

## **GMON, a New Sensor For Snow Water Equivalent Via Gamma Monitoring**

Yves Choquette<sup>1</sup> Pierre Lavigne<sup>1</sup> Michel Nadeau<sup>1</sup> Pierre Ducharme<sup>2</sup> Jean-pierre Martin<sup>3</sup> Alain Houdayer<sup>3</sup>  
James Rogoza<sup>4</sup>

*1 Hydro-Québec, Varennes, QC, Canada; 2 Private Practice, St-Eustache, QC, Canada; 3 JPM Technologie, Montréal, QC, Canada; 4 Campbell Scientific (Canada) Corp., Edmonton, Ab, Canada*

GMON is a Gamma MONitor that measures the absorption of the natural gamma radiation through the snow cover and reports the snow water equivalent (SWE) for a large ground area typically of 100 m<sup>2</sup> by tracking the number of hits recorded on a daily basis from potassium (<sup>40</sup>K) and thallium (<sup>208</sup>Tl) energy windows respectively located at 1.46 MeV and 2.61 MeV. The sensor element is a conventional thallium doped sodium iodide scintillator NaI(Tl) coupled to custom electronics both embedded in an aluminum housing containing high performance insulating material preventing thermal shock damage when the sensor is exposed to -40°C.

Developed and patented by Hydro-Québec to improve the hydraulic power management, Hydro-Québec grants to Campbell Scientific (Canada) Corp. a license to manufacture and commercialize the GMON.

From results obtained by the Institut de recherche d'Hydro-Québec during 2006-08 winter seasons, it was demonstrated that GMON measures the SWE content of a snowpack achieving the desired accuracy level for an accumulation up to 400 mm of water.

Work is presently under going to improve the GMON performances for higher SWE content, typically in the range of 400-700 mm of water.