**Project Title:**

Personal Electro-Magnetic Field (EMF) Monitoring Device

**Background Information:**

BC Hydro’s Material Management Business Unit (MMBU) is is planning on building a permanent Material Classification Facility (MCF) on an existing BC Hydro Right of Way, which be under an existing double circuit 230 kV line, and a second double circuit 230 kV line in the distant future. One of the concerns of the BC Hydro staff working in this new facility is EMF.

The levels of EMF have been shown to be low and acceptable via classic calculation methods, as per the following BC Hydro Engineering Report:

* MMBU MCF - EMF Profile for MCF Profile - May 21, 2019

However, to provide the MCF workers with more peace of mind it has been suggested that each individual who works in the MCF should carry a personal EMF monitor with a visual indication of the level of both electric and magnetic fields. This small and lightweight device should also be able to store electric and magnetic field data, which can be downloaded into a central system at the end of each shift, where a record per worker can be kept. The central system should be able to store data for up to 20 workers yearly, undertaken trending and analysis for each worker and the work force as a whole. The charging of the personal devices and the down loading of the data should be down automatically via individual stations. Ideally, the database should be Excel based.

A feasibility design effort was undertaken by a BCIT Capstone Team in 2020, and this effort is documented in the BC Hydro report entitled as follows, but no working proto-type was demonstrated to BC Hydro, and no field testing undertaken.

* Personal Electromagnetic Field Monitor - May 6, 2020

**Main Objective(s):**

The main objective of this project is to create a working proto-type personal (EMF) monitoring device and data logging, plus analysis system for up to 3 individuals with this system being expandable to handle up 20 individuals as required, in the future. Field testing of the proto-type device and documented the results is part of the scope of this project.

The suggested approach is:

1) A paper and market search for any related papers or other similar devices.

2) Review and utilization of the BC Hydro reports referenced about.

3) Designing a possible proto-type system based on research undertaken and references provided.

4) Building and testing a proto-type measurement model and data logging, plus analysis and

communication systems.

BC Hydro would provide the following:

1) A BC Hydro project liaison for the Capstone project team.

2) Possible funding for the purchasing of the required equipment to build the prototype. (**Still being**

**confirmed.**)

3) Typical BC Hydro facility or system parameters, as required.

4) A report indicating the possible levels of voltage induction.

5) BC Hydro information on induction.

6) Copies of the two BC Hydro reports referenced above.

7) A sample BC Hydro report template.

8) Possible additional funding from the BC Hydro MMBU MCF Project.

**Main Deliverable(s):**

1. A report detailing the findings of the effort undertaken including any associated document on this subject, copies of any designs or detail calculations, costs, copies of engineering software input and outputs, and the details and results of any physical testing undertaken.
2. A single working proto-type with a charging and data download interface for 3 individuals that is expandable to up to 20 individuals in the future, plus data analysis required.

**Intellectual Property and Non-Disclosure Agreements:**

BC Hydro has its own Intellectual Property (IP) and Non-Disclosure (ND) agreements, which are model on past UBC documents and protect BC Hydro legal interest as a Public Company. Copies of these documents will be provided to the student teams prior to their final project selection. It should be noted that in regard to the IP agreement document, the commercialization of a possible product or tool is not part of BC Hydro’s core business, and that BC Hydro will be satisfied with receiving a copy of a working product or tool, and will leave the commercialization to others. The main rational for the ND agreement document is to insure BC Hydro commercial business and rate payer information meets BC Hydro’s Code of Conduct and Protection of Privacy Policies.

**Project Classification:**

* Is the project a repeat or a continuation of past capstone project? **Y**/N
* Which of the categories best describe the project?
  + Improve on existing product - Y/**N**
  + New product - **Y**/N
  + Idea validation - **Y**/N
  + Technology exploration - **Y**/N
  + Operational application - **Y**/N
  + Other - Y/**N**

**Key Words:**

EMF, EMF Monitoring Devices, Field Testing, Transmission Line Right of Way

**Industry Contact Information:**

**Bob Stewart, P. Eng.**

Principal Electrical Engineer

Generatimg Station Engineering

**BC Hydro**

6911 Southjpoint Drive, Edmonds 06

Burnaby, BC, Canada V3N 4X8

**P** 604 528 2175

**M** 604 220 5616

**E** [bob.stewart@bchydro.com](mailto:email.address@bchydro.com)