4 PRACTICAL EXPERIENCE (anticipated time range 40% - 60%)

The MIT may gain practical experience in several ways, including the following:

Work Site Visits – employment at or deployment to active field sites:
In order to experience the practical application of geoscience principles and become familiar with safety issues in the workplace, the MIT should carry out specific tasks at sites that are associated with assigned responsibilities, or should visit such sites on a periodic basis.

If site visits are not possible, the MIT should arrange to visit sites where work is similar to that associated with his or her assigned responsibilities.

Examples of geoscience projects may include exploration camps, drilling rig operations, mines, quarries, geophysical exploration projects, environmental assessment projects, and soil and groundwater remediation projects.

Application of equipment to geoscience:
The MIT should observe and consider the merits of reliability, the role of computer software, and the relationship between the objective of a geoscience investigation and the means to achieve that objective.

Interdependencies:
The MIT should have an opportunity from time to time to observe, and recognize in practice, the interdependence of diverse disciplines and activities in overall systems. This may include the functions and responsibilities of the MIT's department and other departments in the employer's organization, information flow, work performance structures, and the importance of systems.

Recognizing Limitations – observe and experience the limiting factors of practical geoscience:
The MIT should observe work in progress at appropriate stages and locations, including, for example, the effects of climate and weather, scheduling, logistics, financial and budgetary constraints and regulatory considerations on the implementation of geoscience programs, as well as the practical limits of geoscience techniques, and the development of reasonable expectations for the performance of equipment, systems and people engaged in geoscience projects.

Developing Working Relationships:
The MIT should have the opportunity to develop appropriate working relationships with those involved in on-site work and the end use of the work.

2.5 MANAGEMENT OF GEOSCIENCE PROJECTS (anticipated time range 5% - 15%)

While it is recognized that most MIT's will have limited opportunities to become involved in the management of geoscience projects, the expectation of cumulative and progressive experience and increasing responsibility is an important aspect of qualifying experience and should be included as a general exposure to the business environment.

Management in geoscience includes; the supervision of staff, contracts and contractors; project management and logistics; budgeting and cost control; and the socially responsible application of geoscience principles and practices. Representative management components include:

Managing Resources - Planning:
The MIT should understand the importance and need for effective project management and giving due consideration to time, manpower, material and equipment constraints.

Planning includes the identification of the objectives of a geoscience project, assessment of the people and equipment required to implement the project, assembling applicable background information, and acquiring the necessary permits and clearances from responsible authorities, through to assessing the social ramifications of project implementation.

Scheduling
Aspects of scheduling may range from establishing interactions and constraints, developing activity or task schedules, and allocation of resources, through to the assessment of delay impacts and beyond to broader aspects such as interactions with other projects and the market-place.

Budgeting
Aspects of budgeting range from the development of a conceptual budget and its detailed counterpart, identifying labour, materials and overhead, through to risk assessment of cost escalation potential and an on-going review of budgetary considerations in light of change

Supervision
This includes leadership and professional conduct, organization of personnel, team-building, and management of technology.

Record Keeping:
The MIT should observe and participate in all record-keeping and document control requirements and practices required by the employer as well as those that are specific to the geoscience project or client. This requires an understanding of the elements of a greater whole, co-ordination of phases of the project work, potential liability and monitoring of expenditures and schedules and taking appropriate action.

Risk Assessment:
The MIT should understand the requirements and limitations related to operating equipment, field conditions at geoscience projects, and the social and environmental impacts of geoscience projects.

Understanding Contracts:
The MIT should be familiar with the legal aspects of relevant project contracts and project liabilities.

Develop Team Skills:
The MIT should gain and demonstrate an insight into the importance of being part of a team, and participate in teambuilding activities.

Corporate Structure:
The MIT should observe and become knowledgeable about organizational structure, including the functions and responsibilities of key positions.

2.6 COMMUNICATION SKILLS (anticipated time range 5% - 10%)

The development of communication skills is an important experience requirement. Effective communications with superiors, co-workers, government regulators, clients, and the general public is essential.

The candidate should demonstrate increasing proficiency in the written and oral presentation of geoscience work, including correspondence, record-keeping, and report-writing. The candidate should also demonstrate increasing proficiency in the ability to present ideas in the form of geological maps, cross-sections, and other geoscience-related drawings.

Oral Communications
Report or make presentations to management or peers. This can include project status reviews, research or study reports, and presentations at public forums. The MIT can establish public speaking skills through business and community activities. Discussion skills can be developed through active participation in meetings.

Written Communications
The MIT should become proficient in the written presentation of geoscience from daily correspondence and record keeping, to the production of major reports. Technical reports will clearly describe the project and summarize the results.

2.7 PROFESSIONAL ACCOUNTABILITY AND ETHICAL RESPONSIBILITIES (anticipated time range 2% - 10%)

The MIT should achieve and demonstrate an understanding of professional and business ethics and the obligation to practice in an ethical manner.

By working under the direct supervision of a registered professional geoscientist, the candidate should be exposed to professional conduct in the workplace, should demonstrate integrity, the ability to assume responsibility, a commitment to life-long learning, and should gain an appreciation of such ethical considerations as:

- The responsibility of the geoscientist to the public.
- The responsibility of the geoscientist to the profession and the professional association.

- The responsibility of the geoscientist to the client and/or employer.

- The responsibility of the geoscientist to perform work tasks with full regard for the environment and the policy and guidelines for sustainable development and corporate social responsibility.

2.8 AWARENESS OF THE SOCIETIAL IMPLICATIONS (anticipated time range 2% - 10%)

The practice of geoscience has significant impact in the fields of public and environmental safety, industry, finance and education. The MIT should become familiar with the professional's role in society and the social impacts of the projects in which they are involved. The objective is to foster an awareness of the geoscientist's professional responsibility to guard against conditions which threaten life, property or the environment and to call such conditions to the attention of those responsible.

Public Safeguards:
The MIT should understand the role and responsibilities of professional practice in the areas of public safety, protection of the environment, mitigation of adverse impacts, sustainable development, and workplace health and safety.

Value and/or Benefits to the Public:
The MIT should be exposed to the benefits that the profession provides to the public.

Regulatory Agencies:
The MIT should develop an appreciation and understanding of the roles and responsibilities of regulating agencies, including the professional association, in the practice of geoscience.

2.9 CANADIAN ENVIRONMENT EXPERIENCE REQUIREMENT

At least twelve (12) months of the MIT's geoscience work experience must be obtained in Canada or in a Canadian work environment. The Canadian environment is defined as work experience obtained in Canada, supervised by a professional geoscientist, or work experience acquired outside Canada where the working environment is equivalent to that which might be obtained working in Canada. Candidates must demonstrate a good knowledge of Canadian geoscience laws, practices, standards, customs, codes, conditions and climates.

SECTION 3
MIT Geoscience Work Experience Diaries
Instructions for Preparation and Submission

MIT geoscience work experience diaries, describing valid work experience, should be prepared and submitted every 3 months during the first year of the MIT program, with the agreement of the Mentor, and at 6 months intervals for the remainder of the MIT period (*i.e.* every 3 months in the first year of work experience described by the diary; see the attached diary example template).

The diaries should describe, in the format of the example diary template, using prose (full sentences, not point form), the geoscience activities that the MIT has undertaken through that period, and should explain the type of technical work as well as the responsibility and management aspects of the work.

The MIT should indicate, for each activity or time frame, the types or areas of geoscience experience acquired (as noted above and on the example diary form) and what proportion / percentage of these experiences were involved in each activity.

The diaries should be reviewed and approved (signed and stamped) by the MIT's mentor and/or direct supervisor, to confirm that the MIT has fairly and accurately described their work experience. Once approved, the diary should be submitted to the Registrar for review and approval.

The Program Guide and Forms for the APGNS Member-in-Training Program brochure; the example format table for the Geoscience Experience Record form; as well as the reporting and review forms, important tips for the preparation of diaries and several examples of diary submissions are appended to this guide.