

## 2023 TEAM ACHIEVEMENT AWARD

### *WSP Canada's Response to the City of Iqaluit Water Crisis*

*Justin Rak-Banville, P. Eng., Dr. Charles Goss, Ian Moran, EIT, and Steven Simpson, EIT*



In October 2021, residents of the City of Iqaluit reported taste and odour issues with their tap water and a Do Not Consume order was issued by the Territory's Chief Public Health Officer. Immediately, WSP responded by dispatching an engineering team to site.

Iqaluit, being the capital of Nunavut and one of the most northernmost cities in Canada, is home to 8,500 residents who draw their drinking water from a nearby reservoir. The water is of normally pristine condition, reflective of the city being just outside the Arctic Circle.

During the investigation, WSP personnel discovered a sub-surface cavity (the 'void') below the water treatment plant. In the deepest reaches of the void, WSP personnel discovered a historic underground fuel oil storage tank. Following analyses of several different contamination pathways, the WSP team identified the pathway and were successfully able to bypass the contamination entry point.

While there are numerous technical documents and news articles published describing the contamination event, there are few that truly address the major contribution of the engineering team to this project. Specifically, the integration of the S::CAN technology into the water treatment plant was a unique and pioneering approach to safeguard public health, expedite the flow of usable data, help prove the contamination source and pathway, and provide the foundation to restore public confidence in the drinking water supply.

The S::CAN is an online spectrophotometer that utilizes custom calibrations sensitive enough to analyze treated water, in real time, for hydrocarbon contamination and other constituents. This installation was the first of its kind in Canada's North to monitor for hydrocarbons in drinking water. Working alongside the equipment supplier, Aquatic Life Ltd., WSP developed a forensic fingerprinting program that assisted in differentiating samples i.e., comparing jet fuel to heating oil and other potential contaminants, as well as isolating potential sources of contamination. The S::CAN was critical in overcoming logistical sampling challenges and assessing which treated water tank could be strategically removed from service to isolate the contamination. The forensic fingerprint analysis ultimately linked the undocumented 60-year-old underground fuel tank as the source of the contamination.

Customized spectrophotometric calibrations were instrumental to the project, while integration of an early warning detection system triggering an automatic plant shut down allowed the larger team to develop and implement critical upgrades. WSP worked around the clock with Aquatic Life to push the limits of the system to establish credibility and efficacy among the numerous high-profile stakeholders including City Council, the Government of Nunavut, Health Canada, the Canadian Armed Forces, national news media outlets, and, most importantly, the public.

Key innovative highlights delivered by the engineering team included the installation of two online spectrophotometers to help safeguard the public water supply, the development of an extensive records database to generate reports for public distribution to help restore consumer confidence in the water system, and the integration of customized equipment programming into the city's supervisory control and data acquisition (SCADA) and alarm dial-out systems to notify city staff of potential contamination.

Dr. Charles Goss and Ian Moran, EIT, led the onsite investigation team, while the project was managed by Justin Rak-Banville, P.Eng. Together with the support of seven additional offsite WSP team members and Aquatic Life Ltd. technicians, the team successfully identified the contamination source, implemented critical mitigation measures, navigated the complex stakeholder landscape, and delivered technical information to the public in consultation with city officials.

In recognition of the engineering excellence demonstrated in the timely handling of the 2021 City of Iqaluit Water Crisis, Engineers Geoscientists Manitoba is pleased to present the 2023 Team Achievement Award to WSP and Aquatic Life Ltd.