Tritium Emissions from a Detritiation Facility

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CANDU stations consider implementation of detritiation technology to be a practical way to reduce tritium emissions and worker dose. However, tritium removal facilities (TRFs) have the potential to emit both elemental tritium and tritiated water vapour.

Authorized releases to the environment are governed by Derived Release Limits (DRL). The DRL values are specific for each facility and take into account various regional factors such as meteorological and geographical conditions, as well as the population density. For the Darlington site, the DRLs for airborne elemental tritium and tritiated water emissions are ~15.6 PBq/week (421 kCi/week) and ~825 TBq/week (22.3 kCi/week) respectively. With tritium emission control measures in effect at the Darlington Tritium Removal Facility (DTRF), the actual emissions from DTRF are relatively small in the range of 0.01 - 0.1% of the DRL for elemental tritium and 0.1 - 0.2% of the DRL for tritiated water.

The tritium releases and emissions are expected to be specific to the design of the facility. However, the range of process technologies and systems currently available for TRFs are relatively limited and significant insight into the expected emissions from any proposed design may still be gained through review of design and operating performance of existing TRFs.

As part of an ongoing effort to further reduce tritium emissions from the DTRF, we have undertaken a review and assessment of the systems design, operating performance, and tritium control methods in effect at the DTRF on tritium emissions. This paper will discuss the results of this study.