CAT LITTER and DOG FECES:

COMPOST or WASTE?

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EXECUTIVE SUMMARY

An estimated 10,000 tonnes of cat litter and dog feces (CLDF) are generated per year in Nova Scotia. Colchester County operates the only compost facility in Nova Scotia that currently composts this material. Diverting this material away from landfills and into compost in the rest of the province offers a substantial diversion of waste.

Evaluation of CLDF as compost feedstock reveals that this material is suitable. It does not contain excessive sodium, contains low levels of plant nutrients and contributes beneficially to the water holding capacity of compost. Current pathogen standards can be met for CLDF composting if required temperatures are achieved. Pharmaceutical residue issues in CLDF are similar to those for biosolids and animal manure composting which greatly reduce their concentrations. There are no compelling reasons to not compost CLDF based on the chemical and biological aspects of the material.

A consideration of current practices in Nova Scotia reveals that the one facility that does compost CLDF has encountered no problems associated with processing it or meeting pathogen standards. The primary reasons cited for not collecting and composting CLDF are a desire by residents to exclude all fecal material from their compost and concerns about worker safety. Problems with bagged dog feces were also raised.

Before the province considers banning CLDF from landfills a discussion with the public, Regional representatives and compost facility operators should be undertaken.

PART 1: SUITABILITY of CAT LITTER and DOG FECES as COMPOST FEEDSTOCKS

INTRODUCTION

Information provided by *Nova Scotia Environment* indicates that only one permitted compost facility in Nova Scotia (Colchester County) accepts cat litter and dog feces (CLDF) for inclusion in its residential composting program. Municipalities and compost facility operators in Nova Scotia are divided on the issue of composting this material. Examination of this situation is merited to determine if there is an opportunity to divert this material from provincial landfills to provincially permitted compost facilities. The purpose of this study is to investigate if CLDF is suitable to compost and if its disposal in Nova Scotia landfills should be banned.

Estimation of the quantity of CLDF generated in Nova Scotia indicates amounts ranging from 9,400 to11,200 tonnes per year with the major portion of this material now disposed in provincial landfills. The Province of Nova Scotia strives to achieve aggressive waste diversion goals and shifting several thousand tonnes of any material away from landfills and into compost for beneficial use would represent a significant incremental step forward in stewarding waste materials into useful resources. The purpose of this study is to review the suitability of CLDF as a feedstock at provincial compost facilities with a view toward banning its disposal in landfills if composting emerges as the better option.

QUANTITY OF CLDF GENERATED IN NOVA SCOTIA

The quantity of CLDF and its rate of generation in Nova Scotia are important considerations related to provincial waste diversion goals. Unfortunately, these numbers are not directly available for Nova Scotia but can be estimated from waste composition studies conducted in other jurisdictions. Numerous waste composition study reports are available from recent years but only two could be found that specifically provided information on cat litter and animal feces as specific categories. (Both of these studies included “animal feces” which excluded agricultural manure and was acknowledged to consist primarily of dog feces.)

In 2005 a waste composition study conducted in the Capitol District of Victoria, British Columbia was reported with generation rates of 8.0 kg / person / year for cat litter and 1.98 kg / person / year for animal feces (http://www.crd.bc.ca/waste/documents/SolidWasteCompositionStudy2005.pdf). Combining the two figures for cat litter and animal feces yields a rate of **10.0 kg / person / year**. Based on this rate of generation and the October, 2009 *Statistics Canada* estimate of Nova Scotia’s population at 940,397 people, the quantity of CLDF generated in a year in Nova Scotia is estimated at **9,404 tonnes**.

In 2002 the state of Oregon published the results of a comprehensive waste composition study including “cat litter and animal feces” combined in a single category (http://www.deq.state.or.us/lq/pubs/docs/sw/WasteComp2002.pdf). The reported value from this study is **12.0 kg / person / year**. Based on this rate of generation and the estimate of Nova Scotia’s population at 940,397 people, the quantity of CLDF generated in a year in Nova Scotia is estimated at **11,285 tonnes**.

These two estimates from Victoria, B.C. and the state of Oregon are in good agreement with each

other and the averaged Nova Scotia estimates for the CLDF generation rate is 11 kg / person / year and about 10,000 tonnes for the total annual quantity. Diversion of this quantity of material from landfill disposal would represent over 3% of the provincial target goal of 300 kg / person / year. Although 3% may seem small, at this advanced stage in Nova Scotia's aggressive waste diversion strategy this is a very significant incremental step towards the stated goal. On the other hand, given the current provincial compost production rate of over 100,000 tonnes per year at 18 facilities (http://www.gov.ns.ca/nse/waste/docs/Compost.Maturity.Study.Report.pdf), an additional 10,000 tonnes of diverted material are equivalent to the capacity of an average size compost facility with associated employment implications.

CAT LITTER: SODIUM CONTENT

Although the sodium content of compost is not regulated, the amount present is a definite concern that relates to the quality of the product. This situation is highlighted in the Canadian Food Inspection Agency's (CFIA) Regulation of Compost (T-4-120) under the *Fertilizers Act* and *Regulations* which states:

"The composition of compost often lends to increased levels of sodium (Na) in the final product. Sodium is considered to be harmful to soil health and plant growth, and can even be toxic to plants if present in high concentrations. A statement indicating the sodium concentration is recommended, but it is not required, on a compost product label in order to allow consumers to determine the best use for the product."

Following this CFIA recommendation and recognizing its importance, the Compost Council of Canada includes sodium content as one of the seven product attributes reported in its *Compost Quality Alliance* program to verify compost quality.

In considering cat litter as a compost feedstock, its sodium content is a concern for two reasons. Firstly, the most widely used cat litter is the clumping type manufactured from sodium bentonite clay that will contribute to the sodium levels in the finished compost. Secondly, many cat litters contain baking soda (sodium bicarbonate) as an odour control agent that will also contribute sodium to the final product. For these two reasons a selection of 23 commercial cat litters were analyzed for their sodium content to determine if this would limit the utility of cat litter as a compost feedstock.

The results of the cat litter sodium concentration analyses are presented in Table 1. The sodium concentrations ranged from a low of **≤0.015%** to a high of **0.50%** with a mean concentration of **0.15%**. The bentonite based samples (1 – 13) included both the highest sodium concentration (Sample 9) and the lowest (Sample 11). The remaining non-clumping clay (Samples 14 – 15), silica (Samples 16 – 18) and biodegradable (Samples 18 – 23) litters were all at the low end of the range of reported values. The sodium bicarbonate containing samples (1,4,5,6 and 13) were spread across the range and were unremarkable when compared to samples without it. Notably, Sample 9 with the highest sodium concentration was a bentonite litter without added baking soda.

Table 1. Concentration of sodium and other major nutrients in cat litter.

Cat Litter Sample	Na (%)	P (%)	K (%)	Ca (%)	Mg (%)
1. NN/BEN/U/+	0.47	≤0.01	0.06	0.36	0.05
2. NN/BEN/U/-	0.06	0.02	0.05	1.17	0.07
3. NN/BEN/S/-	0.21	0.02	0.06	1.36	0.10
4. AH/BEN/U/+	0.22	0.02	0.06	7.89	3.97
5. AH/BEN/U/+(MC)	0.23	0.02	0.06	8.13	4.25
6. CT/BEN/U/+	0.21	0.02	0.06	1.68	0.09
7. MS/BEN/UAB/-(MC)	0.08	0.03	0.05	1.96	0.07
8. MS/BEN/S/-(MC)	0.09	0.03	0.07	2.07	0.07
9. CN/BEN/U/-	0.50	≤0.01	0.08	9.83	0.13
10. CN/BEN/UAB/-	0.47	0.02	0.08	12.37	0.13
11. CT/BEN/U/-(MC)	≤0.015	0.19	0.11	13.11	0.45
12. CI/BEN/U/-	0.44	0.03	0.10	7.34	0.06
13. KL/BEN/U/+	0.09	0.03	0.06	1.79	0.08
14. MC/CLY/UAB/-	0.03	0.06	0.15	2.27	0.10
15. NN/CLY/U/-	≤0.015	0.03	0.09	12.29	3.45
16. CI/SIL/U/-	0.11	≤0.01	≤0.015	0.04	≤0.02
17. PP/SIL/U/-	0.05	≤0.01	≤0.015	0.04	≤0.02
18. NN/SIL/U/-	0.07	≤0.01	≤0.015	0.04	≤0.02
19. AH/BIO/S/-	0.28	0.05	0.54	0.11	0.08
20. PC/BIO/S/-	0.02	0.04	0.52	0.02	0.03
21. FF/BIO/S/-	0.13	≤0.01	0.04	0.09	≤0.02
22. YN/BIO/U/-	0.04	≤0.01	≤0.015	2.10	0.04
23. SS/BIO/U/-	≤0.015	0.52	0.51	0.05	0.22
MEAN CONCENTRATION	0.15	0.05	0.12	3.74	0.58

As an unregulated substance in compost no standard exists for sodium concentration. Several surveys report compost sodium concentrations and these values are useful in evaluating the sodium concentrations measured in the cat litter samples.

- From 21 California compost producers the reported sodium concentration ranged from **0.04%** to **0.53%** in their finished composts. The mean sodium concentration in biosolids and green waste composts was **0.2%** and in agricultural manure composts was **0.4%**. *(Compost Demonstration Project, Placer County: Use of Compost and Co-Compost as a Primary Erosion Control Material. January 2000 Publication #443-99-018.California Integrated Waste Management Board. www.ciwmb.ca.gov/Publications/)*

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- A study from the UK reported sodium concentrations of compost feedstock materials and finished composts. The sodium concentration for uncomposted green waste was **0.03%** and **0.43%** for food waste. Sodium concentrations of shredded compost feedstocks at two compost facilities processing residential food waste material were **0.21%** and **0.23%** with the finished compost concentrations at **0.19%** and **0.26%**. The sodium concentration in finished green waste compost was **0.05%.** (David Tompkins. (July 2006). Organic waste treatment using novel composting technologies. Summary Report. http://www.plymouth.ac.uk/files/extranet/docs/SCI/Summary%20report.pdf).

- Sodium analyses were conducted on leaf and yard compost and restaurant food waste

compost generated by a pilot project in Halifax in 1995. The leaf and yard sample contained **0.09%** sodium and three food compost samples ranged from **0.45%** to **0.54%**. All of these samples supported seed germination rates higher than controls without compost indicating these sodium concentrations are not phytotoxic. (S. Wilcox. Earth Cycle Opportunities Final Report. ICI Compost Facility, Cowie Hill, Halifax. August 1996.)

- Satriana reported compost sodium concentrations ranging from **0.36%** to **0.51%** with an average of **0.42%** in the 1970s (Satriana, M. J. 1974. Large Scale Composting. Noyes Data Corporation. Park Ridge, New Jersey.). These values from thirty five years ago are very similar to the recently reported compost sodium concentrations cited above.

With a mean sodium concentration of **0.15%** and a high of **0.50%** in the cat litter samples analyzed, all of the sample sodium concentrations are in the same range as sodium values reported for finished composts. **Therefore, the use of commonly available cat litters is acceptable in relation to sodium and will have negligible impact on compost quality.**

CAT LITTER: PLANT NUTRIENT VALUE

Phosphorous (P), potassium (K), calcium (Ca) and magnesium (Mg) are major plant nutrients and their presence in compost contribute to its nutritive value. The majority of these nutrients are very low in the cat litter samples analyzed with the exceptions of calcium which was present in significant amounts in seven samples ranging from 7.34% to 12.37% (Table 1). Three of these seven high calcium samples also had elevated magnesium concentrations. Although the specific composition is not provided by any of the sample suppliers, the elevated calcium samples with low magnesium are consistent with the addition of calcitic limestone to the cat litter or dolomitic limestone in the case of samples with high levels of both Ca and Mg.

The mean concentrations of the above mentioned nutrients in cat litter can be compared to values found for leaf and yard compost and food and paper compost (Wilcox) in Table 2.

Table 2. Comparison of nutrient content in cat litter and compost.

Nutrient	**Cat Litter %**	**Leaf & Yard Compost %**	**Food % Paper Compost %**
Phosphorous	0.05	0.26	0.40 – 0.59
Potassium	0.12	1.22	0.53 – 0.64
Calcium	3.74	2.14	5.6 – 11.4
Magnesium	0.58	0.33	0.26 - 0.30

Of the four nutrients analyzed phosphorous and potassium were very much lower in the cat litter than in the compost. The cat litter calcium concentration was higher than leaf and yard compost but lower than the food compost. Magnesium is the only nutrient found at higher concentrations in cat litter than either of the two composts. Relative to these four nutrients, cat litter generally contains low levels that would contribute minimally when incorporated into compost.

Animal manure and urine are widely recognized for their nutrient content and feature prominently as compost feedstock on livestock farms. Similarly, cat and dog excreta could also be beneficial in compost. Typical values for the composition of cat urine are reported as (**Cat Urine**: http://www.cat-health-guide.org/cat-urine.html):
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0.05% Ammonia
0.18% Sulphate
0.12% Phosphate
0.6% Chloride
0.1% Sodium
0.1% Creatinine
0.003% Uric Acid
2% Urea
95% water

The beneficial nutrients in cat urine are nitrogen (urea, uric acid and ammonia), phosphate and sulphate which together provide a positive contribution when added to compost. Note that the sodium concentration is 0.1% which is lower than the mean sodium concentration measured in the cat litter samples (0.15%) and generally lower than found in compost.

The composition of cat and dog feces is reported to be similar. The feces contain about 0.7% nitrogen (N), 0.25% phosphate (P) and 0.02% potassium (K). (http://www.extension.umn.edu/projects/yardandgarden/ygbriefs/h238manure-dog-cat.html) These nutrients in cat and dog feces also contribute positively to compost just as they do in other livestock and animal manures.

CAT LITTER: WATER HOLDING CAPACITY

An important beneficial aspect of cat litter is its ability to absorb liquids. Typically a significant fraction of unsoiled cat litter is discarded that is able to absorb liquids. This is a distinct benefit inside green carts where the litter will absorb free liquids, as it also will in contact with other liquids in subsequent processing at the compost facility. The water holding capacities of the 23 cat litter samples was measured and the results are presented in Table 3.

The 23 cat litter samples fall into distinct groups based on their water holding capacities. The clay based samples (1 – 15) have the lowest capacity (range: 0.30 – 0.74 ml/g); the silica based litters (16 – 18) were intermediate (0.94 – 1.03 ml/g); and with the exception of the wheat based litter (#23 = 0.68 ml/g) the biodegradable litters (19 – 22) demonstrated the highest water holding capacities (1.58 – 2.54 ml/g). These values compare with typical compost water holding capacities of 0.88 – 2.43 ml/g (Compost Quality Fact Sheet #4: Testing Composts. Cornell Waste Management Institute. Department of Crop and Soil Sciences. Rice Hall, Ithaca, NY. CornellUniversity http://cwmi.css.cornell.edu/compostfs4.pdf) Although it is difficult to quantify the direct effect of adding cat litter to compost it is quite clear that it will have a positive effect as it absorbs liquids in collection carts and contributes to the water holding capacity of active and

finished compost. This benefit will also continue after application of the cat litter-containing compost to soil.

Table 3. Water holding capacity of 23 cat litter samples.

Cat Litter Sample	Water Holding Capacity ml / g
1. NN/BEN/U/+	0.52
2. NN/BEN/U/-	0.59
3. NN/BEN/S/-	0.69
4. AH/BEN/U/+	0.38
5. AH/BEN/U/+(MC)	0.39
6. CT/BEN/U/+	0.73
7. MS/BEN/UAB/-(MC)	0.62
8. MS/BEN/S/-(MC)	0.52
9. CN/BEN/U/-	0.30
10. CN/BEN/UAB/-	0.31
11. CT/BEN/U/-(MC)	0.57
12. CI/BEN/U/-	0.87
13. KL/BEN/U/+	0.64
14. MC/CLY/UAB/-	0.74
15. NN/CLY/U/-	0.52
16. CI/SIL/U/-	0.94
17. PP/SIL/U/-	0.95
18. NN/SIL/U/-	1.03
19. AH/BIO/S/-	1.58
20. PC/BIO/S/-	1.76
21. FF/BIO/S/-	2.54
22. YN/BIO/U/-	2.33
23. SS/BIO/U/-	0.68

CLDF: PATHOGEN ISSUES

Pathogenic organisms found in cat and dog feces can cause serious illness or disease in humans coming into direct contact with these fecal materials. Prominent among these fecal pathogens are a number of enteric bacteria, several species of protozoa and helminth worms. The presence of these pathogens in CLDF is the compelling reason that pet owners are warned to not put soiled cat litter and dog feces in their backyard compost or in their garden soil. Many of these pathogenic organisms or their propagules (spores, eggs and cysts) can persist for years in soil in an infective state where they pose a contact threat to human health. Backyard compost generally does not achieve high enough temperatures required to inactivate the pathogens of concern in CLDF. This pathogen inactivation is a key issue related to CLDF suitability as a compost feedstock in large scale centralized compost facilities.

Consideration of pathogen issues related to CLDF is timely in that the inactivation of pathogenic organisms in centralized compost facilities is an ongoing concern within the compost industry and has been the subject of several recent reviews. (Ge, B., McCartney, D. and Zeb, J. 2006. Compost environmental protection standards in Canada. J. Environ. Eng. Sci. 5: 221 -234. Wichuk, K. M. and McCartney, D. 2007. A review of the effectiveness of current time-temperature regulations on pathogen inactivation during composting. J. Environ. Eng. Sci. 6:

573-586. Brinton, Jr., W., Storms, P. and Blewett, T. 2009. Occurrence and levels of fecal indicators and pathogenic bacteria in market-ready recycled organic matter compost. Journal of Food Protection 72: 332 – 339.)

The Canadian Council of Ministers of the Environment (CCME) microbial pathogen standards applied to Nova Scotia compost facilities relies on compost tests for fecal coliform bacteria (<1000 per gram dry weight) and *Salmonellae* (<3 per four grams dry weight). In addition, the CCME pathogen standard specifies that in-vessel and static pile compost shall achieve a temperature of 55C for three days and windrow compost must achieve 55C for 15 days with a minimum of five turnings. These time–temperature conditions recognize the use of elevated temperature as the most reliable means to induce pathogen destruction in compost.

The most common pathogen of concern in cats is toxoplasmosis, an intestinal parasite caused by the protozoa *Toxoplasma gondii.* (Ryan, K.J. and Ray, C.G. (editors). 2004. *Sherris Medical Microbiology* (4th ed.). McGraw Hill. pp. 723–727.) Cats are easily infected by this parasite from eating infected meat and subsequently shed eggs (oocytes) in their feces. Human health risk is associated with handling cat feces and cat litter followed by ingestion of contaminated fecal material. The most common pathogen in dog feces of concern to human health is *Toxocaracanis*, a roundworm whose eggs can survive up to four years in soil. Ingestion of this pathogen results in an infection caused by certain parasites, leading to enlargement of the liver, inflammation of the middle muscular layer of the heart wall, inflammation of the kidneys, inflammation of the lungs, and blindness, usually in children, but can occur in adults. (Stormwater/municipal/ MUNIdocs/PoulsboPETwasteFAQ.pdf) Other pathogens associated with both cats and dogs include the bacteria *Escherichia coli* and the easily transmitted protozoa *Giardia intestinalis* that results in serious diarrhea.

Because both cat and dog feces contain bacteria, protozoa and helminth worm pathogens the relevant question related to the suitability of CLDF as a compost feedstock relates to the ability of the compost process to inactivate these pathogenic organisms. Tests for the inactivation of specific pathogens in compost are rare and even research in this area is scarce. As stated above, the CCME pathogen standard specifies testing of two indicator organisms: fecal coliforms and *Salmonellae.* These indicator organisms are essentially used as proxies for all pathogens in compost. A further assumption is that the specified time-temperature regime will inactivate all pathogens as demonstrated by inactivation of the indicator organisms.

Reports can be found indicating the survival of each major class of pathogen (bacteria, protozoa and helminthes) in composts that met the required 55C temperature for the specified time. (Wichuk, K. M. and McCartney, D. 2007. A review of the effectiveness of current time-temperature regulations on pathogen inactivation during composting. J. Environ. Eng. Sci. 6: 573-586.) These reviewers suggest this is likely the result of inadequate temperature monitoring with cooler zones allowing pathogen survival. They further suggest more rigourous temperature monitoring and more research be conducted on non-indicator pathogens in compost facilities to verify that currently accepted time-temperature regulations are effective for specific pathogens.

Concerns about pathogen issues in CLDF as they relate to its suitability as a compost feedstock should be considered in the context of two specific activities. The first is a large sector of the compost industry engaged in composting biosolids derived from human fecal matter. These fecal-based composts routinely meet pathogen standards and composts containing CLDF would also be expected to meet the required pathogen standards. The second activity related to CLDF pathogens is the handling of soiled cat litter and dog feces by pet owners on a daily basis. The risk of direct exposure to pathogens from these untreated materials by pet owners should be compared to the risk of exposure to compost containing diluted CLDF after thermophilic processing at the required high temperature regimes and an aerobic maturation process. The risk to pet owners handling CLDF would seem to be substantially higher than public exposure to

risk from handling properly composted material containing CLDF.

PHARMACEUTICAL RESIDUES in CLDF

Veterinary chemotherapeutic agents administered to dogs and cats include antibacterial, antiviral, antifungal, antiparasitic, and antineoplastic compounds. The majority of these drugs are excreted unchanged or as modified metabolic products predominantly in urine but also in feces. (The Merck Veterinary Manual. http://www.merckvetmanual.com/mvm/index.jsp?cfile =htm/bc/191100.htm)

Although the action and metabolism of these pharmaceuticals within the organism is generally well understood, the fate of these substances in the environment after they have been excreted is not well understood. The topic is currently receiving attention as it relates to the presence of human pharmaceuticals in wastewater treatment plant effluent and in biosolids. (I. E.van Beelen. 2007. Municipal Waste Water Treatment Plant (WWTP) Effluents. A Concise Overview of the Occurrence of Organic Substances. http://www.riwa- rijn.org/e_publikaties/147_WWTP _organic_subst.pdf). Many pharmaceuticals can be detected in these effluents and adsorbed onto the biosolids generated in the wastewater treatment process and their subsequent fate in the environment is not well understood.

The impact of veterinary pharmaceuticals in CLDF on its suitability as a compost feedstock is analogous to the impact of pharmaceuticals in livestock manure and in human biosolids, both of which are common compost feedstocks. If it is acceptable to compost livestock manure and human biosolids known to contain excreted pharmaceuticals it would be unreasonable to exclude CLDF as a compost feedstock for this reason. This does not diminish the need for further research on the fate of pharmaceuticals during the composting process, most of which are likely to be decomposed by an intensive thermophilic process.

PART 2: CLDF COLLECTION and PROCCESING: CURRENT PRACTICES

INTRODUCTION

The two most common ways that municipalities deal with CLDF is by directing pet owners to either discard the material into the waste stream for landfilling or place it in their green carts for composting. Currently in Nova Scotia, Colchester County is the only municipality that collects CLDF and processes it at their compost facility. Other compost facilities in the Maritimes and in Ontario also compost CLDF collected from residential green cart organics programs.

Surprisingly, Windsor Ontario has implemented a third option by banning CLDF from its waste stream entirely and refusing to collect it. City representatives site concerns for the safety of waste collection workers in an effort to protect them from the risk of exposure to this material. While this will protect collection workers it leaves pet owners to their own devices in the disposal of CLDF. Windsor has no municipal compost options that may result in problems related to public exposure to unsafe CLDF disposal practices.

JURISDICTIONS THAT DO COMPOST CLDF

Cat litter and dog feces (CLDF) are accepted for composting in many Ontario compost facilities processing residential green cart organics including Toronto (Toronto Star. July 9, 2009. Green Bins a Wasted Effort? http://www.thestar.com/printarticle/660864), Ottawa (Chris Wood, Waste Diversion Project Coordinator,City of Ottawa. Personal communication) and London (Ottawa Sun. May 5, 2010. Smelly London Compost Plant a 'Black Eye' for Composting. http://www.ottawasun.com/news/ottawa/2010/05/05/13839826.html).

Uniquely, Ottawa accepts cat litter but does not accept dog feces. Chris Wood, Waste Diversion Project Coordinator for the City of Ottawa explained this as the result of miscommunication involving the City, Orgaworld (the contracted compost facility) and the Ontario Ministry of the Environment. The former director did not want the dog feces publicly advertised in the Green Bin roll-out for fear that plastic bags would be a large contaminant. As a result dog feces were left off the list of acceptable compostable materials. In his opinion cat litter and dog feces are equivalent and the compost facility would have no difficulty processing both materials.

One of the oldest residential green cart composting programs in Atlantic Canada has operated in Prince Edward Island since 1992. Heather Myers of the Island Waste Management Corporation indicated that cat litter and dog feces have been accepted in their collection and composting program from the beginning. She further indicated there has never been any discussion of changing their practice of composting CLDF and expect to continue to do so. There have also been no complaints from residents related to CLDF in Prince Edward Island. Chris Snively, Manager of the PEI Central Compost Facility, stated that he had no issues at all composting CLDF and the only time it is even noticed at their facility is when a load comes in that included a pickup at the SPCA but this in no way posed any problems.

The only region in Nova Scotia that currently collects and composts CLDF is Region 3: East Hants – Cumberland - Colchester. Discussions with the manager of the Colchester compost

facility, Herb Corbett, indicated their experience was very similar to that in PEI. He said they have accepted CLDF from the beginning, that they have had no problems related to composting CLDF and that they do not even notice the material passing over their sorting lines. They also do not anticipate any changes in their operation related to the composting of CLDF.

JURISDICTIONS THAT DO NOT COMPOST CLDF

Region 1: Cape Breton was the last region in Nova Scotia to establish the collection and composting of source separated organics. They based their collection practices on those used in the rest of the province and decided to exclude CLDF from their compost stream on that basis. They also engage in two public compost give-aways per year and residents expressed concern about CLDF and preferred this not be in the compost. Cape Breton does compost a small quantity of biosolids but it is kept separate from the compost given away.

Region 2: Antigonish – Guysborough – Pictou County does not compost CLDF. According to Earl Cameron, Manager of the Pictou County Compost Facility, the residents of Region 2 decided to keep biosolids and all other fecal material out of their compost and to dispose CLDF in their landfill. They currently collect and compost only food waste and leaf and yard materials.

Although Region 3: East Hants – Cumberland – Colchester was listed above as the only region in Nova Scotia that does collect and compost CLDF, the Municipality of East Hants does not allow CLDF in their green cart organics which are subsequently composted at the Fundy Compost facility in Brookfield, Nova Scotia. When contacted, the owner of this facility, Walter Termeer, thought that East Hants did allow CLDF in their green carts and further that he considered CLDF to be an acceptable compost feedstock. Andrea Trask of East Hants Municipality explained that they had previously contracted with Pictou County which does not accept CLDF and East Hants designed their education and green cart program to exclude this material. Having started with that exclusion they did not want to change when they switched to Fundy Compost. Ms. Trask also stated that they would have no problems changing if a province-wide policy is implemented to compost CLDF.

Region 4: Halifax Regional Municipality (HRM) has not accepted CLDF since their list of acceptable green cart organics was formalized in 1999. According to Laurie Lewis, Regional Coordinator, HRM in collaboration with their two contracted compost facilities (New Era Farms and Miller Compost) decided to concentrate on the major organic elements in the waste stream: food waste and leaf and yard. It was decided at that time to stream CLDF into the landfill. Ms. Lewis stated that HRM is firmly opposed to any bags in the organics stream and they feel dog feces inside plastic bags (the favoured form of collection by dog owners) would be problematic at the compost facilities. She also expressed safety concerns for collection and compost workers and acknowledged negative public perceptions associated with CLDF.

Miller Waste Systems is one of the two compost facilities contracted to process HRM green cart organics. Shawn Hagen, Miller's Compost Manager indicated that if HRM decided to collect CLDF in their green carts that his company would likely discuss that issue with HRM. Without having considered the issue he had no opinion on the matter.

Darren Evans who manages the New Era Farms Compost facility, the other HRM contracted facility, is not in favour of composting CLDF. He indicated that with their food waste and leaf and yard feedstocks their fecal coliform tests should consistently be low but they do encounter high levels from time to time. He is quite certain these result from fecal contamination and feels that CLDF would add a component that will cause problems and lead to additional fecal coliform re-

testing of material failing to pass.

Region 5: Annapolis – Kings does not compost CLDF and Brian Van Rooyen, Regional Coordinator for Valley Waste explained this decision was taken after due consideration and based primarily on occupational, health and safety issues both for the collector and for the sorters and processors at the composting facility. He acknowledged that Colchester County can provide their field experience in composting CLDF and stated they would want to have a thorough discussion with their contractors and their staff if they were ever to consider making the change.

Dwight Horsnell of Northridge Farms compost facility where the Region 5 residential green cart organics are composted is not opposed to composting CLDF at his facility. He also commented that he has greater concerns for his worker's safety related to the number of adult diapers they receive.

Region 6: South Shore - West Hants is an example of a region that has transitioned from accepting to rejecting CLDF at the Lunenburg area compost facility. According to Keven Wentzell who manages the compost facility, Region 6 had accepted CLDF since the facility opened in 1994 but phased it out over the past year to year and a half and is now disposed in their landfill. He stated that a number of residents expressed concerns about composting CLDF and in his opinion their concern was about the "ick factor". He also expressed some concern about collection and facility worker safety. In addition, he considers shifting CLDF from compost to the landfill as a step forward in their learning process and a positive move. Note that the Lunenburg compost facility processes biosolids from Bridgewater and removing CLDF from their compost is unlikely to improve its quality.

Region 7: Yarmouth – Digby has not accepted CLDF since the beginning of their compost program according to Amy Hillyard, Waste Reduction Coordinator at Waste Check. She indicated the reason for this came from the Yarmouth compost facility direction that they would not accept CLDF. Scott Doucette manages the Yamouth facility and his recollection was that this material was not allowed in accordance with their original operating permit issued by the NS Department of the Environment.

CONCLUSIONS

Evaluation of CLDF as a compost feedstock indicates no compelling reasons to not compost this material; this is supported by the experience of compost facilities that have composted CLDF for many years. CLDF does not contain high concentrations of sodium that would degrade compost quality and the cat litter component beneficially contributes plant nutrients and increased water holding capacity. Pathogen issues are directly related to those associated with biosolids composting and current time-temperature standards appear to be adequate; although, more rigourous temperature monitoring may be necessary to ensure proper pathogen control. Pharmaceutical residues in CLDF have not been specifically investigated but also raise issues currently being researched in the area of wastewater treatment.

Evaluation of the current practices in Nova Scotia related to how CLDF is handled indicates that the one compost facility in the province composting CLDF (Colchester County) reports no issues associated with their current practice with no intent to change. This is the same experience expressed by operators of the Prince Edward Island composting program. This contrasts with Region 6 which originally did compost CLDF but has stopped.

Among the reasons stated for not composting CLDF in the other Regions;

- Desire by residents to include only food waste and leaf and yard and exclude biosolids and CLDF
- Concern for worker safety.
- Concerns about bags associated with dog feces.
- Negative public perceptions.
- Concerns about meeting fecal coliform standards.

On balance it appears that those Regions and facilities that do compost CLDF have no issues related to this and can serve as examples for those that do not. On the other hand it is clear in discussing this with Regional representatives in the province that they will need to be engaged in any effort by the province to divert CLDF from waste to compost. With 10,000 tonnes at stake it is worth exploring this matter with the Regions not currently composting CLDF.