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Item No. 3
Halifax Regional Council
September 28, 2010
Committee of the Whole

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY:

Original Signed by



Mike Labrecque, Acting Chief Administrative Officer

DATE: August 26, 2010

SUBJECT: Municipal usage of Halifax N Viro Soil Amendment (Class A)

ORIGIN

At the Halifax Regional Council meeting on August 17, 2010 staff were asked to report on biosolid use and direction in HRM.

RECOMMENDATION

It is recommended that Halifax Regional Council support the ongoing municipal usage of Halifax N Viro Soil Amendment (NVSA) in landscaping programs that reflect Best Management Practices, to manage odor issues and produce maximum growth results.

BACKGROUND

Harbour Solutions Project/Biosolids Management

As per the attachment, biosolids Management has been discussed extensively by Regional Council since the 1990's and the initial framing of the Harbour Solutions Project. Expectation of land use application of biosolids has been a component of the Harbour Solutions Project for quite some time.



DISCUSSION

Municipal Uses of Halifax N Viro Soil Amendment (NVSA)

During the winter of 2009/2010, as the Harbour Solutions Project was being completed, staff was directed by the CAO's office to investigate appropriate utilization of the N-Viro product in municipal operations to demonstrate the confidence in the utility and safety of the product that is an output of the Biosolids Management Facility approved by Regional Council.

During these discussions, many opportunities were reviewed. These included using a soil/N-Viro mixture for:

- Top dressing sportsfields
- Using as an amendment in municipal garden beds
- Incorporation in municipal capital landscaping contracts
- Turf establishment/sod installation/soil renovation
- Supporting Urban Forestry Projects (tree planting/shrub and tree maintenance)

It was obvious to staff that there may be confusion and misconceptions about Halifax N Viro Soil Amendment in the community. Supporting tree planting and other landscaping projects were identified as ideal ways to display the extremely beneficial use of the product to the community.

Some key reasons that supporting tree planting, particularly in traffic right of ways, is an excellent use of Halifax N Viro Soil Amendment are:

- due to ongoing environmental pollution, the health and quality of soils in traffic right of ways are extremely stressed. Many locations have high levels of heavy metals, low pH levels due to acid rain and traces of hydrocarbon, etc. Introducing soils with blended Halifax N Viro Soil Amendment would improve the soil health and quality. Environmental organizations in the United States have endorsed biosolid use for building and maintaining roadsides and medians, site reclamation to adsorb heavy metals, and to build wetland and shorelines. These programs have been ongoing for over 30 years.
- newly planted trees are tremendously stressed and have a very challenging time maturing in a healthy manner. Introducing the Halifax N Viro Soil Amendment would provide optimum nutrients, soil neutralizing capability and encourage the growth of beneficial microbial activity which will expedite the healthy growth of new tree planting. There has been extensive research in forestry on using biosolids to improve and increase tree growth, reduce soil erosion, retain moisture, etc. Long term studies have been conducted in the United States, British Columbia, Alberta and Sweden. These studies, which have tested Class B biosolids, have shown no impact on ground water, surface waters and residential wells.

Supporting growth of our Urban Forest is a community objective, and a measured performance indicator for corporate performance. As such, based on the rationale, staff believes that this HRM N-Viro program will provide for the success of utilization of urban forestry plantings.

Removal of the rose bushes along the Dunbrack Street project was to improve public safety and the implementation of operational measures. To remediate the site for beautification, new trees were planted and the right of ways required soil and seeding. It is essential to improve the soil conditions to develop a healthy environment for the young trees and grasses as outlined above.

As such, Request for Quotation 10P252 (attached) was issued and a contract awarded. The specification of the solicitation included:

Halifax N Viro Soil Amendment (Class A) shall be mixed with topsoil at a mix of 25% by volume. Incorporate (till) 3 inches of the N-Viro/topsoil mixture into top 6 inches of soil prior to seeding or installing sod. (9 yd³ per 1000 ft²).

On August 12 and 13, the contractor executed the project.

On Friday August 13th, reports to HRM staff and the local councillor commenced regarding the smell. Staff visited the site immediately and was able to smell a strong odor. Unfortunately, the smell took a number of days to dissipate, probably due to high temperatures and humidity. This event was not expected by staff or by the agricultural consultant that provided expertise. Halifax N Viro Soil Amendment is used as 100% of the application rate for agricultural production and once mixed into the soil, there are no odour issues. It has also been used as part of a soil mix program in other jurisdictions in Ontario with no odour issues.

Halifax N Viro Soil Amendment

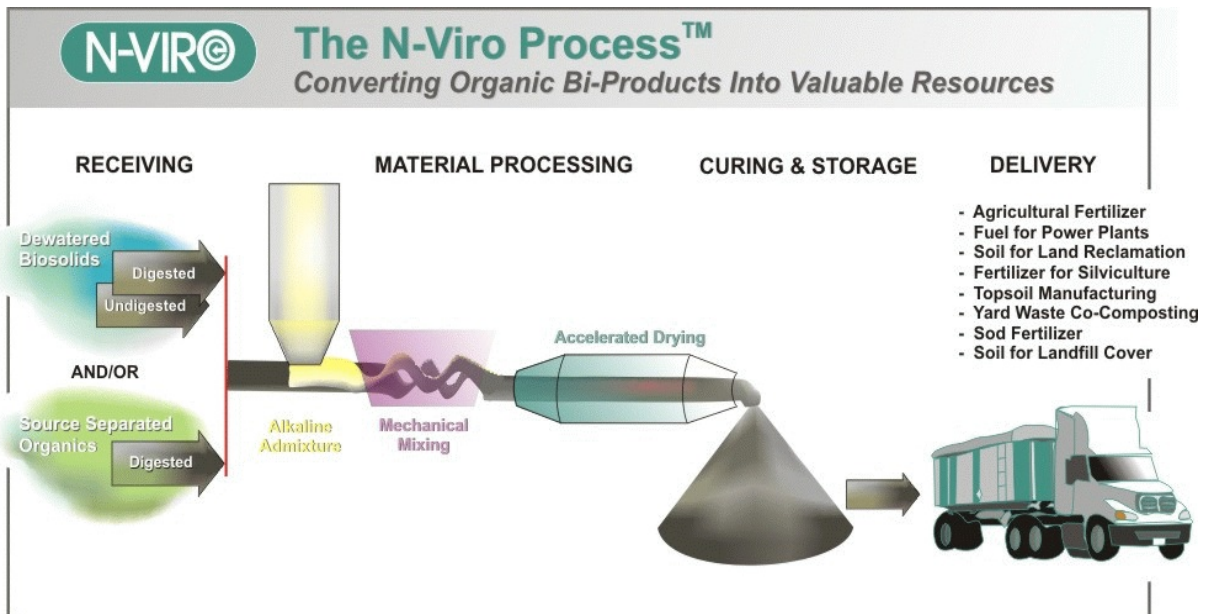
Process:

Mechanical processing of the biosolids involves two distinct steps: mixing and drying. Both of these steps contribute greatly to the overall value of the finished product.

Mixer: The biosolids in the receiving area are conveyed to a mixing bin where the alkaline admixture (AA) is added. Typically, 30% - 40% AA is added on a wet weight basis of biosolids. The AA consists of industrial by-products such as cement kiln dust, lime-kiln dust, and/or fly ash. The amount of the AA varies according to the amount of heating desired in processing, the type of biosolids (the higher the solids content the lower the AA dosage), the characteristics of the AA, and the intended beneficial reuse market(s). If the admixture does not contain enough free lime (CaO, Ca (OH) 2 or other strong alkali) to provide the necessary temperature and pH rise, CaO is added in the form of quicklime. The addition of alkaline materials begins the process of pathogen destruction by creating a hostile living environment for micro organisms. There has never been a positive pathogen test in the final Halifax N Viro Soil Amendment product.

Approximately 60% of the agronomic value of the Halifax N Viro Soil Amendment comes from the CKD. Halifax N Viro Soil Amendment is different from composted biosolids in that it contains potash and increases pH which is critical for optimum plant growth. It is also certified by the Canadian Food Inspection Agency (CFIA) and has to meet a guaranteed minimum analysis.

Dryer: The discharge from the mixer travels by conveyor directly into the dryer. The material is dried to 60% - 65% solids content with the use of a mechanical rotary-drum dryer. As in the mixing stage, this step is also important in the destruction of harmful pathogens. It is also an important step in the stabilization of heavy metals curing. The dryer discharge proceeds to a "heat-pulse cell" where the material is left to cure for twelve hours. A combination of the heat from the dryer and a chemical reaction between the alkaline materials and the biosolids raises the temperature and pH to a controlled range between 52°C - 62°C and slightly greater than 12, respectively. The reactions taking place also serve to stabilize the product and kill pathogens.



Storage: Once the material has cured in the heat pulse cells, it is then transferred to a storage facility for storage and distribution to respective buyers. The material is stable and able to be safely stored. Material is handled with a front-end loader and neatly piled using stacking conveyors into different sections of the storage facility. As the material continues to cure while in storage, odours are generated (release of nitrogen, sulfur, etc.) and subsequently treated in accordance with the certificate of approval for air issued to the biosolids processing facility.

Dryer Exhaust: The dryer and the dryer cyclone separator are completely enclosed. Air from the dryer flows through the cyclone and is conveyed to a dust removal unit called a baghouse system. The baghouse system is extremely efficient in the removal of airborne particulates in the dryer exhaust. The dust can then be recycled by conveyor back to the process to prevent waste.

Once particulates are removed from the air, further scrubbing is done to remove ammonia and other odours. Chemical scrubbing and biofilters have been employed either independently or in series with a high degree of success. At a N-Viro facility in Ontario, chemical scrubbing allows ammonia to be recovered and sold as ammonium sulphate. Ammonia recovery technology is particularly useful as a means of efficiently cleaning process water at locations where water cannot be discharged to the municipal sewer system.

Any heavy metals present in the sludge are converted to insoluble forms so the use of Halifax N Viro Soil Amendment does not create any adverse conditions in terms of metals leaching. No hazardous compounds are produced during the process. Many of the heavy metals in Halifax N Viro Soil Amendment test out at lower levels than traditional products such as manure, lime, fertilizers and compost. All of these products contain heavy metals.

Product

Strict Adherence To Governmental Regulations

Soil Stability and Pathogen Destruction: Halifax N Viro Soil Amendment differs from a “Class B” biosolid because the N-Viro Process destroys all pathogens through a combination of the following main stressors:

1. alkaline pH;
2. high temperature;
3. high ammonia concentration;
4. accelerated drying; and
5. Indigenous micro-flora.

Pathogen destruction begins when alkaline admixture is combined with the biosolids. The high alkalinity contributes to stresses #1, #2, and #3. Extremely fine particle size and low moisture content allow accelerated drying to take place (stress #4). As with compost, thermophilic temperatures (52°C - 62°C) and a soil like environment contribute to the growth of beneficial micro-organisms that suppress the re-growth of pathogens and putrefying organisms (stress #5). The relatively high population of beneficial soil organisms in the final product (103 to 107/gram) produces a slow composting in the material in which degradable organics from the biosolids are stabilized.

The chart below compares Halifax N Viro Soil Amendment against other traditional soil amendments that are typically used in agriculture or landscaping projects.

Soil Amendment	Fecal Coliform (MPN/g)
Class B Digested	104,000
Class A Composted Biosolids	76
Dairy Manure	13,000,000
Poultry Manure	5,000,000
Halifax N Viro Soil Amendment	Not detected (must be reported as <3)

reference: <http://www.n-viro.ca/nviro/regulations>

Halifax N Viro Soil Amendment Meets or Exceeds Rigorous EPA Standards

The US Environmental Protection Agency (EPA) has established standards that regulate biosolids and outline criteria for the safe use of products derived from biosolids. These standards are set forth in EPA Part 503 Regulations and include “Exceptional Quality Biosolids (EQS)” criteria, which establish the most stringent restrictions on pathogens, metal content and product stability. These regulations allow EQS products to be licensed, registered and managed as agricultural resources.

The N-Viro Soil trademark specifications meet or exceed all requirements for an EQS product.

Products are examined on a regular basis for microbiological properties to ensure their acceptability as exceptional quality (EQ), or Class A, under the US EPA 503 Regulations. Canadian Food Inspection Agency (CFIA), which administers the Federal Fertilizers Act, has adopted the USA EPA limits for pathogen destruction. The results show that Halifax N Viro Soil Amendment meets US EPA 503 and CFIA limits. The total bacteria figure, often referred to as the "good bugs", is a measure of the active soil organisms. It can be seen that, shortly after production, Halifax N Viro Soil Amendment has an active beneficial soil culture approaching that of natural soil.

The Nova Scotia Department of the Environment (NSDOE) also has established new 2009 standards that are the most stringent in Canada. NSDOE standards exceed those standards set by EPA Part 503 and CFIA regulations. Halifax N Viro Soil Amendment meets and exceeds the NSDOE standards. These standards were developed by an independent Committee of concerned citizens, wastewater researchers, regulators, scientists and representatives from all levels of government.

QA/QC Monitoring Program

N-Viro has established a multi-stage quality analysis and control (QA/QC) monitoring program as a quantitative approach to Soil Quality Assurance. Samples of Halifax N Viro Soil Amendment is sent by N-Viro, the Canadian Food Inspection Agency (CFIA) or NS Department of the Environment for testing to a third party laboratory that is accredited through the Standards Council of Canada (SCC). The monitoring program involves the following procedures and testing:

Dewatered Biosolids Cake — Metals Characterization

This stage involves a baseline evaluation of the incoming biosolids to determine the characteristics of the material entering the N-Viro process. In this stage, N-Viro analyzes the biosolids for regulated trace metals which often include: Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, and Zinc.

Information obtained from the wastewater treatment plants can be used as the baseline information as well as regular monitoring for this portion of the protocol.

Alkaline Admixture Characterization

This stage involves an evaluation of the AA raw material to determine the characteristics of the AA material going into the N-Viro Process. In this stage, N-Viro analyzes for the concentrations of the eleven regulated trace metals noted above. This test is performed at any time there are changes in production methods at the AA supplier.

Evaluation of Halifax NViro Soil Amendment

This stage involves an evaluation of the final product to determine the total concentration of eleven regulated trace metals. At this stage, Halifax N Viro Soil Amendment is tested by a third party laboratory that is accredited through the Standards Council of Canada (SCC) who exams various parameters such as microbiological (total aerobic bacteria, salmonella, fecal coliforms), heavy metal and agronomic values.

Halifax N Viro Soil Amendment was tested upon plant start-up and is currently tested quarterly to ensure it is within the prescribed standards for Class A designation to meet CFIA and NSDOE requirements.

Ongoing Process Monitoring for Process Control

This stage monitors daily production as part of a program to maintain process control. The following information is collected and logged:

- a) pH of the material in the heat-pulse cells to ensure it is above 12;
- b) temperature of material in the heat-pulse cells to ensure a proper curing temperature is maintained;
- c) percent total solids of final product, dewatered cake, mixed solids, and alkaline admixture percent dosage to ensure consistency; and
- d) dryer inlet and outlet temperature to ensure pathogens are subject to high temperatures.

Standard Agricultural Evaluation

This stage involves an evaluation of the final product to determine the total concentrations of the following agronomic factors and ensure product consistency:

- a) Nitrogen, Potassium and Phosphorous (N, P, K);
- b) TNV (total neutralizing value);
- c) Total calcium, magnesium, and sulfur; and
- d) Readily-digestible organic matter content.

Benefits for Landscaping in HRM

- a) Slow release of nutrients (nitrogen, phosphorus, potassium and other micronutrients) provides for healthier soils, improved root growth and establishment and nurtures healthy plants. The slow release of nutrients ensure they stay within the root zone to eliminate leaching into water courses. It also prevents fertilizer burn;
- b) Safe for use on grasses, trees, shrubs, annuals, perennials, transplants and container gardens;

- c) Stimulates beneficial microbial activity for soil richness, increases pH levels, increases organic matter, reduces soil erosion, reduces stress on grasses, trees and other landscape plants to maintain healthy and attractive landscapes;
- d) Reduces the reliance on the use of mined fossil fuel products such as synthetic fertilizers and lime. Provides the ultimate HRM green recycling program to improve our natural capital, our soils;
- e) Recovers phosphorus, which is an important nutrient for seed germination, root growth, flowering, and water use efficiency of the plants. Concern has been raised worldwide about the future availability of phosphorus. There are 3 major reserves in the world, China, the US and the Western Sahara. They expect that the US may deplete its reserves in 30 years and the other markets in 75-100 years. The phosphorus they are currently mining is easily extractable but future extractions will be very costly as they have to go deeper into the earth. Phosphorus can't be synthetically manufactured, therefore, recycling and reusing phosphorus is essential otherwise the affect of limited phosphorus on world plant production will be devastating. Recovering phosphorus through biosolids and other organic sources is extremely important

US Environmental Protection Agency

The US Environmental Protection Agency (EPA) promotes practices that provide for the beneficial use of biosolids while maintaining or improving environmental quality and protecting human health. As such, attached is an EPA Brochure on Biosolids. Some key points include the benefits of utilizing biosolids and the benefits of using biosolids.

Questions specifically requested from Regional Council:

- 1. The trial on Dunbrack Street consisted of how staff selected that project for a test and concerns regarding a lack of communication to the public and Regional Council.**

As per the background section, staff selected the Dunbrack project based on supporting urban tree planting and urban forest canopy objectives.

- 2. The potential uses of Halifax N Viro Soil Amendment, including identifying what uses occur in other North American Municipalities include:**

1. Top dressing sports fields
2. Amending Garden soils
3. Amending planting soil (for Trees, shrubs, etc.)
4. Turf Restoration Projects
5. Soil remediation projects
6. Energy Potential*

Biosolids (and in particular Class B biosolids) have been used in many areas of the world for over 100 years. Many provinces do not require biosolids to meet Class A standards in order to be used in agriculture or other beneficial use projects as the research indicates that Class B is a safe beneficial reuse product. Research has shown that biosolids are high in nutrients, increases soil health, provides organic matter, supports healthy microbial activity and improves soil characteristics, all while lowering the carbon footprint.

Current programs other areas include:

1. **Agricultural land application** - in most areas of the world including Canada and the United States.
2. **Forestry application** - used extensively in United States, British Columbia, Alberta and Sweden. Can increase tree growth by up to 75% without reducing board strength.
3. **Christmas tree production** - United States, improves growth and tree color.
4. **Green belt Interstates** - used to build and maintain highway roadsides.
5. **Golf courses** - Milorganite is used on many golf courses in North America (often specified in contracts) which is dewatered waste water solids that has been used since the 1920's. Sold in bags across North America to homeowners.
6. **Mine Site Reclamation** - the goal is to revegetate rock and mine tailings, stabilize slopes, tree establishment, development of recreational fields. Extensively used in Colorado, Missouri, Idaho, British Columbia and New Brunswick.
7. **Wetland development in Urban Environments** - biosolids used to restore land to previous wetland characteristics. Biosolids provides growth for native wetland species and stabilizes slopes. City of Everett in Washington has an extensive program.
8. **Shoreline reclamation** - biosolids are used in shoreline stabilization and establishment of wildlife habitat protecting sensitive west coast fish populations.
9. **Municipal Urban programs** - biosolids (mostly Class B) used in landscaping, soil blending, turf planting, home gardens, shrubs, fruit trees and greenhouse mixes.
 - ✓ Massachusetts (Bay State Fertilizer) and Boston sells bagged products to the New England States.
 - ✓ New York City uses and sells biosolid pellets for multiple uses and sells to Florida for citrus grove production.
 - ✓ City of Austin produces a product called "Dillo Dirt" which is sewage sludge composted with yard waste.
 - ✓ Pennsylvania produces a product called "CompostT" which is sewage sludge composted with sawdust.
 - ✓ Virginia produces a product called "Nutri-Green" which is composted sewage sludge.
 - ✓ Bayville, New Jersey, produces a product called "Oceangro" which is granulated sewage sludge.
 - ✓ Town of Leesburg, Virginia, produces a product called called "Tuscarora Landscaper's Choice" which is a heat-dried and pelletized sewage sludge.
 - ✓ Moncton, New Brunswick produces a composted Class A sewage sludge.

✓ And many other communities produces products and compost developed from treated sewage sludge.

- 3. Alternative uses Halifax Water may have for consideration in the future, including existing biosolids contract and future potential options beyond the use of biosolids:**
See #7.

- 4. Communication and consultation with Regional Council, the public and stakeholders on a go forward basis:**

Where Halifax N Viro Soil Amendment registered and labeled by the Canadian Food Inspection Agency (CFIA) is a safe and beneficial product, staff recommend that no additional consultation be required for specific municipal uses. The product should be construed no differently than using current household fertilizers and soil amendments that are also registered by CFIA. The Halifax N Viro Soil Amendment and other fertilizer and soil amendments must meet the same standards.

It is recommended that SEMO and Halifax Water staff undertake a public education effort normalizing the use of Halifax N Viro Soil Amendment, to address public misconception of the product.

Recent controversy in the use of Halifax N Viro Soil Amendment in HRM landscape programs have been characterized by allegations and misinformation rather than actual scientific research on biosolids, and specifically the Halifax N Viro Soil Amendment research studies. There has been extensive research on the use of biosolids as a green, safe, beneficial re-use product all over the world. There have been over 3200 studies, just on the fate of pharmaceuticals, personal health products, etc., in the soil and plant uptake. Some of the studies have been over 20-40 year terms.

- 5. The Clerk's Office schedule a Committee of the Whole agenda item for Regional Council's discussion on the outcomes of this report with the intent to clarify direction for the future:**

Done

- 6. N-Viro and testing processes and the concerns that have been brought forward:**

HRM, Halifax Water and N-Viro are committed to responding to public concerns and providing additional testing. Thallium was identified by a few NS individuals as a metal of concern. Although thallium does not have to be tested under government regulation, N-Viro now includes thallium in all their testing programs. None of the tests have been able to detect thallium in the Halifax N Viro Soil Amendment. Test results along with extensive product information can be found at www.n-viro.

N-Viro goes beyond the regulated required testing by including a testing program for additional pathogens, metals and materials of concern such as pharmaceuticals and organic compounds. Halifax N Viro Soil Amendment has never tested positive for pathogens, has very little substances of concern and has metal levels far below those found in traditional products such as manure, lime, fertilizer and compost. Animal manures, which are used for growing food crops, do not have to meet the same standards as Halifax N Viro Soil Amendment

Comparison to other Materials, including non-regulated materials such as manure

N-Viro Regulated Metal Comparison – Units DWB (mg/kg)						
	Nova Scotia Guidelines	N-Viro Average	Dairy Manure	Poultry Manure	NS Lime	Fertilizer 13-13-13
Description	Class A					
Arsenic	13	4.1	1.3	13	10	2.6
Cadmium	3	0.17	0.2	2.4	0.7	6.3
Chromium	210	15.43	4.6	No Data	164	No Data
Cobalt	34	1.91	No Data	No Data	No Data	No Data
Copper	400	119.4	139	465	10	No Data
Lead	150	66.68	2.2	46	55	1.0
Mercury	0.8	0.18	0.02	No Data	0	1.0
Molybdenum	5	3.18	2.5	19	24	2.7
Nickel	62	10.58	8	16	20	10.3
Selenium	2	2	3	No Data	No Data	No Data
Zinc	700	261	191	602	113	452

N-Viro Compared to Pathogen Requirements of Nova Scotia Guidelines							
Pathogen (Dry Weight Basis)	Units (DWB)	E PA 503 Guidelines	Nova Scotia Guidelines for Class "A"	Nova Scotia Guidelines for Class "B"	N-Viro	Dairy Manure	Poultry Manure
Fecal Coliform	MPN/gm	<1000	<1000	<2,000,000	<3	13,000,000	5,000,000
Salmonella	MPN/gm	<3	<3	Not Applicable	Negative	1,000,000 – 100,000,000	Present
Independent Tests <u>NOT</u> Regulated By Guidelines							
Viable Helminth Ova	Egg/4g	<1	Not Applicable	Not Applicable	Negative	Present	Present
Enterovirus	CFU/4g	<1	Not Applicable	Not Applicable	Negative	Present	Present
<i>*Manure data from ASAE/2000</i>							
<i>**Salmonella reduction in</i>							

7. Use of biosolid product to burn as a biomass:

N-Viro Systems Canada LP (“N-Viro”) recently produced five (5) formulations of N-Virofuel and provided composite samples of each to Greenfield Research Incorporated (“Greenfield”) for analysis. The samples were produced primarily from biosolids, with one sample being mixed with source separated organics. All except one sample were produced with a small amount of alkaline admixture. N-Viro also provided a pair of samples that were dried to two different moisture levels but that contained the same starting materials.

Greenfield was contracted to perform proximal and ultimate analysis of each sample. Computation was then carried-out based on the data obtained for energy content and composition. The goal was to examine if these five formulated fuels could theoretically be burned in a bubbling fluidized bed boiler without an auxiliary fuel to sustain combustion.

The mathematical analysis suggested that all fuel samples could sustain combustion under ideal conditions without a support fuel. Furthermore, it might be possible to extract between 25-35% of the energy content of the fuel in the fluidized bed itself. Additional heat can be extracted further downstream. This theoretical analysis, however, does not examine the combustibility of the fuel. Greenfield is contracted to analyze the fuel’s combustibility using a bench scale combustion test in the next stage of research due to be completed by November, 2010.

These tests demonstrate excellent future energy solution potential.

8. Include as part of the presentation how biosolids are processed and tested:

As per background section.

9. Any risks associated with the use of biosolids mixed with topsoil:

There is unfounded concern about the possibility of contracting Hepatitis or other diseases from exposure to Biosolids. To clarify, Halifax N Viro Soil Amendment is a Class A soil amendment, labeled by the Canadian Food Inspection Agency (CFIA) and is frequently inspected and governed by Federal and Provincial inspectors. The product is pasteurized to remove pathogens, has no pathogens (which is not the case for standard gardening manures) and is tested rigorously. The use of Halifax N Viro Soil Amendment is a safe, green, renewable resource that reduces our reliance on mined fossil fuel products such as synthetic fertilizers and lime. Its' use and safety is supported by thousands of peer-reviewed science.

The National Academy of Sciences has reviewed current practices, public health concerns and regulator standards, and has concluded that "the use of these materials in the production of crops for human consumption, when practiced in accordance with existing federal guidelines and regulations, presents negligible risk to the consumer, to crop production and to the environment."

National Academy of Sciences review

In mid-1993, at the request of EPA, the Water Science and Technology Board of the National Research Council (NRC)/NAS undertook an extensive review of the Part 503 rule, including an evaluation of public health concerns, current biosolids management practices and regulations, and implementation issues. Sponsors of the study included EPA; U.S. Department of Agriculture; Food and Drug Administration; Bureau of Reclamation; Water Environment Research Foundation; Association of Metropolitan Sewerage Agencies; National Water Research Institute; and the National Food Processors Association, as well as several water and wastewater authorities and private companies.

In 1996, NAS released "Use of Reclaimed Water and Sludge in Food Crop Production." This extensive peer review concluded that "the use of these materials in the production of crops for human consumption, when practiced in accordance with federal guidelines and regulations, presents negligible risk to the consumer, to crop production and to the environment."

In 2000, EPA again asked NAS to review the science and methodology underlying the agency's current health and environmental standards for biosolids. On July 2, 2002, the panel released the results of its 266-page study, "Biosolids Applied to Land: Advancing Standards and Practices," which largely confirms the findings of the 1996 NAS study. Its overarching finding is that "there is no documented scientific evidence that the Part 503 rule has failed to protect health," and it does not call for any restrictions on land application of biosolids. According to the report, "a causal association between biosolids

exposure and adverse health outcomes has not been documented." It further states that the panel recognized that the land application of biosolids is a widely used, practical option for managing the large volume of sewage sludge generated at wastewater treatment plants. Furthermore, the report refutes claims by David Lewis, an EPA microbiologist, and others of the presence of *Staphylococcus aureus* in biosolids. "There are no publications documenting *S. aureus* in biosolids." The fact remains that *S. aureus* has never been found in biosolids.

Nova Scotia Environmental Network: BioSolids Caucus

For purposes of fairness and balance, I have included in this report information from the Nova Scotia Environmental Network Biosolids Caucus. Links included are:

- **NSEN Position on Biosolids**
<http://www.nsen.ca/documents/Biosolid%20caucus%20position%20statement.pdf>
- **Ecology Action Centre Position on Biosolids**
<http://www.nsen.ca/documents/EAC%20Biosolids%20Position%20May%202009.pdf>
- **Biosolids Caucus to Premier Dexter**
<http://www.nsen.ca/documents/EAC%20Biosolids%20Position%20May%202009.pdf>
- **Minister Belliveau Response**
http://www.nsen.ca/documents/Minister%20of%20Environment_Biosolids%20Letter_Nov%202009.pdf
- **N-Viro Response**
<http://www.nsen.ca/documents/n-viro.pdf>

The primary focus of the positions are the prevention of the application of biosolids on agricultural land in Nova Scotia and application of the precautionary principle.

Halifax Regional Municipality has no need to make policy decision around the food crop issue. Our Municipal Operations do not have any food crop production.

The Sustainable Environment Management Office would support the Federal and Provincial Government adoption of the precautionary principle (they have done so), as further science and research is being conducted around the use of biosolids on food crop agriculture.

Following the media coverage of the incident on Dunbrack Street, much of the controversy was around the discussion on the usage on food crops. This appeared to confuse residents, but they should be aware that the programs in HRM will not be on food crops.

Province of Nova Scotia: Regulations, Guidelines and Reviews regarding use of Biosolids

2005 Biosolids Science Forum <http://www.gov.ns.ca/nse/forum.biosolids.2005/2010> Guidelines
<http://www.gov.ns.ca/nse/water/docs/BiosolidGuidelines.pdf>

Class A municipal biosolids are treated and stabilized municipal biosolids that meet a very high standard for pathogen, metal and contaminant concentrations. For clarification, as a result of the extensive treatment process and quality of the municipal biosolids, the Department does not consider Class A municipal biosolids to be generated waste, wastewater, or wastewater sludge

that would require an Approval in accordance with section 23 of the *Activities Designation Regulations*.

April 2010 FAQ: <http://www.gov.ns.ca/nse/water/docs/BiosolidsQA.pdf>

Is land application of biosolids safe?

Yes, when proper guidelines and regulations are followed. Biosolids **do not** pose a health risk to individuals, crop production, or the environment.

Sustainability Analysis, Using The Natural Step Framework

System Condition #1: Reduces society from systematically increasing concentrations of substances extracted from the earths crust

Positive, moves HRM toward sustainability goals	Negative, moves HRM away from sustainability goals
Usage of Halifax N Viro Soil Amendment displaces the use of fossil based fertilizers	
Usage of Halifax N Viro Soil Amendment reuses two waste products (Cement Kiln Dust and Sewage Sludge)	

System Condition #2: Reducing society increasing concentrations of substances produced by society

Positive, moves HRM toward sustainability goals	Negative, moves HRM away from sustainability goals
Reduces GHG emissions compared to Landfilling or Incineration	Trace amounts of Heavy Metals and pharmaceuticals introduced to landscape but no more so than animal manures and other commonly used products*
Lower Carbon footprint than use of fossil based fertilizers	
Soil amendment assists with the binding up of heavy metals in existing soils.	

*Much of the debate around biosolids is the introduction of trace amounts of heavy metals or pharmaceuticals into the environment. It is important to note that the N-Viro process is not the originator of those man made substances into the environment. Alternate processing technologies (i.e. incineration, flushing into harbour, or landfilling) would simply place those items in different places in the environment - they would not disappear. N-Viro has gone beyond the prescribed testing protocol and had the product tested by a third party accredited laboratory for these products of concern and found that the process has mitigated most of the products that have been discussed.

System Condition #3: Preventing Society from degrading nature by physical means

Positive, moves HRM toward sustainability goals	Negative, moves HRM away from sustainability goals
Will improve soil quality and health in urban landscaping applications	
Will improve growth of Urban Forest Canopy	

System Condition #4: Reduce conditions which undermine peoples capacity to meet their needs

Positive, moves HRM toward sustainability goals	Negative, moves HRM away from sustainability goals
Halifax N Viro Soil Amendment is a safe product.	Precautionary principle applied for the application to food crops.
Labeled by Canadian Food Inspection Agency under the Canada Fertilizer Act	
Safer for application than common bagged manure	
Lower cost and inputs are not petroleum based (subject to raising fuel prices)	

Is it a stepping stone toward success and sustainability?

Yes, Biosolids are a beneficial recycled product. Halifax Water and industry are exploring future energy solutions for the product to complement the agricultural amendment.

Does it provide a good return on investment?

Yes, Halifax N Viro Soil Amendment is less expensive than fossil based fertilizers and Halifax Water (ultimately rate payers) receive a percentage of revenue profit on sales.

BUDGET IMPLICATIONS

There are no budget implications related to the recommendation. The cost of Halifax N Viro Soil Amendment that HRM would use annually, would be well contained within Capital and Operating Budgets. It is expected that less than \$5,000 of Halifax N Viro Soil Amendment would be used in HRM municipal projects annually.

Implications of not supporting the Biosolids Management Facility and requirement to adopt a different technology, would require capital funding with an order of magnitude of costs exceeding \$10 Million and potentially put the current agricultural program at risk.

FINANCIAL MANAGEMENT POLICIES/BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Project and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Project and Operating reserves, as well as any relevant legislation.

COMMUNITY ENGAGEMENT

This report is stemming from a lack of community information and knowledge on biosolids and the Halifax N Viro Soil Amendment .

ALTERNATIVES

Regional Council has a variety of alternatives:

1. Regional Council may recommend that staff not use Halifax N Viro Soil Amendment for Municipal Operations purposes.
2. Regional Council may recommend that staff restrict the use of Halifax N Viro Soil Amendment to certain programs.

ATTACHMENTS

Background Chronology of Regional Council Reports related to Biosolids Management

A copy of this report can be obtained online at <http://www.halifax.ca/council/agendasc/cagenda.html> then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Richard MacLellan, Manager, Sustainable Environment Management Office, 490-6056

Financial Approval by: _____
Cathie O'Toole, CCA, Director of Finance, 490-6308

Report Approved by: _____
Phillip Townsend, Director, Infrastructure and Asset Management, 490-7166

Chronology of Biosolids Management Reports with Regional Council

- 1999: Project Description for Consideration under Canadian Environmental Assessment Act:
http://www.halifax.ca/harboursol/documents/ceaa_project_description.pdf, page 9, 2.5.5.
Biosolids Handling and Management.

At each treatment plant site, screenings, grit and biosolids will be produced. Plant design will include process equipment for collection, conveying, compaction, storage, mixing, pumping, thickening, and dewatering as required, as well as any chemical deed system and chemical storage required. Biosolids from the pretreatment process will be stabilized and disposed of for beneficial use (*such as compost or landspreading*) or other environmentally acceptable means.

- 2000: Halifax Harbour Solutions Environmental Screening Report:
http://www.halifax.ca/harboursol/documents/ea_screening_report_001.pdf, page 216.
Sludge management is likely to be accomplished by the following processes:

- onsite thickening or dewatering
- onsite alkaline stabilization
- offsite composting
- beneficial end use of composted sludge (e.g. soil amendment for agricultural or non-agricultural uses, depending on quality)

Section 2.9.3 Sludge and Residue Management and Disposal

...HRM has identified certain sludge management options which are not acceptable (i.e. landfilling, incineration, and ocean dumping). HRM seeks to promote beneficial use of sludge, and thus, some form of composting is considered to be the most likely option. Sludge from the treatment process will be stabilized and disposed of for beneficial use or other environmentally acceptable means in accordance with the pathogen reduction and vector - attraction reduction requirements of 40 CFR Part 503 US EPA Regulations and other regulations approved by NSDEL. **Acceptable treatment and environmentally beneficial uses of sludge include composting, pasteurization, lime stabilization or pelletization to be used for purposes such as agriculture soil amendments, sod farming, mine reclamation, commercial fertilizer or silviculture.**

- 2002: Information Report: Use of Sewage Sludge
<http://www.halifax.ca/council/documents/020528cai02.pdf>
...The product will have a broad range of possible applications including use as a liming agent and soil conditioner in agriculture, silviculture, landscaping, land restoration, as landfill cover and as fill material.
- 2003: Public Works and Government Services Canada Screening Report
http://www.halifax.ca/harboursol/documents/ea_federal_screening_001.pdf, page 25.
...The final produce of the process is a biologically stable, low-odour, safe, soil-

like material that will have a solids content of approximately 60 - 65%. The product can be blended with composts to produce a material that can be used in horticulture and commercial landscaping. It can also be blended with soils and soil-like materials to produce manufactured topsoil which would have a broad range of applications. The quality of the finished product will be monitored to ensure that it meets the requirements of Nova Scotia Department of Environment and Labour (NSDEL), Agriculture and Agri-Food Canada (Ag. Canada) and generally, 40 CFR Part 503 US EPA Regulations. The end product meets the criteria of Canadian Food Inspection Agency (CFIA) for distribution as a soil amendment.

2004: March 30, 2004, 12.1: Legal Matter - Harbour Solutions Project - Biosolids Facility
MOVED by Councillor Rankin, seconded by Deputy Mayor Streach that:

1. Regional Council authorize staff to negotiate with SGE Hatch/N-Viro for the planning, engineering, procurement, construction, commissioning, and operation (design/build/operate) of the biosolids processing facility to be located at Aerotech Park.
2. Should negotiations not progress to staff's satisfaction, staff will proceed immediately with a Request for Proposal process and temporary biosolids disposal contingency plan or negotiate directly with proponent number two as subsequently to be determined by Council; and
3. The March 26, 2004 report not to be released to the public until Council approves the final key terms and conditions for the contract.

MOTION PUT AND PASSED UNANIMOUSLY.

2004: October 12, 2004, 11.1 Contractual Matter - Harbour Solutions Project -Biosolids Processing Facility.
MOVED by Deputy Mayor Streach, seconded by Councillor Snow that Halifax Regional Council:

***HALIFAX REGIONAL MUNICIPALITY
REGIONAL COUNCIL MINUTES Page 10 October 12, 2004.***

1. Enter into the Biosolids Processing Facility Development Agreement with SGE Acres Limited for the planning, design, engineering, equipping, procuring, construction, testing, commissioning, completion and transfer of the Biosolids Processing Facility to be located at the AeroTech Park for a Guaranteed Maximum Price not to exceed Twelve Million Two Hundred and Forty Thousand Dollars (\$12,240,000.00), plus net HST of \$419,685 for a total of \$12,659,685 substantially in the form of the attached draft BPF Development Agreement dated October 3, 2004 with the funding as per the Budget Implications Section of the Private and Confidential staff report dated October 7, 2004.
2. Enter into the Operating and Maintenance Agreement with N-Viro for the operation and maintenance of the Biosolids Processing Facility and the marketing

and sale of the Finished Product for Unit Prices described in the Discussion Section of this report and substantially in the form of the attached draft Operating and Maintenance Agreement dated October 1, 2004 with the funding as per the Budget Implications Section of this report.

3. Enter into any required technology license agreements with N-Viro for the acquisition of all required rights to use N-Viro's intellectual property for a guaranteed maximum price not to exceed Two Hundred and Forty Thousand (\$240,000), plus net HST of \$8,229 for a total of \$248,229 substantially as per the Budget Implications Section of this report.
4. This report is not be released to the public until the contract has been agreed to by all parties.

MOTION PUT AND PASSED UNANIMOUSLY.