

**APEGS Test: Competency Report**

**Name** APEGS Test  
**Discipline of Application**  
**Jurisdiction** Engineers and Geoscientists BC

**EDUCATION**

<b>Institution</b>	<b>Degree</b>	<b>Discipline</b>	<b>Location</b>	<b>Date</b>
University of Saskatchewan	Bachelor of Engineering	Electrical	Saskatoon, Canada	Sep 2009 - May 2014

**COMPETENCY SUMMARY**

<b>Category</b>	<b>Applicant</b>	<b>Required</b>
Technical Competence	3.2	3
Communication	3.0	3
Project and Financial Management	3.0	2
Team Effectiveness	3.5	3
Professional Accountability	3.0	3
Social, Economic, Environmental and Sustainability	3.2	2
Personal Continuing Professional Development	3.0	3

## EMPLOYMENT HISTORY

	Employer	Position	Supervisor	Location	Date
1	Employer Three	Senior Engineer-in-Training - Electrical	Supervisor Three	Regina, SK, Canada	Jan 2016 - Apr 2018
2	Employer Two	Engineer-in-Training - Electrical Engineer	Supervisor Two	Saskatoon, SK, Canada	May 2014 - Dec 2015
3	Employer One	Electrical Intern	Supervisor One	Regina, SK, Canada	May 2013 - Dec 2013

### Period 1

**Employer:** Employer Three  
**Position:** Senior Engineer-in-Training - Electrical  
**Supervisor:** Supervisor Three  
**Location:** Regina, SK, Canada  
**Date** Jan 2016 - Apr 2018

#### Major Responsibilities and Projects:

- Completing technical audits, designs, analysis, implementation and commissioning in building energy management which included lighting and electrical systems.
- Performed feasibility studies and completed detailed engineering design studies.
- Using an in house spreadsheet program and lighting design software I completed electrical designs and analysis.
- Using existing building electrical systems (including distribution, power quality and lighting) I conducted technical reviews and carried out analysis to determine energy savings estimates.
- Report summaries of audit and review findings, system conditions and recommendations which included construction budgets and financial analysis.
- Prepared tender documents and technical specifications
- Project Management Assistant which included scheduling and construction coordination for several projects
- Prepared and distributed fee proposals

## Period 2

**Employer:** Employer Two  
**Position:** Engineer-in-Training - Electrical Engineer  
**Supervisor:** Supervisor Two  
**Location:** Saskatoon, SK, Canada  
**Date** May 2014 - Dec 2015

### **Major Responsibilities and Projects:**

- Responsible for electrical equipment upgrades that included electrical services and power system studies which included short circuit and arc flash.
- Testing and commissioning of high voltage systems
- Completed proposals for detailed industrial electrical engineering services which include power system upgrades, maintenance and two major projects.
- Researched the impact of power quality on distributed generation considerations and the impacts on utilities.
- Project Management Assistant which included scheduling and construction coordination for several projects
- Prepared and distributed fee proposals

## Period 3

**Employer:** Employer One  
**Position:** Electrical Intern  
**Supervisor:** Supervisor One  
**Location:** Regina, SK, Canada  
**Date** May 2013 - Dec 2013

### **Major Responsibilities and Projects:**

- Upgraded lighting for energy savings by installing lighting loggers throughout the building in order to determine the operating hours of each section of the building. I measured hours and calculated the estimated energy usage (kWh) based on the retrofit and upgrade information submitted by the consultants.
- Assisted a certified electrician with the installation of power meters in several buildings.
- Performed feasibility studies and developed design packages for renewable energy projects

# COMPETENCY ASSESSMENT

## Competency Category 1: Technical Competence

Required Average Level: 3

1.1 Regulations, Codes & Standards: Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training - Electrical	Validator Three, PENG	Jan 2017 - Apr 2017	Yes

### Situation

This situation demonstrates my understanding of the CEC, CSA and IEEE Standards. I was responsible for determining the substation installation that would be suitable on a temporary construction site and to determine required exterior lighting upgrades on existing buildings.

### Action

I was involved in the concept design preparing a report outlining options to improve lighting in the parking lot and walkways. When the final design was approved by my supervisor I was responsible for the design process.

- This included:
- Using a computerized lighting stimulation calculations were used to determine optimal pole locations, heights and light output levels specified by the IESNA.
- Calculating the required size of poles and concrete base to safely withstand wind and snow loading.
- Using CSA 22.1 I determined the size of the conductors and conduit. This was important as during construction I was required to ensure the contractor dug the trenches deep enough to meet CSA 22.1 requirements. Alternatives were used in areas where trenches could not be dug deep were used in site instruction to provide mechanical protection in accordance with the CEC (54-700) this allowed for the depth of underground conductors to be reduced by 300mm.
- I specified and sized circuit breakers and calculated voltage drop.
- I prepared the drawings and specification for the tender documents.
- I was responsible for reviewing the drawings that were provided by our customer and referenced the CEC 2015 requirements for high voltage installations and hydro interconnections standards.

### Outcome

I completed studies and determined the substation safe for the site and the public spaces. The ground fault protection settings were set and tested for safety limits as per the Canadian Electrical Code.

The client was satisfied with the lighting upgrades on the existing buildings.

### 1.1 Competency Level

**Applicant: 4**

1.2 Project & Design Constraints: Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.

<b>Employer</b>	<b>Position</b>	<b>Validator</b>	<b>Date</b>	<b>Canadian Environment?</b>
Employer Three	Lighting Design Engineer	Validator Three, PENG	Sep 2016 - Nov 2016	Yes

### **Situation**

I managed and designed exterior lighting upgrades and provided a feasibility study for a large scale solar installation for our client.

### **Action**

- I met with the client's project manager and reviewed the scope of the project with them. I completed a detailed review and inventory of existing exterior lighting. A reading of each light source at night was conducted to determine light level in each area, which was presented to the client along with several upgrade suggestions.
- A tender package was prepared that included specifications regarding sizing and material requirements for light standards and concrete basis, accepted lighting and performance requirements, accepted wireless controls systems and commissioning requirements, installation requirements and project management and safety requirements.
- I assisted with a connection impact assessment for generating solar power on a distribution grid connection. I evaluated existing lines and distance to the utility substation, X/R ratio, land classification and construction cost estimates.

### **Outcome**

I contributed to a report to enable to use of existing utility distribution assets and to the multidisciplinary project for the completion of a solar installation which generates green energy.

The upgrades to the existing buildings were complete contributing to the safety of the public. The client was satisfied with the project outcomes.

### **1.2 Competency Level**

**Applicant: 3**

1.3 Risk Identification & Mitigation: Analyze technical risks and offer solutions to mitigate the risks.

<b>Employer</b>	<b>Position</b>	<b>Validator</b>	<b>Date</b>	<b>Canadian Environment?</b>
-----------------	-----------------	------------------	-------------	------------------------------

Employer Two

Engineer-in-Training - Electrical  
Engineer

Validator Two , PENG

May 2015 - Dec 2015

Yes

### Situation

I completed an arc flash report and mitigation study for an existing industrial plant.

### Action

Based on information gathered from a site visit and meeting with a technician I modeled the system in ETAP. I determined that the fault current could be controlled by setting and equipment changes. Using CSA Z462 I applied my knowledge of system protected to improve the system selectivity and lower tripping time. Where the fault currents could not be controlled through setting I proposed an upstream circuit breaker with an Arc reduction maintenance switch.

### Outcome

A report outlining the arc flash hazard assessment and options to mitigate the arc flash risk.

### 1.3 Competency Level

**Applicant:** 3

1.4 Application of Theory: Apply engineering knowledge to design solutions.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training /Project Manager	Validator Three, PENG	Jan 2017 - May 2017	Yes

### Situation

A client came to us reporting power factor surcharges at several of their terminals. I was responsible for reviewing the existing electrical systems and making recommendations to correct the low power factor issues.

### Action

I prepared a report to summarize the findings and provide budget costs for installing the capacitor banks on each of the terminals to raise the overall power factors to levels above 90%.

In order for accurately determine the facility power needs we installed temporary electrical meters for ten business days. After analyzing the data collected I determined that a fixed bank was not suitable due to the fluctuations in power that went up to 60% per day. In order to adjust for these fluctuations I determined an automatic stepped capacitor should be used to prevent over voltage conditions which could harm the motors and equipment.

I analysed the harmonics at the facility to determine if filters would be required or if I had to adjust for resonance. The voltage and current harmonics were below the recommended levels I determined that filters were not required and resonance was not a concern. I prepared the specifications for each site outlining the size and

operating requirements. I was also responsible for

- Reviewing the bids and providing recommendations for award;
- Reviewing the capacitor bank shop drawings for compliance with the specifications;
- Being the point of contact for the contractor;

After all deficiencies were dealt with I prepared the final field review reports, deficiency lists, and certificate of completions.

## Outcome

The capacitor banks were installed in accordance with the required specifications and were functional. After three months of completion the ARHs were reviewed and I was satisfied that the overall power factor levels were between the designed 93% and 96%.

## 1.4 Competency Level

**Applicant:** 4

1.5 Solution Techniques: Be able to understand solution techniques and independently verify the results.

Employer	Position	Validator	Date	Canadian Environment?
Employer One	Electrical Intern	Validator One, PENG	May 2013 - Jun 2013	Yes

## Situation

I assisted my supervisor with the safety grounding and power system study. The study included short circuit coordination and arc flash evaluation for a temporary substation.

## Action

Under supervision I modeled the system and provided hand calculations to support my report.

- I reviewed the drawings and requested fault information from SaskPower
- Calculations were used for equipment for maximum fault current and circuit breaker ratings which were based on infinite bus method
- The system model was modeled with ETAP software for short circuit evaluation and confirmed the results with the SaskPower fault data.
- Using IEEE 80 and with limits of CEC Table 52 I selected ground fault settings and provided ground potential rise calculations evaluating step and touch potentials.
- Using NETA standards I provided the field services to verify the ground fall of potential testing, circuit breaker and relay commissioning.

## Outcome

This situation gave me understanding on solution techniques and the required codes and standards required to assess that a substation is suitable through

calculations, software simulation and the field results.

### 1.5 Competency Level

**Applicant:** 3

1.6 Safety Awareness: Safety awareness: be aware of safety risks inherent in the design; and Demonstrate Safety Awareness - on-site and possible safety authorization/certificate as appropriate.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training - Electrical	Kyle Smith, PENG	May 2017 - Apr 2018	Yes

#### Situation

In each of my high voltage projects it is a requirement that I identify and incorporate or participate in a review of all safety considerations, safety procedures and equipment that apply to each of the system operations and maintenance program.

#### Action

- I was responsible for leading each safety meeting, ensuring onsite safety measures are taken and applying safety standards to ensure a safe work environment. This included field level risk assessments before and after changes in site conditions.
- Applying CSA Z462 I assessed the arc flash hazards of the electrical equipment and made suggestions to the EOR for mitigation strategies and the PPE requirements
- Keeping CEC CSA 22.1 and the safety of employees and the public I designed the electrical distribution on each project.

#### Outcome

Projects were completed on budget to the satisfaction of the client and met all safety requirements. I practiced safety by design principles and practiced safe work practices.

### 1.6 Competency Level

**Applicant:** 4



1.7 Systems & Their Components: Demonstrate understanding of systems as well as of components of systems.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training - Electrical	Validator Three, PENG	May 2017 - Nov 2017	Yes

**Situation**

The client requested a complete electrical upgrade of an industrial warehouse. I was responsible for working on a re design of the control and distribution system, installing new instruments, cable, cable tray and PLC panels. The mechanical equipment was not updated.

**Action**

The most challenging part of this project was integrating the new electrical equipment into the older mechanical equipment. It was important that I had a good understanding of the existing system and integration of all components.

After inspecting the machines I reviewed the machine in detail to check the existing instruments, motors and cable trays. The control system had some existing instruments that were not used, not connected or not connected in a series. After discussion with the client I removed some of the instruments in the new design and had all instruments connected directly to the PLC.

**Outcome**

A report was written and tables were generated with inspection findings and mode of operation of the machine. The report also explained cable sizing and protective device settings.

**1.7 Competency Level**

**Applicant:** 3

1.8 Project & Process Lifecycle: Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Lighting Design Engineer, Engineer-in-Training	Kyle Smith, PENG	Mar 2016 - Jul 2017	Yes

**Situation**

I managed from construction to completion an upgrade relating to energy savings in the lighting systems for a school district.

## Action

I identified and prepared a report on potential upgrades in existing buildings to determine ways to reduce energy consumption without reducing lighting levels in the schools. The report included budget costs for three design concepts.

A tender package was prepared and posted to allow contractors to bid on it.

Throughout the project I was responsible for the following;

- Conducting tours and answering questions with bidders of each building
- Reviewing each RFP and providing recommendations to the school board
- Organizing and meeting with the successful contractor. Acting as a liaison between the contractor and school board
- Reviewing shop drawings
- Preparing contemplated change notices and change orders as required
- Conducting the final field review and issuing a final report outlining the deficiencies found
- Issuing the completion certificate

## Outcome

The project was completed to the satisfaction of the client and the calculated energy savings were able to be claimed toward the target for the energy management program.

## 1.8 Competency Level

**Applicant:** 3

1.9 Quality Control: Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.

Employer	Position	Validator	Date	Canadian Environment?
Employer Two	Engineer-in-Training - Electrical Engineer	Validator Two , PENG	Jul 2014 - Nov 2014	Yes

## Situation

I was responsible for designing and managing the installation of eighteen vehicle charge stations (EVC) at eight multi unit corporate buildings. This included preparing drawings and specifications with pricing from contractors and managed the construction phase from start to completion.

**Action**

Two site visits included my supervisor, the remaining six sites I reviewed on my own.

During each review I was responsible for

- Reviewing the proposed locations for the EVC to ensure proximity to electrical rooms and panels
- Mapping and routed the wire and conduit runs to the EVA from the electrical room
- Reviewing the electrical panels for service size and voltage
- Calculating voltage drops for service runs
- Calculating added loads to the panel boards to verify electrical systems would not be overloaded

My supervisor provided me with feedback which I then incorporated into my methodology for each site.

**Outcome**

The project was successfully completed and I gained additional review skills for all stages of the project from design to construction.

**1.9 Competency Level**

**Applicant:** 2

1.10 Engineering Documentation: Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Kyle Smith, PENG	Aug 2016 - Sep 2017	Yes

**Situation**

When working on the lighting upgrades I was responsible for the initial investigation and the concept design phase. I was responsible for following up with the detailed design and the implementation of the approved design.

**Action**

The lighting upgrades required preparation of layout drawings and specifications for bid documents which required both itemized and unit pricing.

The drawings for the tender package included the following details and information:

- Installation for concrete bases and underground service trenches

- Each location for new lightening to be installed
- Labels for each light type and pole heights for new poles
- Control zones for each type of lighting
- Locations of each electrical service feed

## Outcome

The contractor was able to follow the drawings I provided with little direction required to complete the new lighting and control systems.

## 1.10 Competency Level

**Applicant:** 3

## Competency Category 2: Communication

**Required Average Level: 3**

### 2.1 Oral Communication: Oral Communication

Employer	Position	Validator	Date	Canadian Environment?
Employer One	Electrical Intern	Validator One, PENG	May 2013 - Dec 2013	Yes

## Situation

The energy study project required that I have multiple in person meetings with the client. During these meetings I was required to explain all aspects of the project to different stakeholders with different levels of understanding of the project.

## Action

I was responsible for pitching our idea to the client prior to being awarded the contract, I was required to explain the approach and steps to achieve their objectives. My presentation included the type of software we would be using, examples of similar projects and a budget breakdown.

After we were awarded the contract I provided the client with details on what information I would need to complete the lighting analysis. Along with the client we completed a site review with staff who were familiar with each site. I provided an over view of each site and what information would be required and most applicable for each upgrades.

When the analysis was completed a draft report was completed and I presented the findings and recommendations to the stakeholders. I was also involved in a short training session on how we conducted our analysis.

## Outcome

The feedback received from the client was positive. We finalized our report based on feedback and requests from the client. There was also discussion oh how the scope of work could be expanded into the future and develop energy efficient policies.

## 2.1 Competency Level

**Applicant:** 3

## 2.2 Written Communication: In Writing.

<b>Employer</b>	<b>Position</b>	<b>Validator</b>	<b>Date</b>	<b>Canadian Environment?</b>
Employer Two	Engineer-in-Training - Electrical Engineer	Validator Two , PENG	Apr 2015 - Jun 2015	Yes

### **Situation**

The firm was hired to conduct a feasibility study for electrical vehicle charging stations for a multi unit residential building. The intent of the project was to calculate costs for providing charging stations in the parking space in new building developments and in existing buildings.

### **Action**

The summary report was based on the analysis and calculations I had completed. The report contained detailed descriptions of my research methods, outlines of the electrical sizing calculations for different models and the costing breakdowns. Descriptions were included on how the final numbers were calculated.

### **Outcome**

My supervisor was satisfied with the report and the feedback from the client was positive.

## 2.2 Competency Level

**Applicant:** 3

## 2.3 Reading & Comprehension: Reading and Comprehension.

<b>Employer</b>	<b>Position</b>	<b>Validator</b>	<b>Date</b>	<b>Canadian Environment?</b>
Employer Two	Engineer-in-Training - Electrical Engineer	Validator Two , PENG	Jan 2015 - Dec 2015	Yes

### **Situation**

In order to determine scope and budget for projects I must review proposal documents and understand key points in order to put together a detailed quote and scope of work for the power system studies. Working with a P.Eng. to understand the work needing to be performed and reference codes and standards.

### **Action**

In order to itemize scope of work I review the drawings and specifications.

For the power system studies I summarize work requirements and review them with a P.Eng. who is an expert power systems engineer. If there are questions we review the appropriate codes and standards which include CSA Z462, NFPA 70E to resolve any technical issues

For the electrical equipment I applied reference standards which include the Canadian Electrical Code and incorporated the IEEE guidelines to ensure safety.

## Outcome

I reviewed specification and drawings to assess the required effort of our power systems engineering and equipment experts.

I summarized key points and presented the results concisely.

## 2.3 Competency Level

Applicant: 3

### Competency Category 3: Project and Financial Management

Required Average Level: 2

3.1 Project Management Principles: Awareness of project management principles.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training - Electrical	Kyle Smith, PENG	Jun 2017 - Sep 2017	Yes

## Situation

I applied my awareness of project management principles gained through training in ongoing project work.

In 2017 I provided a scope of work and fixed price contract estimate to a project manager that successfully bid on providing engineering services to support a retrofit of a distribution service in a commercial building.

## Action

I determined the amount of site visits required to gather the information and coordinate with the safety authority.

During the site visits I met with the electrical contractor and safety inspection in order to get the information required to create a design package which was reviewed by my supervising engineering to provide to the client. Time and expenses were tracked for each task and noted in the required additional tasks.

## Outcome

In order to ensure a safe and functional design we needed to negotiate with the client for additional tasks not included in the original scope. We were successful .

### 3.1 Competency Level

Applicant: 3

3.2 Level of Responsibility: Demonstrate increasing level of responsibility for project planning and implementation.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr.Engineer-in-Training - Electrical	Validator Three, PENG	Apr 2016 - Apr 2017	Yes

#### Situation

As my career progresses I have worked to increase my skills, responsibilities and project deliverables through a variety of project roles.

#### Action

I have been and am involved in all aspects of project planning and implementation.

My career started with supporting projects with basic sizing calculations and drafting details. I then progressed to providing project solutions with projects that involved upgrading and retrofitting electrical power equipment. I have been involved in providing input, time estimates and fixed price quotes to project managers.

I was responsible for providing technical support, code references and calculations for power systems which I was required to test and commission to industry standards.

#### Outcome

My role was a valuable part of the operations of our engineering services practice. Through my various roles at the company I was given increasing responsibilities and was able to gain more understanding of the role of a professional engineer.

### 3.2 Competency Level

Applicant: 3

3.3 Expectations vs Resources: Manage expectations in light of available resources.

Employer	Position	Validator	Date	Canadian Environment?
----------	----------	-----------	------	-----------------------

**Situation**

I completed a lighting upgrade opportunities report for two industrial buildings and then managed the implementation phases for two more. This involved coordinating the work and scheduling with the facility manager and the energy manager. The project had to be completed by the end of the fiscal year, June 31, 2017.

**Action**

As part of the analysis phase I:

- Reviewed the buildings with the energy manager and timeline for completing the report.
- Provided high-level estimates for costs and energy saving on a per square foot
- Updated the energy manager regarding my status and when I would be conducting the site visits
- Prepared a summary report outlining three lighting upgrade options with budget costs, estimated energy and maintenance cost savings, pros and cons of each option and sent it to the energy manager to review.
- Updated the report based on their feedback. During the tender and construction phases I:
- Prepared a separate pricing document as part of the tender package.
- Coordinated the bidders tour and construction timeline with the district and purchasing department
- Reviewed tender bids and provided insight as to why the only bid received was over budget
- Provided recommendations to proceed with contractor instead of retendering due to approaching deadline.
- Provided estimated product delivery times based on experience.
- Attended meeting with contractor to discuss scope and ability to meet the timeline
- Organized progress conference calls with Facility Manager and Contractor for timeline updates and product delivery dates.

**Outcome**

The project was completed before the deadline and the client was satisfied with the new LED lighting and dimming systems. The project is estimated to save 183,000 kWh annually and had a construction cost of about \$530,000.

**3.3 Competency Level**

**Applicant:** 3

3.4 Financial & Budgets: Understand the financial aspects of their work.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Validator Three, PENG	Mar 2016 - Sep 2016	Yes



**Situation**

I reviewed and evaluated lighting systems in four industrial buildings to propose energy savings upgrades which included specifications and managed the construction from start to finish.

**Action**

I was responsible for financial aspects for this project:

- Based on the contract fee and budgeted hours I tracked my hours.
- Calculated construction budgets for the different design concepts and paybacks based on expected energy savings
- In a summary report, I presented design concepts, budget costs, and potential savings.
- Providing an estimate on how many working hours would be required to complete the construction phase and prepared a fee proposal for the client including scope of work and fee proposal.
- Reviewing tender bids and provided feedback and recommendations.
- Providing information to the client to prepare CCDC contract.
- Managed and tracked construction changes through change orders.

**Outcome**

The project was completed within the approved budget and is estimated to save more money than originally thought. My work was also completed within the original budget.

**3.4 Competency Level**

**Applicant:** 3

3.5 Response to Feedback: Ask for and demonstrate response to feedback.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training - Electrical	Kyle Smith, PENG	Jun 2016 - Jun 2017	Yes

**Situation**

As part of a facility upgrade I was part of the design team where I was responsible for preparing specifications and arranging for several sample lights that were installed for the facility manager to review.

**Action**

Following installation I met with the client to review options. The client was satisfied with the performance of the high bay and recessed down light for general lighting however they did not like the design or performance of two of the specialty decorative lamps. I evaluated the options and gave the client more options, once

the approval of the facility manager was received I finalized the design and tender.

## Outcome

The involvement of the client in the decision making process was valuable for feedback to narrow options and to find the correct product for their requirements.

## 3.5 Competency Level

Applicant: 3

## Competency Category 4: Team Effectiveness

Required Average Level: 3

4.1 Work Respectfully: Work respectfully and with other disciplines/people.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training - Electrical	Kyle Smith, PENG	Jan 2016 - Jul 2016	Yes

## Situation

I was involved in a project where we were hired to conduct a detailed study of the electrical and mechanical systems for eight facilities. In order to complete the work within our proposed fee schedule we needed to work on an interdisciplinary team of both mechanical and electrical engineers at the same time.

## Action

We had an initial meeting with the client and lead mechanical engineer. A time schedule was agreed upon and the amount of days where we would complete site work was determined. We discussed our most efficient routes would work best for our schedules and workloads. The mechanical and electrical reviews with the client were conducted. We cooperated with one another to ensure none of the work would be rushed. We worked together to gather information and make sure that the work was completed on time. We worked as a team to make sure the data was correct and not lost.

## Outcome

The project was completed on time and on budget. The client was satisfied and we were able to present our report as a team to multiple stakeholders.

## 4.1 Competency Level

Applicant: 4

4.2 Resolve Differences: Work to resolve differences.

Employer	Position	Validator	Date	Canadian Environment?
Employer Two	Engineer-in-Training - Electrical Engineer	Validator Two , PENG	Jul 2014 - Sep 2014	Yes

### Situation

As part of our installations of electric vehicle charging stations (EVCS). After installation I was notified that SaskPower could not install the meter as they intended. I needed to find a solution in order to ensure our client received the incentive.

### Action

I worked with an engineer at SaskPower to review the situation and to work to find a potential solution. In order to meet the SaskPower requirements we were required to tap off the primary side of the building transformer in parallel with the building meter which would have increased the cost. I contacted the manufacturer of the charging station and they confirmed that we could retrofit network and metering capabilities. Originally the contractor was supposed to coordinate with SaskPower, but this did not happen prior to the work being completed. After discussions the contractor agreed to work with us to resolve the issue. The client agreed to pay for the additional materials to upgrade the station and the contractor installed the components at no extra cost.

### Outcome

The additional cost and time extension was required to complete the project. By working with the client, contractor and manger of the incentive program the installation was completed in accordance with the program requirements and the client received the incentive.

### 4.2 Competency Level

Applicant: 3

### Competency Category 5: Professional Accountability

Required Average Level: 3

5.1 Code of Ethics: Work with integrity, ethically and within professional standards.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Kyle Smith, PENG	Nov 2017 - Jan 2018	Yes

### Situation

I was asked to provide a grounding step and touch study required for a temporary high voltage substation required for an event venue where there would be a large amount of public attending the events scheduled.

### Action

I provided a grounding step and touch study for the amount of energy needed for the week event, even though I was under pressure to complete the project I held paramount the safety of the public and worked with my manager to order the test equipment for site measurements and presented the client with a fair quote for the work we would provide. The test equipment was delayed in shipping which meant that our project timeline was compressed. I tested the installation and once it met my professional satisfaction we provided the client who then issued it to the electrical inspector.

### Outcome

My study ensured that public safety was met and the client was satisfied.

### 5.1 Competency Level

Applicant: 3

5.2 Awareness of Limitations: Demonstrate an awareness of your own scope of practice and limitations.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Kyle Smith, PENG	Nov 2017 - Jan 2018	Yes

### Situation

When completing the ground step and touch study I was aware of my limitations and actively asked questions to complete my work. I was responsible for completion of the ground potential rise, step voltage and touch voltage calculations.

### Action

I asked for help and incorporated input from my supervisor. When completing this task I referred the appropriate industry standard (IEEE Standard 80) and created detailed calculations spreadsheet. I presented the comparison of the derived values and allowed limits in the CEC. I worked with my supervisor to review the calculations and contacted hydro to improve the standard for the transformer on the client property.

### Outcome

The work was completed after review by my supervisor. The results were submitted to hydro and I received a complimentary letter of accepted by the hydro engineer.

### 5.2 Competency Level

Applicant: 3

5.3 Conflict of Interest: Understand how conflict of interest affects your practice.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Validator Three, PENG	Aug 2016 - Sep 2017	Yes

**Situation**

As part of the design phase of an exterior lighting project I was invited by a local lighting distributor to attend a specifiers lighting seminar for a large manufacturer. The distributor paid for the cost of my air travel, hotel and any extra expenses.

**Action**

I have regular contact with lighting distributors to stay up to date with the latest lighting technology, so I am able to offer my clients a wide range of options. The seminar I attended was very helpful and was not only related to one product line. After attending the training I continued to prepare specifications on the exterior lighting project I was working on; and with the knowledge gained from the seminar I was able to recommend products from the product line of the distributor who paid for my trip. In order to avoid a conflict of interest I included products from other manufacturers that were equivalent in performance. In order to benefit my client I made sure to include more than one option when making recommendations, I also included the option for my clients to submit products for my review.

**Outcome**

As an independent consultant it is important that I ensure a fair evaluation of products and services provided to my clients. In this situation the outcome was that the project was completed to the clients satisfaction, using products from the distributor and others.

**5.3 Competency Level**

Applicant: 3

5.4 Professional Liability: Demonstrate awareness of professional accountability.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Validator Three, PENG	Mar 2016 - Jul 2017	Yes

**Situation**

I completed an exterior lighting upgrade to an industrial building that was located near residential apartment buildings. The company received complaints from a resident that the new lights were shining into their apartment. I was responsible for the design and was responsible for correcting the issue.

**Action**

- I received notification from our client about the complaint.

- In order to correct the issue I went on a site visit at night to review the situation and determine a solution.
- The LED lights installed were lower power than the existing lights, however they were providing a more concentrated distribution of light. The new lights were effective lighting the grounds however the lights also penetrated through the trees on the property.
- I also noted that the complaint was made in the spring when the trees did not have leaves to block the light.
- Following the review I notified the contractor to add shields to the lights and adjust the direction. This solution fixed the problem at no extra cost to the client.

### Outcome

The client appreciated by quick response and the solution satisfied the neighbours.

### 5.4 Competency Level

Applicant: 3

5.5 Use of Stamp & Seal: Demonstrate an understanding of appropriate use of the stamp and seal.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Validator Three, PENG	Mar 2016 - Jul 2017	Yes

### Situation

My company was hired to design an updated lighting system for a waste water treatment plant. The scope of the project was to change the existing metal halide and high pressure sodium lights to new LED lights without compromising existing lighting levels.

### Action

The original drawings were updated to reflect the changes. It was not a requirement to submit the updated drawings to the city for a building permit, but the client's policy required that "issued for construction" drawings be signed and sealed by a P.Eng.

I was responsible for the primary design and selection of the replacement lights, which included lighting calculations to ensure that the lighting levels were met. As I am not a P.Eng. I could not sign or seal my work, I met with my supervisor to describe my work and ensure that the P.Eng. had a good understanding of my final drawings and calculations so that they could sign and seal the final designs.

### Outcome

The P.Eng. who was taking responsibility for my work was satisfied and could sign and seal the document. The client accepted the updated drawings and was satisfied. I gained further knowledge of the process and procedure required when a professional engineer is signing and sealing documents prepared by another.

### 5.5 Competency Level

Applicant: 3

5.6 Strengths & Weaknesses: Understand own strengths/weaknesses and know how they apply to one's position.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Validator Three, PENG	Jan 2016 - Mar 2018	Yes

**Situation**

In order to be effective in my professional life it is important I am able to have self awareness as to my strengths and weaknesses. As part of my professional development plan (PDP) I track my self evaluations in order to identify the areas where improvement is required and outline the steps I need to take to improve my skills.

**Action**

I update my professional development plan on a semi annual basis. This enables me to evaluate my career path and determine areas for improvement. Currently the areas for improvement I am focusing on are;

- Being more proactive during the construction phases when I am managing a project so that I am following up with clients on a regular basis.
- Reviewing my costing methods and requesting feedback to determine whether I am missing any aspects that should be included in the budget.
- I also took a training course on construction estimates.

**Outcome**

The course I completed helped me better understand the construction estimate management process. This has improved my relationships with clients and made my projects run smoother. Tracking my professional development plan has also made my continued growth as a professional more organized and has made it easier to address any weaknesses in my work.

**5.6 Competency Level**

**Applicant:** 3

**Competency Category 6: Social, Economic, Environmental and Sustainability**

**Required Average Level: 2**

6.1 Public Impacts & Safeguards: Demonstrate an understanding of the safeguards required to protect the public and the methods of mitigating adverse impacts.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Validator Three, PENG	Mar 2017 - Jul 2017	Yes

## Situation

I completed an exterior lighting upgrade to an industrial building that was located near residential apartment buildings. The purpose was to reduce energy consumption and address any safety issues. I was responsible for the site visits.

## Action

I completed two site visits, one during the day and one at night. During the day I completed an inventory of all exterior lights and noted where they were located. I also spoke with staff to gain their perspective on what they were currently concerned about regarding the lighting. Several members of staff voiced concerned about areas outside where there was not enough light creating hazards,

During the design concept phase I considered the need for more light in hazard areas. I recommended the installation of lights in areas that did not have lighting which included the staff parking lot. I assisted in preparing the design drawings and specifications. Included were methods to reduce light pollution on neighbouring properties.

## Outcome

The project was completed and the client received positive feed back. The additional lighting provided safety for staff as well as visitors to the property.

## 6.1 Competency Level

**Applicant: 2**

6.2 Engineering & the Public: Demonstrate an understanding of the relationship between the engineering activity and the public.

Employer	Position	Validator	Date	Canadian Environment?
Employer Two	Engineer-in-Training - Electrical Engineer	Validator Two , PENG	May 2015 - Nov 2015	Yes

## Situation

In projects that involve high voltage installations I perform grounding studies to ensure safety of the public in the event of high voltage faults. I have performed grounding studies for industrial clients for work safety and for multi residential developments.

## Action

I completed a grounding fault study for a pad mount transformer for a condo construction project. Following SaskPower requirements IEEE 80, IEEE 81 and the Canadian Electrical Code. I tested the installation and calculated the required assessment of the installation for grounding safety. The system was confirmed to be within acceptable levels and a complete step and touch study was issued. It is important that during an electrical fault in a substation installed that it remain electrically safe.

## Outcome



During my practice I am aware of the impact of my work on public safety for high voltage substation electrical faults and uphold responsibility to public safety.

## 6.2 Competency Level

**Applicant:** 3

6.3 Role of Regulatory Bodies: Understand the role of regulatory bodies on the practice of engineering.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Validator Three, PENG	Jan 2016 - Mar 2018	Yes

### Situation

During my practice I work with other professions whose practice overlaps with the practice of professional engineering. I frequently work with those in the electrical trade and with staff from SaskPower.

### Action

When I was working with electricians I understood the role and certification process of the Safety Authority and the Red Seal qualifications granted by the Industry Trade Association and ITA. I also provided services to the construction industry which also follows a similar training apprenticeship process and adherence to electrical codes.

I also comply with the regulations of the Authority of Jurisdiction, SaskPower, regarding authorized work, equipment installation standards, and work practices with systems connected to the SaskPower distribution system.

My designs also meet utility standards, national standards, municipality requirements and other specific regulatory bodies standards;

### Outcome

I will continue to build respectful relationships in my work with all colleagues, regulating bodies and utility representatives. I have gained appreciation for all roles and regulations affecting my colleagues and work as a collective to maintain safety in our work.

## 6.3 Competency Level

**Applicant:** 3

6.4 Sustainability & Practice Guidelines: Be aware of any specific sustainability clauses that have been added to practice guidelines that apply to their area.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Kyle Smith, PENG	Jan 2016 - Mar 2018	Yes

**Situation**

A key part of my practice are projects that include energy saving measures. During design of exterior lighting upgrades I have to be aware of the applicable codes and standards that apply to lighting and lighting control systems.

**Action**

During concept design phases I presented several control options to the client that had met and exceeded requirements outlined in ASHRAE 90.1 - 2010. Each option is presented with cost estimates, advantages and disadvantages of each option and the potential energy savings projected. Once the client chose their option I am responsible for selecting the lights and control systems, preparing the project specifications, review the shop drawings to ensure compliance and preformed the final field review.

I have also read and strive to comply with the principles in the APEGS Environmental Guidelines for Professional Engineers and Professional Geoscientists.

**Outcome**

The outcome of the project was meeting the requirements as outlined by the client and meeting the requirements of the applicable codes and standards. The options presented are always sustainable and minimize energy consumption without compromising safety and security.

**6.4 Competency Level**

**Applicant: 4**

6.5 Promotion of Sustainability: To the extent possible, recognizing the applicant's position of influence, consider how sustainability principles could be applied and promoted in his/her specific work.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Kyle Smith, PENG	Jun 2016 - Dec 2017	Yes

**Situation**

My company was hired to review and upgrade an industrial lighting system. The staff raised concern that the existing lighting system did not provide enough light.

**Action**

The primary objective was to improve lighting in the office areas of the building. After considering several options, including the simple solution of adding more lights I presented an option that increased light levels and reduced energy consumption. In order to present energy saving options I completed a computerized lighting simulations to verify that the option would increase lighting levels; calculated potential energy savings for each option, calculated maintenance costs, estimated implementation costs and calculated the simple payback, NPV and IRR.

## Outcome

When presenting my report to the client I promoted the benefits of energy saving options, when the project was implemented the result was a 78% reduction in lighting energy consumption.

## 6.5 Competency Level

**Applicant:** 4

### Competency Category 7: Personal Continuing Professional Development

**Required Average Level: 3**

7.1 Professional Development Activities: Demonstrate completion of professional development activities.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training	Validator Three, PENG	Jan 2016 - Mar 2018	Yes

## Situation

It is important I stay technically informed and continually recognize areas where I need further courses in order to strengthen my understanding and apply this knowledge to my projects.

I also participate in technical events with the IEEE Power and Energy Society and the IEEE Young Professionals.

## Action

As part of my course I read several IEEE standards and guidelines as well as technical articles and manufacturer literature.

I helped organize technical tours of sites where I discussed power generation and the historical basis of circuit protection.

I completed a course in construction management to strengthen my management skills and relationships with other stakeholders.

## Outcome

I have gained better understanding of the technology and can apply this knowledge. I also share my knowledge with my colleagues.

The attendees of the technical tour were pleased with the tour and discussion panels. This allowed for increased participation in the technical networks of the participants.

## 7.1 Competency Level

Applicant: 3

7.2 Identify Training Needs: Demonstrate awareness of gaps in knowledge and areas requiring future development.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training - Electrical	Validator Three, PENG	Jan 2015 - Jun 2015	Yes

### Situation

An opportunity to take on a significant role on a project that required a review of the electrical systems and preparation of a capital plan. While I have had experience in designing and sizing electrical systems my knowledge and in reviewing existing systems was limited.

### Action

I discussed the project outline with my supervisor and asked for suggestions on how to move forward.

The advice I received was that I should gather all the available maintenance and testing reports for the major pieces of equipment and contact manufacturers and local experts for guidance on expected life and recommended maintenance intervals.

As part of my site work, I inventoried the various electrical systems and equipment for each building including:

- Electrical distribution equipment
- Fire alarm control panels
- Back-up generators
- Lighting and lighting control systems
- Elevators

### Outcome

I gained knowledge relating to the expected life of the different components, what to look for when evaluating their conditions, and cost estimates for replacements.

Guidance from the engineer who was completing the mechanical systems and taught me how to create a capital plan.

**7.2 Competency Level**

**Applicant:** 3

7.3 Professional Development Plan: Develop a professional development plan to address gaps in knowledge and maintain currency in field of practice.

Employer	Position	Validator	Date	Canadian Environment?
Employer Three	Sr. Engineer-in-Training - Electrical	Kyle Smith, PENG	Aug 2016 - Jan 2017	Yes

**Situation**

As a consulting engineer I am expected to have knowledge and skills to be able to complete a wide range of projects. My supervisor developed a matrix that detailed the various tasks and skills for various jobs including lighting, power systems, communications, code requirements and fire alarm systems

**Action**

My performance development plan includes rating myself on a scale of 1 through 5 based on my perception of my current skill level. This helps me identify areas where I need to improve and what areas I may consider becoming an expert in and able to train other team members. The matrix is updated yearly so I am able to observe my progression and learning, I work with my supervisor to determine what areas are most applicable to the type of work I am doing and what type of work I may want to do in the future.

Based on the outcome of these meetings I set out my yearly goals and research courses to complete and upcoming opportunities to apply my learning.

**Outcome**

Based on the outcome of these meetings I set out my yearly goals and research courses to complete and upcoming opportunities to apply my learning.

**7.3 Competency Level**

**Applicant:** 3