

**APEGM Progress Report for:**

Period beginning: **May 3, 2010** and ending: **Aug 27, 2010. (4 months)**

**Submission Date:** Sep 10, 2010

**Supervisor:** P.Eng. Submitted on Sep 13, 2010

**Period Employer:**

**Job Title:** Environmental Engineering Assistant

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**1. Give a description of the Engineering work experience you have obtained during this reporting period. Include information supporting the rest of your answers.**

The Office of Drinking Water is responsible for the approval of projects involving water and sewer infrastructure and ensuring that public water system owners provide the public with safe and aesthetically pleasing water. Duties performed by the approvals staff include approval of projects, reviewing of engineering assessment reports written about existing public water systems, inspection of water systems, and providing advice to engineers, water system owners, and operators regarding design, operation, maintenance, and monitoring. Drinking water officers inspect water systems and take water samples to test for health-based or aesthetic water parameters.

Duties which I performed during my work term with the Office of Drinking Water included assisting with engineering reviews of water and wastewater projects. I reviewed projects including water, sewer, and land drainage system extensions, as well as watermain renewals to verify conformance of the designs to standards such as the Drinking Water Safety Act, Ten States Standards, American Water Works Association, and Manitoba Water Services Board Standard Construction Specifications and internal design checklists. During the review of engineering assessment reports written about existing public water systems, I confirmed that the system was in compliance with their Operating License, and the Guidelines for Canadian Drinking Water Quality. Upon non-compliance of designs or operation of water systems, I was responsible for discussing concerns with the senior approvals engineer, the regional drinking water officer, and the design engineer. I assisted in the review of a variety of rural, urban, and seasonal systems. I drafted the file note, letter to the engineer, and permit to construct for many water and sewer system permit applications. I drafted letters to the owners of public water systems regarding action that must be taken to improve the system after the review of engineering assessments. I was also responsible for the electronic and physical filing of permit documents. I researched and developed design requirements and guidelines to conduct project reviews and approvals. Inspection of the Virden, Lorette, Sanford, and Headingley Correctional Institute water treatment plants were excellent experiences for comparing engineering drawings to the plant as-builts, seeing water treatment technologies in application, and sampling water for health-based and aesthetic parameters.

Theoretical knowledge was applied during the analysis and interpretation of designs of water and sewer infrastructure including technical drawings and specification documents. This included verification that project designs were in conformance with standards and formulation of comments of suggestion or statements of requirement to the engineer to ensure conformance. My knowledge of water chemistry was applied during the testing of water at water treatment plants and rechlorination reservoirs for colour and turbidity and taking samples for labs to analyze other water quality parameters. I was able to implement knowledge of AutoCAD from a graphics course, and water chemistry from a water quality analysis course to assist in my review of technical drawings of permit applications and water quality sections of engineering assessment reports of public water systems.

Practical experience was gained when I participated in the inspection of water treatment plants in Lorette, Sanford, Headlingley Correctional Institute, and Virden, and the installation of watermains in Lorette. I experienced the limitations of engineering design at the Virden water treatment plant where a new treatment system was implemented and the old, inadequate treatment system was still in place.

I gained engineering and project management skills through the planning and scheduling of permit application and engineering assessment reviews. I was also responsible for assisting in the training of a new wastewater approvals reviewer. I assessed proposed construction projects for potential hazards such as contamination of the public water supply and reliability and safety during maintenance of sewer systems.

Ethical responsibilities included making decisions based on an engineer's professional and ethical responsibility to the public, the profession, co-workers, and the environment during the review of permit applications and engineering assessment reports. I asked design engineers for clarification when designs seemed to not be in compliance with construction standards and, after discussion with the approvals engineer, make recommendations for design alterations, if necessary, to ensure quality of drinking water and safety of the public.

Employment with the Office of Drinking Water was an excellent opportunity for learning about the role of government agencies and standards in the approval of construction works. I was able to gain an understanding of where and why certain appurtenances are used in water and sewer infrastructure as well as what lift stations and rechlorination reservoirs must include. My education in the area of water quality analysis and graphics (AutoCAD) allowed for the application of theory to my job setting. It would have been helpful to have learned more about water chemistry and water treatment technology in university courses but at the office I was given the resources to research these areas and was encouraged to ask my co-workers any questions which would improve my understanding in this area. This work experience related to my academic training in the areas of fluid dynamics, water quality analysis, design, geomatics, and graphics as I was able to use my knowledge of pumps, water quality parameters, geology, design, and technical drawings to review permit applications and engineering assessments. This summer's placement benefitted me in many ways as it has not only given me a greater knowledge in the area of water, wastewater, and environmental engineering, but has also allowed me to correspond with professionals including approvals engineers, design engineers, and hydrogeologists.

**Supervisor Agrees:** Michele assisted with the review of tender documents (engineering plans, specifications) for water and sewer projects, and the review of engineering assessments of public water system.

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## 2. Please check the following options that apply:

### 2.1: During this reporting period, I have applied theory in:

- ✓ Analysis/Interpretation  
Project Design/Synthesis
- ✓ Testing/Verification
- ✓ Implementation

**Supervisor Agrees:** Michelle was exposed to engineering calculations and interpretation of water system design and water quality data. Michelle had some exposure to water quality sampling and testing, and to the inspection of newly constructed water treatment system works.

### 2.2: I have obtained experience by:

- ✓ Studying or being exposed to existing Engineering works  
Applying Designs as part of larger systems
- ✓ Experiencing the limitations of Engineering designs  
Experiencing time as a factor in the Engineering process

**Supervisor Agrees:** Michelle participated in inspections and site visits to several water treatment plants. Michelle was exposure to design limitations and issues with these site visits and also with the review of engineering assessments of existing systems.

### 2.3: I was exposed to the following areas of Engineering management:

- ✓ Planning
- ✓ Scheduling
- ✓ Budgeting
- ✓ Supervision
- ✓ Project Management
- ✓ Risk Assessment

**Supervisor Agrees:** Michelle was responsible with scheduling her time on project reviews and to coordinate involvement in inspections. Michelle had to consider public health risks in completing reviews of engineering plans and reports related to drinking water systems.

### 2.4: I was required to make decisions based on professional and ethical responsibilities to:

- ✓ The Public
- ✓ The Profession  
The Client and/or Employer
- ✓ Co-Workers
- ✓ The Environment

**Supervisor Agrees:** Michelle, in preparing recommendations and responses to permit applications for water and sewer projects, had to consider public health and environmental protection, industry standards

and regulatory requirements. Over the summer placement, Michelle demonstrated increased understanding of the responsibilities of engineers to the public and the environment, and the importance of industry standards and legislative instruments in the design and operation of water systems.

### **3. Describe any activities that have improved your Communication, Teamwork, or Interpersonal Skills in the following areas:**

#### **Oral Presentations:**

After reviewing permit applications and engineering assessments, I had to communicate my opinions and concerns, in a succinct manner, to the senior approvals engineer regarding any issues which represented a potential risk to public health.

#### **Written Documents:**

I drafted letters to the design engineers of many water and sewer projects regarding recommendations and requirements to be considered in the final design and installation of the project components. I drafted letters to the owners of public water systems regarding the compliance of their system based upon the review of the engineer's assessment report. I also wrote file notes, to summarize the design details and comments made in the letter to the engineer, to be read and understood by other Office of Drinking Water staff. I gained experience creating permits for public water systems. I reviewed public water systems' operating licences and discussed discrepancies of their operation of these systems with the Regional Drinking Water Officer.

#### **Interaction with Others:**

Ability to communicate with a variety of people was essential. During this work term I showed my ability to discuss the operation, maintenance, compliance, and design qualities of public water systems and sewer systems with owners, operators, design engineers, approvals engineers, and drinking water officers.

#### **Other:**

As a student with a government regulatory office, I was able to develop my communication skills through oral and written correspondence with supervisors, co-workers, owners of public water systems, operators, and engineers. I also had experience in record-keeping and writing research based reports. I have become proficient in reviewing and understanding technical drawings and specifications related to municipal water and sewer infrastructure.

**Supervisor Agrees:** Michelle was asked to consult directly with design engineers, water system owners and other government staff in conducting reviews either by phone or email. Michelle prepared letters, file notes and permits using templates and checklists. She demonstrated excellent written and verbal communication skills.

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### **4. During this period, I had to consider the social implications of my work in the following areas:**

reviewing of permit applications for the construction of water and sewer works, and reviewing of engineering assessments. I had to ensure that safeguards were in place to protect the public when reviewing permit applications. I had to ensure that water and sewer lines had adequate separation, that water and sewer mains were of adequate size and material and equipped with appurtenances and manholes etc., and that lift stations and rechlorination reservoirs were also in compliance with guidelines' specifications. Many details of the designs had to be examined carefully to ensure that the project would not pose a threat to public health. I was able to learn about the benefits of the infrastructure I was reviewing including the improved reliability of a treated water source for people who had previously had private wells. I have earned a respect and deep understanding of the significant role of regulatory agencies on the practice of engineering.

**Supervisor Agrees:** The focus of engineering reviews completed by the Office of Drinking Water is

public health protection as related to the provision of drinking water.

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**5. Examples of my ability to work effectively as part of a team, during this period, include:**

communication with approvals engineers, and correspondence with regional drinking water officers during the review of permit applications and engineering assessments of public water systems. During many permit application reviews I had to discuss my concerns with approval engineers and we would discuss the severity of the issue and decide if a comment should be made in the letter to the engineer or if we had to contact the engineer for further clarification. During the review of engineering assessments of public water systems, I had to discuss the engineer's recommendations with the regional drinking water officer to decide if the water system was not in compliance or if the operating licence should be changed based on the engineer's recommendations.

**Supervisor Agrees:** Michelle demonstrated a keen interest in gaining a better understanding of drinking water systems, and worked closely with myself and other staff members to ensure thorough reviews and effective communication with clients and staff.

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**6. Examples of my ability to assume responsibility include:**

my role as a mentor to a new employee and my ability to apply review procedures and design checklists to identify construction projects with health and environmental impacts. An engineer for review of projects containing sewer infrastructure was recently introduced to a wastewater approvals unit. I was trusted to show him how we have reviewed these projects in the past, and how to check for areas of concern regarding compliance with our standards, public health, and environmental impact. During my review of sewer and water infrastructure projects, I had to take into account ethical considerations such as my responsibility to the public, the profession, the guidelines and the Drinking Water Safety Act, and the environment.

**Supervisor Agrees:** Michelle quickly demonstrated good technical skills, judgment and excellent communication skills, and was given extra responsibilities including assisting with the training of a new government employee in review procedures, issuing communications to clients, and maintaining files and approvals tracking tools.

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**7. I have shown progress since the last report (where applicable) as follows:**

Not applicable.

**Supervisor Agrees.**

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**8. I feel myself to be lacking in exposure to, or requiring improvement in, the following areas:**

testing of engineering products, and being part of the design process. The experience I have in testing is limited to site visits to water treatment plants, reservoirs, and pumping stations with drinking water officers, but this exposure to testing could be increased in the future. I have reviewed engineering designs for public water systems and sewer and land drainage systems including specifications and plans, but have not been part of the design process. I have not had the opportunity to work with engineers to design these systems. I have however reviewed designs and made suggestions on changes

to the design for compliance with standards.

**Supervisor Agrees:** Michelle was involved in the review of engineering designs but not in design or project management processes.

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**9. I would like to provide the following additional, relevant information:**

I was able to attend a seminar discussing membrane filtration technology and its uses in water treatment.

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**Supervisor:** S. P.Eng. (First Registered: 1 )

**I make the following evaluation and recommendation regarding the progress report for this MIT:**

The placement provided the student with acceptable engineering work experience for a pre-grad co-op work term. The student worked in the engineering unit of a regulatory agency under the supervision of two professional engineers, and was involved in the review of engineering plans, reports and data. Over the work term, the student gained an understanding of public health and environmental protection related considerations for the design of water and sewer system infrastructure, and industry standards and regulatory requirements. The student demonstrated excellent judgment, and technical and communication skills. The student had an opportunity to participate in inspections of water treatment plants, and to review engineering assessment reports on water systems. The student was exposed to several areas of engineering practice, and had to apply skills and knowledge from her academic training. Exposure to the engineering design process and to engineering project management were limited. The student would benefit from engineering experience in a design or consulting environment.

**In my opinion, during this reporting period, (May 3, 2010 - Aug 27, 2010) (4 months), Michelle has completed an equivalent of 4 months full time experience.**

Please show my comments to the MIT.

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