PROFESSIONAL GEOSCIENTISTS ONTARIO

GENERAL PROFESSIONAL PRACTICE GUIDELINES FOR ENVIRONMENTAL GEOSCIENCE

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Under Review

This guideline was developed by PGO's Environmental Geoscience Subcommittee

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1. Introduction

These guidelines have been prepared by the Association of Professional Geoscientists of Ontario (APGO) to assist Professional Geoscientists (P.Geo.) in the planning and execution of environmental geoscience programs. These guidelines have also been prepared to assist Professional Engineers (P.Eng.) who are qualified to practise professional geoscience in accordance with The Professional Geoscientist's Act, 2000.

Environmental programs that require professional geoscience services can include, but are not limited to, activities such as identification and evaluation and monitoring of groundwater resources, investigation and restoration of contaminated sites and selection and monitoring of waste and nutrient management sites.

Environmental programs that require the practice of professional geoscience must be under the supervision of a P.Geo. who will be responsible and accountable for the planning, execution and interpretation of all investigation activities as well as the implementation of quality control and quality assurance (QC/QA) programs and reporting.

These general practice guidelines have been developed to result in a consistent quality of work that will maintain public confidence and protect human health and safety and the natural environment with due regard for the APGO Code of Ethics Regulation (O.Reg. 69/01).

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These professional practice guidelines are also recommended for use in the planning and execution of environmental geoscience programs where there is a regulatory provision for a Qualified Person (QP).

The P.Geo. may base the environmental geoscience program on such geoscientific premises and interpretation of existing information as the P.Geo. decides to be appropriate, based on relevant experience and professional judgment. In planning, implementing and supervising environmental geoscience work, the P.Geo. should ensure that the practices are generally accepted in the industry and/or can reasonably be justified on scientific grounds.

The guidelines are not intended to inhibit the original thinking or application of new approaches that are relevant to environmental geoscience work. The guidelines recognise that geoscience is a discipline that is evolving along with new or innovative technologies and methodologies employed by Professional Geoscientists.

2. Qualified Person

Specific regulatory instruments can mandate that a QP carry out certain activities. The P.Geo. must determine the requirements of such programs and take into account the recommendations of the Final Report of the APGO Qualified Persons Task Force for the Environmental Geosciences (October 2000).

3. Geoscientific Concept

The geoscientific concept on which the program work is based, including the geological, hydrogeological and geochemical settings, should be supported by relevant, site-specific data and a scientific approach. As data are gathered and interpreted, the site-specific concept may be altered depending on the findings. The geoscientific concept provides the foundation for the geoscientific conclusions concerning the site and should be presented diagrammatically in documents and reports.

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4. Quality Control and Quality Assurance

Throughout the process of conducting all environmental geoscience work, the P.Geo. should ensure that a quality assurance program is in place and that quality control and assurance measures are implemented.

QC/QA programs should be systematic and apply to all types of procedures and data acquisition, across the full range of values measured.

The QC/QA program should confirm the validity of the data that are used in the production of technical reports. The data verification exercise should be documented and the document(s) maintained with the project files.

5. Field Methods & Data Collection

The P.Geo. supervising the work should confirm that work by employees, contractors or consultants is undertaken by competent personnel and that appropriate QC/QA programs are practised.

The investigation and sampling method(s) selected by the P.Geo. should be appropriate to the objective(s) of the program, the geoscientific concept under consideration, the environmental media and local conditions being investigated and any regulatory guidance or requirements that are applicable.

6. Sampling

All sampling programs should be carried out in a careful and diligent manner using scientifically established sampling practices that are designed and tested to ensure that the results are representative and reliable.

Professional judgment requires that subsurface investigations be designed with sample intervals that provide sufficient, representative sample materials for interpretation and analysis.

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7. Field Methods and Data Verification

Environmental geoscience field work, including planning, mapping, sampling, sample preparation, sample security and physical and chemical testing should be accompanied by detailed record keeping. The record keeping should include information such as authorship of the record, a list of field staff, a description of the procedures followed, the field conditions encountered and other pertinent information obtained. A photographic record of the field program is also recommended.

Data should be properly recorded and documented at spatial and temporal scales and with accuracy appropriate to the investigation. The study area and all data points should be accurately located with respect to known horizontal and vertical reference points.

Borehole, test pit or other geoscientific logs should be prepared in the field providing a detailed description of the materials and conditions encountered, sample recovery, samples obtained and field test results.

The locations of monitoring wells, piezometers or other probes that are installed should be documented for reference and decommissioning. If decommissioning of monitoring wells is not undertaken during the course of the program, the owner should be notified of decommissioning requirements.

Whenever several persons carry out similar duties or when the data have been collected by different persons over a period of time, care should be taken to verify that the quality and consistency of the data are maintained in accordance with the established QC/QA program.

8. Sample Preparation, Storage and Delivery

Sample preparation, storage and delivery procedures should be appropriate to the materials being tested and the parameters being analysed.

All samples that are reduced or split should be processed in a manner such that the fraction analyzed or tested is as representative of the whole sample and environmental medium being sampled as reasonably possible.

Sample storage and delivery should include chain of custody procedures to provide sample security. The method of transport for samples sent to a laboratory should be documented and done in a manner that maintains sample integrity.

Representative fractions of the material to be analyzed or tested should be retained for an appropriate period of time.

9. Laboratory Analysis and Testing

Chemical analysis and physical testing of samples must be done by a laboratory that is accredited or equivalently qualified for the particular methods to be employed and the materials to be analyzed or tested.

All analytical or test results should be supported by duly signed certificates or technical reports issued by the laboratory or testing facility and should be accompanied by a statement of the methods used and the laboratory QC/QA program results.

10. Interpretation and Technical Reporting

Comprehensive and ongoing compilation, analysis and interpretation of all the geoscience data are essential activities throughout the project. These activities should be undertaken to assess the results of the work, refine the geoscientific concept and modify or recommend modification of the work program as appropriate. Changes in working hypotheses, objectives or work programs should be recorded.

The format and style of the technical report or geoscience component of a larger report will vary depending upon the objectives and scope of the work program. All reports should document the program objectives and scope of work, the geoscientific concept and rationale for the investigative program, field and analytical methodology, results, and conclusions or findings. The report should state whether recommendations are provided either in the report or under separate cover.

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The results of subsurface investigation should be presented in graphical format such as maps, plans, geologic cross-sections, fence diagrams, groundwater flow and quality plots, and aquifer test curves, etc., as appropriate.

Data interpretation should be based on all of the information collected. Technical reports should describe and document the interpretation and discuss information that appears at variance with the selected interpretation. The adequacy of the collected data should be critically assessed as to its ability to support any qualitative and quantitative conclusions that are reported.

Estimation or delineation of geological or hydrogeological properties, both physical and chemical, can be fundamental steps in project development. The methodology used for estimation or delineation and the associated uncertainties must be documented.

Where cost estimates are provided, the assumptions used in developing the cost estimate should be documented.

11. Analysis and Testing

Analysis and testing of samples should be done by a reputable and preferably accredited laboratory qualified for the particular material to be analyzed or tested. The selection of a laboratory, testing or mineral processing facility and the analytical methods used will be the responsibility of the QP. The analytical methods chosen must be documented and justified. All analytical or test results should be supported by duly signed certificates or technical reports issued by the laboratory or testing facility and should be accompanied by a statement of the methods used. The reliability of the analytical and testing results should be measured using the results of the quality control samples inserted in the process by the QP. Duplicate analyses at other laboratories should be undertaken.

12. Natural Environment, Safety and Community Relations

All environmental geoscience work should be conducted in a safe, professional manner in accordance with applicable regulatory requirements and with due regard for the natural environment and the concerns of local communities.