Job Description

New

Ministry

Environment and Protected Areas

Describe: Basic Job Details

Position

Position ID

Position Name

Junior Hydrogeologist

Requested Class

Scientific 2

Job Focus

Operations/Program

Supervisory Level

00 - No Supervision

Agency

Cost Centre

Program Code:

Employee

Employee Name (or Vacant)

Vacant

Organizational Structure

Division, Branch/Unit

RSD/ Oil Sands Monitoring Branch

Supervisor's Position ID

Supervisor's Position Name

Hydrogeologist

Supervisor's Current Class

Scientific 4

Design: Identify Job Duties and Value

Job Purpose and Organizational Context

Why the job exists:

This position will support the safe and effective delivery of groundwater monitoring, evaluation and reporting for the Oil Sands Monitoring (OSM) Program. The Junior Hydrogeologist (Scientific 2) will contribute scientific expertise to support the legislated science mandate, “to develop and implement an environmental science program to monitor, evaluate, and report on the condition of Alberta's ambient environment” (Section. 15.1(1) Environmental Protection and Enhancement Act, 2016). This role ensures that the OSM program, its partners including Industry, Indigenous Communities and the Government of Alberta receive the scientifically credible and relevant information needed to responsibly manage groundwater resources in the face to support safe and responsible resource development.

Key outcomes for the position include: implementing scientific ideas and approaches developed by the OSM Hydrogeologist and other scientists; providing expert advice on scientific program and project design; supporting multi-year monitoring programs that bridge scientific disciplines; and initiating or contributing to scientific publications related to groundwater monitoring under the OSM Program. The incumbent is also expected to provide expert advice to the OSM program and its partners as well as Government of Alberta leadership, on the cumulative impacts of human activity as well as naturally occurring effects on groundwater quality and resources.

Responsibilities

The Junior Hydrogeologist (Scientific 2) will be responsible for four core results related to groundwater monitoring delivered under the Oil Sands Monitoring (OSM) Program by the OSM Branch: (i) **Long-Term Groundwater Monitoring Design**, (ii) **Annual Work Planning**, (iii) **Groundwater Monitoring Program Delivery**, (iv) **Evaluation and Reporting**. These responsibilities include:

1. Design (10%): contribute to the review, development and continuous improvement of groundwater quality research and long-term groundwater quality monitoring programs that address issues of concern to the Program and its partners including the governments of Alberta and Canada, Indigenous communities, and the oil sands industry with the end result being a scientifically credible, groundwater monitoring program aligned with the needs of the OSM Program and its partners. This includes:

- Working with the OSM Hydrogeologist, OSM scientists and relevant staff in other EPA Branches to ensure innovative, scientifically credible monitoring protocols are conceived and deployed in OSM groundwater monitoring program.
- Contributing to the development of conceptual models based on the latest science that summarize the known and hypothesized responses of groundwater quality and quantity to environmental variation and anthropogenic stressors including climate change, land use, contaminants, etc.
- Working with Indigenous communities to ensure integration with Community-Based Monitoring groundwater monitoring activities and supporting efforts to address groundwater related concerns expressed representatives of Indigenous Communities.

2. Planning (10%): provide input to the annual (or multi-year) monitoring plans that are driven by the OSM key questions, direction from OSM governance and relevant scientific questions to assess the condition of groundwater in the oil sands region. Plans also include scientific evaluations of the impacts of anthropogenic and ecological drivers. Activities include:

- Contributing to the annual work plans and budgets for OSM groundwater monitoring projects, that clearly articulate the objectives, outcomes, activities, delivery schedules and resource requirements;
- Providing input to focused studies are relevant to the overall understanding of groundwater quality and resources within the oil sands region of Alberta;
- Identifying innovative methods to assess groundwater condition by staying up to date with the latest science.

3. Delivering (20%): ensures long-term groundwater quality and quantity monitoring and research programs are delivered in a safe and effective manner. The end result is safe and timely completion of deliverables within the approved budget. Activities include:

- Collaborating with the OSM Hydrogeologist, scientific and technical staff in the OSM Branch and other relevant EPA Branches on operational components of program delivery such as visiting field monitoring sites and analytical labs, supporting staff to anticipate and troubleshoot potential scientific and technical challenges, providing ongoing validation of groundwater monitoring data.
- Supervising drilling and installation of groundwater monitoring wells as required and generating borehole logs.
- Coordinating the involvement of indigenous community members and volunteers in program delivery.

4. Evaluation and Reporting (60%): actively participates in undertaking scientifically credible environmental data evaluation and reporting that meet work plan commitments, program as well as legislated reporting requirements. The end results are State of the Environment reports and peer-reviewed papers in international

journals. Activities include:

- Proposing and contributing to analytical approaches for groundwater data, as well as implementing robust analyses of groundwater data to support standard and non-standard reporting products.
- Collaborating with internal and external scientific experts in additional evaluation of, and reporting on, groundwater data sets to ensure scientific linkages with programs and interpretations employed elsewhere in Canada, and internationally;
- Providing credible and defensible scientific content for meetings, workshops, conferences, web pages, and briefing packages;
- Contributing to the communication of major observations and conclusions of long-term monitoring and focused study activities on the condition, status and trends of groundwater quality and quantity in the oil sands region including but not limited to primary and collaboratively authored peer-reviewed scientific papers, technical and state of the environment reports, major scientific synthesis reports, program reports (quarterly, annual), and plain-language summary documents;
- Participating in scientific committees and task forces requiring Alberta groundwater expertise;

Problem Solving

Typical problems solved:

- Requires scientific expertise, knowledge and understanding in order to interpret and provide advice on groundwater to various internal and external stakeholders;
- Addresses challenging problems related to the condition of groundwater quality and quantity in the oil sands region of Alberta resulting from scientific uncertainty over the environmental mechanisms by which anthropogenic and natural drivers such as climate affect groundwater quality/quantity;
- Participates in efforts that generate new knowledge and supports creative solutions to groundwater quality problems including aquifer contamination, contaminant transport and dispersal, fluid-sediment interactions, changing groundwater-surface water interaction, impacts of industrial activities, climate change, etc.;
- Addresses cutting edge research issues in one or more specialized areas of hydrogeology, with potential for the findings to set precedents for provincial and national use;
- Participates in research in an environment where guidelines or scientific standards are inadequate and significant scientific or technological innovations are required;
- Collaborates with academic and other scientists on research that accelerates the creation of new hydrogeological knowledge and solutions and extends the reach of the OSM groundwater monitoring programs;
- Conceives, plans and conducts groundwater quality research which could have considerable influence on scientific knowledge and management of Alberta's groundwater resources.

Types of guidance available for problem solving:

Guidance for solving groundwater related science problems is provided by multiple complex standard operating procedures, guidance from the OSM Hydrogeologist, advice from colleagues including other technologists, scientists and external experts/collaborators, and direction from senior managers.

Considerable expert judgment is required to ensure scientific (and operational) decisions with relatively small risks are made independently, while decisions with relatively large risks are made after receiving appropriate input or direction from the OSM Hydrogeologist and senior managers.

Direct or indirect impacts of decisions:

This position provides scientific support and expertise in hydrogeology to the OSM groundwater program to support understanding and mitigating the environmental impacts of contaminants, groundwater withdrawal, and climate change on groundwater quality and quantity. The position has significant

impacts on the Government of Alberta's groundwater management approach by providing scientific input to the development and implementation of groundwater quality and relevant environment-related policies and regulations under the Water Act and the Environmental Protection and Enhancement Act and through the Water for Life strategy.

The position has significant external environmental, economic, and social impacts by influencing:

- Information required to support drafting approval processes and regulations under the Alberta Energy Regulator;
- Information needed by industrial applicants and operations of the energy, forestry, agricultural, and municipal sectors that may affect or be affected by groundwater resources;
- Information required to support relations (government and OSM Program) with indigenous communities, environmental groups, and stakeholders with interests in groundwater resources in the oil sands region of Alberta.

Key Relationships

Major stakeholders and purpose of interactions:

Hydrogeologist, OSM Groundwater

- Daily interaction to discuss strategic and operational issues related to scientific priorities and delivery of approved work plan commitments.

Director, Environmental Science and Field Operations

- Weekly interaction to discuss strategic and operational issues related to scientific priorities; develop and monitor performance agreements; prioritize and lead operational and strategic planning.

EPA Leadership Team (Directors, Executive Directors, Chief Scientist)

- Monthly interactions to assist senior leaders in setting organizational priorities including developing strategic plans; provide scientific input on groundwater-related issues of importance to the OSM Program, EPA and Government as a whole.

OSM Branch Scientists and other Program Staff: Daily to weekly interactions with:

- **Groundwater Team**: collaborating with other groundwater scientists and technologists on the development of the OSM groundwater quality and quantity monitoring program and providing scientific advice and information related to approved OSM activities.
- **Other OSM Branch Scientists:** working collaboratively with other EPA watershed scientists including surface water, wetland and geospatial experts to analyse relevant data and provide expert advice on groundwater-related data collection, validation, evaluation and reporting.
- **OSM Program Office:** providing scientific advice/information to support program activities as needed.

Scientists and other staff in EPA and other Government of Alberta Departments

- Participate in the provision of relevant groundwater quality scientific information to key EPA contacts.

Indigenous community members and their representatives: providing scientific advice/information to support program activities as needed.

- Interactions to support delivery of Indigenous-led community based groundwater monitoring programs that are relevant to the information needs of indigenous community members, consistent with the direction of the OSM Oversight Committee; programs may also directly involve community members in program delivery.

External scientists, including academia, industry, partner monitoring organizations, Environment and Climate Change Canada (ECCC), Department of Fisheries and Oceans(DFO), other provincial or territorial governments and Geological Survey (USGS)

- Interactions to collaborate and lead (where appropriate), on integrated groundwater quality monitoring and research programs and projects. Activities may include review of scientific literature, and reviewing draft manuscripts for journal articles and other reports; co-authoring

publications with other organizations.

Required Education, Experience and Technical Competencies

Education Level	Focus/Major	2nd Major/Minor if applicable	Designation
Doctorate	Science	Science	Other

If other, specify:

Job-specific experience, technical competencies, certification and/or training:

The position requires PhD degree or Masters with 2 years related experience. In addition, the Scientist 2 must have a demonstrated record of publication in peer-reviewed scientific journals commensurate with established peers with a similar level of experience.

The position requires knowledge in a relevant scientific discipline related to hydrogeology in more than one of the following areas: contaminant hydrogeology, physical hydrogeology, geology, geostatistics, environmental (bio) geochemistry, vadose zone processes, environmental engineering and water resources, or equivalent. The position requires a minimum of 2 years post-doctoral or equivalent work experience in the design and implementation of groundwater quality research and monitoring programs. In addition, the Junior Hydrogeologist (Scientific 2) should have a demonstrated record of primary and collaboratively authored publications in peer-reviewed scientific journals commensurate with established peers at similar levels.

The person filling this position is expected to enhance scientific expertise and capacity in the OSM Program in relation to hydrogeology, with a specialization in groundwater, and cumulative effects assessment and synthesis.

The position requires extensive knowledge and experience in the following areas:

- Groundwater quality, quantity, and hydrogeological science, including monitoring program design and data management.
- Advanced numerical analyses using (geo) statistical methods and tools for large environmental data sets.
- Application of appropriate hydrogeological models or other means to predict local, regional and cumulative impacts of a broad range of activities impacting groundwater quality in the oil sands region of Alberta.
- Development and/or application of new and emerging methods related to assessing the status and trends in Alberta's groundwater quality and resources.
- Current and emerging regional, provincial and national groundwater quality issues.
- Knowledge of Alberta's hydrostratigraphy and familiarity with groundwater modeling including software such as FEFLOW, HYDROGEOSPHERE, and MODFLOW.

The following will be considered as assets:

- Relevant partnerships with academic and industrial research communities, relevant government and non-government agencies, etc.
- Experience with data from OSM monitoring programs and related programs or studies in Alberta and elsewhere is an asset.
- Knowledge of EPA's business plan, goals, strategic priorities, and accountability processes.
- Knowledge of Alberta's acts, regulations, policies and frameworks related to groundwater resources.

The position requires the following skills and abilities:

- Demonstrated innovative and creative thinking, problem solving, and strategic thinking skills.
- Drilling techniques, installation of monitoring and production wells and soil and groundwater sampling

procedures.

- Using water level meters, data loggers, EC meters, electronic submersible pumps, etc. to gather hydrogeological and environmental data as well as aquifer pumping testing programs
- Working in field settings, including remote locations and winter weather.
- Strong data analysis, modeling and interpretation skills.
- Strong scientific writing skills, project management and program planning skills.
- Strong communication and interpersonal skills to develop and deliver understandable scientific information to key OSM program partners, stakeholders, the scientific community, public audiences, and senior government executives.
- Ability to build and maintain effective and productive working relationships with Indigenous communities, various internal and external researchers, post-secondary institutions, graduate students, researchers, and specialized scientists.
- Ability to successfully manage multiple projects, meet timelines and work under pressure.
- Ability to identify, anticipate, and analyze complex issues.
- Ability to synthesize findings to identify risks, possible actions and where possible, solutions.

Behavioral Competencies

Competency	Level A B C D E	Level Definition	Examples of how this level best represents the job
Systems Thinking	○ ◉ ○ ○ ○	Considers inter-relationships and emerging trends to attain goals: • Seeks insight on implications of different options • Analyzes long-term outcomes, focus on goals and values • Identifies unintended consequences	Ensures long-term groundwater quality monitoring and research programs are delivered in a safe and effective manner. Supports the integration between OSM groundwater monitoring program, other OSM Program theme areas, and environmental monitoring and research programs within the broader EPA
Creative Problem Solving	○ ◉ ○ ○ ○	Focuses on continuous improvement and increasing breadth of insight: • Asks questions to understand a problem • Looks for new ways to improve results and activities • Explores different work	Seeks to understand problems related to groundwater monitoring. Proposes solutions that require analytical and/or interpretative thinking, creative thinking, and problem solving skills. Works with the OSM

		methods and what made projects successful; shares learning • Collects breadth of data and perspectives to make choices	Hydrogeologist, Branch scientists to ensure innovative, scientifically credible groundwater monitoring protocols are conceived and deployed.
Drive for Results	○ ◉ ○ ○ ○	Works to exceed goals and partner with others to achieve objectives: • Plans based on past experience • Holds self and others responsible for results • Partners with groups to achieve outcomes • Aims to exceed expectations	Contributes to scientifically credible groundwater monitoring program generating new knowledge related to addressing groundwater problems including aquifer contamination, changing water levels, impacts of industrial activities, etc.; Initiates and/or supports collaborative writing of standard and non-standard reporting products on observations and conclusions of groundwater monitoring activities including status and trends.
Build Collaborative Environments	○ ◉ ○ ○ ○	Facilitates open communication and leverages team skill: • Leverages skills and knowledge of others • Genuinely values and learns from others • Facilitates open and respectful conflict resolution • Recognizes and appreciates others	Collaborates with Branch staff and others on all phases of groundwater monitoring program, from conception to delivery and reporting Contributes to and support the delivery of the groundwater monitoring programs delivered by teams involving academia, industry, indigenous community members, and government.
Develop Self and Others	○ ◉ ○ ○ ○	Seeks out learning and knowledge-sharing opportunities: •Reflects on performance and identifies development opportunities • Takes initiative to stay current • Shares with the team even when not asked • Actively coaches and mentors direct reports	Effectively communicating complex scientific issues/ results to a wide range of expert and non-expert audiences, thereby ensuring government, industry, and public stakeholders can best employ or apply the information resulting from groundwater monitoring, evaluation and reporting activities. Supports a culture of scientific excellence within the groundwater team.