



Co-composting Source Separated Organics and Biosolids?



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INTRODUCTION

- City of Sault Ste. Marie Waste Plan
- Composting Study Results
- Compost Guidelines in Ontario
- Conclusions





Waste Management Plan

- Initiated Study in late 2000
- Alternative Waste Diversion/Collection System Options Report, June 2001
- Waste Collection and Disposal Options Report, July 2002
- Business and Implementation Plan, February 2003
- Scoped EA Terms of Reference Document, June 2003

Waste Management Plan

- Alternative Waste Diversion/Collection System Options Report recommended System 5 which included:
 - Curbside collection of expanded recyclables;
 - Processing of recyclables for IC&I sector;
 - Curbside collection of organics;
 - Composting of organics from IC&I sector;
 - Leaf and yard waste collection;
 - Public education;
 - Backyard composting;
 - HSW depot;
 - User fees; and
 - Increased tipping fees.
- Approved by council



Achievements

- New recyclable contract awarded
- New MRF operational in October 2003
- 70-80% tonnage increase for dry recyclables
- Bag limits and user fees approved by council in 2003
 - Six bags to four Jan 1, 2004
 - Three bags May 2004
 - Two bags Jan 1, 2005
 - Tipping fees will rise from \$27.50 to \$65/tonne by Jan 1, 2005
- Received a grant through Green Municipal Enabling Fund to study co-composting of leaf yard waste, source separated organics and biosolids



Composting Study

- 80,000 tonnes of waste handled by the city annually
- Approximately 32,000 tonnes, or 40%, is organic;



9,500 tonnes Leaf/Yard Waste



12,500 tonnes Organic Waste



10,000 tonnes Biosolids

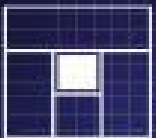
- In order to make full-scale organics composting feasible from a solid waste perspective the city had to look at biosolids.

STUDY OBJECTIVES

- 1) Determine the residential response to a municipal composting program.
- 2) Determine compost quality.
- 3) Determine if composting would be cost effective.

COMPOSTING TECHNOLOGIES

Ag-Bag CT5 machine

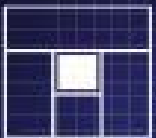


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COMPOSTING TECHNOLOGIES

Omega Organics Rotating Drum



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RESIDENTIAL COLLECTION

- Collection occurred between September 30, 2002 and January 27, 2003
- Averaged 13.8 kg per participating household per week over the entire pilot period
- 50% participation rate
- Drop in the number of garbage bags at the curb from an average of 2.5 to 1.15 per week (54%)

COMPOSTING RESULTS

Ontario's Interim Guidelines require that material throughout a pile must maintain a temperature of at least 55°C for a minimum of 15 days during the composting process to inactivate pathogens

October Mixes; with Days Exceeding 55°C (131°F) after 10 weeks

- 1) 1.3 kitchen/yard : 1.0 woodchips (0 days)
- 2) 4.6 kitchen/yard : 12.4 woodchips : 1.0 Biosolids (21 days)
- 3) 4.6 kitchen/yard : 3.4 woodchips : 1.5 Flakeboard Fines : 1.0 Biosolids (21 days)
- 4) 4.6 kitchen/yard : 14.0 woodchips : 1.0 Biosolids (10 days)
- 5) 2.0 woodchips : 1.0 Biosolids (26 days)
- 6) 3.0 woodchips : 1.0 Biosolids (9 days)

The ambient temperature range during this period was 9°C to -23°C

14 additional mixes processed in December

COMPOSTING RESULTS

- Harvested all 20 mixes in April 2003
- 10 of the 20 mixes met 55°C for 15 days or greater
 - Six mixes contained biosolids and woodchips
 - Three mixes contained food waste, biosolids and woodchips
 - One mix contained food waste and woodchips

COMPOST QUALITY - METALS

- Compost is required to meet the 1991 Interim Guidelines for metal content

	Interim Guideline	West End Plant	East End Plant
<i>Arsenic</i>	10	0.9	2.8
<i>Cadmium</i>	3	1.8	0.9
<i>Cobalt</i>	25	7	22
<i>Chromium</i>	50	60	48
<i>Copper</i>	60	376	267
<i>Mercury</i>	0.15	0.36	1.19
<i>Molybdenum</i>	2	5	5
<i>Nickel</i>	60	21	12
<i>Lead</i>	150	295	14
<i>Selenium</i>	2	1.6	0.9
<i>Zinc</i>	500	412	951

All units mg/kg dry weight

- MOE Guidelines states “To prevent dilution of contaminated feed materials, no individual waste source, additive or inoculants may exceed the metal concentration limit”
- Biosolids do not meet feedstock requirements



MOE 1998 DRAFT GUIDELINES

Parameter	MOE 1998	Sault Ste. Marie Biosolids	
		West End Plant	East End Plant
Arsenic (As)	13	0.9	2.8
Cadmium (Cd)	3	1.8	0.9
Cobalt (Co)	34	7	<2
Chromium (Cr)	210	60	48
Copper (Cu)	100	376	267
Mercury (Hg)	0.8	0.36	1.19
Molybdenum (Mo)	5	5	5
Nickel (Ni)	62	21	12
Lead (Pb)	150	295	14
Selenium (Se)	2	1.6	0.9
Zinc (Zn)	500	4.12	951


- If a feedstock contains any parameters in a concentration that exceeds twice the maximum concentration, the feedstock is considered to be unsuitable for composting



METALS RESULTS MIXES 1 THROUGH 6

	Interim Guidelines	CCME "A"	Mix 2	Mix 3	Mix 5	Mix 6
Arsenic (As)	10	13	1.1	1.3	1.6	1.3
Cadmium (Cd)	3	3	<0.5	<0.5	0.7	0.9
Cobalt (Co)	25	34	4	4	4	3
Chromium (Cr)	50	210	95	140	115	90
Copper (Cu)	60	100	26	28	90	155
Mercury (Hg)	0.15	0.8	0.06	0.11	0.31	0.37
Molybdenum (Mo)	2	5	<3	3	3	4
Nickel (Ni)	60	62	45	57	52	40
Lead (Pb)	150	150	9	11	13	13
Selenium (Se)	2	2	0.4	0.3	0.5	0.6
Zinc (Zn)	500	500	92	80	248	292

All units are mg/kg dry weight

 Exceeds MOE

 Exceeds MOE & CCME

Mix 2 – 4.6 kitchen/yard: 12.4 woodchips: 1 biosolids

Mix 3 – 4.6 kitchen/yard: 3.4 woodchips: 1.5 fines: 1 biosolids

Mix 5 – 2 woodchips: 1 biosolids

Mix 6 – 3 woodchips: 1 biosolids

METALS RESULTS SELECTED MIXES

	Interim Guidelines	CCME "A"	Mix 7	Mix 8	Mix 9	Mix 10	Mix 14	Mix 17	Mix 18	Mix 19	Static Pile
Arsenic (As)	10	13	2.2	4.9	2.5	0.6	1.0	2.5	3.3	1.7	0.8
Cadmium (Cd)	3	3	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	1.3	<0.5	0.6
Cobalt (Co)	25	34	<2	4	<2	3	5	4	4	3	-5
Chromium (Cr)	50	210	178	24	13	13	19	28	30	15	71
Copper (Cu)	60	100	118	40	30	20	31	118	142	38	39
Mercury (Hg)	0.15	0.8	0.49	0.19	0.09	0.05	0.05	0.23	0.38	0.08	0.11
Molybdenum (Mo)	2	5	<3	<3	<3	<3	<3	<3	<3	<3	<3
Nickel (Ni)	60	62	31	10	5	7	11	11	11	7	36
Lead (Pb)	150	150	16	34	17	<5	12	79	108	23	7
Selenium (Se)	2	2	0.5	0.3	0.2	<0.2	0.2	1.0	1.2	0.3	0.3
Zinc (Zn)	500	500	501	178	143	62	59	171	211	120	104

> MOE
 > MOE & CCME


Mix 7 - 2 woodchips: 1 biosolids
 Mix 8 - 5 woodchips: 1 biosolids
 Mix 9 - 8 woodchips: 1 biosolids
 Mix 10 - 1 food: 1 ground leaves

Mix 14 - 1 biosolids: 20 ground leaves: 2 food
 Mix 17 - 3 woodchips: 1 biosolids
 Mix 18 - 2.5 woodchips: 1 biosolids
 Mix 19 - 3.5 woodchips: 1 biosolids
 Static Pile - 4.6 kitchen/yard waste: 14 woodchips: 1 biosolids

METALS

	ONTARIO Interim Guidelines	CCME "A"	BRITISH COLUMBIA "A"	BNQ AA&A
Arsenic (As)	10	13	13	13
Cadmium (Cd)	3	3	3	3
Cobalt (Co)	25	34	34	34
Chromium (Cr)	50	210	210	210
Copper (Cu)	60	100	400	400
Mercury (Hg)	0.15	0.8	2	0.8
Molybdenum (Mo)	2	5	5	5
Nickel (Ni)	60	62	62	102
Lead (Pb)	150	150	150	150
Selenium (Se)	2	2	2	2
Zinc (Zn)	500	500	500	700

All units are mg/kg dry weight.

 > MOE

 > MOE and CCME

 > All

FEEDSTOCK QUALITY

	West End Plant	East End Plant	Kelowna B.C. Biosolids	Penticton B.C. Biosolids
<i>Arsenic</i>	0.9	2.8	1.6	3.7
<i>Cadmium</i>	1.8	0.9	1.42	1.29
<i>Cobalt</i>	7	22	15.2	2.37
<i>Chromium</i>	60	48	2.43	17.3
<i>Copper</i>	376	267	686	648
<i>Mercury</i>	0.36	1.19	1.66	2.47
<i>Molybdenum</i>	5	5	4.8	7.24
<i>Nickel</i>	21	12	16	15.2
<i>Lead</i>	295	14	15.2	26.6
<i>Selenium</i>	1.6	0.9	1.6	4.5
<i>Zinc</i>	412	951	226	326

 Exceeds MOE Feedstock requirements



OTHER MUNICIPALITIES

BIOSOLIDS COMPOSTING RESULTS

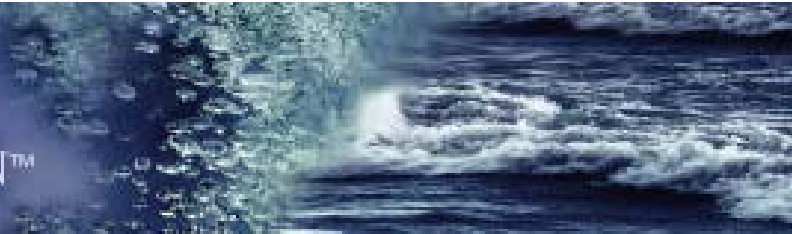
	ONTARIO Interim Guidelines	CCME "A"	BNQ AA&A	Kelowna B.C. Compost	Penticton B.C. Compost
Arsenic (As)	10	13	13	6.3	4.6
Cadmium (Cd)	3	3	3	1.3	0.68
Cobalt (Co)	25	34	34	19.3	2.33
Chromium (Cr)	50	210	210	2.75	16.3
Copper (Cu)	60	100	400	313.25	248
Mercury (Hg)	0.15	0.8	0.8	1.32	1.12
Molybdenum (Mo)	2	5	5	<4	2.85
Nickel (Ni)	60	62	102	13.25	9.28
Lead (Pb)	150	150	150	<50	46.9
Selenium (Se)	2	2	2	<2	2
Zinc (Zn)	500	500	700	226.5	195

 > MOE and CCME

 > All three

SUMMARY

- Objective 1: Residential response to composting
 - High level of interest in full-scale residential composting



SUMMARY

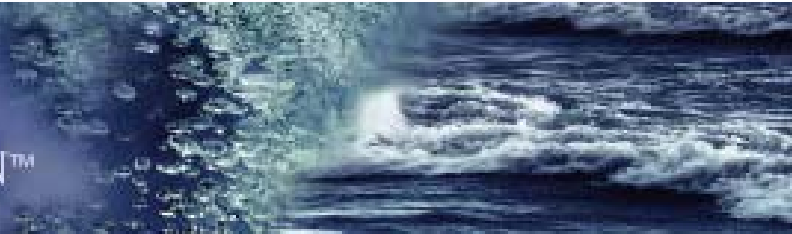
- Objective 2: Can a useful product be produced
 - Based on Ontario's interim guidelines biosolids should not be used as a feed stock for composting
 - Will not be able to produce an unrestricted use product that meets the Ontario Interim Guidelines
 - Other Ontario compost facilities using food waste are finding it challenging to meet interim guidelines
 - Unlikely able to produce a CCME Class A compost with biosolids (Copper ? Mercury ?)
 - Could meet British Columbia Class A Standard with biosolids and food wastes
 - Could meet voluntary National Standards

SUMMARY

- Objective 3: Will composting be cost-effective?
 - Landfill tipping fees to rise to \$65/tonne by 2006
 - Simple outdoor facility would be cost effective when compared to landfilling
 - Indoor facility may not be cost effective when compared to landfilling

Significant Events

- Richmond Landfill Decision, no longer scope EA's
- Dec 22, 2003 MOE Announcement
 - Industry to pay 50% of municipalities' blue box costs
 - WDO to submit a plan by March 2004 to expand recovery of material suitable for blue box from current 45% to 60% by 2008
 - 60% diversion for landfills within 5 years
 - "We plan on phasing in a ban on organic waste in our landfills because we believe organic waste is a resource, not garbage"



CONCLUSIONS

- Approval of new landfill capacity will take longer
- In order to encourage greater organics diversion in Ontario the compost guidelines need to be revised
- Clear approval guidance is required
- In certain parts of Ontario biosolids should be part of the organic mix

CONCLUSIONS

- In North America there are approximately:
 - 4000 Yard Waste Composting Facilities
 - 300 Biosolids Composting Facilities
 - 20 MSW Composting Facilities

Source – Presentation by Eliot Epstein (March 23, 2003)

