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Belkorp Environmental Services Inc.  
Suite 900, 1508 West Broadway  
Vancouver, BC V6J 1W8

Attention: Mr. Ted Rattray, President

May 13, 2010

Dear Sirs/Mesdames:

**Metro Vancouver's Draft Solid Waste Management Plan**

You have asked us to prepare a financial comparison of the waste-to-energy (WTE) option proposed by Metro Vancouver (MV) and the continued use of the Cache Creek Landfill for the disposal of municipal solid waste (MSW). It is our understanding that you have requested our comments as part of your ongoing efforts to clarify the basis for MV's apparent preference for the use of incineration in managing residual solid waste and for MV's apparent view that a WTE option is less costly than an out-of-region landfill option.

Our comparison has been based on the following:

- 1 Information regarding the proposed and existing WTE facilities from the AECOM and Sheltair reports commissioned by MV.
- 2 Information regarding the Cache Creek Landfill Extension provided by Belkorp

We have also identified a number of considerations and questions to be addressed to assist in assessing the alternatives and making an informed decision as to the preferred option from a financial perspective.

If you have any questions about our comments about the attached comparison and related comments, do not hesitate to contact the undersigned at your convenience.

Yours very truly,

Paul Levelton  
604-691-3409

enclosures

## Municipal Solid Waste Disposal in Metro Vancouver Cost Comparison

The following chart provides a comparison of the costs of Municipal Solid Waste (MSW) disposal via a proposed single Waste to Energy (WTE) facility and the costs of the Cache Creek Landfill Extension. Information on the capital costs, operating and maintenance costs and potential revenues were obtained as follows:

- WTE – AECOM<sup>1</sup> and Sheltair<sup>2</sup> reports prepared for Metro Vancouver
- Cache Creek Landfill – Belkorp

The AECOM report has been referenced to identify the capital and operating costs of a WTE facility. The Sheltair report on the Burnaby WTE incinerator has been referenced as a base case for actual and proven electricity and steam sales, scaled upward from 275,000 tonnes to 500,000 tonnes of MSW per year.

The financial analysis assumes public sector financing for the WTE facility and private sector financing for the landfill. The analysis assumes a 25 year amortization period for the financing. All costs/revenues are presented in terms of dollars per tonne (assuming 500,000 tonnes per year of MSW).

As indicated in Table 1 below, the net base case cost per tonne is significantly lower for the landfill relative to the WTE option, taking into account the recovery of energy and energy equivalents from both options.

**Table 1**

Cost Element	Waste to Energy		Landfill	
		\$ per Tonne		
<b>Facility Capital Cost</b>	\$470 million financed for 25 years at 5.2%	\$67.26	\$6.21	\$15.0/\$14.0/\$13.0 million in years 1, 8 and 14 respectively financed for 25 years at a weighted average cost of capital of 8.8% (after tax)
<b>Landfill and B-Train Equipment Replacement</b>		\$0.00	\$2.80	Averages about \$1.4 million per year over the expected life the Cache Creek Landfill Expansion
<b>Operating Costs</b>	Includes local transportation \$10 / tonne) or eco-centre operations where required for direct haul volumes	\$50.00	\$47.40	Includes long-haul transportation (plus credit for backhaul of woodchips from Cache Creek)
<b>Electricity Revenue Offset</b>	429 kWh (gross) / tonne of MSW (per Sheltair) and \$0.10 / kWhr (per AECOM)	(\$42.90)	\$0.00	
<b>Steam Revenue Offset</b>	3.5 GJ / tonne of MSW, 1.09 tonnes of steam / tonne of MSW, \$6 per GJ at 70% of natural gas value - per Sheltair report on Burnaby	(\$14.65)	\$0.00	
<b>Landfill Gas Revenue Offset</b>		\$0.00	(\$7.78)	Assumes 75% capture of landfill gas at Cache Creek Extension with incremental gas production for 20 years and conversion to LNG. Conversion at 1.7 litres of LNG to 1.0 litres of diesel.
<b>Net Cost</b>		\$59.71	\$48.63	

<sup>1</sup> Management of Municipal Solid Waste in Metro Vancouver – A Comparative Analysis of Options for Management of Waste After Recycling, AECOM Canada Ltd., June 2009.

<sup>2</sup> Environmental Life Cycle Assessment of Solid Waste Management: Evaluation of Two Waste Disposal Scenarios for the Metro Vancouver Region, Sheltair Group, February 2008.

There has been considerable discussion in regard to the above referenced cost estimates. The costs estimated for the landfill option provide a relatively high level of certainty, since the landfill is currently in operation and permit requirements for the landfill extension have been largely specified. Costs for the WTE option involve significantly more uncertainty, since the information is preliminary, not site specific and many of the underlying assumptions have not been specified.

Table 2 provides a summary of potential adjustments to the estimates based on considerations discussed more fully on the subsequent pages. These adjustments pertain to capital costs, operating and maintenance costs, revenues, financing and property taxes.

**Table 2**

Potential Adjustments	Waste to Energy	\$ per Tonne		Landfill
<b>Capital Cost - Initial</b>	Capital cost higher than estimated, as discussed in Appendix 1	\$21.97 to \$75.85	\$0.00	
<b>Capital Cost - Ongoing</b>	Ongoing major capital required to remain compliant with regulatory standards and for replacement of major components. Assumes \$100 million (21% of initial capital) in each of years 10 and 20 with same public sector financing assumptions as original capital.	\$12.59	\$1.41	Ongoing major capital required to remain compliant with regulatory standards. Assumes \$8.1 million (21% of initial capital) in each of years 10 and 20 with same private sector financing assumptions as original capital.
<b>Operating Cost</b>	Operating costs higher than estimated, as discussed in Appendix 2	\$19.00 to \$64.00	\$0.00	
<b>Steam Revenue Offset</b>	MV able to achieve greater efficiency from steam sales - 8.0 GJ vs 3.5 GJ per tonne of MSW - per AECOM	(\$18.84)	\$0.00	
<b>Private Sector Financing</b>	Incremental cost of \$470 million financed for 25 years at 8.8% versus 5.2%. Will be higher if initial capital cost is low and ongoing capital cost is included	\$25.86	\$0.00	
<b>Property Taxes (private ownership)</b>	Depends on assessment and municipality - estimate of \$2.5 million per year	\$5.00	\$0.00	
<b>Total Adjustments</b>		\$65.58 to \$164.46	\$1.41	
<b>ADJUSTED COST</b>		\$125.29 to \$224.17	\$50.04	

As indicated in Table 2, the adjustments could add up to over \$160 per tonne for the WTE option and a total adjusted cost that is over four times that of the landfill option. If any of these potential adjustments are required, they would significantly affect the feasibility of a WTE solution.

As the potential cost adjustments to the WTE option are so significant, they highlight the need for more publicly available information and detailed analyses of the options for the disposal of MSW. Some of the key questions include:

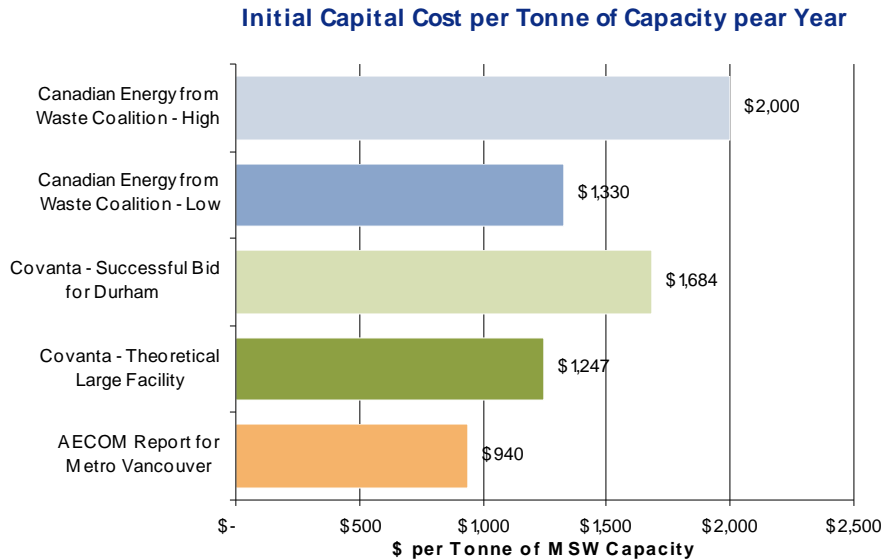
1. Can MV provide the support and basis for a capital cost estimate for a WTE facility that is significantly lower than the apparent costs for other facilities?

2. Can MV provide the support and basis for an operating and maintenance cost estimate for a WTE facility that is significantly lower than the apparent costs for other facilities?
3. Has MV undertaken a detailed assessment of the markets for steam sales and how that could impact the number and location of facilities, as well as the capital and operating costs of the WTE option?
4. Has MV undertaken an “apples to apples” comparison of the options based on similar assumptions regarding financing, property taxes, corporate income tax and insurance?
5. Has MV undertaken a risk assessment of the options and have the results been used to develop risk-adjusted estimates of capital costs, operating costs and revenues?
6. Has MV assessed the operating costs implications of potentially having to purchase carbon credits to offset some of the GHG emissions for the WTE option?

## Appendix 1 Waste to Energy (WTE) in Metro Vancouver Key Issues – Capital Cost

### Information Provided by Metro Vancouver

AECOM (MV's engineering consultant) estimated the capital costs for a 500,000 tonne per year WTE facility at \$470 million, or \$940 per tonne of capacity. AECOM does not, however, provide details of how this estimate was derived, or of the capital costs for comparable facilities. A comparison of other capital cost reference points suggests that the capital costs could be significantly higher, as indicated in the chart below.



- The range of capital cost estimates from the Canadian Energy from Waste Coalition is based on information from their June 27, 2009 presentation to the Metro Vancouver Council of Councils;
- The capital cost estimate for the Durham, Ontario WTE facility (140,000 tpy) is based on the successful bid submitted by Covanta; and
- The (lower) capital cost for a large facility is based on public comments by Covanta that smaller facilities have capital costs per tonne that are 30 to 40 percent higher than those for a larger facility.

### Questions

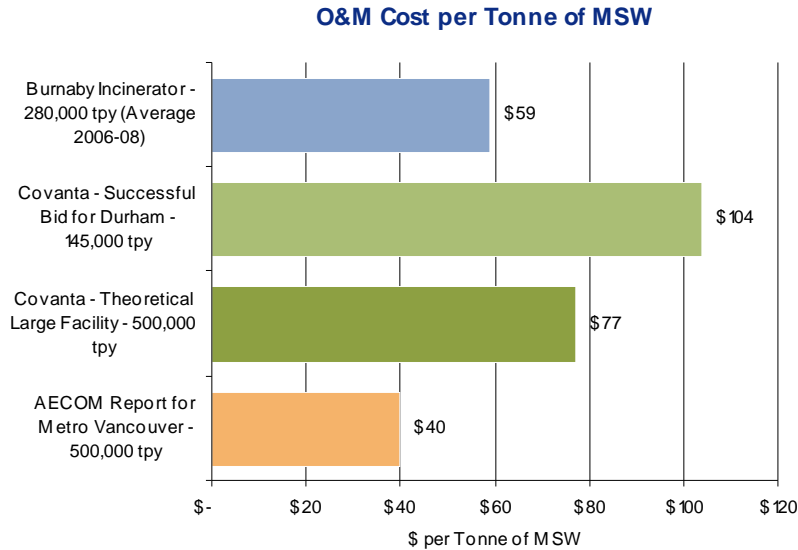
1. Can MV provide the supporting information for a capital cost estimate for a WTE facility that is significantly lower than the apparent costs for other facilities?
2. Has AECOM or another party prepared a detailed cost estimate to support the \$940 per tonne of capacity? Has this been undertaken on a component by component basis? Can this estimate be made available for review?
3. Can MV provide details on the cost of ongoing capital that will be required to maintain the facility in accordance with good practice and changing regulatory requirements?
4. What comparable facilities were used to develop the cost estimate? Are they in North America, in a similar jurisdiction with respect to costs, currency, greenfield site, etc? Can the cost information on these comparators be provided?

5. What is the level of accuracy of the costs? AECOM does not provide any information in this respect, and during a public forum provided a response to a question that the cost estimates were indicative level costs, not investment level costs.
6. How much would the capital costs go up if several smaller facilities were built, compared to one large facility? What would this do to the comparative costs of WTE and landfill?

## Appendix 2 Waste to Energy in Metro Vancouver Key Issues – Operating & Maintenance Costs

### Information Provided by Metro Vancouver

AECOM (MV's engineering consultant) estimated the operating costs for a 500,000 tonne per year WTE facility at \$40 per tonne, but does not provide details of how this estimate was derived, or of the operating costs for comparable facilities. A comparison of operating cost reference points suggests that the operating costs could be significantly higher, as indicated in the chart below.



- The operating costs for the existing Burnaby incinerator are based on the actual costs as reported in the May 19, 2009 Waste-to-Energy Facility - 2008 Financial Update;
- The estimated operating costs for the Durham WTE facility are as reported in the publicly available report from the Regional Municipality of Durham; and
- The (lower) estimated operating costs for a large facility are based on public comments by Covanta that smaller facilities have operating costs that are 30 to 40 percent higher than those for a large facility.

The operating and maintenance cost estimates presented above do not include local transportation. AECOM estimated that this would cost a further \$10 per tonne (for a total of \$50 per tonne).

MV has indicated that if a WTE facility is built, the Coquitlam transfer station would be closed and replaced with a new eco-centre at the WTE facility. The capital cost is estimated at \$14 million, with operating costs in addition. Insofar as an estimated 300,000 tonnes of MSW would move through the eco-centre to the WTE facility, it is assumed that the total of the capital and operating expenses would equal the local trucking charge for that portion of the waste. The balance, 200,000 tonnes, would continue to be moved by local trucking from other transfer stations/eco-stations at \$10 per tonne.

### Questions

1. Can MV provide the supporting information for an operating and maintenance cost estimate for a WTE facility that is significantly lower than the apparent costs for other facilities?
2. Has AECOM or another party prepared a detailed cost estimate to support the \$40 per tonne for operating and maintenance costs? Has this been undertaken on a major cost component basis? Can this estimate be made available for review?

3. What comparable facilities were used to develop the cost estimate? Are they in North America, in a similar jurisdiction with respect to costs, labour, etc? Can the cost information on these comparators be provided?
4. What is the impact on operating and maintenance costs if several small facilities are built as opposed to one large facility?
5. Has MV assessed the operating cost implications of potentially having to purchase carbon credits to offset some of the GHG emissions for the WTE option?

### Appendix 3

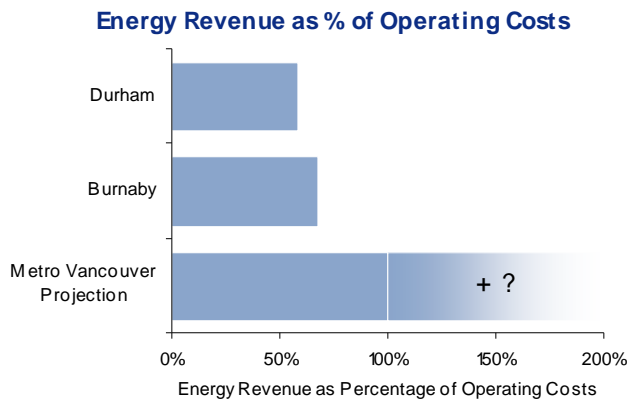
## Waste to Energy in Metro Vancouver

### Key Issues – Revenues

#### Information Provided by Metro Vancouver

MV estimates that the “Total 35 yr Net Cost” of an “In-Region Waste to Energy” facility processing 500,000 tonnes per year of municipal solid waste (MSW) would be negative \$20 million (i.e., it would generate a profit). Accordingly, it appears MV is projecting the revenues from the production of electricity and steam, for use in an as yet undefined district heating network, to exceed the total costs of constructing, financing and operating such a facility by \$20 million over a 35 year period.

As a generalization, the current energy revenues from WTE facilities of the type under consideration by MV do not cover their operating costs let alone their full costs, as indicated in the chart below for the existing Burnaby WTE facility and for the WTE facility currently proposed to be built by Covanta in Durham, Ontario.



#### Questions

1. Can MV provide the detailed assessment of the projected costs and revenues that lead to this conclusion?
2. Is MV aware of any other WTE facilities that make a profit on their operations (excluding consideration of any tipping fees or revenues other than those from the sale of electricity and steam)? If so, please provide the details.
3. Has MV undertaken market studies for the sale of steam for industrial or district heating purposes that would indicate the potential location(s) and feasibility of such systems? If so, please provide the studies.
4. The AECOM report does not include the costs of building the infrastructure associated with district heating or industrial steam sales. Has MV conducted such an analysis? If so, please provide the details.

## **Appendix 4**

### **Waste to Energy in Metro Vancouver**

#### **Key Issues – Public vs Private Financing and Ownership**

##### **Information Provided by Metro Vancouver**

The AECOM report compares the WTE option to other options, including continued use of landfills. The financial comparison of the options assumes:

- The WTE facility is financed and owned by MV, though it may be operated by the private sector; and
- All other options are modeled as being privately financed and owned.

There are four key issues with respect to the differential treatment of the options, as follows:

1. **Cost of Financing** – If MV was to obtain financing today for the construction of a WTE facility, the current interest rate for long term debt from the Municipal Finance Authority of British Columbia would be about 5.20%. If the same WTE facility was financed by the private sector the approximate weighted average cost of capital (debt and equity) would likely be in the range 8.5% to 9.0%.  
  
Assuming the construction of a 500,000 tonne per year WTE facility at a capital cost of \$470 million, this creates a cost differential to the private sector of about \$16.5 million per year (assuming a cost of capital differential of 3.5%) or \$33 per tonne.
2. **Property Taxes** – While a private developer of a WTE facility would be required to pay property taxes, a facility developed by MV would not. For a new facility such as the proposed WTE facility, the property taxes would be many millions of dollars per year, depending on which municipality it was located in. These would not be paid to the municipality if the facility was developed by MV. Assuming a municipal requirement for a balanced budget, property taxes for other land owners would thus be higher if MV developed the facility than if the private sector developed the facility.
3. **Income Tax** – while a private developer of a WTE facility would be required to pay corporate income tax on profits earned, this would not be the case if the facility were owned and operated by the public sector.
4. **Self-Insurance** – Governments and government agencies often self insure some or all of their risks of certain events happening. Thus while they may not pay insurance premiums, they are exposed to third party liability, environmental and/or other claims that are not captured in operating cost estimates.

The effect of the four factors noted above is that public ownership appears to be the cheaper alternative to private ownership. Partnerships BC, the lead agency for P3 projects in BC, have recognized this situation, and apply a competitive neutrality adjustment to the comparison of public and private financed projects.

##### **Questions**

1. How does MV propose to handle the public versus private financing issue with respect to the options being considered?
2. How does MV propose to deal with the issue of risks being assumed through self-insurance by MV for the WTE options versus the private sector approach of directly insuring the risks for the other options being considered?
3. How does MV propose to deal with differential local, provincial and federal government tax revenue impacts between the options?
4. What does or would the financial analysis of the options indicate if all of the options were treated in the same fashion with respect to ownership, financing and operation?

## **Waste to Energy in Metro Vancouver Key Issues – Risks**

### **Information Provided by Metro Vancouver**

The AECOM report prepared for MV does not specifically deal with the risks of designing, constructing and operating a WTE facility, or any of the other options discussed in the report. In response to a question posed at a forum sponsored by the Vancouver Board of Trade, one of MV's advisors noted that the risks associated with a technology option such as WTE are much higher than those associated with a landfill, where local governments and the private sector have extensive experience.

The David Suzuki Foundation, in conjunction with a number of other groups, has published a fact sheet on the costs and risks of municipal waste incineration. The risks include:

- Changes in waste composition
- Changes in waste volumes
- New regulatory requirements
- Future cheaper alternatives

Additional risks include construction costs, design considerations, system performance, site conditions, and energy markets, which may be more significant for a WTE facility than some of the other options (particularly landfill). The potential adjustments identified earlier in this note provide an indication of the potential scale of these risks.

Many agencies use standard contingency factors to account for risk, but these do not acknowledge the nature and scope of potential risks and their impact on project cost/feasibility.

Academic and government research has found that the private sector is more effective in delivering projects on-time and on-budget than the public sector. Some of the key reasons identified in the research are the prevalence of optimism bias in public sector estimates of capital costs, a significantly higher probability for scope creep in public sector managed projects and significant incentive for the private sector to use value engineering, performance incentives and creative design/construction techniques to reduce costs while maintaining performance/quality.

Given that many of the options being considered by MV are assumed to be delivered by the private sector and are based on private sector estimates of costs, the majority of these risks are already incorporated. This may not be the case for the WTE options that assume public sector delivery. These risks could increase the costs for the WTE options.

### **Questions**

1. Has MV undertaken a comprehensive risk assessment of the options? If so, please provide the details.
2. Have the potential risks been quantified and used to develop risk adjusted estimates of capital cost, operating cost and revenues for each of the options?