**CITY OF KIRKLAND**
**Department of Public Works**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3800**
**www.ci.kirkland.wa.us**

# MEMORANDUM

**To:** David Ramsay, City Manager

**From:** Erin J. Leonhart, Public Works Facilities & Administrative Manager
Daryl Grigsby, Public Works Director

**Date:** September 20, 2007

**Subject:** COMPARATIVE EVALUATION OF WASTE EXPORT AND CONVERSION TECHNOLOGIES DISPOSAL OPTIONS – METROPOLITAN SOLID WASTE MANAGEMENT ADVISORY COMMITTEE (MSWMAC) LETTER TO KING COUNTY COUNCIL

## RECOMMENDATION

It is recommended that Council support the Metropolitan Solid Waste Management Advisory Committee (MSWMAC) letter to the King County Council about the Comparative Evaluation of Waste Export and Conversion Technologies Disposal Options.

## BACKGROUND

The current system of municipal solid waste management in King County principally consists of a transfer station to landfill mode of disposal. Based upon current projections, the King County-owned Cedar Hills landfill will reach its permitted capacity in 2016, although that date could be extended if the County diverts a significant amount of waste from the landfill through early export of waste and/or increased recycling rates. The life of the landfill could also be extended if King County finds additional permitted capacity at the existing site. Per established King County policy as described in the 2001 Solid Waste Management Comprehensive Plan, King County will not seek a new landfill site and has been directed to take steps to provide an alternative mode of disposal in advance of the anticipated 2016 closure date.

MSWMAC was established with adoption of King County Ordinance 14971 and had the initial purpose of developing recommendations for the solid waste transfer and waste export system. The City of Kirkland's representation on MSWMAC consists of Councilmember Greenway (representative and Vice Chair), Mayor Lauinger (alternate), Daryl Grigsby (alternate) and Erin Leonhart (alternate). Kirkland has been very active in MSWMAC since its inception and played a key role in development of milestone reports related to the transfer and waste export systems that were required by Ordinance 14971.

A proviso to the 2007 King County Solid Waste Division budget required that the Division retain a consultant to prepare a comparative evaluation of waste conversion technologies (i.e. waste to energy incineration) and waste export. R.W. Beck was selected to conduct the evaluation. After review and comment on the draft report by MSWMAC and SWAC, the final R.W. Beck report was submitted to the council on August 6, 2007.

MSWMAC discussed the final R. W. Beck report and attached comments from MSWMAC Chair Jean Garber at their meeting on September 14, 2007. MSWMAC directed Chair Garber to write a letter to the King County Council for MSWMAC member signatures with these recommendations:

1. That the King County Council continue its current policy course toward waste export by implementing the recommendations in the Solid Waste Transfer and Waste Export System Plan.

2. That every avenue to extend the life of the Cedar Hills Landfill be explored, including increased recycling and partial early waste export, to keep our solid waste rates as low as possible for as long as possible and to provide maximum flexibility for long-term planning.

3. That no further resources be expended on the study of incineration technologies at this time. We believe there is sufficient information in the R.W. Beck report to analyze waste export and incineration technologies at a programmatic level in the Comprehensive Solid Waste Management Plan update and its EIS.

The majority of MSWMAC in attendance at the September 14th meeting (there was one abstention) and Kirkland staff support the recommendations from Chair Garber. There are concerns about the practicality of Conversion Technologies in our region at this time and there is a need to continue planning for the existing transfer system and the potential of extending the life of the Cedar Hills landfill. This does not preclude more thorough study in the future. The draft letter will be provided as soon as it is available. Councilmember Greenway, Mayor Lauinger, Daryl Grigsby and Erin Leonhart will continue representing Kirkland on MSWMAC. Please contact Erin Leonhart with questions.

ATTACHMENT A

# THOUGHTS ON WASTE EXPORT VS. WASTE-T0 ENERGY
**Jean Garber, MSWMAC Chair**

## Ordinance 14971 Deliverables

In July 2004, the King County Council adopted Ordinance 14971, which established the Metropolitan Solid Waste Management Advisory Committee and charged it with developing recommendations for the solid waste transfer and waste export system. The ordinance responded to a council policy decision to export the county's solid waste to one or more landfills after the Cedar Hills regional landfill reaches capacity and closes. The council rejected alternatives to waste export, including development of a new landfill in King County or incinerating the county's waste.

Three years later, I believe the directives of Ordinance 14971 have been fully implemented. The four milestone reports specified in Section 6 of the ordinance were submitted to the council and the Regional Policy Committee in its capacity as the solid waste interlocal forum in 2005 and early 2006. These reports provided the basis for the *Solid Waste Transfer and Waste Export System Plan*, submitted in September 2006.

Other deliverables required by Ordinance 14971 have also been submitted to the council, including an independent review of the *Solid Waste Transfer and Waste Export System Plan* prepared by GBB. While the independent review provides some additional recommendations for the County to consider, it supports the recommendations in the *Transfer and Waste Export System Plan.*

## Comparative Evaluation of Waste Export and Waste Conversion Technologies

In addition to the directives of Ordinance 14971, the council added a proviso to the 2007 Solid Waste Division budget that required the Division to retain a consultant to prepare a comparative evaluation of waste conversion technologies and waste export. The Division retained R.W. Beck to conduct the evaluation. After review and comment on the draft report by MSWMAC and SWAC, the final R.W. Beck report was submitted to the council on August 6, 2007.

Among the key conclusions of the report are:

1. **The three feasible waste conversion technologies are estimated to cost more than waste export over the 20-year analysis period.** The following cost estimates are for the 20-year period from 2016 (the assumed first year of closure of the Cedar Hills Landfill) to 2035. Costs are expressed in net present value per ton in 2016, and include capital and operating costs, as well as energy revenues:

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|---|---|
| Mass Burn Waste-to-Energy | $42-58 per ton |
| Refuse-Derived Fuel (RDF) Waste-to-Energy | $59-74 per ton |
| Advanced Thermal Recycling* | $54-70 per ton |
| Waste Export | $43-47 per ton |

*The German technology being promoted by the vendor WRSI

The higher per-ton cost of conversion technologies would be significant when multiplied by the estimated 1.2 million tons per year of solid waste requiring disposal by 2016.

2. **The waste conversion technologies would have somewhat higher greenhouse gas emissions than waste export to a landfill.** This conclusion disagrees with that of some other researchers who have found greenhouse gas emissions from conversion technologies to be similar to or less than those from landfills. The R.W. Beck report explains that the difference in conclusions is caused by: 1) the greater landfill gas collection efficiency of the modern landfills considered in the report compared to the national average, and 2) the relatively low avoided emissions in Washington State compared with other states where a higher percentage of the electricity is generated from coal combustion.

3. **Waste conversion technologies would compete with recycling as the recycling rate approaches 70 percent.** The R.W. Beck report concludes that King County' recycling rate could increase to 60% with only a small impact on the energy production per ton of waste processed in a conversion facility. However, as the recycling rate approaches 70%, there would be enough of an impact on energy production to affect decisions about the size and operation of the facility. If the county were to commit to a certain size facility based on today's recycling goals, it may limit the county's ability to exceed those goals during the 40-year life of the facility, because certain materials may be required to be used as fuel rather than recycled.

4. **Conversion technologies have down time for scheduled and unscheduled maintenance on an annual basis.** Mass burn and advanced thermal recycling facilities would be expected to be down about 10 percent of the time or 36 days per year; while RDF facilities would be expected to be down about 13 percent of the time or 47 days per year.

5. **Conversion technologies still require landfill capacity.** The R.W. Beck report indicates that landfill capacity would be needed for a) fly ash and bottom ash, which together represent about 10% by volume and 25-30% by weight of the incoming waste, b) non-processible waste, which represents about 5-10% of the incoming waste by weight, depending on the technology; and c) waste brought to the facility when it is down for scheduled and unscheduled maintenance. Bottom ash is recycled at some locations, but Washington State law requires all ash to be landfilled. Fly ash potentially tests as a hazardous waste.

In summary, based on the R.W. Beck report, I believe that the conversion technologies available today offer no advantage to King County and its contract cities compared to waste export.

**Other Issues**

I am concerned about two issues related to conversion technologies that are not addressed in the R.W. Beck report.

First, building a conversion facility at this time would be a less flexible approach to disposal following closure of the Cedar Hills Landfill. It would likely require that the county and its contract cities commit to long-term contracts with no opportunity for contract reopeners to consider other vendors or other emerging technologies that may become commercially viable. Waste export, on the other hand, would provide the flexibility of periodic contract reopeners.

Second, the siting process for a conversion facility would be costly, time-consuming, and controversial – and may ultimately not be successful. None of the issues that were of most concern in the mid-1980's have been eliminated – the risk of fugitive emissions of hazardous materials from the stacks should air-pollution controls fail (however unlikely that may be); the need to handle and dispose of hazardous fly ash; the visibility and industrial look of the tall stacks and plumes (a facility large enough to serve King County would likely have four 200+-foot stacks); concerns on the part of

potential host jurisdictions that the facility and its attendant truck traffic would adversely affect their community identity; and the lack of a clear need to build a $530 - 700 million facility (2013 dollars).

King County is fortunate to have several already permitted MSW landfills that have a combined capacity of hundreds of millions of tons of MSW; are within cost-effective rail-haul distance; have or have the potential for energy recovery; are located in sparsely populated jurisdictions who depend on the jobs and revenues the landfills provide; and are in arid areas where leachate is substantially reduced, the topography and geology are well suited to landfills, and the land can revert back to use for grazing or wildlife habitat.

**Potential Recommendations**

Now that the R.W. Beck report is complete, I believe it is important to convey to the council our impression of what the report means to the future of the solid waste system, and to offer our recommendations on how to proceed from here.

My overall impression after a careful reading of the R.W. Beck report is that it does not reach any conclusions that support a move away from the current policy of waste export. Based on the above considerations, I believe MSWMAC should consider making the following recommendations to the King County Council:

1. **That the council continue its current policy course toward waste export by implementing the recommendations in the *Solid Waste Transfer and Waste Export System Plan.***

2. **That every avenue to extend the life of the Cedar Hills Landfill be explored, including early waste export, to keep our solid waste rates as low as possible for as long as possible.**

3. **That no further resources be expended on the study of conversion technologies at this time.**

ATTACHMENT B

## COMMENTS ON WRSI PRESENTATION ON ADVANCED THERMAL RECYCLING, AUGUST 23, 2007

| ISSUE | STATEMENT IN PRESENTATION | COMMENTS |
|---|---|---|
| **Greenhouse Gas Emissions** | Landfills produce substantially greater greenhouse gas emissions than waste-to-energy (WTE) facilities. | The R.W. Beck report concludes that waste export/landfilling would result in somewhat lower greenhouse gas emissions than the WTE technologies. This differs from the conclusions of some researchers due to (1) the relatively high landfill gas collection efficiency at landfills in Washington State compared to the national average; and (2) the relatively low avoided emissions in Washington State, where only a small percentage of electricity is generated from coal combustion. (Avoided emissions – i.e., emissions that are avoided because the WTE facility or landfill generates electricity that would otherwise have to be generated by the local power supply – are subtracted from each technology's total emissions to get net emissions.) |
| **Annual Availability** | The Hamburg WTE facility has virtually no down time for scheduled and unscheduled maintenance. | The R.W. Beck study states that over the last four years, the two processing units (1,100 ton-per-day each) at the Hamburg WTE facility have had an average annual availability of 92% and 93%. That means one unit is down for scheduled and unscheduled maintenance about 8% of the time, or 29 days/year; and the other about 7% of the time, or 26 days per year. |
| **Need for Landfilling** | No landfilling is needed in conjunction with the Hamburg WTE facility. | This may be true in Hamburg, but wouldn't be true in King County. The Hamburg WTE facility produces hazardous fly ash that is wetted to form a slurry and pumped into old salt mines. Bottom ash is recycled. Here in Washington State, the law requires that both fly ash and bottom ash be landfilled. The R.W. Beck report indicates that fly ash and bottom ash together represent about 10% by volume and 25-30% by weight of the incoming waste. In addition, the R.W. Beck report states that about 5% of King County's waste stream by weight would not be processible in a WTE facility like the one in Hamburg, and would have to be disposed by other means. Landfill capacity may also be needed for waste brought to the facility when it is down for scheduled or unscheduled maintenance (see above) |
| **Effect on Recycling** | The Hamburg WTE facility has no effect on recycling. Germany has one of the highest recycling rates in the world at 65%. | The R.W. Beck report concludes that King County' recycling rate could increase to 60% with only a small impact on the energy production per ton of waste processed in a conversion facility. However, as the recycling rate approaches 70%, there would be enough of an impact on energy production to affect decisions about the size and operation of the facility. If the county were to commit to a certain size facility based on today's recycling goals, it may limit the county's ability to exceed those goals during the 40-year life of the facility, because certain material may have to be used as fuel rather than recycled. |

| ISSUE | STATEMENT IN PRESENTATION | COMMENTS |
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| **Visibility of Plume** | Since the moist air coming from the stack is at 70° F, the plume from the stack would only be visible when the outside air temperature is below 70 degrees. | That means the plume would be visible much of the time here in King County, based on National Weather Service monthly temperature summaries for the years 1999 through 2007. To dispose of King County's 1.2 million tons per year of garbage (in 2016), four 800 ton-per-day WTE processing units would likely be placed on the same site. Each processing unit would have its own 200+ -foot stack (a total of four stacks). Each stack would have its own white plume every time the outside temperature is below 70° F. |
| **Use of Steam** | Seattle Steam could use steam generated by a WTE facility. | In order for Seattle Steam to make use of steam from a WTE facility, the WTE facility would have to be sited in the industrial area of Seattle within close proximity of Seattle Steam. It is highly unlikely that a King County WTE facility could be sited in this area given Seattle's experience trying to site its own intermodal facility in Georgetown. WRSI has referred to the old Weyerhaeuser Mill site in Snoqualmie, the Cedar Hills Landfill, and a site on the Snohomish River, as being potential sites for an incinerator. Apart from how problematic it would be to site a WTE facility at any of these locations, none of them would allow the steam to be used by Seattle Steam. |
| **Potential for Landfills to Leak** | Spokane had four superfund landfill sites before the City/County decided to build an incinerator. All landfill liners will fail in 50 to 60 years and pollute groundwater. | First, the Spokane Superfund sites are unlined landfills, so it is not surprising they leaked. Second, the presenter who says all landfill liners will fail is no doubt quoting G. Fred Lee, who has written for two decades that Subtitle D landfills will inevitably fail due to breakdown of the landfill liner and that groundwater will be polluted. What Lee says may be true for some landfills, but there is no reason to believe it is true for the Northwest arid-area landfills to which King County would export its waste (which are built to more stringent non-arid standards). Liners are only likely to leak if there is leachate buildup in the landfill. But at the Roosevelt, WA Regional Landfill (typical of an arid-area landfill), TVing of leachate observation pipes has indicated there is no leachate head over the bottom liner (Klickitat County, December 2001 EIS). Also, rigorous construction quality assurance and operations measures are taken to minimize the potential for leaks. These measures, combined with the lack of leachate head, address the issues that G. Fred Lee cites as contributing to liner leaks. King County could require such measures in its waste export contract. |
| **Railroad Reliability** | The unreliability of the railroads is an unacceptable risk, and no business should take that risk. | There is currently substantial waste export occurring in the region, and the private haulers appear to have a relationship with the railroads that keeps the waste trains moving. Private haulers have said they would prefer to operate intermodal facilities so they can continue to be the ones interfacing with the railroads. |

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| **Post-Closure Care of Landfills** | The law only requires a 30-yr. post-closure period, and landfills in Europe have been found to be“unstable” long after that (that is, they keep generating landfill gas and leachate). Landfills will be abandoned after 30 years and pollute the environment. | Washington State’s Criteria for MSW Landfills require post-closure care during the 30-year post-closure period, including maintaining the integrity of the final cover, maintaining the leachate collection system, maintaining groundwater and landfill gas monitoring, and continuing active gas collection if needed. The regulations state that the 30-year post-closure care period may be increased by the jurisdictional health department if the lengthened period is determined necessary to protect human health and the environment (in other words, if leachate and/or landfill gas still need to be managed). Post-closure care periods for the large landfills to which King County would export waste would likely extend well beyond 30-years. |