IDENTIFICATION

Department	Position Title	
Industry, Tourism and Investment	Permafrost Scientist	
Position Number	**Community**	**Division/Region**
63-16304	Inuvik	NWT Geological Survey

PURPOSE OF THE POSITION

The Permafrost Scientist undertakes scientific studies that increase knowledge of baseline conditions and the drivers of change to permafrost environments with particular focus on the Beaufort Delta region of the Northwest Territories (NWT) and the Mackenzie Valley.

SCOPE

The Permafrost Scientist is located in Inuvik at the Western Arctic Research Centre (WARC) which is housed within the Aurora Research Institute of Aurora College. The position reports to the Senior Permafrost Scientist located at the Northwest Territories Geological Survey (NTGS) in Yellowknife. The Permafrost Scientist collects, manages, analyses, and disseminates permafrost information and works collaboratively on permafrost research with partners both internal and external to the Government of Northwest Territories (GNWT). The Permafrost Scientist is a key part of the NTGS Permafrost Research Unit, providing critical technical capacity to the Beaufort Delta region through collaboration with WARC staff, Aurora College and Research Institute staff, GNWT departments, and academic and Indigenous partners.

The Beaufort Delta region is experiencing the most rapid climate change on the Earth. It is underlain by ice-rich and thaw-sensitive permafrost and has the highest density of communities and historic oil and gas infrastructure in the Canadian Arctic. The Permafrost Scientist provides core capacity to conduct permafrost research and monitoring by implementing studies to characterize permafrost temperature and geotechnical conditions, assessing terrain sensitivity through mapping and remote sensing, supporting the management of permafrost data and publications, and engaging with research partners, infrastructure managers, industry, Indigenous organizations, environmental managers, and the public. The position is critical in contributing to permafrost and climate change research in the Beaufort

Delta and developing adaptation strategies and policies that support sustainable economic development in the region.

The NWT Climate Change Strategic Framework (NWT CCSF) has identified that knowledge of permafrost conditions is necessary to develop informed mitigation and adaptation strategies that minimize impacts on society and is necessary to advance infrastructure development in a responsible manner. Scientific knowledge of permafrost conditions provides the necessary foundation for predicting impacts of climate change in the north, making the discipline relevant across scientific disciplines and government and industry sectors. Developing a permafrost knowledge base is now a key factor in supporting sustainable economic development and maintaining a positive socio-economic environment for NWT residents. The importance of permafrost knowledge has been significantly captured in the NWT CCSF Action Plan which informs and guides some of the project work conducted by NTGS permafrost staff.

The Permafrost Scientist works with legislative, regulatory, and policy frameworks including the NWT CCSF and Action Plan, the NWT Transportation Strategy, the GNWT Knowledge Agenda and Action Plan, the *NWT Scientist Act*, Aurora College research policies, and the *Mackenzie Valley Resource Management Act*.

The Permafrost Scientist contributes to regional permafrost science and monitoring by carrying out research and monitoring programs, developing scientific awareness, and collaborating with industry, other government departments, Indigenous partners, and other researchers conducting studies in the region. To accomplish this, the incumbent develops collaborative field and laboratory research projects with visiting and in-house scientists, provides training to local technicians, and supervises the operations and staff required to deliver these research programs.

The Permafrost Scientist also plays a lead role in coordinating the compilation, management, analysis, and dissemination of geotechnical, ground temperature, and geohazard data for the Beaufort Delta region. The position closely collaborates with other NTGS permafrost researchers, the Department of Lands Geotechnical Advisor, the Department of Infrastructure, and visiting and in-house scientists at the Aurora Research Institute. The Permafrost Scientist coordinates and conducts field data collection, data analysis, and related research that contributes to infrastructure decisions, environmental management, climate adaptation and mitigation strategies, and general scientific and engineering knowledge.

The Permafrost Scientist provides information, evidence, and advice to NWT regulatory boards to inform their decision-making processes. This information may be used to establish terms and conditions for Land Use Permits, Water Licenses, and Environmental Impact Assessments that are issued or ordered by regulatory agencies.

The Permafrost Scientist collaborates with other NTGS colleagues, the NWT Centre for Geomatics, the GNWT departments of Infrastructure, Lands, and Environment and Natural Resources, federal departments (especially Natural Resources Canada), and Indigenous governments (especially their land management agencies). The incumbent also regularly collaborates with academic partners, engineering and environmental consultants, and non-profit organizations.

The Permafrost Scientist has significant latitude provided that best practices in scientific data collection, research, and methodology are followed. The position's work must be impactful in achieving the goals of the NTGS Strategic Plan and in meeting the needs of the GNWT and NWT residents.

RESPONSIBILITIES

1. **Develops and implements permafrost research programs.**
   - Initiates and develops research and monitoring projects that focus on permafrost and geotechnical conditions in the northwestern NWT.
   - Develops proposals, including budgets and schedules, to secure external funding that sustains permafrost research activities and data compilation and database projects.
   - Arranges the timely acquisition of permits and licenses for field-based projects if needed and consults with local communities and land managers to share information and obtain clearances.
   - Contributes to the prediction, analysis, mitigation, and overall government management of permafrost-related challenges.
   - Performs numerical or statistical analyses on thermal, geotechnical, and terrain mapping data.
   - Collaborates with GNWT colleagues and external partners including local industry and Indigenous organizations to carry out and coordinate research projects and ensure efficiencies of field- and office-based activities.
   - Collaborates with NTGS staff, universities, and Aurora College to facilitate, and in some cases oversee, the field component of post-doctoral, graduate, and undergraduate research and summer student research activities.

2. **Develops and implements a permafrost monitoring network for the NWT.**
   - Works with NTGS, WARC, and other GNWT staff and external organizations including the Geological Survey of Canada, Indigenous governments, and university partners to develop and maintain a permafrost monitoring network for northwestern NWT.
   - Collects data and assembles existing data, often in collaboration with other scientists, technicians, and external research partners, and develops a framework for analyzing information.

- Collaborates with Geographic Information System (GIS) technical staff at the Aurora Research Institute and the NWT Centre for Geomatics on digital field data acquisition and analysis strategies as appropriate.
- Works with northern partners, including industry and Indigenous organizations, in the collection of permafrost monitoring information through training, outreach, and coordination of monitoring efforts.

3. **Compiles, organizes, and archives permafrost, geotechnical, and geohazard data collected in the NWT.**
   - Investigates past permafrost, ground temperature, geotechnical, and mapping projects conducted in the NWT with a focus on communities and infrastructure corridors in the Beaufort Delta region.
   - Plans and implements data compilation and synthesis projects in collaboration with NTGS staff and other partners.
   - Works collaboratively to implement permafrost and geotechnical databases within data management system focused on the Beaufort Delta region.
   - Works with partners to facilitate ground temperature, geotechnical, and permafrost spatial data compilations.
   - Works with partners to develop and implement data reporting standards, protocols, and best practices.
   - Maintains current knowledge of best practices in the discipline.

4. **Disseminates compiled data and scientific reports in an appropriate and timely manner.**
   - Responds to client requests for assistance in accessing and interpreting permafrost and environmental geoscience data.
   - Authors or co-authors high-quality reports, figures, maps, web pages, books, digital atlases, and other materials to meet project goals and deadlines.
   - Contributes as an author and a reviewer to the NTGS publication process and to peer-reviewed scientific journals.
   - Assembles and presents research results at professional scientific meetings and industry conferences.
   - Organizes and conducts project workshops, technical sessions, and training exercises.
   - Maintains communications with others that help to identify new research and funding opportunities.
   - Prepares non-technical promotional and educational materials about permafrost databases, their derived products, and other information on permafrost and geotechnical conditions in northern Canada.
   - Conducts or contributes to community information sessions and outreach activities.

WORKING CONDITIONS

Physical Demands

The incumbent primarily works in a normal office environment from September to April and up to three weeks of winter field work. From May to August this is a field-based position. In the summer field season, the incumbent will be hiking over rough terrain with a backpack and collected samples (up to 50 pounds) for 8 hours per day, up to 3 weeks per year; will be travelling in small aircraft and helicopters for up to 4 hours per day, up to 3 weeks per year; will be travelling in small water craft for up to 1 hour per day, up to 3 weeks per year. In the winter field season, work involves travelling by snowmobile, work at extreme cold temperatures, operation of two-person drills and working alongside industrial diamond/sonic geotechnical drills for up to 8 hours per day, up to 3 weeks per year.

Environmental Conditions

The incumbent primarily works in a normal office environment from September to April. From May to August this is a field-based position. Up to three weeks of winter fieldwork will also be required. While in the field, the incumbent can be exposed to: rapidly changing weather and to conditions such as cold (hypothermia), intense sun (burn), wind, rain, snow and extreme cold; helicopters, airplanes, ATV's, road vehicles (physical injury, hearing loss, gas/fumes); insects and insect bites; dangerous, unforeseen, uncontrolled field situations such as vehicular accidents, attack by wild animals, falls and other accidents while on traverse (broken bones, cuts, etc.). The incumbent will be exposed to these environment conditions every day up to five weeks per year every day.

Sensory Demands

The incumbent primarily works in a normal office environment from September to April. From May to August this is a field-based position. Up to three weeks of winter fieldwork will also be required. While in the field, the incumbent is subject to impacts associated with long hours of field work (e.g., fatigue), including driving to remote locations and on winter ice roads. The incumbent will be exposed to these environment conditions every day up to five weeks per year every day.

Mental Demands

The incumbent primarily works in a normal office environment from September to April. From May to August this is a field-based position. Up to three weeks of winter fieldwork will also be required. While in the field, the incumbent is subject to substantial disruption of family life due for field work in distant locations. The incumbent is also responsible for the continuous management of scientific and logistical activities and safe work practices while in the field, including the prediction and mitigation of potentially hazardous situations and managing personality conflicts amongst field staff. The incumbent will be exposed to these demands every day up to five weeks per year.

The incumbent is also required to present research or work plans to scientific peers, collaborators, community groups, etc. and attend research meetings internationally or in southern Canada two to four times per year.

KNOWLEDGE, SKILLS AND ABILITIES

- Knowledge of scientific principles and techniques pertaining to permafrost and geotechnical research and monitoring, and/or engineering, including field-based data acquisition, management, and analysis.
- Knowledge of the drivers that influence permafrost conditions, especially those related to surficial geology and geomorphic processes in northern Canada.
- Knowledge of the linkages between: (i) permafrost and geotechnical information, and; (ii) data compilation and data usage for assessing terrain conditions or in engineering design.
- Knowledge of the common methods used in permafrost terrain and geohazard mapping and prediction.
- Knowledge of the methods, techniques, and practices of digital information management, including manipulation, interpretation, digitization, retrieval, and storage of data.
- Knowledge of data management principles and appropriate data structures for permafrost and geotechnical information.
- Knowledge of government strategic priorities and the role of permafrost and geotechnical data in contributing to infrastructure planning, design, and maintenance.
- Knowledge of the roles and environmental geoscience needs of other government departments, agencies, and industry.
- Knowledge of databases and basic computer coding to upload, search, evaluate, manipulate, and analyze datasets.
- Knowledge of the legal and ethical obligations of the geoscience or geotechnical engineering profession.
- Project management, organizational, and logistical skills to effectively manage and participate in independent and collaborative research projects.
- Data management skills to organize, archive, and manage large volumes of permafrost and geotechnical information.
- Analytical skills to describe and synthesize permafrost data and to model data using statistical or numerical methods.
- Skills in scientific report writing, critical peer review, and editing of scientific reports and interpretations.
- Supervisory skills to oversee contractors, other staff, and field assistants.
- Field skills that are grounded in best practices in safety management and permafrost and environmental geoscience research and monitoring.

- Presentation skills that result in effective communication both with scientific and engineering peers and laypersons.
- Ability to work effectively, both independently and in collaboration with other professionals.
- Ability to conceptualize, design, and implement a permafrost and geotechnical database.
- Ability to complete projects on time and within budget, often in conjunction with the performance of other duties.
- Ability to produce scientific reports of high technical quality suitable for publishing in external journals or through the NTGS.
- Ability to efficiently use computer hardware and software for data collection, data management, synthesis and modeling, and presentations (e.g. MS Office; ArcGIS; specialized graphic design, statistics, and modelling software; database software).
- Ability to use programs that require some degree of computer coding.
- Ability to clearly and effectively communicate scientific information in visual, oral, and written formats and at an appropriate level.
- Ability to commit to actively upholding and consistently practicing personal diversity, inclusion and cultural awareness, as well as safety and sensitivity approaches in the workplace.

Typically, the above qualifications would be attained by:

A minimum of a Master of Science (M.Sc.) degree in Geology, Geography, or a related field, or an M.Sc. in Engineering with a specialization in geotechnical or geological sub-disciplines, with expertise in permafrost environments and least two years of work experience in industry, academia, or a government agency in a related capacity.

Assets include:

- A demonstrated track record of implementing a permafrost monitoring system, data management experience and peer-reviewed scientific publication.
- Eligibility for registration in Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (NAPEG).

Equivalent combinations of education and experience will be considered.

ADDITIONAL REQUIREMENTS

Position Security (check one)

☐ No criminal records check required
☒ Position of Trust – criminal records check required
☐ Highly sensitive position – requires verification of identity and a criminal records check

French language (check one if applicable)

☐ French required (must identify required level below)

Level required for this Designated Position is:

ORAL EXPRESSION AND COMPREHENSION

Basic (B) ☐ Intermediate (I) ☐ Advanced (A) ☐

READING COMPREHENSION:

Basic (B) ☐ Intermediate (I) ☐ Advanced (A) ☐

WRITING SKILLS:

Basic (B) ☐ Intermediate (I) ☐ Advanced (A) ☐

☐ French preferred

Indigenous language: Select language

☐ Required

☐ Preferred