

# WHAT TO DO WHEN YOUR INCINERATOR GETS SHUT DOWN: SOCRRA'S APPROACH

**MICHAEL A. CZUPRENSKI**

Southeastern Oakland County Resource Recovery Authority  
Royal Oak, Michigan

## ABSTRACT

When the Authority's 35-year old refuse incinerator was shut down by State regulators, an integrated scheme of yard waste composting, household hazardous waste management and recycling was implemented. The separate collection of yard waste and regional composting has resulted in a 20% diversion from landfilling. The Authority is presently collecting more than 6000 lb of household dry cell batteries per month and is handling roughly 250 appointments per month at our permanent household waste station. Several different collection programs for recyclables are being implemented by Authority members, with the goal of diverting another 10%.

## INTRODUCTION

The Southeastern Oakland County Garbage and Rubbish Authority, created in 1951, and recently renamed the Southeastern Oakland County Resource Recovery Authority (SOCRRA), is a regional governmental entity responsible for refuse disposal, yard waste composting and recyclables processing for its 14 member municipalities (120,000 households/325,000 residents). To solve the problems associated with the local open burning garbage dump used in the 1930s and 1940s by these communities, a mass burn refuse incinerator was constructed on the site of the old dump, after its closure by the Authority. The incinerator ran successfully for 34 years, processing 600 tons of refuse

per day, with approximately 150 tons of ash needing to be landfilled each day. More importantly, since landfills fill up due to volume rather than weight, the roughly 2400 cu yd going into the incinerator was converted to only 240 cubic yards of ash! In addition, as the member communities grew in population, up to 300 tons of excess refuse was directly landfilled each day. More than 30 ton/day of ferrous metal were recovered from the ashes by a private contractor representing a 5% "recycling" rate, before recycling became fashionable. In any case, however, the incinerator was shut down by the Michigan Department of Natural Resources (DNR) in July of 1988 in response to complaints from neighboring residents of odors from the smoke-stack plume.

With closure of the incinerator plant, a massive employee layoff ensued, followed by contractual arrangements put in place to provide for landfilling of all municipal refuse. With the concomitant leap in tip fees when incinerator activities ceased, the Authority began seriously looking at alternatives to contractual landfilling.

## COMPOSTING

At about the same time that our incinerator ceased operations, (spring 1988) one of our members (the City of Huntington Woods) began a pilot program providing for curbside collection of separated grass clippings. The Authority, for the past 20 years, has handled the fall

leaf collection differently than general refuse—hauling the leaves to our sanitary landfill for composting and use in the final cover. Leaves collected by separate vacuum or scraper vehicles were handled this way, while those communities with no such separate pickup allowed their residents to continue to allow bagged leaves to be disposed with regular trash. Based on the success of the Huntington Woods project [1], three other member communities followed suit through the 1989 season. It is noteworthy to point out here that, based on research conducted by the Authority, it was mandated that if bags were to be used to contain yard waste, they needed to be in clear photo and biodegradable plastic bags approved by the Authority. Only one vendor initially supplied approved bags (Naturegrade-plus by Petoskey Plastics, Inc.), and although we initially purchased 30,000 for members to sell at cost to their residents, the \$0.18 apiece price tag created quite an uproar. Although we have received much criticism from folks touring our compost operations, believing kraft bags are the only ones to approve, their price of \$0.35 each has proved unworkable, given views solicited from our constituent residents.

#### 1989 Season

With the four community pilot yard waste composting project underway in the summer of 1989, bagged and containerized grass clippings were collected by packer truck, after its load of refuse was delivered to Authority facilities. The separate grass was then taken to our Transfer Station, weighed, then dumped into a 40 yard semi-trailer for the 12-mile trip to the Compost Site. We originally began introducing the grass into leaf windrows established on a 50-ft high hill of buried refuse. We began mixing the grass/leaf rows with a \$68,000 Wildcat CX-750 Compost Windrow Turner received with partial funding from the State's Clean Michigan Grant Fund. With the successful diversion obtained by the four pilot communities (almost 18% during the summer months), our Board of Trustees, in September 1989 mandated that all 14 members would provide for separate yard waste collection by July 1990. Lucky for us, the volume of leaves available on site and windrowed that summer of 1989 was enough to handle the relatively small amount of grass received that season. The 1990 season, however, proved to be quite a different matter, with grass amounting to a significant proportion of our total waste stream all spring and summer, but especially heavy in May.

TABLE 1 SELECTED SOCRRA COMMUNITIES —  
MAY 1990  
(Grass Clippings as a Percent of Municipal Solid Waste)

	% Grass Clippings		% Grass Clippings
Berkley	31%	Huntington Woods	25%
Beverly Hills	38%	Lathrup Village	39%
Birmingham	23%	Madison Heights	26%
Clawson	33%	Oak Park	16%
Ferndale	16%	Royal Oak	29%
Hazel Park	11%	Troy	33%

#### 1990 Season

With the understanding that it would take about a month before the plastic bags would degrade to the point of losing enough elasticity to minimize operational problems with the Wildcat (e.g., clogging up the flails, bearing damage, etc.), we encountered our first major headache in this full-scale composting effort: windrows went anaerobic shortly after grass was introduced, and these anaerobic gases were released upon turning. Needless to say, it didn't take long before the City of Rochester Hills, our host community, but not an Authority member, took us to court and received a temporary restraining order imposed on part of our operation. Conclusion? We find no operational basis to require "biodegradable" bags, since one should mix, debug, and aerate windrows as soon as the grass is introduced to the leaf windrows.

To get through the season, we began to turn (primarily for debugging purposes) within a day or two after grass was mixed into the leaf windrows. We suffered the consequences of rapid flail replacement due to the abrasive nature of the grass and extensive downtime due to main bearing wear. To make matters worse, the separate collection program proved to be such a success that we ran out of leaf windrows and had to hurriedly establish an unimproved (landfill cover) area for late-season composting of pure grass windrows. Although we experimented with lime addition, chemical masking agent addition and natural enzyme odor counteractant addition, we ended the summer covering these grass windrows after each turning with finished humus and/or topsoil, which acted as a natural odor biofilter.

The Authority also received a grant for a compost screener in mid-year, and we purchased a \$90,000 Finlay Hydrascreener. This is a vibrating shaker-screen (versus a trommel) and was acquired on a rent-with-option basis. The plastic bag remains have become an operational nightmare in the screening process, and we have tried many different screen combinations in attempts to produce quality humus at a decent production rate. We now have a 2 in. spaced harp-fingers top

deck to allow the plastic and large debris to roll down and off the vibrating unit without clogging, a 3/8-in. piano wire middle deck, with a homemade bottom screen consisting of 1-in. perforated hole steel plate. It's a rather odd combination, having larger openings on the bottom than in the middle, but the tight parallel piano wire middle screen also removes a good proportion of contaminants without serious clogging from the plastic. For better production, we have just ordered two new stainless steel "zig-zag" screens which will be evaluated. All finished humus is hauled back to a central locale for free distribution to residents at the member DPW yards.

Before leaf season, a new area on the landfill was cleared of topsoil and an expanse of leaf windrows was established. Excess leaves were also added to the existing grass windrows and turned extensively over the 1990-1991 winter.

### 1991 Season

Now fully underway, grass is added to existing leaf windrows as a "bead" along one side of each row, in a ratio of approximately one part grass to four parts leaves. We bought a new \$105,000 CAT D5 wide track dozer which then pushes the leaf windrow over the fresh grass clippings, completely encapsulating the odorous grass. A new 6 ft H x 16 ft W tracked SCARAB turner was also purchased this season, and runs through the freshly formed windrow as soon as possible (same day or next) to mix, debug, aerate and fluff the windrow. At 600 rpm versus 360 rpm for the WILDCAT, the \$186,000 SCARAB has allowed us to produce very neat, very efficiently decomposing windrows, at a maximum turning rate of about 20 ft/min, and an average weekly rate of about 12 ft/min. We find that we can get through all 33,000 ft of windrows in 5-6 days, allowing rows to usually be turned once a week. Weekly temperature readings with a 4-ft probe were initiated in the spring, but a court-mandated test showed that the windrows actually heat up from the outside in, so we now monitor temperatures at a depth of 2 ft. Because of the high volume of grass received (21,000 tons expected, to mix with about 5000 tons of wood chips into 23,000 tons of the previous fall leaves), the initial addition of grass took only 30 days, so we expect to repeat this 1:4 addition several times this summer. Also, in an attempt to incorporate the high-moisture grass into the existing leaves, we find it necessary to turn as often as possible (preferably once a week) so that minimal discernible grass remains when the next introduction of grass is implemented. Temperature readings consistently range from 110°F to 155°F;

**TABLE 2 SOCRRA YARD WASTE COMPOSITION  
(Monthly Tonnage Delivered to Compost Site)**

Month 1991	Grass Tons	Leaves Tons	Wood Chips Tons	Total Tons
Jan		1,730	337	2,067
Feb		56	186	242
Mar			125	125
Apr	1,540		227	1,767
May	7,057		265	7,322
Jun	4,240		283	4,523
Jul	2,195		425	2,620
Aug	2,120		482	2,602
Sep	1,988		249	2,237
Oct	1,397	6,369	147	7,913
Nov		10,296	82	10,378
Dec		1,220	137	1,357
1991	20,537	19,671	2,945	43,153
1990	29,052	15,231	2,264	46,547

however, for the above reason, we do not utilize these readings as sole operational process parameters to dictate turning frequency. Plainly put, with one machine, we do not believe it is possible to turn too often. We also began the season assessing percent oxygen content in the windrows, at 4-ft depths, but found that even old odorous windrows tested out at 20%+ oxygen. This monitoring then was abandoned in favor of pH testing, which proved inconclusive. A post-hole digger is now used to retrieve samples from select windrows at 4-ft depths, and odorous samples command immediate turning, regardless of past turning frequency. We have found that strong odors are usually indicative of a higher grass to leaf ratio than desired and turning is often accompanied by the addition of final humus and/or topsoil cover, or as a last resort, any janitorial type odor counteractant spray. Concluding, we have found that with a 1:4 ratio of grass to leaves, even repeated more than once, significant off-site odors are not generated as long as weekly turning with a powerful machine is conducted.

Several final notes: Although the Authority requires all members to provide for curbside chipping of brush and Christmas trees, we have found so many contaminants (logs, stumps, concrete curbing, manhole covers, boulders) in the "wood chips" that we recently discontinued their addition to our composting operation. We have needed to replace the 140 flails on the SCARAB each week since ownership, at \$980 per set, and hope this recent change reduces this maintenance dilemma. We are also working with the manufacturer in a redesign of their flail holders.

We have also initiated a Yard Waste Reduction Campaign, specifically aimed at reducing the amount of grass placed curbside, and offer a booth to members for public education efforts. Table 2 highlights the composition of yard waste processed on a monthly basis.

The analysis of the above calendar year statistics presents the following:

(a) There was a total reduction in yard waste in 1991 from 1990 of 3394 tons. This occurred in spite of an increase in wood chips tonnage of 681 tons.

(b) The reduction attributable to our 1991 campaign for leaving the "clips on the lawn" and "composting at home" is 3394 + 681 or 4075 tons.

(c) The decrease in the grass totals and the larger increase in leaf totals can be attributed to the early start of leaf season by 2 weeks this past October and the increased volume of leaves brought to the Authority by landscaping firms.

## **Future Program**

As part of the State's Solid Waste Alternatives Program, SOCRRRA has been selected as a Clean Michigan Demonstration Community, receiving a grant for \$2.7 million to construct a Materials Recovery Facility. In turn, the Authority must develop model recycling and composting operations. To this end, the Authority is in the process of constructing a 20-acre sloped pad (two hills with 1½% slopes), with a 9-in. compacted foundry slag surface with drainage to a retention basin. We will cover the surface with a layer of wood chips to protect the flails on the SCARAB, and are now constructing the curing pad.

In addition, we will be installing a rotary trommel screen (9-ft diameter × 28 ft long, with 4 in. × 4 in. openings and debagging hooks) at our Transfer Station. Most yard waste will be routed through the screen for debagging, initial aeration/ammonia odor release, and oversized contaminant removal.

## **HOUSEHOLD HAZARDOUS WASTE MANAGEMENT**

### **Introduction**

In an attempt to remove the most likely harmful materials from a waste stream destined for a proposed \$70 million waste-to-energy plant, the Authority instituted a household dry cell battery collection program. The pilot project began in late 1989 with a \$15,000 DNR grant, and has grown into a program comprised of 400 bait buckets located at various municipal offices and retail outlets, a 55-gal drum at each dropoff center, and curbside collection for those members offering the traditional newspaper/container pickup services. Now, over 6000 lb/month are collected! Button batteries are separated from the others by use of a ½-in. diameter hole steel plate screen, while the remainder are placed in sealed 55-gal drums for disposal (as a RCRA-exempt

household waste) in a double lined licensed Type I Hazardous Waste Landfill.

The Authority also recently set up a permanent household waste station, consisting of two converted beverage distribution trailers. We accept old paint, automotive products, garden chemicals, household cleaners, etc. on an appointment basis. When one trailer fills up, the empty one is spotted in its place and the filled one transported to our contractors' processing facility for sorting and ultimate reuse or disposal. This program has been averaging less than \$50 per appointment (all Authority and contractor labor/trailer rental/disposal costs included), which compares favorably to the traditional \$100–125/car for the once-a-year amnesty day programs. Considering the convenience to residents, control maintained over material brought in, and cost, we believe this program has a lot of merit.

## **RECYCLING**

### **Introduction**

With the Authority comprised of 14 member communities, there are no less than 14 different recycling approaches underway! Many of our communities started off (and likely may stick with) the traditional dropoff center at the DPW yard, while one by one, others are expanding their contracts to provide for weekly curbside service.

All recyclables are brought to our existing Transfer Station, where material is kept separate from the yard waste for appropriate processing. To provide some rationale and direction for items to collect, we develop individual rates for the various recyclables, based on 3-month bids. Thus, Authority costs to weigh, store, then load the items, plus selected vendor costs to collect and process the recyclables are totaled for each item. A price list, or "menu," is then developed which lists the tipping fee or credit for each commodity. At present, we have a rate schedule for the following: newspapers, magazines, presorted HDPE/PET plastic, non-sorted HDPE/PET, clear glass, brown glass, green glass, steel cans and bulky metal (scrap and white goods). It is interesting to note, that shortly after initial offering of a cost-based credit for bringing in white goods, which have traditionally been mixed in with other bulky items (sofas, mattresses, etc.), member communities, on their own, began to collect bulky metal objects separate from the nonvaluable furniture loads. Therefore, rather than trying to enforce a mandate to keep salvageable metal products out of landfills, this economic incentive provided a positive avenue to enhance recycling opportunities.

**TABLE 3 SELECT RECYCLING PROGRAMS OF SOCRRA MEMBERS**

Community	# of Households	Recycling Program	Recyclables Salvaged, Tons*	Total MSW, Tons**	% Recycled
Berkley	6,380	Curbside for news/no dropoff center	746	11,513	6.5%
Birmingham	7,599	Comprehensive dropoff center	1,108	22,673	4.9%
Clawson	4,403	Comprehensive curbside & dropoff center	847	9,230	9.2%
Huntington Woods	2,437	Comprehensive dropoff center	468	6,338	7.4%
Madison Heights	9,650	Comprehensive curbside & dropoff center	1,614	20,812	7.8%
Royal Oak	19,975	Curbside for news/3 dropoff centers	4,200	47,328	8.9%

\* represents tonnage for past fiscal year, July '90 thru June '91; includes bulk metal/white goods.  
 \*\*represents total of refuse, yard waste and recyclables.

**TABLE 4 POUNDS PER HOUSEHOLD PER WEEK  
 (Drive-bys, Not Set Outs)**

News	HDPE/PET	Clear Glass	Brown Glass	Green Glass	Steel Cans	Total
4.0# (72%)	0.2# (3%)	0.8# (14%)	0.05# (1%)	0.05# (1%)	0.5# (9%)	5.6# (100%)

Also, when several members wanted to initiate collection of plastic containers and steel cans at their drop-off centers, but found they didn't have room for individual rolloff boxes, the Authority established two separate "milk runs" to the various sites for collection of these recyclables from 8-yard front end dumpsters.

Highlighting the success of the various member programs, please refer to Table 3.

These communities differ dramatically in lot size, people per residence, commercial/residential mix, age, tax base, home value, etc. Likewise, the total costs for these different recycling programs vary quite a bit; all of which make for a difficult decision regarding what type of recycling service to provide. Also useful in this decision-making is the quantity of items that will actually be collected, to assess avoided disposal costs. Our data, which excludes appliances and other bulk metal, and is influenced significantly by Michigan's Beverage Container Return statute, break down as follows:

**CONCLUSION**

Given the relative percent diversion from mandatory yard waste separation (18%+) versus residential recyclables collection (less than 10%), this is why the Authority chose to develop their Compost Operation before proceeding with construction of a Materials Recovery Facility. Designation as one of the State's six Clean Michigan Demonstration Communities will allow the Authority to expand these waste management programs so that further technical information can be shared throughout the coming years.

**REFERENCE**

[1] Dean, Lillian and Wollenweber, Mark. "Curbside Collection of Grass Clippings," in *The Biocycle Guide to Yard Waste Composting*, 1989, pp. 37-39.