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ANALYSIS OF THE “ZERO WASTE” MANAGEMENT OPTION USING THE MUNICIPAL SOLID WASTE DECISION SUPPORT TOOL

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ABSTRACT

The U.S. Environmental Protection Agency’s Office of Research and Development (US EPA ORD) has developed a “Municipal Solid Waste Decision Support Tool”, or MSW-DST, for local government solid waste managers to use for the life cycle evaluation of integrated solid waste management options.

The MSW-DST was developed over a five year period (1994-1999) with the assistance of numerous outside contractors and organizations, including the Research Triangle Institute, North Carolina State University, the University of Wisconsin-Madison, the Environmental Research and Education Foundation, Franklin Associates and Roy F. Weston.

The MSW-DST can be used to quantify and evaluate the following impacts for each integrated solid waste management alternative:

- Energy consumption
- Air emissions,
- Water pollutant discharges
- Solid Waste disposal impacts.

Recently, the MSW-DST was used by the U.S. EPA to identify solid waste management strategies that would help to meet the goal of the EPA’s “Resource Conservation Challenge.”¹

In this effort, ten solid waste management strategies were evaluated for a hypothetical, medium-sized U.S. community,

¹ The U.S. Environmental Protection Agency launched the Resource Conservation Challenge in 2002 to help reduce waste and move towards more sustainable resource consumption.

with a population of 750,000 and a waste generation rate of approximately 3.5 pounds per person per day.² (Table 1). The assumed waste composition was based on national averages. A peer-reviewed paper on this research was published in 2008 by the American Society of Mechanical Engineers (ASME).³

Table 1. Waste Management “Scenarios” Evaluated by the U.S. EPA

Scenario	Description
1	10% recycling, 90% landfilled with no gas collection and control
2	20% recycling, 80% landfilled with no gas collection and control
3	30% recycling, 70% landfilled with no gas collection and control
4	40% recycling, 60% landfilled with no gas collection and control
5	30% recycling, 70% landfilled; landfill gas is collected and combusted using flare
6	30% recycling, 70% landfilled; landfill gas is combusted using internal combustion engines to produce electricity
7	30% recycling, 70% landfilled; landfill gas is piped to nearby industrial facility and combusted in boiler (displacing fuel oil)
8	30% recycling, 70% combusted using waste to energy facility (generating electricity and recovery of metals)
9	Same as Scenario 5 except waste is collected and transported to transfer station, and then long-hauled 800 kilometers (500 miles) to landfill using semi-tractor truck
10	Same as Scenario 9 except waste is long-hauled to landfill by rail

To complete the EPA’s analysis of solid waste alternatives available to local governments, the Foundation identified the need to evaluate the “Zero Waste Option.” This option typically

² Thornloe, S., Weitz, K. and Jambeck, J. “Application of the U.S. Decision Support Tool for Materials and Waste Management”. *Waste Management Journal- Special Edition* (May 2007).

³ O’Brien, J. “Waste-To-Energy and the Solid Waste Management Hierarchy”. *Proceedings of NAWTEC16 – 16th Annual North American Waste-To-Energy Conference*, May 19-21, 2008, Philadelphia, PA. New York: American Society of Mechanical Engineers.

involves the expansion of materials recycling and composting programs to divert 70% or more of the waste stream. Environmental advocacy groups have been promoting this option as an alternative to a recovery-based system which relies on waste-to-energy.

In the summer 2008, the Foundation submitted a concept paper to the EPA’s Office of Solid Waste (EPA OSW) describing this research need. In response, the EPA OSW has allocated and transferred funding to the EPA’s Office of Research and Development (EPA ORD) to conduct the research.

For the analytical results to be comparable, this option will be analyzed using the MSW-DST model with the same assumptions that were used to analyze the previous ten options in support of the Resource Conservation Challenge.

The EPA ORD expects to complete its analysis of this alternative within the next six months. Once again ten solid waste management strategies will be evaluated for a hypothetical, medium-sized U.S. community, with each scenario handling 100,000 tons of material. The “new” scenarios are as follows in Table 2:

Table 2. “New” Waste Management “Scenarios” Evaluated by the U.S. EPA

Scenario	Description
1	15% Recycling, 85% Landfilling
2	35% Recycling, 65% Landfilling
3	55% Recycling, 45% Landfilling
4	75% Recycling, 25% Landfilling “Zero Waste Option”
5	15% Recycling, 85% Waste-to-Energy
6	35% Recycling, 65% Waste-to-Energy
7	55% Recycling, 45% Waste-to-Energy
8	75% Recycling, 25% Waste-to-Energy
9	35% Recycling, 45% Landfilling, 20% Waste-to-Energy
10	45% Recycling, 45% Waste-to-Energy, 10% Landfilling