APPENDIX 2 –
Geoscience Experience Examples by Discipline

(for geoscientists-in-training)

The examples contained in these appendices are grouped by discipline from a variety of experience reports. The examples for each discipline are not meant to flow together, but are a conglomeration from a variety of geoscientists-in-training. Note that you do not have to include as many examples as listed in this Appendix. See the experience reporting instructions on how many examples to include in each section.

In order to protect personal information, specific project names and locations have been indicated with a letter, such as X. Also, places where the applicant could have provided more detail are shown with "____".

If there is no page number beside a discipline, then we don't have any examples for that discipline yet. Refer to other disciplines to get an idea of the kind of information required.

CONTENTS

Geology Examples

Part 1 - APPLICATION OF THE KNOWLEDGE OF GEOSCIENCE PRINCIPLES AND PRACTICE

Geoscience training and familiarization

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- As a Geologist II, I worked on four diamond drill programs to explore for uranium mineralization; the X project located in the Z basin overlying the B metasedimentary rocks on the Y Domains within the G Province. *This example should also have included the applicant's role in the work, how it was done, why it was done that way and what the outcome was.*
- I attended several geological conferences and advanced educational opportunities; the Geological Association of Canada, the Mineralogical Association of Canada (GAC-MAC) conference and uranium course, and the Saskatchewan Geological Survey (SGS) open house. Some highlights of what I learned are _____.
- In May, I took an in-house CANSTRAT Sample Logging course, directed by X in Calgary. The course was 10 days long where I focused on sample description, studied clastic, karst and evaporate samples under the microscope.
- In June, I took a professional log evaluation seminar at the Calgary Petroleum Club lead by Schlumberger. I was able to apply my training to the X project.
- In June, I took an in-house potash course in the Regina Subsurface Geological Laboratory. The 5-day course was let by Joe Smith, P.Geo. I studied several cores focusing on familiarizing the Prairie Evaporite Formation, and predominately on the Upper and Lower M Member.
- During the field program in northern Alberta I became increasing familiar with the Fort McMurray Formation and being able to call core points. I also worked with the Clearwater Formation and became more familiar with this argillaceous limestone in the X project.
- When working in central Saskatchewan I became familiar with the Prairie Evaporite Formation, as well as, all the stratigraphy between the glacier-till to ore zone. I became comfortable being able to call both the First and Second Red Beds to initiate coring procedures.
- On the X project, my work has focused on exploration and delineation of three zones ____*name the zones*____ in order to develop NI43-101 compliant resource estimates. I received training on proper logging techniques including measurements, samples, photos, and core handling. Due to the intense alteration at this project, lithological recognition and deciphering of the antecedent is a core skill that I have developed with confidence during this reporting period. My observations helped unravel the metallogenic model for the X deposit and the familiarity in recognizing alteration signatures is crucial in future exploration programs.
- Due to the nature of the uranium mineralization at X project, I took eight in-house seminars on the proper and safe handling procedures and sampling procedures for radioactive drill core.
- I took a certified course on the transportation of dangerous goods to be able to properly package radioactive samples and know how to legally and safely transport our radioactive samples to the analysis lab. I am now certified by Transport Canada to ship and transport naturally occurring radioactive samples. This training is crucial, as part of the chain of custody for samples requires that X's employees personally transport the samples from site to the lab.
- I took MapInfo and GIS training courses in order to use them during exploration projects. They helped me prepare cross-sections, plan maps, log displays and thematic maps. I used these programs not just to visualize displays of a drill log but to help interpret trends on a property scale to better understand the entire property at projects X and Z.

- I attended the Saskatchewan Industry and Resources Open House conference in Saskatoon. This conference allowed me to keep up to date with other projects going on in the province and new technologies being used in exploration.
- Over this reporting period I worked on six exploration projects in southeast Saskatchewan in eight different stratigraphic units: Midale, Frobisher, Alida, Tilston, Bakken, Torquay, Birdbear and Red River. My role on the team was _____. I received training from experienced consultants on the trapping and reservoir characteristics in these units in southeastern Saskatchewan.
- I became more familiar with the geology of the Bakken and Torquay Formations in southeastern Saskatchewan by analyzing cores with other geologists, attending core workshops and reading geology articles in magazines and website such as _____.
- I noted that across the local areas the G sandstone was often thicker, coarser-grained and less argillaceous. All of these observations indicated that the better reservoir sandstone was originally deposited across areas with earlier structural relief. This clearer understanding of the Bakken reservoir allowed me to work more effectively with my supervisor, geophysicist, consulting geologists and partners in order to develop an exploration model for pursuing Bakken prospects in southeastern Saskatchewan. This work lead to our acquisition of 11 sections of land in the Q area.
- I attended the Williston Basin Petroleum Conference in Regina where several talks, poster presentations and the Core Workshop focused directly on the geology of southeastern Saskatchewan. Some highlights of what I learned that applied to my work were _____.
- As part of our exploration program, I viewed cores and discussed Midale and Bakken depositional models with two senior geologists and gained a much better understanding of facies and depositional controls.

<u>Technical geoscience experience</u>

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*
- I completed 15 geological sections and maps based on the field data that was collected and interpreted the geochemistry with the help of in-house specialists. *This example is missing what the outcome was (pick one and explain the outcome).*
- I contributed to the annual report by writing drill hole summaries, interpretations and generating technically descriptive figures. I became increasingly familiar with the geological controls on unconformity and basement type mineralization models in large dextral strike-strip fault systems.
- I collaborated with technical experts on geophysics within the department and gained an understanding of how electromagnetic (EM), magnetics, gravity, resistivity and 3D seismic can be used to help target favorable basement stratigraphy beneath the Y sandstone cover.
- I cored logged at the X Mine and the Y Project. I picked core point (D Formation) at the geotechnical drills on site. I also core logged lithology and geotechnical, focusing on clearly describing the M Formation and the P Formation.
- At the Y Project, I went to the drill-to-call core point at the Q Formation. This was necessary to confirm that the drillers with H Drilling were installing the vibrating wire piezometers in the target zone.
- I was a wellsite Geologist for the X exploration project in Saskatchewan. I analyzed drill core and chip samples. I logged the chip samples, called core point based off chip samples and Pason data. I logged the lithology of ore zone before shipping it to the core lab in city X.
- I worked with other geoscientists as part of the exploration team on the X property in the Z Basin in northern Saskatchewan. Key duties I had included working along with geotechnicians to measure the meterage of the core. Logging included differentiating lithologies as well as where alteration is present, including argillisation, chloritization, silicification/desilicification and iron oxides and structural features including faults, foliation and folding. Other drill-associated duties I had involved spotting drill hole collar

locations and getting GPS coordinates for recently drilled holes with a Q GPS. I also probed drill holes with a X downhole gamma logging system. I also used Z's Gyro system for accurate downhole dip and azimuth measurements of drill holes.

- While working in the office, my role on the project was to develop and maintain the GIS database, write summary reports, and interpret data. I carried out geochemical interpretation of clay PIMA data from numerous drill holes to be added to the drill hole summaries and yearly reports. I also did over 50 geochemical analysis write ups including interpretation and descriptions of anomalous trends on both reconnaissance and X deposit drill holes.
- I was the co-author of a three drill hole assessment report for claim D on the Z property. This report included the preparation of maps, drill hole summaries, data interpretation and report compilation.
- I also carried out a geological, geochemical interpretation of the G project. This work helped identify possible target areas, and present management with evidence for their land management plans.
- I made three presentations during this reporting period. One was on my geological and geochemical interpretation of the N Property, another on my findings on the mineral potential of a new property and the third on the results of reconnaissance drilling on the J property.
- As a part of our D exploration project, I conducted a detailed geological study of salt-collapse structures and related hydrocarbon trapping, and identified potential oil prospects in the X, Y and Z areas using 2-D seismic, cores, cuttings, well-logs, and maps.
- I studied isopach and structural trends across areas of local salt dissolution at P, Q and R oilfields in order to gain a more thorough understanding of the relationship between salt collapse and X formation production. With comparisons to these known oil-producing areas, I used regional maps, well logs and cores to identify oil potential across similar structures at X, Y and Z. I identified faults by looking for vertical offsetting relationships that could be correlated across several seismic horizons with often associated folding, thickening and/or thinning of strata.
- I correctly identified faults and noted their approximate timing and stratigraphic position, which was a crucial part of the exploration across salt collapse structures. Other horizontal wells in the G area had already intersected open fractures that lead to loss of circulation and significant additional costs. Our company purchased the land at Z and drilled one Q zone horizontal well. During drilling, I was successful in avoiding fractures and thereby minimizing drilling costs.

<u>Development of geologic concepts</u>

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- Using the data collected by the project team and myself, I was required to assess and describe the mineralization potential of the targeted subsurface X stratigraphy using geological maps and scenarios. The outcomes was _____.
- I was a part of the team that delineated three uranium deposits, X, Y and Z. As a part of the delineation process, we wrote 14 reports and gave five presentations showing the development of our geologic model for the uranium deposits. My role was to log core and do geochemical and clay interpretations. These contributed to our exploration team's understanding of the deposit leading to NI43-101 compliant resource estimates for the X and Y deposits.
- From the mentoring on the Q deposits I received, I developed a great understanding of the geologic models for the deposits and how to translate that to grassroots exploration on other properties such as J and K. *Insert a specific example of the geologic model and where you gained a greater understanding.*
- Our team initiated and conducted an exploration project of the Mississippian Frobisher Beds in the Q area in order to further our land base and drilling prospects. I constructed detailed isopach and structure maps of all producing zones in the Frobisher beds using well logs and core data across an area covering a

Township, with particular emphasis on defining the subcrop edge of the various units. I determined that hydrocarbon trapping resulted from a combination of structural elements and stratigraphic subcropping of the porosity zones. Close examination and mapping of a tight impermeable anhydritization zone immediately below the Mississippian unconformity showed the thickness of this zone to be highly variable, ranging from 20 to 50 m in thickness. This work lead to the development of an exploration model for local trapping related to the depth of subcrop anhydritization. Where the porosity is preserved in down-dip areas adjacent to local anhydrite "thicks" potential trapping can occur. This geologic concept was then applied to several areas of successful drilling and showed to be an important element to trapping. As a result, two sections of land was acquired in the Q area.

Mapping and systematic geoscience evaluation

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- Using the historical and current drill hole results, I assembled a subsurface data set to aid in the evaluation of unconformity mineralization on Project X. The data I assembled was _____.
- I did sub-surface mapping of the Y Member from the E Formation. The sub-surface mapping included logging structure and lithology.
- I updated the stick diagrams for upcoming exploration holes based off of the lithological data from the previous holes on the X Project.
- My sub-surface mapping included logging structures, lithology and a basic geotechnical suite on the X project.
- I evaluated the following formations/units; A, B and C near Q; D near R; E and F near S; a SW Manitoba regional study of the G and H; Mississippian carbonates near T and five other smaller projects that were evaluated in less detail. The maps I generated as part of an evaluation typically included thickness, elevation/structure, porosity, permeability, gross pay, net pay and compilation maps. Compilation maps may include data from integrated geological mapping, hydrology, roads, seismic planned drilling locations/paths, lease roads, economic parameters, planned battery locations, production data, working interest, aerial photographs, land schedules, land prices, facies change, lithology, completions types, core data, etc. The outcome of the above was that we used the geological mapping to guide land acquisition and drill five wells in the S area, made bids for several reviewed assets, raised capital and attracted drilling partners. I learned a great deal about the stratigraphy, mapping, geology and operations of SW Manitoba and formed a strong internal data-source for our company.

Identification of geologic hazards and risk to the public and the environment

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- One of my roles as a project lead was to meet and work with local trap line owners who have hunting and fishing rights on our project lands. I was responsible for making sure our drilling activities would not disrupt their way of life. *This point is missing how it was done and the outcome.*
- The geotechnical drilling at the Y Project was for the installation of deep wireline vibrating piezometers on their stock piles and around the mine itself. The drilling and core logging was to make sure the active mining was not affecting the local water table for both inflow and monitoring any environmental effects. This drilling made me more aware of the environmental effects of active surface mining.
- After taking field trips in northern Saskatchewan, I realize the extent to which exploration affects the environment, especially the roads and drill sites. This knowledge has acutely focused my attention to the flora and fauna of the Athabasca Basin. I also learned to pay more attention to work done by contractors and their adhering to the exploration work guidelines set out by the government in regards to best practices

in mineral exploration. Recent dry years up north have also made the threat of fire very real for us doing exploration work and more so for the local residents. Prevention or mitigation of all public and environmental hazards is paramount to my company and moreover myself and co-workers. The specific regulatory agencies and laws the applied in my projects are listed in the section Significance of Regulatory Agencies in Part 3.

- While preparing the well licence application in our J area, I communicated with government licensing officials in regards to our compliance for handling of telephone cable lines at the Y project.
- On the rig site, I was responsible for ensuring that any potential geological drilling hazards were communicated in advance (e.g. over-pressurized zones). Any disruption at the well site related to geology could cause unnecessary stress and concern to others and can even lead to extreme carelessness and accidents. As site geologist, I ensured that others are immediately aware of any unexpected changes in the geology and/or well plan, and I kept all lines of communication open between Directional Hands, Well Supervisors and Engineer.
- Working with the Petroleum Engineer, I used Google earth to identify sloughs, creeks and waterways where natural habitat and runoff could be disrupted by the construction of roads and well site at the Q project.
- I monitored the posted Crown lands that are designated as Heritage Sensitive, Environmentally Sensitive, Wildlife Habitat, etc. and reported these hazards to my supervisor in our areas of interest.

Part 2 - MANAGEMENT OF GEOSCIENCE

Supervision

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I was the site senior while cross shifting the project geologist on Project X. I later became the project lead on this project. I was responsible for monitoring the work of our geological technicians, junior geologists, drill contractors and summer students on a daily basis. I was responsible for ensuring that all project and contract staff were adhering to the company's Safety, Health and Environment best practices, and the regulatory requirements placed on the company by federal and provincial regulatory agencies, such as, ___*name the agencies*___.
- At the Z Project, I supervised one co-op student. I did quality assurance and quality control (QA/QC) of his work and helped explain the stratigraphy and core logging procedures when questions would arise.
- Although I was not the project leader on X property, there were instances where I was in a supervisor role. For example, there were two to four drills coring concurrently which often created staffing issues. Every season there were often new geologists and geotechnicians coming to do field work. This would result in myself or a group of veteran employees supervising the new hires. My supervision of the geotechnical work done by others included such things as depth measurements, core loss, box labels and especially to make sure proper sampling techniques took place.
- I ran the entire field program at project Y for one week to cover for my supervisor's vacation. For this week, I supervised the logging on all three drills including making updated cross-sections, writing daily update reports for management and talked directly with the drill foreman and drillers about current holes to confirm they were staying on target, re-starting holes due to deviations and planned the drilling for the next site.
- I supervised crews of two or three helpers in the cleanup and carry out maintenance of the B camp on Y property. We winterized tents, patched tents and marked out electrical cables and breaker boxes. We also made a chopper landing pad close to the camp for emergency situations.

Project leadership

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- During the field season I was responsible for reviewing and signing off on daily drill timesheets, shutting down drill holes, adhering to permit conditions, sending daily updates to senior management, and hosting safety meetings.
- As a project lead, I was responsible for identifying areas for exploration and proposing and executing drill programs in these areas. *How the areas of exploration were identified would be a going point for Part 1.*
- I worked closely with the project supervisor and learned from his lead on both Y and Z exploration projects, such as _____.
- On the Y project I would run the daily morning tailgate meetings when our supervisor was not on site which was about one day a week.
- I took the role of project leader for one week in February of this reporting period at the X camp. I was in charge of drilling, logging and sampling core. Morning meetings were held to inform everyone on daily happenings including hole re-starts, or shutdowns and probes. I would delegate individuals to log core, split core, probe holes, shovel out core racks and other camp jobs. I looked at the core that comes in and wrote daily updates on what was intersected (lithology, alteration, structure, ore). The drill foreman would stop by daily for updates on the drills, drop off reflex surveys and weekly safety meeting minutes. I would update the reflex azimuth and dip surveys into the database daily. Cross-sections for drilling grid lines were updated after each completed drill hole. I received phone calls from the drillers at all times of the day and night regarding the dip and azimuth and when it was time to line up the drill. I went out to the drill with a co-worker to line up the azimuth of the drill using a handheld compass and also, especially at night, a GPS-based compass to make sure the drill was lined up correctly. After each hole was completed, I would take the X GPS and got accurate collar location measurements and updated them in the database.
- I was the Project Geologist for the X project. My duties mainly consisted of familiarization and transferring data into X's database and logging system. As part of the data transfer process, I was also making note of interesting features found in D's reports and data, which was working towards a compilation of target areas for further exploration including both geophysics and drilling. Prioritizing targets lead to budgeting for future work.
- My helpers and I flew into the J camp on X property to assess the status of the camp for future drill seasons. It was decided that cleanup work and building a chopper pad were necessary. I supervised all of the work done on the camp site.
- Working with my supervisor, I initiated and helped to complete four main exploration projects (P, Q, R and S) that resulted in the acquisition of new lands and drilling prospects. As project leader, I was responsible for defining the purpose and scope of each project, supervising consultants, writing progress reports, making presentations to management, and providing recommendations for land acquisition and drilling locations. The two main purposes of the projects were to 1) identify and acquire new lands for drilling and 2) develop trapping models to apply in new areas. The Q project lead to the drilling of our first successful horizontal well in a new pool west of Z, and helped to verify our trapping model in the Y.

Budgeting

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- In the project geologist's absence, I was responsible for monitoring the drilling budget on project X and making sure we were within our projection.

- As a project lead on project X, I was responsible for all aspects of budgeting including initial budget creation, quarterly projections and monthly spending summaries.
- For one of my projects, there were issues concerning invoices from a consultant that I was responsible for resolving in a timely fashion. Specifically, a consultant spent several days working on portions of a project that had not been assigned and charges for this extra time would have caused us to go over budget. I was able to resolve the issue by providing records outlining the work that was assigned and I eventually had the invoices adjusted.
- I created an Excel based cash flow model capable of calculating monthly net revenue projections for individual wells. I was responsible for deriving the necessary production profiles appropriate for use in the model and was ultimately responsible for any/all other data required by the model (oil price forecasts, crown/freehold/other royalty calculations, well budgets, disposal & hauling costs, operating expenses, etc.). This cash flow model was the primary tool we used to evaluate financial viability of projects and to forecast future cash flow which in turn determined the allocation of capital (budgeting) within our company.
- I completed asset valuations and compiled rough budgets (for land, drilling, completions and tie-in) on six projects throughout SW Manitoba.
- I obtained multiple quotes and in order to make decisions on price/quality on bids to accept for the services involved in operations. My supervisor was ultimately responsible for handling this aspect of the business, but we collaborated to determine the best course of action. As a result, our company got the best value for its dollar and the shareholders received the best return on their investment.
- For projects approved by management for drilling and/or acquisition I worked closely with my supervisor to decide on the best operational approach and outline capital requirements for existing and potential projects for consideration by the Board of Directors.
- I was part of the team that planned, drilled and completed eight vertical wells in the G area. The company established a base of production and attracted drilling partners and investment as a result of the success in the area. We also developed a better understanding of the geology in the area and found ways of reducing operational expenditures, especially through sharing rig move costs and using local service providers.

Other

- Data Management – On the Z project I was responsible not only for QA/QC on my own work, but also my peers. I managed the data through an organized file structure, which was then systematically uploaded by VPN (virtual private network) to our engineers off site. I did QA/QC review by ___*include details of what you did*___.

Part 3 - SOCIAL IMPLICATIONS OF GEOSCIENCE

Value and benefits to the public

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- The majority of the projects I was involved with are related to the mining industry. Mining is important to the public as it provides natural resources, jobs and has been part of the economic prosperity in Saskatchewan.
- The X Exploration Project for Z resource in X, Saskatchewan provided continuing employment for the region and royalties for the land owners who had their properties adjacent to the developing mine property.
- Y company maintained municipal roads that heavy hauling equipment was using and directly stimulated revenues for small business owners in the immediate area by using local services whenever possible.
- Exploration work done in the Athabasca Basin in general benefits northern communities in many ways. Directly, our X project had good relations with the local northern residents of Z First Nation. Y company directly employed local residents for seasonal work in the camps. We also contracted or used the services

of P, Q and R companies which employ local people as geotechnicians, camp attendants, drillers, helpers, geophysical workers and cooks. The camps could potentially become mines and generate wealth and sustainable employment for the northern residents for years to come.

- Uranium exploration in the Athabasca Basin is important on the world stage. With green, low carbon emitting energy becoming very popular around the world, many countries are using nuclear energy. Here in Saskatchewan we have amazing potential for producing much of this needed nuclear fuel. The value of the uranium ore to the people in the province (via taxation of mining companies for social programs or personal employment) is immense and benefits all of the public.
- The public of the Z area where our company is most active benefit directly and indirectly from my geoscience work. The exploration projects create new drilling locations that help employ more people in the community, and the revenue and wages related to drilling help to ensure that the economy remains vibrant and the community continues to grow.
- Any petrophysical well data, cores and core analysis collected by companies exploring for or developing oil and gas in Saskatchewan are required to be submitted to the government and are accessible to the general public. This kind of government regulated, centralized data collection only occurs in a few places in the world and is an incredible source of data to both industry and academia and ultimately the Saskatchewan economy.

<u>Safeguards to protect life, property and the environment</u>

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- Given my increasing level of responsibility, I had to spend more time learning and understanding federal and provincial regulatory requirements along with keeping abreast of industry best practices not only with regard to technical disciplines but also OH&S, environmental management and social license aspects. The names of the specific regulatory agencies and laws involved are listed in Significance of Regulatory Agencies below. *The specific regulatory agencies that apply should be listed in Significance of regulatory agencies below.*
- I was exposed to OH&S safeguards at several levels. On the small scale, I observed safeguards such as drill guards on drill rigs as a method to protect workers from high speed rotating parts. On a larger scale, I was the person responsible for ensuring all safety measures such as daily drilling inspections, toolbox meetings, proper storage of fuel and radioactive core were met.
- As a geologist on the D project, the holes that I logged were used to install deep vibrating wireline piezometers. The piezometers were to make sure that the water tables were not connecting to the main tailings pile and tailings ponds.
- My company and X, our client, were both very cognitive of the environmental impact that surface mining for oilsands makes. For example, I saw ___*include a specific example from one of your projects*____.
- I took first aid and CPR training in order to be prepared for emergencies in remote settings.
- Time spent in northern Saskatchewan made me more aware of the importance for safeguards for life and the environment. Working in a remote setting increases risk to health due to delayed access to medical services. Examples would be having emergency medical planning in case of injury or illness. This would require contact phone numbers, personnel's medical histories (i.e. allergies, need of nitroglycerin), and a plan to get the injured person to safety and to medical help. Summer drill seasons add another element to working safely with a helicopter being involved. Knowing proper helicopter safety is key for daily work. Also, it is important to know how to properly and safely evacuate someone from a site in case of emergency.
- Environment safeguards are well outlined by the Government of Saskatchewan. These safeguards are extremely important when dealing with fish and plant life which are very sensitive to changes in their habitat. All drilling is done away from the shoreline, sumps are made for some of the split drilling water and

biodegradable mud used, and all drilling fluids are biodegradable or in containment areas to prevent spills. The names of the specific regulatory agencies and laws involved are listed in Significance of Regulatory Agencies below.

- As an operator in Saskatchewan, our company is required to follow regulatory laws regarding safety and environmental responsibility. We have drilled wells, built roads and been actively producing in a manner that meets or exceeds all regulations and laws governing such activity. The regulatory bodies and laws that govern our work are listed in Significance of Regulatory Agencies below.

Geoscience activity and public at large

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I worked at the company's booth at the career fair at the University of Saskatchewan giving students an idea of what it would be like to work at Company Y and explore for uranium in Canada. This helped foster the practice of geoscience and promoted our company as a potential employer in a time when there is a shortage of personnel.
- I attended two open house debates about nuclear energy in Saskatchewan. It is important to understand the public view on nuclear energy, so that I can ensure that my contribution is part of a positive solution and my actions are socially responsible.
- I presented in a high school Earth Science class at Glenbrook North High School on the importance of science and math. I presented what I do as a geologist and how physical science and mathematics are very important in the industrial world. I prepared a PowerPoint presentation explaining the process of how to become a geoscientist and the possibility of research in the oil and gas industry. This helped foster the practice of geoscience and promoted our company as a potential employer in a time when there is a shortage of personnel.
- I went to Z School in my home town of Q, Saskatchewan and gave a PowerPoint presentation and show-and-tell to 20 grade 5 students. I presented on what a geologist does, the different scopes of work (field and lab work) and the schooling involved to get a degree. I had a show-and-tell of fossils, rocks and minerals with hand samples to pass around. I then had a trivia game and I gave students small rocks and minerals as prizes for getting answers correct. All of the students interacted and showed their own rock collections. This helped foster the practice of geoscience and promoted our company as a potential employer in a time when there is a shortage of personnel.
- I gave a presentation entitled "_____" to 20 members of the local _____ Club. This helped foster the practice of geoscience and promotes our company as a potential employer in a time when there is a shortage of personnel. It also shed light on the safeguards taken in the industry to protect people and the environment, thereby improving public perception.
- I provided a geology seminar to a classroom of students in the Oilfield Production Accounting course provided by CAPPA (Canadian Association of Petroleum Production Accounting) at the J Community College. . This helped foster the practice of geoscience and promotes our company as a potential employer in a time when there is a shortage of personnel.
- I provided a rock and fossil show-and-tell presentation at X School for children in grades 7 and 8. . This helped foster the practice of geoscience and promotes our company as a potential employer in a time when there is a shortage of personnel.
- Our company worked with the Petroleum Geology class at the U of S to provide geoscience projects to students. I helped draft the projects and reviewed the project results. This gave the students a real-life experience that is valuable to their training as geoscientists.

Advancement of geoscience knowledge

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I continued to participate in an in-house advanced technological reading class focusing on varying types of uranium deposits from around the world. Participants shared their knowledge and experience.
- I started an in-house advanced structural geology course under the guidance of the Director.
- I was able to use the knowledge I gained both in the field as well as from mentors and peers to work on compilation and reconnaissance projects for the Z property and a prospective property that the company could acquire. My team and I researched Saskatchewan Government assessment files for historic geophysical work, drilling and mapping done on the property. This, along with current work done by the company, was compiled by our team to better understand the geology of the property, where conductive trends were located and if there were any anomalous metal trends on the property. My role in the research and compilation was _____.

Interest and involvement

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I organized and lead a talk on the local geomorphology of X, Saskatchewan. I explained how the geological development was created by the Holocene glaciers retreating and created drumlins and the barrier beach within the town. We then went into the town and showed where the glacier striations are on the granodiorite.

Significance of regulatory agencies

- *All regulatory agencies, laws and regulations that apply to your work should be listed here in every report. Hint: include the Code of Ethics contained in the Regulatory Bylaws of The Engineering and Geoscience Professions Act and how it applies to you.*
- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I followed the laws and regulations of both Saskatchewan and Alberta depending on the project location as applicable and obtained all required documentation before the start of any drill. The specific laws and regulations that applied in Saskatchewan were _____. The specific laws and regulations that applied in Alberta were _____.
- When working on the Z project I would make sure that we had our well licence from Saskatchewan Industry and Resources in Regina. I would confirm that we had a copy of the Well Licence Application (ER-46) on file before the start of any drilling with B company.
- The Saskatchewan Environment Exploration Guideline is very important in day-to-day exploration work as well as future impacts as a result of exploration. This guideline ensures that the public and environment are affected as little as possible. An example of where I applied this guideline in my work was _____.
- Time spent working in the industry has made me realize how important it is to have agencies like APEGS. Having regulated individuals that are qualified to do work in their scope of practice is very important for accountability in public safety and the environment. Many of the projects going on within our industry are multi-million dollar endeavors and with such large scale projects often comes great risk and hazards to the public and environment. APEGS and similar associations make sure that only qualified persons are members and in case of an incident are able to discipline members or take legal action against a company or an unregistered individual.
- I became more familiar with well licensing and spacing when I made applications to Petroleum and Natural Gas Branch in order to encroach on boundaries of older vertical and horizontal wells at our Z property.

- I became much more familiar with Subsurface Mineral Regulations and the Oil and Gas Conservation Regulations of Saskatchewan through reading, written correspondence, and conversations with the staff at Industry and Resources.
- Our company identified oil potential in an area designated by the government solely as potash lands that was leased by X company. I studied the regulations regarding potash and petroleum and natural gas to request re-opening of lands to oil and gas exploration in the Y area. As a result, these lands were eventually re-opened for petroleum and natural gas leasing.
- I studied the materials for the APEGS Professional Practice Examination and became familiar with the governing laws and ethics for practicing geoscientists in Saskatchewan. An example where this applied to my work was _____.
- My supervisor and I along with the engineering team designed drilling programs that met all the requirements and safe practices outlined in "The Oil and Gas Conservation Regulations" and _____*list all laws and regulations that apply*____. We were responsible for completing and submitting all the necessary paper work and reporting regarding the drilling, completion and abandonment of a well. My role in this process was _____. As a result, our operations were carried out in a safe and responsible matter and I gained a better understanding of the operational, regulatory and reporting side of the industry.
- As a practicing geologist, I have a moral and ethical obligation regarding the responsible application of geological principles to anything concerning safety, public welfare, economics, and the environment under *The Engineering and Geoscience Professions Act*.

Hydrogeology Examples

Part 1 - APPLICATION OF THE KNOWLEDGE OF GEOSCIENCE PRINCIPLES AND PRACTICE

Geoscience training and familiarization

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- As a part of Z company's team I worked on six projects in Canada and Madagascar during this reporting period. My current position within Z requires frequent travel to Madagascar including work at three mine sites and at Z's Mahajanga office while maintaining employment through the Canadian operations. My work with Z required that I become familiar with the local geology, climate, ore deposits and associated waste rock/tailings in order to assist with the development of site-specific closure plans and cover designs for closure plans at mine sites, such as:
    - seepage assessment of a Tailings Storage Facility (TSF) at mine X, where I gained knowledge of the geology and hydrogeology of northern Y as part of the investigation into the material properties of bedrock geology, to determine seepage characteristics of the TSF, as well as familiarization to the local climate and the influence of humid environments on TSF closure planning. My role on this project was to _____. I completed similar assessments for three mine sites in Madagascar which required the interpretation of local geology and hydrogeology including, a waste rock dump at D Mine located at P, the TSF at E Mine located at Q and a Tailings Containment at F Park in R; and
    - completing closure plan support studies for large-scale closure plans of mine waste storage facilities including the waste rock dumps at G Gold Mine, H Nickel Mine, and the TSF at J Iron Mine.

Technical geoscience experience

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I completed seepage and solute transport numerical modeling programs to determine closure criteria (i.e. target net percolation rates for cover systems) for mine waste storage facilities including abandoned uranium mine tailings containment at D Mine in X), Waste Rock Dump at E Mine and the TSF at F Mine located in Q. These numerical modeling programs included the training and use of Geostudio and Feflow numerical modeling programs.
- I completed four Cover System Field Trial Construction and Performance Monitoring Installations at six locations in X and Y including, Cover System Performance Monitoring installation at X company's D Mine, TSF Cover System field trial construction and instrumentation at E Mine, and TSF Cover System Performance Monitoring Installation at F Mine. The techniques I learned included the installation of temperature sensors, water content sensors and weather stations in addition to commissioning the automated data acquisition systems that control measurements.
- I completed Waste Rock Compaction trials to determine the suitability of using compaction to limit net percolation as part of a cover design for the X waste rock dump. The technical skills I needed included *in situ* density testing and field saturated hydraulic conductivity testing.

Development of geologic concepts

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was.*

- I completed 15 reports as part of seepage and solute transport programs that required the interpretation of local hydrogeologic units. These reports included interpreting the findings of material sampling and testing programs completed by X as well as previous investigations completed by the client (i.e. either internal or contracted investigations that included geologic mapping, test pitting, borehole logging or geophysical surveys) that measured specific geotechnical and hydraulic conductivity and ____*include other things the report included, if anything*____. I interpreted these characteristics with the help of my supervisor to develop a conceptual model of the groundwater flow system for the vicinity of the mine site. In addition, I developed a conceptual flow model for the mine waste storage facility along with my supervisor and one other geologist. My role was _____.

Mapping and systematic geoscience evaluation

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I oversaw the D Testing Programs as part of material sampling programs completed at A Mine and B Mine. Materials sampled were comprised primarily of unconsolidated overburden material, run-of-mine waste, consolidated overburden material and various waste materials including waste rock and tailings material. The skills I utilized included interpreting laboratory results for particle size distribution, standard Proctor tests, Atterberg limit tests, specific gravity, gravimetric water content, triaxial permeability (hydraulic conductivity) and moisture retention testing. I interpreted the results along with my supervisor and used them to develop material properties for use in numerical modeling programs such as plant-soil-atmosphere modeling to assess cover system alternatives and unsaturated/saturated groundwater flow (seepage and contaminant transport modeling programs).

Identification of geologic hazards and risk to the public and the environment

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- The primary goal of X is to assist with the development of P plans for mine waste storage facilities in order to mitigate adverse impacts to the environment post-closure. I completed tasks such as seepage and solute transport numerical modeling programs for a given waste storage facility for the mines named previously. These analyses determined the minimum required net percolation rates for cover system performance in order to limit contaminant transport to downstream receptors to acceptable levels. In the case of a storage facility containing acid-generating waste material, which is a geological hazard in the mine closure industry, these analyses were key in determining a suitable closure plan that would be sustainable over the long term.

Part 2 - MANAGEMENT OF GEOSCIENCE

Supervision

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I supervised a junior geologist who worked primarily on Z project and a junior soil scientist on the Y project.

Project leadership

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I managed five projects that were support studies for various closure plans at various stages in development. Examples include: Closure Planning Support Studies for Z company's D Mine Tailings Storage

Facility (TSF), Cover System Design and Closure Plan for M company's E Mine TSF, and Performance Monitoring of TSF Cover System Field Trials at F company's N Mine.

- I completed work scopes and cost estimates for four of the projects that I currently manage. The skills I applied included forecasting professional personnel hours to complete tasks, developing budgets to complete various tasks that are part of the work scope and managing internal resources such that deliverable timelines are estimated with precision.

Budgeting

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- I developed more than 30 cost estimates for sole source and open bid projects. This included scoping major closure planning support studies, cover system field trial construction / performance monitoring installation programs, performance monitoring programs and numerical modeling programs. The scoping documents required the estimation of professional hours for each task in addition to development of cost estimates. In addition, as project manager for several projects, I tracked budgets for up to six projects at once while monitoring task progress and resource levels to ensure tasks were completed on-time and on budget.

Part 3 - SOCIAL IMPLICATIONS OF GEOSCIENCE

Value and benefits to the public

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- The resources produced in mining projects are essential to the functioning of our society and quality of life globally. Mining operations needs to happen in a sustainable and responsible manner for the health of future generations and our planet.

Safeguards to protect life, property and the environment

- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- The primary component of my work experience relates directly to the public, property and environmental safety as closure planning for mine waste facilities. Closure plans must meet expectations of those set out by regulatory agencies who represent the public. In addition, the requirements must meet stakeholders' expectations. The regulatory agencies involved are listed in the Significance of Regulatory Agencies section below.

Geoscience activity and public at large

- *No examples available yet. See examples in other disciplines*.

Advancement of geoscience knowledge

- I was co-author on a conference paper for the X Conference, in Saskatoon during this reporting period. It was a case study on ___*include topic name*___ located in _____.

Interest and involvement

- *No examples available yet. See examples in other disciplines*.

Significance of regulatory agencies

- *All regulatory agencies, laws and regulations that apply to your work should be listed here in every report. Hint: include the Code of Ethics contained in the Regulatory Bylaws of The Engineering and Geoscience Professions Act and how it applies to you.*
- *Each and every point in your reports should include what you did personally, how you did it, why you did it and what the outcome was*.
- A primary goal of developing a comprehensive closure plan for mine waste is the establishment of closure and cover system criteria for the plan. Regulatory agencies are a key link in the establishment of the closure criteria. The closure planning projects that I worked on were approved by regulatory agencies in order for the client (mining company) to continue to operate. The regulatory agencies and laws that applied in my projects were _____.