

Journal

of the Northern Territories
Water and Waste Association

September 2012



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IN THE NORTH**



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The Journal

is published by
DEL Communications Inc.
Suite 300, 6 Roslyn Road
Winnipeg, Manitoba
Canada R3L 0G5
www.delcommunications.com

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Production services provided by:
S.G. Bennett Marketing Services
www.sgbennett.com

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Cover Photo:
Iqaluit Landfill by Ken Johnson

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Publications mail agreement #40934510
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Canadian addresses to:
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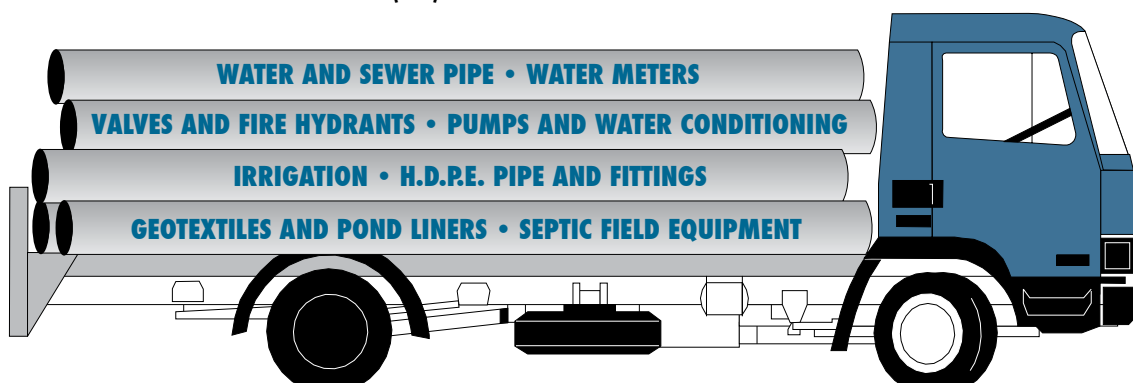
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Editor's Notes KEN JOHNSON

Taking out the trash has a different meaning in the far north than it does in the south. For starters, most northerners probably know where the dump or landfill (to be politically correct) is located in or very near to their community – with roads costing hundreds of thousands of dollars per kilometre, the dump cannot be located too far from town. For some residents of Nunavut, the dump also poses the threat of polar bear attacks – this is not something that a southerner can even comprehend. The evolution of the dump over the past several decades has been profound; it is no longer

the source (at least for many communities) of smoke and smell as it has been in the past. My own northern dump experience has been directly influenced by the waste management in Iqaluit with the design of Iqaluit's first landfill in 1994 and current work with the City of Iqaluit on managing the current facility and finding a new site. The journey for waste management in the north is still far from over and this year's articles in the Journal tell many tales of that continuing journey. ♦

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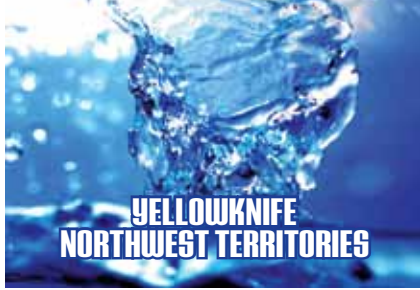
Water Treatment Plant Operators can earn Continuing Education Credits for attending the conference and the Operator's Workshop on November 26 and 27.

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YELLOWKNIFE CENTRALIZED COMPOSTING PROGRAM: FEEDING THE LAND, NOT THE LANDFILL



Turning and watering an actively composting windrow.



Bale of shredded paper to be added as a carbon amendment to the compost windrow.

Centralized Composting Begins in Yellowknife

In 2007, as the Yellowknife landfill was reaching capacity, the City of Yellowknife completed a solid waste audit to determine the composition of the City's solid waste stream and recommendations on how to reduce waste. This study found that 26% (2,353 tonnes/year) of the municipal solid waste disposed of by the residential and commercial sectors consisted of organic materials, of which 23% was food waste and 3% was yard waste. The study recommended the City develop a composting program to significantly increase the diversion of food waste.

In response to this solid waste audit, in late 2007 a Yellowknife-based environmental and community organization, Ecology North, obtained funding from the Government of the Northwest Territories to work in cooperation with the City to undertake a 4-month Study of Options for a Centralized Composting Pilot Project in the City of Yellowknife, completed in April, 2008. The City followed recommendations in the study and implemented the Yellowknife Centralized Composting Pilot Project from 2009 to 2011. Based on the success of the pilot project, the City is now exploring options to expand centralized composting to the residential sector.

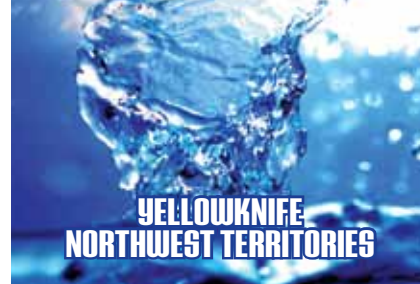
Focus On Collecting Organic Materials from the Commercial and Institutional Sectors

The City of Yellowknife focused on collecting organic materials, such as food waste and yard waste, from the commercial and institutional sectors for its pilot project, unlike many centralized composting programs that start with door-to-door collection of household organics. Approximately 20 businesses and institutions participated in the pilot project, including restaurants, grocery stores, the correctional facility, schools and the hospital.

One of the advantages to beginning organics collection in the commercial and institutional sectors was that a relatively large quantity of organic materials could be diverted from a small number of collection points, particularly because businesses and institutions with large volumes of organic wastes were targeted. Approximately two to three tonnes of food waste per week were collected through the pilot project.

The Yellowknife centralized composting program accepts all food waste (including meat scraps, fish, bones and dairy products), yard waste (including leaves and grass clippings) and paper products that have been soiled with food.

By Shannon Ripley,
Environmental Scientist, Ecology North



How Does the Collection System Work?

The collection system for organic materials was designed to be as straight-forward as possible for commercial and institutional participants. Participants separate organic materials into certified compostable bags, instead of placing these items in a garbage container. The compostable bags are then transferred to a 2- or 4-cubic yard dumpster labelled "organic materials only" located adjacent to the regular outdoor garbage dumpster.

Once per week, the Yellowknife waste contractor completes a special organics collection run with the garbage truck to empty the organics dumpsters and transport organic materials to the Yellowknife centralized compost facility. Organics bins are emptied once every one, two or three weeks according to the volume of organic materials generated by the participant. A number businesses and institutions share an organics bin, to make most efficient use of space and collection resources.



Microbial activity within the actively composting windrows creates temperatures between 55 and 70 C, and a fog as the pile is turned

An advertisement for AWI (Advanced Water Industries). The background is a collage of images: a worker in a blue hard hat and safety harness working on a metal structure, and several splashes of water. The text "We cover it all" is written in a white, cursive font across the center. Below this, the following services are listed in white, sans-serif font: "Granular Media Filter Optimization", "Phoenix Underdrain System", "Granular Filter Media Design and Supply", and "Technical Services". At the bottom left is the "PHOENIX" logo, which includes a stylized bird and the text "PHOENIX". At the bottom right is the "AWI" logo, which includes a stylized water drop and the text "AWI FILTER OPTIMIZATION". At the very bottom, the phone number "1-866-755-7377" and the website "www.awifilter.com" are displayed in white, sans-serif font.



Yellowknife Centralized Compost Facility

The centralized compost facility is located adjacent to the solid waste facility, and solid waste facility staff and equipment are actively involved in management of the composting operation.

The compost facility consists of a 1970 m² engineered base pad, surrounded by an electrified bear fence. The basic structure of the base pad was formed using asphalt discarded from road and sewer upgrades, with a surface of crushed gravel. The base is elevated above the surrounding landfill to prevent any run-on moisture, and has a 2% grade which directs run-off from the compost base pad to a leachate collection pond.

The Composting Process

The decomposer organisms that break down the food and yard wastes in the composting system require a balance of nitrogen and carbon to thrive and most efficiently carry out decomposition.

Food and yard wastes tend to have high amounts of nitrogen, and therefore require the addition of carbon to facilitate proper decomposition. At the composting site, shredded paper collected through the Yellowknife recycling program, and wood chips created

TABLE 1.
Quantity of materials processed in the Yellowknife centralized composting pilot project between September 2009 and December 2011.

Material	Quantity processed (tonnes)
Food waste	350
Yard waste	155
Shredded paper and boxboard	100
Wood chips	10
Total	615

at the landfill from chipping tree branches are mixed with the food and yard wastes in order to increase the amount of carbon.

Yellowknife uses a turned windrow method of composting to convert organic materials into finished compost. In Yellowknife's climate, it takes two summer seasons to produce finished compost using this method. During the first summer season of "active composting", between May and September, windrows (long piles) of composting materials are turned one to two times per week with a loader, to incorporate oxygen into the decomposing materials. At the same time windrows are turned, a water pump and fire hose are used to



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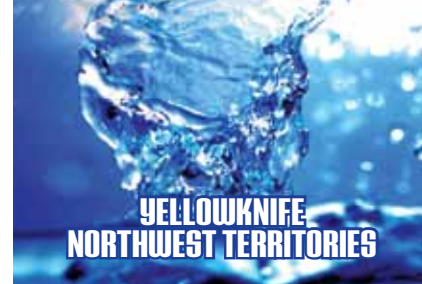
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The City of Yellowknife is exploring options to expand its centralized composting program to include city-wide residential organics collection.



water the piles using leachate from the leachate collection pond or fresh water to ensure adequate moisture levels are maintained for decomposer organisms. During active composting, the microbial activity within the composting windrows keeps temperatures in the windrows high, between 55 and 70°C. We were fascinated this past year to discover that one windrow maintained temperatures above 40°C throughout the entire winter season! On one -30°C day the temperature in the windrow was 60°C!

During the second summer season, organic materials go through the final, slower stages of decomposition, called “curing”. During this phase, temperatures slowly drop to close to ambient temperature, at which point the dark, crumbly soil-like finished compost is ready to be screened. The mass and volume of finished compost is approximately one half that of the original feedstock materials, with the mass lost as carbon dioxide and water vapour during the decomposition process.

Compost Quality Testing and Use

Following screening to a size of 1/2”, samples of finished compost are sent to a laboratory to be tested for potential pathogens,

trace elements (contaminants) and maturity following the Guidelines for Compost Quality established by the Canadian Council of Ministers of the Environment. The first batch of finished compost produced at the Yellowknife centralized compost facility was high quality Category A compost, which can be used for any application including for residential gardens, landscaping or agriculture.

The City of Yellowknife held a compost sale in June, 2012 so citizens can access some of this locally produced soil amendment. The City also plans to use some of the finished compost for landscaping projects, which will off-set the amount of soil amendment the City purchases.

Future Plans for Centralized Composting in Yellowknife

Based on the positive outcomes from the centralized composting pilot project, the City of Yellowknife is exploring options to expand its centralized composting program to include City-wide residential organics collection and expanded collection from the commercial and institutional sector, with likely phased-in expansion of the program beginning in 2013. 💧

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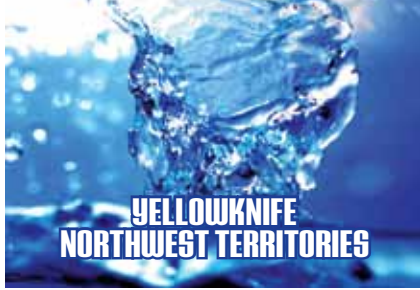
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INDUSTRIAL WASTE MANAGEMENT IN THE NORTH



Aerial view of industrial waste facility in Yellowknife

Waste management in Canada's north has come a long way in the last few years. Due in part to increased awareness and improved guidelines requiring responsible management of waste from both private and industrial sectors. Historically, there were no facilities in the north licensed to accept industrial or hazardous waste. There are limited regulations and few guidelines detailing how waste should be appropriately managed. With no disposal options available, companies were forced to ship waste to southern facilities and incur additional logistics costs in an already costly market. Northern communities had to store industrial and hazardous wastes at local landfill facilities due to tight budgets and the high cost of shipping waste south, usually to Alberta or British Columbia.

This situation has changed with the Northern Canada's first licenced and approved Industrial Waste Transfer Facility that has opened in Yellowknife. The services associated with this facility promote liability management associated with hazardous and non-hazardous industrial waste, which includes classification, packaging, labeling, manifesting and transportation. The facility offers disposal, treatment and recycling options for diverse wastes generated in the north.

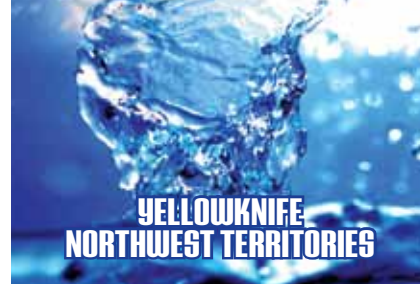
Transfer Station

The transfer station is the only facility of its class in the north with the expertise and resources to manage hazardous and non hazardous waste from cradle to grave. It is located in Yellowknife's Kam Lake Industrial Park

on three acres of medium industrial zoned land. In the development of the facility close work was undertaken with government and regulatory bodies to ensure health, safety and environmental compliance in all facets of the operations. The facility is regulated by the Government of Northwest Territories Department of Environment and Natural resources to receive hazardous wastes.

The transfer station is utilized for storage, segregation and consolidation of various waste streams for bulk transportation to approved and specialized waste receivers in the south. The facility has been engineered, constructed and is maintained to prevent any impact to the environment while managing industrial wastes. Classes accepted for sorting, repacking and storage include: Non-

By Krystal Malkin,
KBL Environmental Ltd, Yellowknife



Regulated; Class 2 Gases; Class 3 Flammable liquids; Class 4 Flammable solids; Class 5 Oxidizers; Class 6 Poisonous substances; Class 8 Corrosives; and Class 9 Miscellaneous.

Waste Receiving Process

Industrial and hazardous wastes are produced in the normal course of operations, even communities generate hazardous wastes in the form of vehicle batteries, aerosols, paints, glycol, contaminated water, fuels and oils. These wastes require special handling, shipping and disposal to prevent impact on human health and the environment. Generators, carriers and receivers must have government approvals and hold licenses to generate transport or accept hazardous wastes for disposal or recycling.

Waste requiring disposal is profiled which includes information on how the waste was produced and lists any hazardous characterizes as well as available management options. Considering recycling and economics, an option is selected and a contractor coordinates transportation with internal equipment to the receiving facility using road, marine or air transportation.

The generator or shipper must have training in the Transportation of Dangerous Goods (TDG) in order to complete the appropriate and legally required movement documents. If the generator has no certified shippers, a contractor can arrange mobilizing to location and preparing labels, ensuring packaging requirements are met and generating necessary movement documents. The Yellowknife facility has the capability for formal receiving, segregation and consolidation processes promoting recycling options for waste and reducing volumes of the waste for economical shipment to ultimate disposal facilities in the south. Waste generators then receive a certificate of disposal that illustrates waste was managed accordingly and in an environmentally safe manner.

Emergency Response

The facility also provides emergency response services for hazardous materials transportation, mining and expediting clients in the Northwest Territories. 24/7 emergency response is critical and promotes immediate response to minimizing the human health

and environmental risks associated with accidental releases. The services range from spilled product identification to materials handling and disposal. Emergency response specialists may be certified to respond to seven different classes of dangerous goods and associated wastes.

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The Future of Waste Management in the North

As Northern Canada continues to develop and grow, we will see an increase in the amount of waste produced by industry and private sectors. Mining exploration will develop into operating mines or active oil

and gas fields and communities will grow in size and variety of services offered. This will put a strain on the already underdeveloped waste infrastructure in the North. Having a local waste receiving facility allows more economical waste management options than just transporting all the waste south. 💧

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OLD CROW'S WASTE MANAGEMENT SYSTEM GETS UPGRADED



Controlled burning device previously used in Old Crow.

In 2009, the Yukon Government adopted a Solid Waste Action Plan (Plan). This Plan is a commitment to develop a modern, environmentally sound and sustainable waste management system that included recycling, waste reduction and diversion. As part of that Plan, the Yukon Government banned open burning of solid waste by January 1, 2012 at all of their solid waste disposal facilities. The Yukon Govern-

ment had implemented a program of controlled burners, but these facilities had limited success.

The Village of Old Crow is one of the 19 communities that were affected by the solid waste burning ban. As the most northern community in the Yukon, Old Crow's solid waste management system is both unique and comprehensive. With just under 300 people, this community collects garbage and recyclables weekly.

Old Crow's waste disposal system has been upgraded with a thermal oxidation system. This is a two-stage gasification process that gasifies waste in the primary chamber and combusts syngas in the second chamber. Following a competitive Request for Proposal (RFP) process, Waste-To-Energy Canada (WTEC) was selected to supply a thermal oxidation system for under \$600,000.

The associated operation and maintenance costs of the facility are approximately \$100,000 per year. There are three main components to the operation and maintenance. The first component is fuel, estimated at 5,000 litres of diesel per year (diesel costs about

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By Wilbert Yang,
Environmental Engineer, AECOM



Left: Residential garbage collection in Old Crow.

Below: Old Crow incinerator.



\$3 to \$4 per litre in Old Crow) for an estimated total cost of \$20,000 per year. The second component is staffing, estimated at two days of work per week (assume wage is \$50/hr) is estimated total cost of \$41,600 per year. The final component is a maintenance contract which is estimated to be \$35,000 per year plus parts. This estimate assumes that the residual ash is landfilled.

The WTEC unit is called MBOS, which stands for “Mobile Batch Oxidation System”. This is a “plug and play” system that can be placed and operated nearly anywhere. It’s a self contained system that is set on blocks. It has batteries and a diesel generator to operate the system automatically and maintain the temperature in the unit. Advancements in cellular technology allow WTEC to monitor

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The associated operation and maintenance costs of the facility are approximately \$100,000 per year.

the unit remotely in real time to ensure it is running properly. All that is required in Old Crow is for staff to load waste into the primary combustion chamber, close the doors, press the start button and remove the ash after a 24-hour batch cycle.

The thermal oxidation system is housed in two steel 12.2 metre (40 feet) shipping containers. The containers are attached by a 1.8-metre walkway with an enclosed roof. This allows workers to manage waste inside the enclosure away from the elements during extreme cold conditions. The thermal oxidation system was delivered at Old Crow in June 2012.

Thermal treatment was selected following an assessment of solid waste management options for Old Crow. Options evaluated include landfilling, thermal treatment, waste transfer and waste diversion (the three Rs – reduce, reuse and recycle). With the exception of waste transfer, all of the options require operating and maintaining a landfill in Old Crow.

Waste transfer is not economically feasible because Old Crow is not accessible by road. The community is almost entirely dependent on daily air resupply making it very expensive to bring materials in and out of Old Crow. Transport costs would be \$4,000 per tonne. For a community that generates approximately 100 tonnes of waste per year, annual transportation costs for waste transfer would be approximately \$400,000. This does not take into consideration the cost to build and operate a waste transfer facility in Old Crow and the waste transfer and disposal cost at the ultimate receiving landfill.

The assessment acknowledged that a landfill is required in Old Crow. Old Crow has a landfill, however it is located adjacent to the Porcupine River and according to new landfilling standards, waste cannot be located within 100 metres of the watercourse. This substantially reduces the available space for the landfill and based on the current disposal rate, the landfill capacity would be about ten years. Thermal treatment was viewed as a means to reduce the waste vol-



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The combustion process will also reduce the waste volume by at least 90 per cent.



ume required to landfill and to avoid future liabilities. Several thermal treatment technologies were identified including in-vessel burning, air-curtain burning, conventional combustion (i.e. mass burn), controlled air two-stage combustion and advanced thermal treatment processes. Controlled air two-stage combustion which is also called thermal oxidation was determined to be available for the quantities that would be generated in Old Crow.

Thermal oxidation uses a batch process. This allows Old Crow to use the facility when the waste is collected once per week. The combustion process will also reduce the waste volume by at least 90 per cent. This would extend the life of the existing landfill to approximately 100 years.

Without thermal oxidation, the Yukon Government would need to acquire more land from the Vuntut Gwitchin First Nation (VGFN) provided there are parcels of land that are suitable for a landfill. Furthermore, the landfill would need to be engineered to a higher

standard than what was conducted in the existing landfill. Retaining qualified personnel to manage and operate the landfill was also a challenge since VGFN expressed no interest in operating and maintaining a landfill. At the end of the day, a landfill only alternative had many challenges.

VGFN and Yukon Government both agreed that the most sustainable alternative is a thermal treatment system. With agreement between VGFN and Yukon Government, a tender package was prepared by AECOM for the design, construction, deliver and commission a thermal treatment system for Old Crow.

Waste diversion alternatives were endorsed by VGFN. These options include enhanced recycling and food waste composting. Plans are in the works to purchase a compactor to optimize the recycling system. Food waste composting is being considered as a means to provide soil for the community's demonstration garden. 💧

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COMMUNITY TRAINING IN NUNAVUT – FUELING A FOCUS ON SOUND HAZARDOUS WASTE MANAGEMENT PRACTICES



Where do you begin to tackle management of hazardous waste products at municipal landfills in the north? Training is proving to be a good place...

The Municipal Hazardous Waste Training Program was collaboratively developed between Nunavut's Department of Environment, Municipal Training Organization and the Edmonton Waste Management Centre of Excellence. Work toward the training pro-

gram started in 2008 when a group from the Edmonton Waste Management Centre took a fact finding visit to Iqaluit to understand the issues that Nunavut municipalities face and to evaluate training needs and methods. Joint work toward development and refinement of the program progressed from there.

The Hazardous Waste Management Program has been offered to Senior Administrative Officers and Landfill Operators

across Nunavut to help guide the development of waste management infrastructure and practices in the communities they represent.

The program introduces participants to regulatory requirements and good hazardous waste management practices; it provides relevant certifications, direct experience working with hazardous waste and exposure to the management structures within controlled landfills through 11 days of training, six days of which are spent onsite at the Edmonton Waste Management Centre.

Jim Lapp, Supervisor of Compost Operations with the City of Edmonton and instructor within the program, says, "We know northern communities face obstacles that don't exist in Edmonton. That's why we approach the training with lots of opportunity for discussion. We want to understand what will work and what won't. When a limitation exists, we want to help the participant explore their options. We see ourselves as resources and our goal is to arm the participants with as much information as we can so they can problem-solve effectively for their own communities. That's the beauty of this program – we are helping the community develop its own strength. Community members are armed with the information they need to influence thinking and make good decisions. It's sustainable."

"We have also found these training sessions to be one of the first times that these key community leaders have been brought together to consider this topic," adds Colleen Starchuk, Education Coordinator for

By Colleen Starchuk, B.Ed., and Jim Lapp,
Edmonton Waste Management Centre of Excellence



the Edmonton Waste Management Centre of Excellence. "The training provides opportunities for alliance with others working to resolve the same issues. The answers won't be the same for all communities, but each community stands to gain from knowing the experiences of another."

Jamesee Moulton of Nunavut's Department of Environment says, "When key community representatives understand the issues around hazardous waste they begin to regulate activities more effectively within their own communities. One of the key steps last year's participants committed to taking was to clamp down on commercial and industrial groups that used their municipal landfills. That step alone will place the onus and responsibility for management back in the generator's hands and make a significant difference for a number of communities."

Some of the challenges communities face include public attitudes regarding hazardous wastes, access to appropriate storage facilities, cost of transportation



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It was also a great experience to meet and trade ideas with people dealing with similar problems from across the north.

to southern recyclers and disposal sites and the means to adequately fund collection, recycling and disposal programs. While long-term and collaborative strategies need to be developed to resolve many of these issues, participants left with clear priorities and a sense of the 'gaps' within their current practices.

With limitations around the volume of hazardous waste and the length of time for storage, good options to remove hazardous wastes from landfill sites are some of the most pressing. Summerhill's Mercury Switch Recycling Program is an example of a viable option. Many participants were very excited to hear about the program which provides

them with appropriate containment and free freight options to mercury recycling facilities in Ontario. Additionally, they are provided with clear instructions on how to recover mercury switches from a variety of automobiles and direct support with the process. Unfortunately, viable disposal and recycling options for waste paints, solvents and automobile batteries aren't as easy to access.

"This program is a good example of our role in support of communities," says Mike Courtney of the Municipal Training Organization in Nunavut. "We believe it will have tangible and lasting impacts for the people of Nunavut. It is a great launching point for future hazardous waste management initiatives because it prepares communities to collaborate towards change. This program was recognized by the Canadian Association of Municipal Administrators for the 2011 Environment Award."

The pilot program was offered in March of 2011 and included 11 participants from seven communities. The second offering included 14 individuals from another eight communities.

According to Jeff MacNunn, landfill operator in Iqaluit, "The best thing about the course was the refrigerant recovery section that showed me how things are to be done and gave me the knowledge to acquire the equipment necessary to do the job right. It was also a great experience to meet and trade ideas with people dealing with similar problems from across the north."

Armed with knowledge and some practical experience, the 25 participants are more able than ever to help their own communities understand the issues, make good decisions and effectively advocate for the support necessary to make lasting change.

For more information contact Janice Isberg, Education Program Manager at the Edmonton Waste Management Centre of Excellence, at 780-442-6467. ♦



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SOLID WASTE SURVEY IN THE TERRITORIES

The responsibility of municipal solid waste management in the Canadian Territories is shared between federal, territorial and municipal governments, as well as territory-specific permitting and licensing authorities. Environment Canada promotes waste disposal best practices and risk management tools to mitigate environmental and human health risk from the waste sector.

A survey of each community that contains an active solid waste management facility, which receives residential waste, was completed in 2010. The survey summarized design and operational characteristics of active solid waste disposal facilities, transfer stations and material recovery facilities. The survey was completed based on: information collected from public registries; phone and e-mail inquiries with community staff, Federal, Territorial and regulatory personnel; and/or corporate knowledge.

Solid Waste Generation and Management

The Territorial annual quantity of waste generated ranged from 27,308 to 49,000 tonnes/year for a total of 112,771 tonnes/year. The average annual waste generation rate ranged from 0.64 to 0.85 tonnes/year/capita. Select waste statistics for each territory are provided in the table.

The primary methods to transport materials include: all weather road, winter road (seasonal accessibility), barge (seasonal accessibility), and regular scheduled airplane. In general, Yukon has the greatest accessibility with all communities (except one) available by road, whereas no road access is present in Nunavut. The Northwest Territories has a mix of communities that are accessible by road (all weather or winter), barge, or airplane.

Nunavut has a solid waste facility for every community, whereas the Northwest Territories, and to a greater extent the Yu-

kon, have fewer solid waste facilities than communities. Having fewer solid waste disposal facilities than communities is likely a result of the proximity of the neighbouring communities and of the ease at which materials can be transported out of a community. The Yukon has eight community focused transfer stations that collect material and divert it from local disposal and assist in recovery/recycling efforts. There are no community-specific transfer stations in the Northwest Territories or Nunavut. Further, there are no community-specific material recovery facilities in the three territories. The territorial governments of the Yukon and Northwest Territories as well as non-government and non-community organizations do contribute towards transfer stations and material recovery of select waste materials (i.e., beverage containers or used tires) as part of regulated recovery programs. These efforts are not captured in this study.

Summary of waste statistics for each Territory

Characteristic	Yukon	Northwest Territories	Nunavut
Population			
• Territory total	30,372	41,464	29,474
• Community average	980	1,243	1,188
Annual Quantity of Waste Generated (tonnes/year)			
• Territory Total	36,518	49,000	27,308
• Community average	1,588	1,485	1,092
Annual Generation Rate per Capita (tonnes/year/capita)			
• Community average	0.75	0.64	0.85
Waste Inventory Findings			
• Number of communities (based on Statistics Canada census subdivision)	28	35	25
• Number of communities with waste management facility	23	33	25
o Active solid waste disposal facilities	18 / 78%	33 / 100%	25 / 100%
o Transfer stations	8 / 24%	0 / 0%	0 / 0%
o Material recovery facilities	0 / 0%	0 / 0%	0 / 0%

By Jamie VanGulck,
Chief Technical Officer, ARKTIS Piusitippaa Inc. and
Richard Dwyer, President, ARKTIS Piusitippaa Inc.



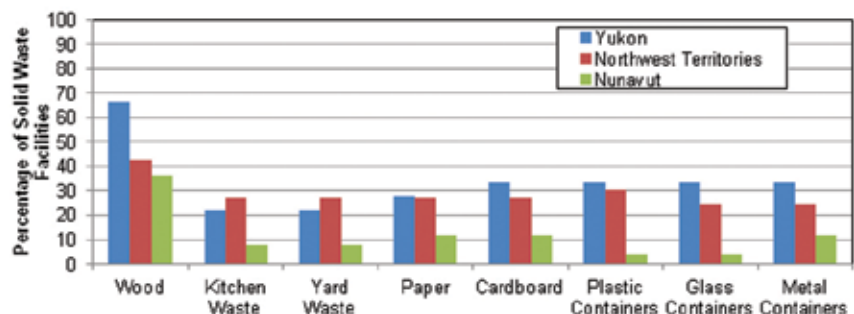
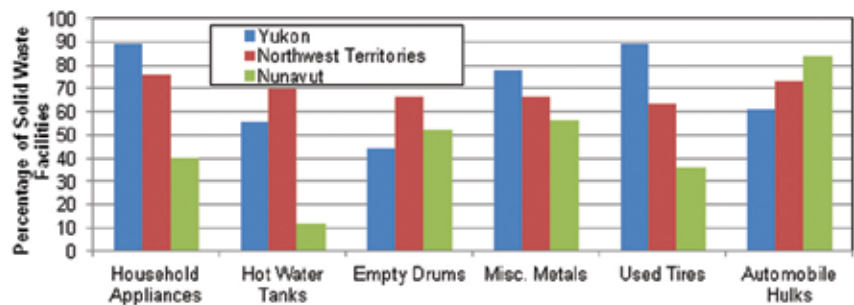
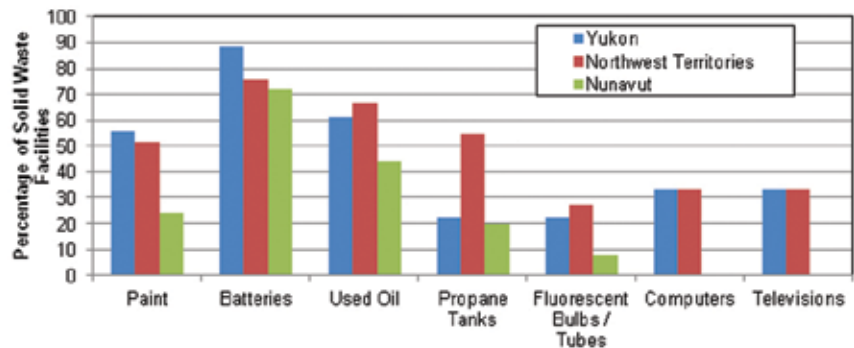
Solid Waste Segregation

Waste segregation refers to separation of specific types of waste at the solid waste facility such that these items are not commingled or disposed of with other municipal waste. Segregation is a key step towards managing specific waste types to encourage environmental protection, recycling and composting.

Five common types of household hazardous waste were targeted to understand its segregation; these included paint, batteries, used oil, propane tanks and fluorescent bulbs/tubes. In general, 1/2 of the facilities segregate household hazardous waste in the Yukon and Northwest Territories compared to about 1/3 in Nunavut. About 1/3 of the solid waste facilities segregate computers and televisions (electronic waste) in the Yukon and Northwest Territories and no facilities in Nunavut segregate this waste.

Various bulky wastes were targeted to understand its segregation at the solid waste facility; these included metals (household appliances, hot water tanks, empty drums, and miscellaneous metals), used tires and automobile hulks. About 1/2 of facilities in the Yukon and Northwest Territories and 1/3 of the facilities in Nunavut segregate these waste metals, respectively. The majority of the Yukon facilities segregate used tires, which is likely a reflection of the regulated recovery program associated with this waste. About 2/3 and 1/3 of the facilities in the Northwest Territories and Nunavut segregate used tires, respectively. More than 2/3 of the facilities in the three Territories segregate automobile hulks.

Kitchen, yard and wood waste were targeted to understand compost segregation at the solid waste facilities. In the Yukon and Northwest Territories, about 1/3 of facilities are separating out compostable, whereas less than 10% of facilities in Nunavut segregate this waste. About 2/3 of facilities in the Yukon and 1/3 of the facilities



Summary of waste segregation activities at individual facilities in each Territory.

in the Northwest Territories and Nunavut, segregate wood products.

Recyclable waste targeted to understand its segregation included: paper, cardboard, plastic containers, glass containers and metal containers. About 1/3 of facilities in the Yukon and Northwest Territories and less than 10% of Nunavut facilities, segregate recyclables.

With regards to waste segregation and potential recycling efforts, the majority of

active solid waste facilities separate out bulky waste and, to a lesser extent, hazardous waste. Removal of these recyclables or hazardous materials from the solid waste facility appears common in the Yukon; however, it is generally limited in the Northwest Territories and Nunavut. The reason for this trend is likely to be related to the ease of accessibility (by road) and lower transport costs between Yukon communities. 💧



LANDFILL RUNOFF TREATMENT OPTIONS FOR IQALUIT, NUNAVUT

In 2006, the City of Iqaluit upgraded the West 40 Landfill to improve drainage management. The current landfill drainage management system on site is based on a system of berms, ditches, detention ponds and a retention pond (See Figure).

A perimeter berm structure diverts off-site runoff around the site and diverts on-site runoff into a ditch collection system (see cover photo). The on-site runoff flows into detention ponds which are ultimately drained by pumping into a retention pond for longer-term storage. The landfill runoff retention pond was constructed as part

of the 2006 improvements and has approximately 5,000 m³ of storage volume. The retention pond provides storage before the runoff is decanted into the receiving water system.

Some sample results from the retention pond exceeded limits for iron, manganese and zinc as well as for BOD₅, TSS, aluminum, copper and lead based upon the City of Iqaluit Water License (2006) and the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories. Based upon these high values, the City has investigated treatment options for the runoff in the retention pond.



By Ken Johnson,
AECOM



Constructed Wetland Technology

Constructed wetlands are engineered systems that are designed and constructed to utilize the natural functions of wetland vegetation, soils and soil microbial populations to treat contaminants in wastewater streams. As wastewater flows slowly through a wetland, pollutants are removed through physical, chemical and biological processes. The physical processes include entrapment, sedimentation and adsorption. The biological processes include nitrification and denitrification, the uptake of nutrients and metals by plants and by organisms that occupy the bedding media. The wetland would be in operation from June to October.

The wetland system in Iqaluit would be developed in two phases. The cost estimated to implement a constructed wetland at the site was \$300,000 for each of the two phases.

Membrane Bioreactor Technology

Membrane bioreactors (MBRs) combine the membrane filtration process with a suspended growth bioreactor to degrade contaminants. An immersed MBR was recommended as the most appropriate MBR technology because of the lower energy demand when compared to side stream MBR configurations. To treat the West 40 Landfill runoff an anoxic and aerobic tank would be required in front of the MBR for nitrogen removal. The MBR system would be able to produce effluent that is well below any guideline limits.

The MBR would only be in operation for the summer months (120 days) and would require proper storage and maintenance work during the winter months. Commissioning the MBR for each season would be a difficult task. The order of magnitude cost estimate for a MBR for only one season of operation was \$2.4 million (including a 40% contingency allowance for construction and engineering services).

Geomembrane Physical-Chemical Treatment System

The geomembrane physical-chemical treatment process involves chemical treatment, solid filtration and neutralization all carried out continuously. The landfill runoff properties are characterized initially and the contaminants which require removal are identified. A chemical treatment process is designed to precipitate the contaminants from solution and to flocculate the contaminants into larger filterable particles. The geomembrane then works as a physical barrier to remove suspended solids. The solids that remain in the geomembrane can be returned to the landfill or transported for disposal at an appropriate facility.

The cost of the geomembrane equipment (pumps, tanks, geo-

membrane, piping, fittings, and chemicals for one season and transportation) to Iqaluit was estimated to be \$75,000. An additional cost is an operator estimated at \$1,000/day. For the 2010 discharge event the cost of operator time and expenses per seasonal treatment and discharge event would be \$25,000. Supplies for seasonal treatment events were estimated to be \$10,000. The estimated total cost for a single discharge event would be approximately \$100,000.

Geomembrane Filtration Only System

The City of Iqaluit has purchased and utilized a geomembrane filtration system on two discharge events from the retention pond. The first event was in July 2010 and the second event was in June 2011. The filter used by the City has a nominal pore size of 450 microns. The pore size decreases during operation as the tube captures suspended solids. The City has not used any chemical pre-treatment on the runoff. As discussed, pre-treatment could enhance contaminant removal through the flocculation of dissolved contaminants.

The performance of the geomembrane in removing contaminants, based upon the very limited sampling in 2010 (unfiltered discharge versus filtered discharge), was encouraging with substantial reductions in aluminum, iron, zinc and turbidity reported by the City of Iqaluit. The results reported by the City in 2011 did not show significant signs of contaminant removal, which suggests that the City may wish to consider chemical pre-treatment in the future as part of the geomembrane filtration process.

Conclusions and Recommendations

The City has investigated potential treatment processes which may be applied to the landfill runoff, including wetland treatment, membrane treatment and geomembrane physical-chemical treatment. Based upon the capital cost of the three options, the membrane treatment option is not financially viable for the City. The wetland treatment option may be financially viable; however, negotiation is required with the adjacent landowners. Negotiation could take a considerable amount of time and may not be successful, depending upon the stakeholders involved. The City has implemented a physical filtration process on a trial basis. The performance of filtration alone for the treatment of the landfill runoff has been inconclusive; therefore, it is recommended that the City advance the use of a chemical treatment in advance of the filtration process. The geomembrane physical-chemical proposal is financially viable for the City and operationally practical for the City staff. 💧



IMPORTANCE OF LANDFILL OPERATIONS – KNOWING THE WASTE IN HAY RIVER



Compacted household waste waits to be covered at the Town of Hay River Solid Waste Site – the intermediate cover will reduce the infiltration of water through the site, and reduce the access to wildlife.

Introduction

Understanding the content and impact of the municipal solid waste stream is essential in the North due to the limited resources available for management. When the effects on the environment can be quantified, we must use this information to direct our efforts at the substances causing the most harm. Coincidentally, the most harmful substances do not take up a significant amount of landfill airspace. These substances are commonly overlooked and added to the landfill trench. The quality of life in the North offers many privileges that are foreign to the rest of the world. However, like the rest of the world, contaminants that ac-

cumulate from population growth are having a detrimental effect on the wildlife and our water source. The current methods of disposal used throughout the North can be improved regardless of population or lack of financial resources. With an increase in awareness, residents and operational personnel are beginning to see a modern day landfill for what it is; a passageway to leach harmful chemicals into our ecosystem. Landfills can also be a major liability for any municipality that does not take the appropriate steps to show due diligence in its operation.

Coming from an age where landfill burning was practiced and source separation was uncommon, the North stands to make

a significant impact by making this a social issue. When communities in the North take responsibility for protecting their environment, immediate benefits can be realized. Every community should treat their landfill as a valuable asset that will either serve the environment by diverting hazardous materials or damage it by producing a constant source of pollution.

Hazardous Waste

Understanding the processing of hazardous waste helps in the separation and reduces the uncertainties involved in accepting the wide range of products that encompass hazardous waste. When accepted at a receiv-

By Dustin Dewar,
Civil Technologist, Town of Hay River



ing facility, hazardous waste is managed according to the substances chemical properties.

- Latex paint can be dried with a mixing material such as topsoil. It can also be processed into recycled paint with by-products being sent for fuel blending.
- Stains, non-paint coatings, aerosols, fuels and adhesives are bulked and sent for fuel blending.
- Acids and all corrosive material will be neutralized through chemical treatments which can be discharged after testing.
- Lead-Acid batteries are deconstructed for lead and the acid is neutralized.
- Waste oil can be burned in approved waste oil burners or processed into recycled oil.
- Fertilizers will be incinerated at high temperatures.
- Aerosols will be punctured and drained of contents with the container being recycled.

Taking the guess work out of hazardous waste disposal allows for proper segregation that can be managed according to the categories they are processed. Budgeting for disposal of material that will inevitably be accepted from residents is a sound management practice that shows due diligence in waste management.

Mercury – Summer Hill “Switch Out” Program

Mercury was contained inside the switches in the majority of home thermostats and gravity influenced hinge assemblies up to the year 2002. This includes doors on washers and driers as well as refrigerators. These switches can contain between 2.5 and 10 grams of mercury. While relatively small in size, these switches can significantly impact the environment. To put this into perspective, 1 gram of mercury poured into eighty million liters of water would be cause for concern under federal human health standards for drinking water, enough to contaminate a typical mid-western lake. If 1 gram of

mercury is introduced into an average 80 hectare (800,000m²) lake, the fish would be considered inedible for 1 year.

Catherine Sturk from the Summer Hill Environmental Group offered a presentation on a mercury collection program at the landfill course offered by MACA's School of

Community Governments in July of 2012. Their program offers free shipping and processing by means of a plastic bucket provided to metal processors and any community who registers. This is a gigantic step for a pollutant that severely affects the environment.

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Summer Hill Environmental Group offers free shipping and processing for mercury recycling by means of a plastic bucket provided to any community who registers.

Paper and Cardboard Products

Paper and cardboard products carry a special significance to operating landfills in the North. Our distance from the global market creates an increase in waste produced through packaging of products shipped to our communities. While this excess in packaging does not represent a direct environmental risk. It does influence the success of a landfill by occupying valuable space within the landfill.

A solid waste composition study conducted by the City of Yellowknife found that paper products were 38 % of the waste stream from a single family household and were 50% of the commercial waste stream. These percentages are based only on weight, which can translate to over 60% of the volume accepted at a northern landfill site. This proportion of landfill airspace substantially reduces the lifespan of a landfill. The amount of airspace consumed by a recoverable material that can be recycled is counterintuitive to a responsibly managed landfill site.

The problem with processing paper and cardboard products in the north lies in the logistics and funding required for processing and transportation. Once a convenient, centralized drop off facility is in place, the product must be taken to a dry enclosure for bailing and subsequent transport for processing. When a program like this is developed for managing the waste, a paper and cardboard ban can be imposed at the landfill. This would force residents to source separate material which would have a dramatic effect on the lifespan of a landfill. This source separation in Hay River could easily be obtained by separating the twice a week collection to allocate one day for recyclables and one day for household waste. This is perhaps the most effective way of reducing wasted landfill airspace.

Household Organic Waste

Forty percent of a typical single family household waste stream is organic material. This waste is for the most part thrown in the trash along with other non-recyclables and products not providing a return to consumers. This is a poor practice and reflects the lack of information the average citizen has on the process of organic decomposition.

One of the essential elements of organic waste decomposition into a stable organic material is oxygen. When organic material is introduced into an environment that is covered, such as a landfill, it is deprived of the necessary oxygen required to efficiently decompose. This creates a problem for landfill managers in educating the public. This waste stream can only be diverted through educating residents looking to help the environment.

The main recoverable to residents diverting this waste stream occurs through backyard composting, which produces a very rich soil amendment. Centralized compost drop offs are another option which may be implemented to target residents who have no use for nutrient rich soil. Composting initiatives are worth exploring due to the significant amount of waste diversion that can be realized.

Hay River has greatly benefitted from a partnership with Ecology North by developing a working relationship with Kim Rapati and Shannon Ripley out of Yellowknife. Their efforts in implementing community awareness and a backyard composting program have proven to be invaluable to the Town of Hay River. The amount of backyard composters purchased by the community represents a willingness to take responsibility for individual waste production. The success of a May composter sale subsidized by the Town of Hay River justifies future efforts related to this initiative.



Waste Diversion Success in Hay River

In 2011, the Town of Hay River successfully diverted a significant amount of household hazardous waste along with 180 tons of vehicles and scrap metal, including white goods (see table).

Waste Type	Amounts	Units
Corrosive's	125	L
Mercury	1	L
Fertilizer	62	Kg
Pesticide	52	L
Flammable Liquid	4444	L
Adhesives	22	Kg
PCB's	13	Kg
Leachable Waste	200	L
Paint	200	L
Aerosols	280	L

"Out of sight, out of mind" has become a common saying or perhaps an unspoken understanding when it comes to landfills in the North. Perhaps this is due to our over abundance of clean fresh water and immense boreal forest; however, the solution to pollution is no longer dilution. That being said, we must counteract this irresponsible common saying by reminding ourselves to, "Manage our waste, not our time". It is our responsibility to protect the environment to the best of our ability because every animal and water source has a saturation point. This can be accomplished by an effort to work together, making shipping of HHW to transfer stations significantly cheaper.



Kim Rapati's (Ecology North) efforts in implementing community awareness and a backyard composting program have proven to be invaluable to the Town of Hay River.



The North has a small population base but a large geographical area. This perceived weakness of a small population can work to our advantage when we improve communication to manage hazardous waste with effective budget planning. As the Port of the North, the Town of Hay River is central to all Southern shipping and is more than willing to work with surrounding communities to increase Territorial waste diversion.

While living in the North provides unique challenges, communities must stay positive and manage their expectations for change. In closing, I would like to use a couple of quotations from the infamous Canadian icon Red Green and relate them to waste management in the North: "Remember, I'm pulling for you. We're all in this together" and "Keep your stick on the ice". 💧

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ALASKA SOLID WASTE MANAGEMENT



Burn box incinerator being emptied of ash.



Burn cage for solid waste management.

Burning household waste is still a widespread practice in rural Alaska to reduce waste volume, decontaminate refuse, and make waste less attractive to animals. Alaskans use a wide variety of combustion methods that range from less expensive

open burning to more costly high temperature multiple chambered incinerators and thermal oxidation systems. Generally, the higher temperature combustion systems tend to be more expensive to purchase and maintain. However, these systems cause less

pollution than do the less expensive and lower temperature open burning, burn barrel, burn cage and burn box methods.

Understanding waste combustion requires knowledge of the waste and how it is burned. Municipal solid waste contains both combustible (e.g. paper, plastic, wood, and food) and non-combustible (e.g. metal and glass) materials. Combustible wastes account for about 70% of municipal waste. Paper and cardboard alone make up around 40% of the total. Garbage also contains 20% to 40% water. The amount of water and non-combustibles in the waste reduces the burning efficiency.

The various burning methods applied in Alaska include open burning on the ground, burn cages, burn barrels, burn boxes, air curtain incineration, and multiple chambered incineration systems.

Open Burning

"Open burning" means the burning of a material that results in the products of

Edited from *Burning Garbage and Land Disposal In Rural Alaska*,
A Publication for Small Alaskan Communities Considering Incineration and
Energy Recovery, Alaska Energy Authority and
Alaska Department of Environmental Conservation, May 2004



combustion being emitted directly into the air without passing through a smoke stack. Open burning is the least effective and most hazardous form of combustion and it is also the least expensive way to burn municipal solid waste, which is why it has been commonly used in Alaska. It is the policy of the Alaska Department of Environmental Conservation (ADEC) to eliminate, minimize, limit or control open burning as needed and to encourage other methods of disposal or incineration where possible.

A burn cage is a simple and inexpensive way to make an open burn somewhat more effective. The burn cage is an improvement over open burning on the ground because the burn cage exposes the waste to natural draft on all surfaces including the bottom and this allows air to access the waste and promotes more efficient combustion throughout the burning period. It also limits the size of the waste pile thereby reducing the potential for smoldering of waste not exposed to air inside the pile. And finally, it contains the burning within a specific location reducing the chance of the burn spreading to other waste disposal areas or surrounding vegetation.

Although this form of burning is an improvement over uncontained open burning on the ground, there is still a good chance that insufficient turbulence and low burning temperatures will produce smoke and incomplete combustion products. The process may not consume large and frozen masses of waste and partly burned food wastes may still attract animals. This method is an effective way to burn clean, dry wood, paper and other wastes that ignite and burn cleanly without smoke. Burn cages can be built locally using existing resources. However, units can also be pre-cut and shipped for assembly on site.

Incinerators

Many waste incineration systems are used in Alaska, and incinerators burn waste at higher temperatures than open burn methods. Incinerators rely on engineered designs to achieve the higher temperatures

that reduce smoke emissions and contaminant formation when burning garbage.


Most of the incineration systems are modular. Modular incinerators are manufactured in a shop off-site and installed at the place they are used. Site-built incinerators

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are generally larger, with capacities of over 500 tons per day. The largest municipal waste incineration system in the state is located in Juneau and includes two modular units with a total capacity of 72 tons per day.

Incinerators are often described based on the amount of combustion air that is provided to the system. Starved air systems contain at least two chambers. The primary chamber receives less than the amount of air needed to achieve full combustion. Gases from this incomplete combustion then pass into the second chamber where sufficient air is brought in for full combustion.

Although "burn boxes" are generally considered to be a modification to open burning, because these devices are usually fitted with a smokestack they are regulated as incinerators. Burn boxes are single-chamber chambered units and are the least expensive incinerators in use. Waste is placed on grates inside the upper half of the unit. Ash falls through the grates during and after burning. Ash is cleaned from the lower half of the unit when a sufficient amount has accumulated. Burn boxes usually rely on natural draft, not a fan, to provide combustion air and generally do not require power or a motor to operate.

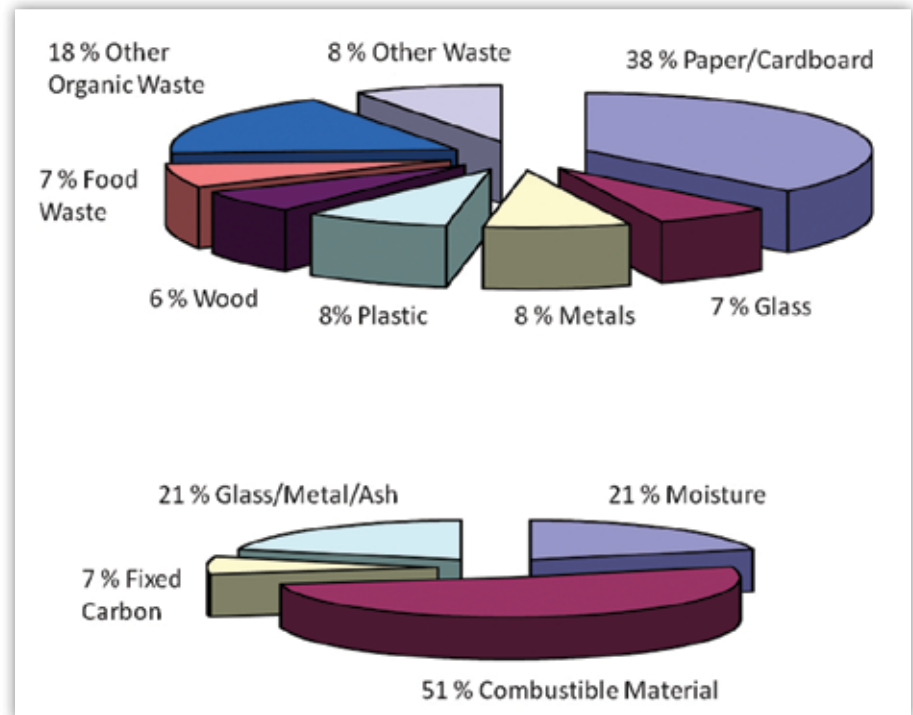
Burn boxes are the least effective form of incinerator and will exceed air quality standards if not operated carefully. Inert wastes such as metal and glass do not burn well and will rob heat from the combustion process, thereby creating a lower temperature burn. These wastes should be separated prior to burning and recycled, landfilled directly, or transshipped to another facility. Approximately 16 communities in Alaska use Burn boxes. The current cost of a unit is around \$12,000 but can be less if salvageable materials are available for local fabrication.



Typical composition of solid waste from a material perspective and a combustion perspective.

Requirements are Becoming Stricter

The requirements for the burning of garbage in Alaska are slower becoming stricter as communities incrementally make improvements to their waste management facilities. Under current Alaska air quality regulations, any device that can burn more than 1,000 pounds of waste per hour must have an air quality permit and be operated and monitored to minimize air pollution. These facilities must also meet standards for particulates and ambient air quality. The permit will ultimately require stack testing for the incinerator. 💧



Ecology North is a charitable, non-profit organization based in Yellowknife, Northwest Territories. Ecology North supports sound environmental decision-making on individual, community and regional levels.

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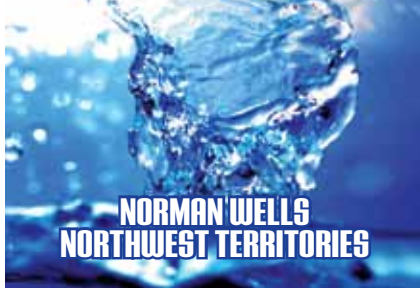
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NORMAN WELLS SOLID WASTE MASTER PLAN



The existing landfill site in Norman Wells is located about 5.3 kilometres east-northeast of the town centre. There is quarry area adjacent to the landfill site, which provides material (limestone) that can be used as cover material. The historic landfill development was based on the depression landfill method, in which the wastes are dis-



By Ken Johnson,
AECOM

posed of on the ground and following the topography of the site. The landfill has no liner or runoff collection system.

The existing landfill site is situated between the rock outcrops and the glacial deposits of the valley plain. The underlying material is a glacial moraine plain and is described as glacial till (clay, silt, minor sand and gravel). Norman Wells is near the boundary between discontinuous and continuous permafrost, and the active layer is typically 0.5 m to 2.0 m thick. Due to the presence of permafrost, the movement of any runoff through the landfill would be restricted in the active layer.

A solid waste master plan was completed to provide a long term framework for the future development of the existing site, and provide guidance to the Town of Norman Wells (administration and operating staff), as well as a communication document with the regulatory authorities in demonstrating their appropriate solid waste management practices.

The solid waste master plan evaluated the airspace and future expansion applying an average waste to soil budget of 4:1 (ratio of landfill waste to soil used as cover material). The proposed development plan contemplates a cell airspace capacity of approximately 600 tonnes or 1,200 cubic metres per year. New cell construction would start at the down-gradient end of the existing landfill and proceed uphill to reduce the interference of runoff with any new construction.

The following design criteria were recommended as part of the master plan:

- 10% slope (the original ground slope) around the disposal area;
- 25% (4 horizontal to 1 vertical) grade on waste side slopes, to a height of approximately 12 m;
- 5% minimum grade on top of the landfill; and

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An on-site runoff collection system was reasoned to be unnecessary for the Norman Wells landfill.

- Final cap of 1.10 m, consisting of a 0.2 m topsoil layer, a 0.3 m subsoil layer, and 0.6 m barrier layer (compacted clay liner).

An on-site runoff collection system was reasoned to be unnecessary for the Norman Wells landfill for the following reasons:

- The population served is less than 1,000 people (849 in 2006);
- The quantity of waste is relatively small, approximately 1.6 tons or 3.3 m³ per day;
- The surface area of the landfill is only 17,500 m²;

- Precipitation is relatively low, approximately 290 mm per year; and
- The permafrost and cold temperatures create slow, nearly negligible biodegradation.

However, the landfill approval does require that all municipal cells be constructed to include groundwater and surface water monitoring programs

In order to minimize the amount of cover soil required and achieve the targeted waste to soil ratio of 4:1, it is important to maintain an "optimum" cell size and shape. Based on the volumes received at the landfill, the following "optimum" operating cell size was recommended:

- Operating cell geometry slanted cube
- Operating cell width 8 to 10 m
- Operating cell depth 2 to 4 m

The Norman Wells landfill will provide adequate capacity until the year 2080, for a life of approximately 70 years. This estimation of site utilization sequencing is based on the projected population, waste growth projections and the estimated developed site capacity. 💧

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LOW LEVEL RADIOACTIVE MATERIAL STORAGE AT THE FORT SMITH LANDFILL



In the closing days of World War II, miners working at Port Radium on Great Bear Lake (See photo) ferried bags of uranium ore from the Eldorado mine. The ninety-pound sacks were carried on men's backs, loaded onto boats and transported about 2,000 kilometres south to Alberta. The ore was transported up the Mackenzie and Slave Rivers to Waterways, Alberta and then by rail south. A major portage was required around the rapids between Fort Smith and Fort Fitzgerald. As a result, the ore was stored for brief periods of time at either end of the portage. The ore was processed in Ontario, and ultimately sent to the Manhattan Project in New Mexico, where it was used to develop the atomic bombs dropped on Japan. Ore from the Eldorado mine was shipped from the 1930s until 1960.

An old storage shed (a 10 x 14-metre building) was one of several identified sites along the portage route that accumulated radioactive material. A contamination survey showed that uranium ore had been ground into the wooden floor boards, into the cracks between the floor boards, onto the tops of the floor joists and onto the crawl space soils beneath the building.

A temporary storage area for radioactive material has been developed at the Fort Smith Landfill and is comprised of three separately constructed cells within an L-shaped footprint measuring approximately 22 metres in length and 15 metres along its widest side. All contaminated materials, lumber and soil, are contained within wo-

ven fabric and/or HDPE material. The entire storage cell is covered with clean sand material varying in thickness between 30 and 90 centimetres. The Fort Smith radioactive material storage cell has been developed over the course of three remedial programs conducted in the Town of Fort Smith in 1998, 2001 and 2010.

The first cell in 1998 facilitated the removal and disposal of the uranium ore-contaminated warehouse. The Town of Fort Smith was responsible for the overall management of this initial demolition project and the identification of a disposal site for the associated materials. Atomic Energy of Canada Ltd. was retained by the Town to provide the technical expertise and the support staff required for the safe removal and containment of the low-level radioactive waste. In 2001, uranium-contaminated soils were removed from three private properties and ditches in Fort Smith. Radiation levels at each location were above that of the local background, but were lower than that which would result in an incremental dose of 1 mSv/a (the regulatory limit for the general public). Eighteen truckloads of uranium contaminated soil were hauled to a cell adjacent to the 1998 cell. The 2010 a program was undertaken to address the materials in the road bed that were identified in 2001. Conditions encountered during 2010 were consistent with expectations based on the previous work and nine truckloads ultimately disposed of in the special containment area at the Fort Smith landfill. 💧



2012 NTWWA President's Report

BHABESH ROY

In the early years of our organization, the main activities were the annual conference and a newsletter. In the years since then, the organization has increased the services to its members by adding a tradeshow to the conference events in 2000, creating a CD of the conference proceedings in 2003, adding an Operators Workshop to the conference in 2004 and publishing an annual Journal in 2005. Most recently, in response to the wishes of the membership, the one day Operators Workshop has been expanded to two days in 2011.

The 2011 Iqaluit conference was exceptional because it was the first time that a delegation (five people) attended from Northern Quebec. I'd like to thank Roy Green (ADM, GN-CGS) for his opening message to the delegates on behalf of the Government of Nunavut (GN) and Perry Heath, Manager of Infrastructure and Project Management, MACA, GNWT for his message on behalf of the Government of the Northwest Territories. I also want to thank Lorne Levy (retired ADM, GN-CGS) for his inspirational keynote dinner speech.

There were 21 presenters at the Iqaluit conference who spoke on wide range of relevant topics. There were also tradeshow booths and representatives who provided delegates with information on the various supplies, equipment and services necessary to keep infrastructure functioning in northern communities. Many thanks to all the sponsors who gave us discounts on travel and other services. Special thanks to Past President Justin Hazenberg for organizing the drinking water competition and Southern Director Ken Johnson for his excellent work on the Journal. I should not forget to thank Pearl Benyk for her hard

work organizing things and Executive Director Olivia Lee for her devotion to spear-heading the conference planning and all the other tasks involved in this very successful event. Finally, I thank board member Bill Westwell for his local support, including organizing the supply of Pangnirtung hats for the presenters.

The two-day operators workshop is a big attraction for operators. I want to express my gratitude to Jonah Koonark, Billy Qaqasiq and Jean Soucy for their participation on the board and their work on planning the operators workshop. I especially thank Alan Harris, current Vice-President of the Board, for chairing the Operators Workshop planning committee.

I have had the opportunity to serve on the NTWWA board from 2005 to 2010 as a Director and in 2011 as the Vice President. It has been my great pleasure and honour 2012 to serve as President, and as my term comes to an end, I would like to thank all the members and the other board members, as well as the Executive Director Olivia Lee and the in-coming Executive Director Jennifer Spencer, for giving me this honour and for the pleasure of working with you.

I would encourage the communities of Nunavut and Northwest Territories to send more operators to the 2012 conference and workshop in Yellowknife from November 23 to 27. I look forward to joining you in Yellowknife and to getting to know those of you I have not yet met and, of course, to enjoying the conference events. I hope we can all continue to work together to promote and develop the water and sanitation sector in the North. 💧

The 2011 Iqaluit conference was exceptional because it was the first time that a delegation attended from Northern Quebec.



2012 NTWWA Executive Director's Report

OLIVIA LEE

The 2012 NTWWA Annual Conference, Trade Show and Operator's Workshop will be hosted in Yellowknife, Northwest Territories November 23rd to 27th. The conference theme is "Water and Waste: Research to Reality". The conference program will include 20 technical presentations, and the conference will be followed by a two-day Operators Workshop. Last year's conference featured our first two-day workshop, and the feedback from operators was very good.

The NTWWA provides a very worthwhile and interesting opportunity for those working in the northern field of water and wastewater – and others who are concerned about these vital services – to meet, network and hear about the projects others have been working on during the past year. If you are a northern water or wastewater professional, mark your calendars and join us at the annual event to share ideas and learn about northern water and wastewater challenges and solutions.

Last year the Annual Conference, Trade Show and Operators Workshop in Iqaluit was a huge success, with over 90 delegates. Thanks to those operators who sat on the Operators' Panel and shared their experiences. A big thank you to the City of Iqaluit, their staff, Bill Westwell and Pearl Benyk for all the hard work coordinating the logistics of the 2011 NTWWA annual event. The delegates, presenters and trade show participants are key to the success of the annual event, so thank you very much for your participation.

Since 2005, the NTWWA has been hosting a friendly drinking water competition for the water treatment plant

operators who attend the conference. The winner of the 2011 competition was the Town of Norman Wells. If you want to take home the trophy and bragging rights remember your H₂O in 2012!

The board tries to maintain diverse representation and currently consists of water treatment plant operators, consultants with expertise in the areas of water and waste, a water and wastewater industry representative, and government employees. If you are interested in becoming a board member, please step forward at the Annual General Meeting held following the conference.

This will be my last year as Executive Director of the NTWWA, and I want to thank the NTWWA Board of Directors for five years of support. I am very proud of what the board has done to increase relevance to operators at the conference and I wish them success in future conferences. Every year we say goodbye to dedicated members and welcome newcomers and this year is no exception. On behalf of the board, I would like to thank all of the board members who are leaving us for their dedication. To all of the new board members: thanks for volunteering your time; we are excited about the new experiences, knowledge and ideas you bring. Special thanks are due for the efforts of the President, Bhabesh Roy, the Vice President, Alan Harris, the Past President Justin Hazenberg, the Journal editor Ken Johnson, and our administrator Pearl Benyk.

I look forward to seeing you in Yellowknife. 💧

The NTWWA provides a very worthwhile and interesting opportunity for those working in the northern field of water and wastewater.

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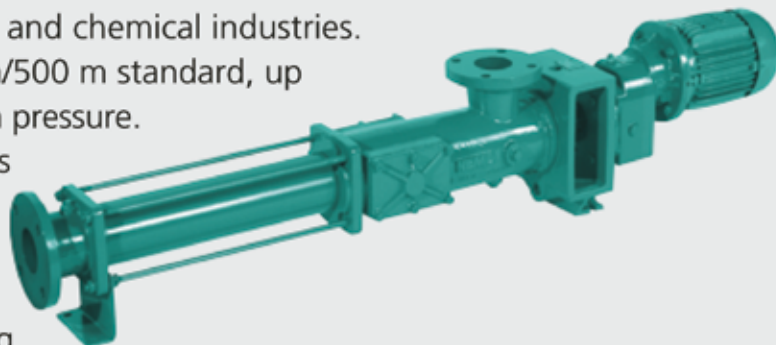
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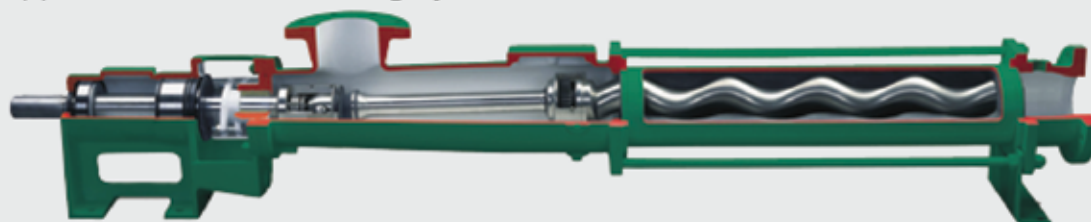
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