



# COMPOST USE IN MINES IN NORTHERN CANADA



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# PRESENTATION CONTENT



1. **Waste production and management in remote areas**
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  - Challenges
  - Innovations
2. **On-site composting in remote areas**
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  - Challenges
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  - Carbon Sources
  - Legislation
3. **Case Studies**
  - Hydroelectric Dam Construction Camp
  - Gold Mine Operation Campsite
  - Diamond Mine Operation Camp
  - Iron Mine Operation Camp
  - Uranium Mine Prospection Camp
4. **Take home messages from success stories**



# 1. WASTE PRODUCTION AND MANAGEMENT IN REMOTE AREAS

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Current Practices

Challenges

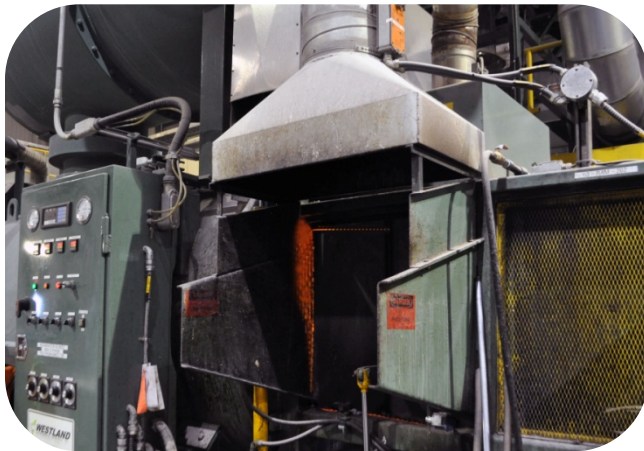
Innovations



# 1. Waste production and management in remote areas

## CURRENT PRACTICES

- Organic waste generated on-site is commonly:
  - Mixed with recyclables/ultimate waste
  - Transported off site
  - Landfilled (trenches)
  - Incinerated





# 1. Waste production and management in remote areas

## CHALLENGES

- Remote worker camp locations have difficult access to waste management services
- There's a regular turnover of camp workers
- Waste landfilled on-site may attract wildlife
- Incinerated waste generates local atmospheric pollution



# 1. Waste production and management in remote areas

## INNOVATIONS

- Sustainable on-site processing systems are desirable
  - By regulatory authorities in accordance with territorial policies
  - By operators to minimize costs and environmental footprints
- Sustainable on-site processing systems for organic waste include
  - Composting
  - Methanization
  - Co-generation



## 2. ON-SITE COMPOSTING IN REMOTE AREAS

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Benefits  
Challenges  
Economics  
Carbon Sources  
Legislation



## 2. On-site composting in remote areas

# BENEFITS

- Provides value to waste
  - Instead of downcycling or wasting resources
- Reduces greenhouse gas emissions
  - Transportation and combustion reduction
  - Avoids methane production from landfills
- Compost can be useful
  - For restoring degraded sites after mine closures
- Increases businesses' social responsibility
  - Process which is more respectful of the environment and workers' health





## 2. On-site composting in remote areas

# CHALLENGES

- **Organic waste generation**
  - Worker populations fluctuate (staff turnover, peaks and troughs in operations)
- **Adapt purchasing policies to ensure the use of recyclable or compostable products**
  - MetLife Stadium example
- **Post-consumer organic waste collection**
  - Public education
  - Available tonnage
  - Separation of contaminants at source
- **Environmental constraints**
  - Difficult climatic conditions
  - Wildlife
- **Human constraints**
  - Importance given to health and safety



## 2. On-site composting in remote areas

# ECONOMICS

Overall, on-site composting can be much cheaper than alternative processes

### Savings

- Reduced transportation and tipping fees in some cases
- Reduced maintenance and operation of incineration equipment (Manpower, fuel...)
- Reduced costs compared to in-trench landfill digging, and extended life of existing trenches when organics are diverted.
- Management of carbon-rich waste through composter can further reduce alternate treatment costs (Paper plates, hand towels, paper, cardboard)
- Savings on compost acquisition for site closure

### Increased costs

- Acquisition and maintenance cost of composting systems (usually low)
- Operating costs (sorting)
- Compostable items (cafeteria single-use items) may be more expensive than conventional items (but ultimate waste cost reduction may compensate).
- Carbon source acquisition
  - *Savings can greatly increase when locally available carbon sources are used in the composting recipe*



## 2. On-site composting in remote areas

# CARBON SOURCES

- Carbon-rich waste is problematic
  - \$\$\$ transportation off-site or to landfill
  - Bulky
- On-site available carbon sources can actually be a resource for composting
  - Cardboard boxes (from equipment shipping)
  - Paper (from offices or paper towels)
  - Woodchips (from forested area clearing)
- ↓\$ Purchased carbon sources
  - Buy bulk & large volumes  
(storage space is required)



## 2. On-site composting in remote areas

# LEGISLATION

- Waste management policies may value composting over other waste management methods
  - Québec's waste management policy
- Environmental policies may require lesser-impact alternatives for issuing a certificate of approval
  - OW landfilling has already been banned under Newfoundland's Waste Management Strategy



# 3. CASE STUDIES

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Hydroelectric Dam Construction Camp

Gold Mine Operation Campsite

Diamond Mine Campsite

Iron Mine Operation Camp

Uranium Mine Prospection Camp



## 3. Case Studies

# HYDROELECTRIC DAM CONSTRUCTION CAMP

- **Promoter:** Hydro-Québec
- **Site:** La Romaine Dam construction
- **Activities:** 2009-2020
- **Determining factors for implementation**
  - Reduce waste transportation
  - Avoid opening another trench for landfilling
- **Specific challenges**
  - Large seasonal fluctuation of work force  
>100-2000 people
  - Periodic migration of operations  
3 composters travelled to 4 camp sites
  - Wildlife: Daily operations of a closed composter reduced wildlife attraction (also bear-proof)
- **Improvements**
  - ↓ Operation time with mixer (vs shredder)



Photos: Paul Larouche





## 3. Case Studies

# GOLD MINE OPERATION CAMP

- **Location:** Opinaka Lake, Radisson, James Bay
- **Work force:** 600-700
- **Tonnage:** 125-200 tons OW/year
- **Activities:** 2016-...
- **Accomplishments**
  - 75% reduction in operational time through automation of processes (mixers, conveyers, etc.) and optimization of pre-processing equipment (compared to other similar site)
- **Operations**
  - 2-3h/week
  - Online Calculator



### 3. Case Studies

# DIAMOND MINE OPERATION CAMP

- **Company:** Dominion Diamond Corporation
- **Location:** Ekati Diamond Mine in the Northwest Territories
- **Workforce:** 1,820 employees and contractors
- **Tonnage:** 500 kg OW/day, food waste + cardboard
- **Determining factors for implementation**
  - Savings of \$30,000-40,000/month on incineration
  - Reduced diesel consumption by 250,000 litres every year and prevented up to 680 tons of GHGs
- **Operations**
  - Mixer + Automated Feeder
  - Online Calculator



DOMINION  
DIAMOND



### 3. Case Studies

# IRON MINE OPERATION CAMP

- **Workforce: 200**
- **Determining factors for implementation**
  - Common agreement from negotiations between the operator and the environmental ministry who wanted to avoid landfilling





### 3. Case studies

# URANIUM MINE PROSPECTION CAMP

- **Workforce:** 30
- **Tonnage:** 10-15 tons/year
- **Determining factors for implementation**
  - Industrial composting systems are scalable and easily transported
- **Achievements**
  - 75% reduction in landfilled waste
- **Highlights**
  - Composting of cooking oils also allowed to increase the tonnage of composted cardboard
  - Residual heat transfer from generators to the building shielding the composter allowed to temper extreme winter colds



# TAKE HOME MESSAGES FROM SUCCESS STORIES



**EXPERTISE IS SCARCE... BUT INCREASING:**

For planning, optimizing operations,  
accompanying project leaders in daily  
operations and problem solving capacity.



*Thank you!*

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