What's Next for Landfills?

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Of the economy, consolidation, and being green

By Robert B. Gardner

What are the hot topics for 2010? What are people talking about in the industry, and how will these "hot topics" play out in the next year? This article reflects some of my thoughts regarding the hot topics in the landfill industry today and how they may affect landfill management and operations in the future.

It's the Economy, Stupid

"It's the economy, stupid" is a phrase used during the elections in 1992 by Bill Clinton in an attempt to refocus attention on the American economy, which had just come through a recession. In the last year, we have experienced an unprecedented downturn in the economy. The solid waste industry has felt the impacts of the downturned economy on many levels. Solid waste quantities are down. Reports vary throughout the country, but one hears that reductions of 15%, 25%, 30%, or greater are common. I spoke with a friend of mine the other day who manages a landfill in the Southeast. He said that over a year ago the landfill was receiving 3,000 tons per day, whereas now it is receiving 800 tons per day. This kind of reduction eclipses what most have experienced.

What this means for most private and municipal operations that rely on tipping fees as their primary source of income is that revenues are substantially down. Landfill managers have pared back operations. People have lost jobs. Equipment is idle or has been reassigned elsewhere, and planned landfill cell expansions have been delayed. The ripple effect goes on and on, but most have adjusted their staffing and equipment levels at this point and are carefully deferring their operational costs.

Private operations can respond to variations in the marketplace more quickly than municipal operations. Municipal landfills are operated to provide a service to their citizens, and there is a fixed cost for making that service available, regardless of the quantities of solid waste delivered. For example, the fixed capital cost of a compactor or other major pieces of equipment is incurred whether there is 1 ton of waste or 750 tons of waste delivered to a site per day, and the price per ton that needs to be charged to recover these fixed expenses increases as the amount of waste delivered to a landfill decreases. To illustrate the concept, Figure 1 shows the estimated price per ton that would need to be charged at a landfill to break even for every million dollars of capital invested as a function of the tons per day of solid waste delivered to a site. The graph shows a range of 50 tons per day to 500 tons per day. For the purposes of this illustration, I have assumed an interest rate of 5% for debt, and a seven-year term on the equipment recovery. At 500 tons per day, a rate of $0.95 per ton would recover the cost of the capital. Reduce the tonnage by 30% to 350 tons per day, the required rate would increase to $1.58 per ton. A 30% reduction in tonnage results in a 43% increase in the dollar per ton required to recover the fixed capital costs. The point is that landfill economics can change very quickly, especially when fixed costs are significant.

Who Owns What Now?

Consolidation of the solid waste market continues on a regional and national scale. In late 2008, shareholders from Allied Waste Services and Republic Services Inc. voted to merge the two companies to become the new Republic Services Inc. This merger created the second largest solid waste company behind Waste Management Inc. In 2009, IESI-BFC Ltd. acquired Waste Services Inc. to become the third largest provider of solid waste services in North America. Also in 2009, Veolia Environmental Services Inc. sold its waste-to-energy facilities to Covanta, making Wheelabrator (A Waste Management Company) and Covanta the top two waste-to-energy firms in the country. Table 1 shows the breakdown of the assets of the top three solid waste companies in North America.

These private companies control over 75% of the municipal solid waste disposal capacity in the United States. (Applied Research Foundation, Solid Waste Association of North America, *The Regional Privately-Owned Landfill Trend and Its Impact on Integrated Solid Waste Management Systems*, February 2007, p.11). However, that being said, cities, counties, and public authorities continue to play an important role throughout the country in the management of solid waste disposal, and in most cases are responsible for making sure this important public service is provided for in a safe and cost-effective manner, either through contracted services or by providing the services directly.

Everything Green

I find it interesting how popular societal influences affect our industry. The whole "green revolution" is just one example. Look at the color schemes of some of the larger solid waste companies or their Web sites (e.g., Waste Management, Veolia, Covanta, and Recology). What color are Waste Management's trucks? What slogan is on each of them? "Think Green." Republic Services is only one of the Web sites that I looked at that did not have green in it. If green is not the predominant color, it is strategically included somewhere in the fonts used or color accents. Green is the predominant color used in advertising in *Waste Age*, *MSW Management*, or many other periodicals associated with our business. In the January edition of *Waste Age*, I counted 27 or the 56 pages of the publication that used the "green" color in some form or fashion. Is this just a coincidence, or is it a subtle message trying to be communicated? I think the latter. Everyone wants to demonstrate what they do and how they do it is green or greener than their competition. SWANA has a calculator on its Web site to calculate the carbon footprint for conference attendees, and provides a means to purchase carbon credits to make a person's trip carbon neutral.

I serve on the Environmental Research and Education Foundation (EREF) Research Council. One of the council's responsibilities is to review research proposals and make recommendations to the EREF board of directors regarding solid waste research funding. What struck me this year was how almost every proposal I reviewed tried to make some connection to the green movement, and in some cases it was almost comical, because it was evident that many of the research proposals really were not focused on the subject, but for some reason the research proposers felt compelled to include some reference to the "green revolution," thinking that was the hot topic of the day and by including the reference they would somehow improve their chances for funding. I felt like I

was watching the Sandra Bullock movie "Miss Congeniality," where all the beauty contestants ended their speeches about their hopes for the world by saying, "and we hope for world peace," regardless of the context of their speech.

Landfill owners and operators argue that they are green through sequestering carbon, collecting and destroying methane through flaring or landfill gas utilization projects, or reducing dependence on fossil fuels through the same. Waste-to-energy companies say they are greener, in that they take a waste product, which they argue is a renewable energy resource, and covert it efficiently into electricity. Compost advocates claim they are greenest of all the waste management technologies because composting aerobically treats organic wastes, eliminating the adverse affects of anaerobic decomposition of organic waste in landfills (i.e., production of methane, which is a strong greenhouse gas). The asserted byproducts of compost are carbon dioxide, water, and compost, which can be returned to the environment as a helpful soil amendment. Compost advocates hardly make reference to testing that has been done in California and elsewhere demonstrating that composting can also experience significant volatile organic and other problematic emissions, because no compost process is perfectly aerobic. Each segment of the industry presents arguments and calculations demonstrating how green they are. Assumptions upon assumptions are made, and complicated calculations are presented to make their respective case for being green or the greenest. What is the truth? The truth may be difficult to discern at times, and when there is money at stake, market share at risk, or regulations or taxes being proposed that give preference for one technology over another, then the truth matters.

Top Solid Waste Companies

	Collection Ops	Transfer Stations	Landfills	Recycling Facilities
Waste Management, Inc.	367	355	273	134
Republic Services, Inc.	400	242	213	78
IESI-BFC Ltd	107	56	29	32

Table 1

GHG Reporting Rule

On October 30, 2009, the US Environmental Protection Agency (EPA) published its mandatory greenhouse gas (GHG) reporting rule in the *Federal Register* (Volume 74, No. 209, pages 56,260–56,519). The rule became effective December 29, 2009. The rule requires monitoring beginning January 1, 2010, and reporting for the calendar year 2010 by March 31, 2011. All affected facilities should determine if they might be subject to the rule and to plan accordingly. For many facilities, it will be too late to comply with the rule if steps are not taken before January 1 to begin proper monitoring and record keeping.

The rule applies to various facilities or industrial sectors (please refer to the rule for specific applicability and reporting requirements). A few highlights are discussed here; the final rule should be consulted for details. The EPA believes there are just over 10,000 facilities that will

have to report under the rule, including 3,000 stationary fuel combustion units, 2,551 MSW landfills, 1,502 natural-gas suppliers, and 1,108 electric generating facilities.

The rule applies to MSW landfills (not industrial or C&D landfills) that accepted waste after January 1, 1980, if they generate at least 25,000 metric tons of carbon dioxide ($MTCO_2e$), whether or not the landfill gas (LFG) is collected. Landfills on contiguous properties under common control must be included in the estimates (even if they have been closed for years).

MSW landfills must use a mathematical model to estimate gas generation. The rule prescribes specific modeling coefficient values that are different than the EPA's default emission factors found in AP-42 and New Source Performance Standards (NSPS) values. As such, facilities cannot rely on existing-site-gas models to determine applicability. Based on the EPA's screening tool:

- Closed landfills with less than 350,000 metric tons of waste in place will not be subject to the rule.
- All other MSW landfills that received waste after January 1, 1980, should conduct mathematical modeling to evaluate applicability. Landfills that generate approximately 270 standard cubic feet per minute (scfm) of LFG (at 50% methane) in 2010 per the rule's gas-generation model will be subject to the rule.


Carolina Software

MSW landfills with gas-collection systems must use a second mathematical algorithm to estimate gas generation and use whichever estimate is higher to determine if the rule applies. The EPA's screening tool says a landfill collecting 900 metric tons of methane (about 185 scfm of LFG at 50% methane) will be subject to the rule, but those who collect gas (for any purpose) may wish to perform additional calculations.

For computing emissions, the rule requires use of a conservative 10% factor to account for methane oxidation as LFG passes through a landfill cover. By now, most landfills have already figured out whether they fall under the new rule and are in the process of evaluating their monitoring systems and preparing for the required periodic monitoring and reporting.

In addition to using the EPA model to estimate gas generation, landfills that have gas collection and control systems (GCCS) must perform an alternative estimate of collection efficiency and GHG emissions, and must commence specific gas-monitoring requirements by January 1, including:

- waste disposal amounts (scale house);
- continuous gas-flow monitoring;
- gas-flow correction for temperature, pressure, and moisture; and
- methane monitoring, continuously or at least weekly.

John Trotti

The rule provides instructions for dealing with missing data points and includes calibration requirements. Gas-flow rates must be measured using one of eight methods listed in the rule. The flow measurement must be corrected to standard conditions. Thus, pressure and temperature must be measured or incorporated in the flow meter.

Many landfills with a GCCS were unable to comply with these requirements by January 1 because of the lead time required to install continuous-flow measuring equipment and/or to arrange for at least weekly monitoring of methane content.

The EPA will permit other "best available" monitoring techniques to be used on a temporary basis (until March 31, 2010), and may allow use of such techniques after March 31 if a facility requests and qualifies for an extension.

The rule requires reporting by stationary fuel-combustion units that have an aggregate maximum rated heat input capacity of 30 million British thermal units per hour or greater and that have at least 25,000 $MTCO_2e$ emissions per year

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(excluding emissions from combustion of biomass or biogas).

MSW landfills that are subject to the reporting rule must also report emission of various GHGs from stationary fuel-combustion sources located at the facility, such as boilers, combustion turbines, engines, incinerators, and process heaters. Emissions from flares and portable combustions sources are not included in this portion of the rule.

The rule requires quantification of methane, carbon dioxide, and nitrous-oxide emissions from applicable sources. The rule includes separate requirements under the stationary combustion section for monitoring, testing, and reporting, based on four "tiers" of sources. Generally, though, emissions from biomass-fueled sources and from other combustion sources at landfills, will likely fall under the Tier 1 requirements.

Third-party LFGTE facilities not under common control with the landfill may also be subject to the stationary combustion source portion of the rule if the aggregate heat input capacity (not actual flow rates) of their combustion units equals or exceeds 30 million Btus per hour, and they are dual-fueled with a traditional fossil fuel such as natural gas.

The first GHG-monitoring reports are due for calendar year 2010 by March 31, 2011. The key dates in the rule are as follows:

- **December 29, 2009**—effective date of the rule
- **January 1, 2010**—develop plan and begin monitoring
- **March 31, 2011**—calendar year 2010 report
- **30 days after** the effective date of the rule—request extension of grace period to use best available monitoring methods through calendar year 2010
- **January 30, 2010**—designate authorized representative and alternate authorized representative for facility

Closing

Where will all this monitoring lead us? Is there a landfill tax in the making? I

read with interest an editorial by Harvey Gershman the other day in the January-February edition *MSW Management*. He states, "Waste-disposal taxes need to be imposed—not a dollar a ton, but toward $10 per ton.

Wisconsin is a good example of using a high disposal tax to support state regulatory programs as well as to provide grants to support local programs." If history is any guide to the future, I suspect there may be some who will disagree with his assessment and do so strongly.

Will the EPA impose additional emission-control requirements on more landfills than are now captured under the NSPS? Some think that may be the endgame. SWANA has already submitted its concerns that the proposed federal greenhouse-gas regulations addressing the prevention of significant deterioration and the Title V Greenhouse Gas Tailoring Rule may subject a large number of small disposal facilities to regulation under the Clean Air Act, and by doing so impose a significant cost burden on these facilities and operations with only a small reduction in emissions (*Waste Age*, January 2010, p. 12).

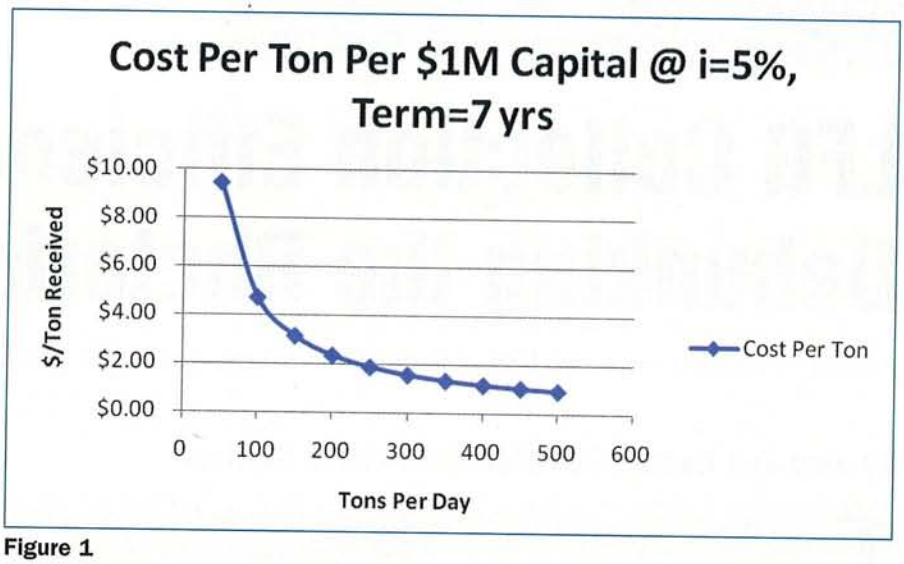

Figure 1

This year should see many interesting twists and turns. Will the economy begin to rebound? Opinions are mixed for sure. Will more new regulations be imposed, leading to higher costs for solid waste management? Will the concept of a "landfill tax" gain traction? I suspect many of us hope not. Will the "green revolution" continue to be a major influence in shaping public policy? I suspect it will. For those who are involved with landfills, these influences must be followed closely and the motivations behind certain initiatives clearly understood. Not everyone who says they are green really is. **MSW**

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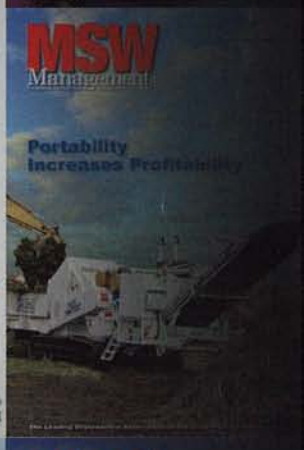
2011 Elements



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