Water Challenges and Solutions: Canada’s First Nations
Bringing Safe and Reliable Drinking Water to Aboriginal Communities in Canada’s Far North

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Building a World of Sustainable Communities
• Canadian federal government commitment to Aboriginal First Nations
• Safe drinking water challenges
• The Corix response
• Sustainability
Canadian federal government commitment to Aboriginal First Nations:

• Aboriginal Affairs and Northern Development Canada (AANDC) implements programs and policies to support Aboriginal people (First Nations, Inuit and Métis)

• AANDC is one of the federal government departments responsible for meeting the Government of Canada's obligations and commitments to First Nations, Inuit and Métis, and for fulfilling the federal government's constitutional responsibilities in the North

• Comprehensive assessment of water and wastewater systems serving 571 participating First Nations was conducted between 2009 and 2011

• Survey identified $6 billion dollars of water and wastewater infrastructure and operator training requirements over the next 10 years
• 39% of those systems were classified as high risk to the water quality of the community
• High risk water systems affect 25% of the total on-reserve population base of approximately 485,000 people
• Majority of high risk systems serve a small population. Water systems in remote communities are 2.5 times more likely to be high risk than low risk
• 161 water systems in 116 First Nation communities were under Health Canada Drinking - Water Advisories (DWA) as of February 2011
• DWAs may be impacting up to 18,900 people, which is approximately 3.9% of the total on-reserve
• Federal and Territorial governments in Canada struggle to provide adequate utility infrastructure to remote communities in Canada, particularly in the sparsely populated Northwest Territories and Nunavut.

• Most of these small, remote communities are predominately populated by Aboriginal Canadians.
Northwest Territories (NWT): Meeting Challenges of the Canadian Arctic

Phase I

Phase II
2008 the Government of the Northwest Territories, with substantial funding from the Government of Canada, issued a RFP for the provision of “turn-key” design, engineering, fabrication, assembly, delivery, installation and commissioning of 5 modular water treatment plants for the remote communities of Edzo, Deline, Tuktoyaktuk, Aklavik and Ulukhaktok.

Government funding was for fixed amounts and time limited.

Population of these communities varied from as few as 250 people in Ulukhaktok to 1,500 in Tuktoyaktuk.
A Typical Community:
Jean Marie River
• Raw water quality varies from pristine lake water to extremely high turbidity water from the McKenzie River

• Lack of skilled trades people in the communities

• Minimal, if any, support services in the communities (e.g. fabrication shops, lifting equipment, construction equipment)

• Limited skills and training of the water plant operators in the communities

• Requirement to continue to provide water service during installation of the new plants
The Challenges

• Limited transportation options (e.g. river barges, winter (ice) roads)

• Severe winter weather conditions for many months of the year thereby limiting transportation and installation timing

• Sustainability - the requirements for continuing operation of the plants and long term warranties for materials and workmanship
The Corix Response…
Modular Water Treatment Plants

From concept to installation!
Modular Plants

• Design and fabrication of fully self-contained modular water treatment plants with length, width and height dimensions that allowed for transport by truck over normal highways and roads in Canada

• Fully self contained units included interior heating, back-up power supply, water testing facilities, remote communication capabilities and other requirements all enclosed within structurally designed, insulated wall panels that could meet the harsh winter weather conditions often reaching -40 degrees C or lower for extended periods of time

• Sole source responsibility assigned to Corix for the design, build, installation, training and performance guarantees – no multiple entities with cross-purposes
Modular units were made fully operational at a subcontractor site in Edmonton, Alberta and fully tested for operational capabilities prior to acceptance by government officials and shipping to the north.

With all relevant dimensions and specifications known prior to arrival of the modular plants at site, most of the site preparation work was completed in advance including preparing foundations for the new plant, new power supply arrangements, etc.
Installed and Operational
One of the most important challenges was to address the training needs of the water plant operators.

Many of the communities have small populations (less than 300 people) with few formally trained individuals and minimal access to accredited training facilities.

Community staff often tasked with operating and maintaining the water treatment plants in addition to other duties in the community.
Operator Training and Support

- Extensive training of local and regional staff at the time of commissioning the plants.
- Corix installed remote monitoring equipment for each plant that can scan and evaluate operation of the plants.
- Local operator can contact a Corix technician for assistance and technician can remotely obtain real time system information.
- Operators have an interactive, computer based training module that includes photos of the equipment at each site.
- By scrolling over the graphic of each phase of the treatment process – detail about that particular piece of equipment pops up on screen.
Community Involvement

- Extensive meetings held with community leaders before and during plant installation, including band Chiefs and Council
- Local companies contracted for services e.g. earth moving, site labor
- Local lodging services used by workers
- Workers on the project were able to assist with other unrelated repairs in the communities
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QUESTIONS