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# Integrated Solid Waste Management in Northwest Minnesota

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## Abstract

In the early 1980's Polk County and four other partner counties in rural Northwest Minnesota made the decision to incorporate a waste to energy (WTE) plant into their solid waste management program. This decision was made to comply with the Minnesota hierarchy for solid waste management, to extend the life of the Polk County landfill, and to recover valuable energy from the waste. The plant was constructed in 1987 and began burning MSW in 1988. The processing technology consisted of two starved air mass burn municipal solid waste combustors each with a combustion capacity of 40 tons of MSW per day, and produced energy in the form of saturated steam for customers in the adjacent industrial park. Initially each train utilized a two field electrostatic precipitator (ESP) as the air pollution control (APC) device.

In 1996, a materials recovery system (MRF) was constructed in front of the waste combustors to remove problem/objectionable items most of which are recyclable. This facility has been a tremendous success providing many benefits including reduced stack emissions, lower O & M costs for the WTE units, and revenues from the sales of extracted recyclables.

In 1998 Polk began injecting powdered activated carbon (PAC) into the flue gas of each unit upstream of the ESP to attain compliance with new State limits for dioxin/furans and mercury. Then in 2000 Polk County proceeded with an APC retrofit project designed to meet revised EPA emission guidelines which set more stringent limits for pollutants currently regulated and added limits for several other pollutants previously unregulated..

In 2001 and 2004 Polk County performed research demonstration projects substituting screened WTE combined ash for a portion of natural aggregate in two asphalt road construction projects. Both projects passed stringent environmental testing and demonstrated superior strength and flexibility performance compared to conventional asphalt.

Polk County is now proceeding with the installation of a turbine/generator to produce renewable electricity with excess steam. The electricity produced will be used to reduce the demand for incoming power from the local utility. Initially this may be only a twenty-five percent reduction but has the potential to be more in the event one or more of the steam customers reduces their dependence on steam from the WTE plant.

All of these projects received funding assistance from the State of Minnesota in the form of Capital Assistance Grants. In 2003 the WTE plant and MRF became debt free and Polk County lowered the tip fee resulting in a disposal rate that is fairly competitive with that of most out of state landfills.

This paper will discuss the development, success, and benefits of this completely integrated solid waste management system for these five counties located in Northwest Minnesota.