

The Written Deal



By Constance Hornig

This is the sixth in a series of articles that identify issues frequently encountered when procuring, negotiating, and drafting MSW service contracts. These articles constitute a practical contracts manual that describes approaches MSW service providers and local governments can take to share risk and reward—and reach a mutually satisfactory agreement.

You draw on customer demand, political preference, regulatory mandate, and fiscal practice to define the scope of the MSW services that you want to procure. (How many bulky items can customers set out at annual curbside cleanup events? Will the second greenwaste cart be provided without an additional customer charge?)

You rely on your experience and citizen complaints to set the performance standards you expect. (If a missed pickup is called in by 3 p.m., must the hauler return that same day? At what hour can commercial pickup commence within 500 feet of

residential premises?)

You also rely on your past experience to identify historical problem service issues. (Was greenwaste commingled with garbage? Is the on-street staging area for scooter service a source of litter?)

But when it comes to administering and enforcing service scope and performance standards, you will find yourself turning to the written pages of your service contract. (What happens if the hauler charges customers excess rates? Can you get copies of customer complaint records? How long can the hauler fail to secure valid workers' comp insurance before you can exercise your contractual remedies?)

This article suggests ways that you can work with your contracts counsel—whether in-house or retained for a specific procurement—to ensure that the printed word of your contract empowers you to secure the service scope and performance standards that you solicited and ensure that your residents and businesses get what you

bargained for them.

Although most examples come from collection contracts, many of the principles apply to other MSW services as well. The article highlights 10 important aspects of an MSW contract:

1. Term
2. Enforcing Service Scope and Performance Standards
3. Excuses for Non-Performance: Uncontrollable Circumstances/ Force Majeure
4. Performance Assurance
5. Indemnification
6. Liability Insurance
7. Assignment
8. Contract Construction and Interpretation
9. Expiration or Termination
10. Obligations That Survive Expiration or Termination

Term

The length of your contract term is not mandated by Internal Revenue Code depreciation schedules or solid waste regulations. But the length of the contract term may largely determine your service price.

Naturally, contractors lobby you and your local officials for longer terms. Term translates into money. Contractors don't have to face immanent renewed competition and the considerable expense of preparing proposals. You may similarly want a mid-to-longer term in order to delay your budgeted time and expense and the political dance of a competitive proposal process.

On the other hand, you may desire a shorter term to test-drive a newly implemented program. You may want to eventually procure bundled, integrated services, thereby coordinating termination of one contract (for example, collection) to occur at the same time another one ends (for example, a disposal contract).

Recovery of capital investment—But contractors prefer recovering their capital investment during the contract term. Understandably, they prefer not to assume the risk of capital recovery dependant upon your discretionary contract extension or renewal. The shorter the term, the more likely that contractors will correspondingly compress their capital amortization, which will increase your service price. (Remember, if you own the capital assets, such as containers, rolling stock, a materials recovery facility (MRF), or a transfer station, then you may free the contract term from capital recovery considerations.)

Competitive attractiveness—Worse still, if the term is too short, potential contractors may decide to forego submitting proposals altogether. Contractors will earn proportionately more aggregate revenue over a relatively longer-term agreement, which makes that longer-term agreement a more attractive piece of business and whets more contractors' appetites to compete.

Service fee adjustment—In addition to minimizing capital recovery risk and maximizing competitive attractiveness, the length of the contract term shapes the service price in a less obvious but equally important way. Since potential contractors will probably not assume the risk of cost inflation for more than a few years, in most service contracts the service price is adjusted over the term of an agreement, resulting (usually) in higher unit compensation as the term

matures. For a detailed discussion of the implications of short-, mid-, and long-term agreements for choice of rate adjustment protocol, see "Preserving the Benefits of Your Bargain: Rate Adjustment Options," in *MSW Management Elements 2005*, www.mswworld.com/elements/0506/05060101.html. But here is a summary.

Short term—No rate adjustment may be appropriate for short-term agreements. Expect to pay higher rates, reflecting both contractor's increased assumed risk of cost inflation and/or reduced competition. Consider this option only if you prize rate stability and do not anticipate program or regulatory changes that would increase contractor's costs.

Mid term—Index-based rate adjustment is appropriate for short- to mid-term contracts (five–seven years), especially if your initial service fees were procured competitively.

You can develop a bundle of weighted indices, such as labor, fuel, and equipment replacement/maintenance, or just use a percentage of your regional CPI or the new chained CPI (C-CPI-U). (The chained CPI results in lower escalation because it ac-

Use the word "adjust" instead of "escalate" in order to capture possible deflation. (You can dream.)

Even though you may choose an index-based rate-adjustment methodology, identify and carve out costs that are not directly related to indices, such as tipping fees, host fees, scheduled lease, or capital finance costs. Define those pass-through costs carefully. Include specified conversion ratios to translate costs to service fees (for example, conversion of subscribed residential gallons or commercial cubic-yard weights to tipping fees expressed as tons). Alternatively (and more simply), assume that a specified percent of service fees is attributable to a pass-through cost (such as x% for disposal tipping fee). If possible, keep the risk of waste volume on your collection contractor, even if you go through changes in disposal tipping fees.

Long term—Cost-based adjustment may be appropriate for long-term contracts (10–20 years). A longer term allows the contractor to recover its capital investment in a facility.

Consider whether your rate base is sufficiently large to spread the cost of con-

The length of the contract term may largely determine your service price.

ducting cost audits and implementing a cost-based adjustment protocol that is more time-consuming and expensive than index-based adjustment. (You are more likely to hire outside consultants.)

Ensure that your cost-based rate-adjustment methodology clearly defines (non)allowable cost. Include sufficient detail of operational obligations to clearly define the denominated "reasonable and necessary" costs.

Secure audited financials for your contract services only. Be alert to corroborate fair cost allocations among your contract services and those of others and to ascertain that compensation paid to principals, affiliates, and parent companies is kept at arm's length.

Consider reconciling all projected depreciation expenses with all actual expenses that have been incurred.

Compare average annual changes in index values from year to prior year and not from month to month or from year to base year. (Month to month may capture a nonrepresentative spike; year to base year compounds inflation of less than 100% of the index.)

Coordinate index-publishing dates with your budget process (such as the July 1–June 30 fiscal year).

Consider capping increases.

Do not adjust the profit component of rates; where possible, competitively bid profit/operating ratios and apply them to adjusted costs.

Provide a conclusive administrative dispute resolution protocol in the event of your contractor objecting to your rate adjustment determination.

To reduce fees in longer-term agreements, consider establishing a cycle of several years using index-based rate adjustment punctuated by cost-based adjustment.

Even in shorter-term agreements, consider the right to require a specified number of cost-based adjustments at your option. This maintains your flexibility to implement program changes.

Term Extension

The contract expiration date is fixed but may be flexible.

Ideally, you may want the right to extend the term for a number of annual or biannual increments at your sole discretion.

Alternatively, you might give your contractor performance incentives by offering the contractor the right to earn extensions for objective, measurable, superlative performance (such as for low amounts of liquidated damages or fee increases, or for meeting guaranties for recyclables diver-

sion in collection, recyclables recovery in MRF operations, or compaction in landfill operation).

Unexpected delays and roadblocks can easily stretch out even the most well-planned reprocurement schedule. Secure the right to short extensions of the stated expiration date of your contract (such as six one-month extensions) to give you flexibility to complete a sole-source negotiation or competitive procurement for a new agreement.

Enforcing Standards

If your contractor's performance is slipping, it's not likely that you will be able to quickly or cheaply terminate your service contract.

Termination of even the best-drafted contract will almost certainly involve contractor contest and expensive litigation. And if the contractor is failing because of its lowball price proposals, termination and reprocurement will only result in a higher (market) price.

Your contract must give you interim remedies short of default and termination. Even better, pay performance-based com-

penensation that rewards superlative service. Carrots are better than sticks. Especially in a competitive procurement, you may be able to secure termination-for-convenience (no-fault) termination, which you can exercise at your discretion without proving contractor breach.

But in order to attract proposers, you—or your replacement contractor—will have to buy undepreciated assets. Fix the depreciation schedule and/or purchase price in the contract, before trouble materializes. For more detailed discussion on remedies and performance-based compensation, see "Money Talks: Financial (Dis)incentives for Performance," www.enr.com/resources/legal.html.

In summary, consider the following.

Performance-based compensation or compensatory (cost-demonstrated) damages are preferable to liquidated (pre-"guesstimated") damages, since liquidated damages are vulnerable to judicial challenges by your contractor as unenforceable penalties. If you cannot implement performance-based compensation, negotiate liquidated damage provisions where possible and make certain

If You're Going With Smoothside, Go Double or Nothing!



48' Tandem THINWALL™ V-Floor™ Wedge custom-built for American Waste
Equipped with KEITH® V-Floor™ WALKING FLOOR®

Only the original THINWALL™ gives you the patented end-to-end strength of double-welded double-wall extruded aluminum.

THINWALL was the *first* extruded aluminum smoothside system for trailer bodies. It's the *only* smoothside system that's backed by **10 years** of road-proven performance. And it's still the *only* aluminum smoothside that's **100% machine welded** from end to end, inside and out.

Since 1996, custom building for customers like you has led Titan from the original THINWALL WALKING FLOOR® trailers to THINWALL tippers, rear dumps, tub dumps, extreme-duty trailers and more. So when you're thinking "smoothside," think Titan THINWALL -- first!

Get the continuing inside story about THINWALL online at www.titantrailers.com.

See us at ISRI and Waste Expo

If it doesn't say TITAN, it can't say THINWALL™!

Titan Trailers Inc.

1129 Hwy #3, R.R. #3, Delhi, Ontario, Canada N4B 2W6

Phone 519.688.4826 Fax: 519.688.6453 Email: info@titantrailers.com Website: www.titantrailers.com

KEITH® and WALKING FLOOR® are worldwide registered trademarks of KEITH Mfg. Co.

TITAN

TRAILERS INC.

Strength Through Innovation

Circle #84 on Reader Service Card

that you recite detailed acknowledgments to support their enforcement.

Budget and/or set rates and tipping fees to fund a cushion for potential compensation bonuses. When establishing compensation bonuses/reductions or damages, consider the trigger, timing, and amount as they relate to contractor control and (mis)conduct, as well as to fiscal and political stakes.

For example, with respect to control, provide less for missed pickups that could be late set-outs, and more for a contractor's failure to return your calls in a timely manner. Include modest amounts of liquidated damages merely to get the contractor's attention.

Remember: Contractors worry that you will assess liquidated damages when customers are at fault or in instances where contractor can't control the breach. Excessive number or amounts of liquidated damages may squelch contractor competition for your contract.

Control the purse strings. Pay your contractor so that you can offset fee reductions or damages. (If you do not collect rates, hire

your contractor as your billing and collection agent.)

If you have service fee offset rights, collecting service fees may reduce the amount of performance assurance you demand from your contractor.

There is one caveat worth remembering: In states such as California, collecting rates might transform your MSW contract from private to public service, triggering state constitutional procedural notice and substantive compliance requirements with respect to service fee change and revenue use. Require a readily accessible and liquid letter of credit rather than a performance bond.

Prescribe simple and inexpensive dispute resolution procedures. De-politicize it; keep dispute in your administration and management departments, if possible, not in public forums. Avoid multiple levels of appeal to allow for quick, definitive, and final resolution.

Remedies include not only suspension or termination, and liquidated or compensatory damages, but also the right to provide substitute service.

Excuses for Non-Performance

One law school legend recounts that a tough old torts professor posed a particularly complicated set of facts in a final exam and asked, "Against which party(ies) could you bring actions for damages?" A canny law student responded succinctly: "Sue Him"—and supposedly received a grade of "A." In contracts, too, there are instances when nonperformance is not due to either party's fault. Referred to as "uncontrollable circumstances," or the Latin *force majeure*, they typically include events such as diverse natural and manmade disasters (earthquakes, war, etc.) and other "acts of God."

But don't forget that you can contractually define your list of events that excuse performance. One of the most likely—and therefore important—causes of service interruption is labor-related. For a more in-depth discussion, see "Sharing and Minimizing Labor Risks," www.enr.com/0311_legal.html.

Some summary tips follow.

Especially in a competitive procurement, you might be able to entirely exclude labor-

SCS ENGINEERS

www.scsengineers.com

SCS ENGINEERS is ranked by Engineering News-Record as the No. 1 solid waste consulting firm in the nation. We are a growing, employee-owned company, with a focus on solid waste. We have over 40 offices nationwide, with over 550 employees. We provide design, permitting, construction, operation, and maintenance services to clients worldwide. We are looking for results oriented professionals.

If you are interested in pursuing any of the opportunities below, email your resume to Bob Gardner, P.E., BCEE, Senior Vice President, Solid Waste Services, rgardner@scsengineers.com.

Solid Waste & Environmental Engineers

BS or MS in civil/environmental engineering or other relevant degrees. Entry level up to 6 years experience in environmental assessments, landfill and solid waste facility design, permitting and construction. **Opportunities in Bellevue, WA; Charlotte, NC; Dallas, TX; Long Beach, CA; Overland Park, KS; Norfolk, VA; Phoenix, AZ; Reston and Richmond, VA; Tampa, FL; and Valley Cottage, NY.**

Senior Solid Waste Engineers

BS/MS in civil/environmental engineering or other relevant engineering degree, with a minimum of 6 years experience in landfill and solid waste facility design, permitting, and construction, and project management and business development. **Opportunities in Atlanta, GA; Charlotte, NC; Dallas, TX; Long Beach, CA; Overland Park, KS; Pensacola and Tampa, FL; Phoenix, AZ; Reston and Richmond, VA; and Valley Cottage, NY.**

Solid Waste Managers

BS/MS in civil/environmental engineering or other relevant degree with a minimum of 12 years experience in all phases of solid waste management. Must have demonstrated experience in staff supervision and management, project development, design, permitting, construction, and operations. **Opportunities in Bellevue, WA; Long Beach, Pleasanton, Sacramento, Santa Rosa, CA; and Valley Cottage, NY.**

Construction Heavy Equipment Operators and Technicians - Opportunities nationwide. Contact Tom Barham, Senior Vice President, tbarham@scsengineers.com.

Fluency in Spanish is desirable for many positions noted above.

Career opportunities to grow with SCS

- Landfill Design
- Landfill Gas Control
- LFG Utilization
- Transfer Stations
- Solid Waste Studies
- Operations

**SCS is an equal opportunity employer.
Offices Nationwide.**

Circle #76 on Reader Service Card

related disturbances from your definition of "uncontrollable circumstances," meaning that your contractor will be in default during strikes. But such a harsh provision may be the proverbial straw that breaks the camel's back, scaring off potential proposers. And in practical terms, garbage is piling up during a strike, and instituting contract termination actions would be time-consuming. Rather, grant your contractor some degree of flexibility to resolve labor disputes by including labor disturbances within the definition of "uncontrollable circumstances" for a limited period of time.

But correspondingly secure the right to provide substitute service (yourself or, more likely, a third-party contractor) using contractor's service assets, employees, and routing/customer billing records. (Routinely enforce a contractor's ongoing obligation to provide you with updated routing maps so that you don't scramble during a crisis.) Secure the right to audit customer accounts not only for the purpose of confirming franchise fees, for example, but also for the purpose of having access on prescribed timely notice.

If you do not collect customer service fees, require the contractor to forward customer service fees to you during the continuance of the *force majeure* strike and secure that obligation with a liquid instrument, such as a letter of credit.

Performance Assurance

If your contractor does not meet its performance obligations fully and in a timely manner, you want access to cash so that you can hire someone else to pick up, transfer, or dispose of that rotting garbage and protect the public health. Sample areas of performance obligations include:

- Core service specifications (such as picking up those putrescibles)
- Service standards (such as keeping bins painted and water-tight)
- Operations (such as safe truck operations and maintenance and maintaining your immediate access to customer complaint files)
- Subcontracts (such as paying disposal tipping fees)
- Keeping records and reporting
- Paying the insurance premiums and the

assurance fees

- Liquidity and creditworthiness

Good performance assurance should be liquid (to provide quick cash infusions). It should provide sustained creditworthiness to ensure that your contractor is good for the money for the duration of the contract.

Sizing your performance assurance is not merely a comparative exercise, looking at the size of your neighboring community's performance bond. Your neighbor's contract may have an entirely different substitute service cost than yours. Instead, do the math: Estimate the substitute performance cost for the period of time from breach, cure, notice of default, termination, and reprocurement specific to your contract, mindful that your mid- to long-term contract cost is probably less than substitute service cost on a temporary, spot basis.

Add reprocurement costs for event of termination.

Add your franchise and other fees.

Forms of Assurance

Performance bonds or letters of credit, parent guaranties, and insurance are means

Are You Ready?

In 2004, Florida's residents generated 1.3 tons of Municipal Solid Waste per person.

By 2030, Florida's population is expected to increase by 29.5%.

Jones Edmunds provides engineering innovations that are vital to improving Florida's infrastructure.

Join the team that is preparing for Florida's future.

We are recruiting now for:

- Senior Project Manager — Solid Waste, Tampa or Gainesville
- Project Manager — Solid Waste, Gainesville
- Senior Project Engineer — Solid Waste, Tampa

To learn more please call
1-866-827-3653
or visit us at

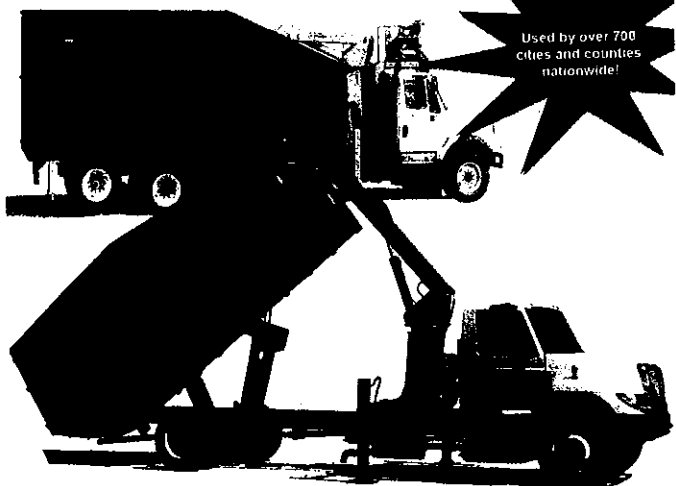
www.jonesedmunds.com

JONES EDMUNDS
ENGINEERS | ARCHITECTS | SCIENTISTS

Circle #53 on Reader Service Card

LIGHTNING LOADER GRAPPLE TRUCKS

the industry standard since 1978



- ~single operator turn-key system
- ~see 50% cost savings over handloading
- ~boom reach of 20 ft. includes 4 ft. tip extension
- ~dump body sizes range 24-45 cubic yards

Dealers nationwide!
Also available for rolloffs!



800-999-LOAD (6623)
www.peteresen.com
4000 BR-60 West
Lake Wales, FL 33827

Circle #67 on Reader Service Card

of providing cash flow for performance assurance.

Performance bonds are generally intended to complete construction of a building, not to provide ongoing service. They are not liquid, and the surety may contest draws—while the garbage piles up. Performance bonds may not clearly provide coverage for all of the contractor's pecuniary obligations, including liquidated damages, indemnifications, cost reimbursements, or fees (both franchise fees that the contractor may owe you or other solid-waste-management fees that it may collect from customers on your behalf). Since you may have chosen your contractor based in part on its MSW experience, environmental and litigation record, and client references, you probably don't want a bond surety to foist another contractor on you. So if possible, your contract should not allow forms of performance bonds that allow the surety to substitute contractors.


Letters of credit provide superior liquidity. You can draw upon a standby letter of credit by submitting a draw certificate to the bank without contractor authorization. (Your contractor may dispute your right to make the draw, but meanwhile, you will have the cash to pick up the garbage.) Contractors may complain that securing letters of credit makes rates less "competitive" than performance bonds. Bonds may (or may not) cost more than letters of credit, since the cost of both letters of credit and performance bonds is based in part on the contractor's creditworthiness. (Unlike insurance claims, the contractor must repay draws on letters of credit and performance bonds.) But if you require all proposers to provide letters of credit, the playing field is level. Credit costs may differ among potential contractors, but that is true regardless of whether you require a bond or a letter of credit. The contractor's real objection to letters of credit may be that they use up part of their line of credit or require disclosure as a contingent obligation on their books. As a compromise, you might allow the option to provide a performance bond for a larger amount than a letter of credit, reflecting the probable greater time and expense of liquidating the performance bond and giving the contractor the fiscal incentive to choose the letter of credit option.

Secure guaranties by a contractor's parent corporation, principal shareholder, or partner. (If it is a personal guaranty, make

certain you get a spouse's signature in community property state.) Guaranties are not necessarily redundant with letters of credit, but one more option in your arsenal of remedies. Secure the guaranty of the ultimate parent that holds revolving credit line, that has audited financials, and that has filed 10Ks with SEC. In your contract, include a cross default for defaults under the guaranty. Only accept a parent guarantor with audited financial statements. Ideally, municipalities should impose financial tests to ensure con-

tinuing creditworthiness of their guarantor (or contractor), but few local governments to date have secured this assurance. Short of breach, failing to meet financial tests (such as maintaining a specified corporate bond rating or meeting certain financial ratios) might trigger the obligation to provide further assurances of performance . . . as may be required in event of judgements over specified dollar amounts, prolonged labor disputes, or failure to pay creditors or debts (such as tipping fees).

Horizontal Recyclers
Raise Your Operating Expectations.




Solid Profits.

Peterson's horizontal recycler is an industry leader for profit and dependability. Our innovative, patent-pending Impact Release System ejects uncrushable material and re-latches for non-stop grinding.

Our multiple Quick-Change grate system allows operators more control and flexibility in producing materials that meet the tightest specifications.

Peterson leads the industry in US sales of horizontal recyclers. Call us today to find out why. Our specialized grinders can make your job easier — and more profitable.

Peterson's highly qualified dealers and salespeople will help you find the best solution for your operation.



Peterson™
Solid.

Peterson Pacific Corp
1.800.269.6520
www.petersoncorp.com

Circle #68 on Reader Service Card

For further discussion of performance assurance, see "Tra\$headed Ca\$h: Contractor Credit Risks That Can Trash Your MSW System" (*MSW Management*, September/October 2003, www.enr.com/resources/stories/0903/09030301.html).

many variations of this general indemnification commitment (e.g., with respect to sole or comparative negligence, approval of counsel, etc.), but the basic indemnification provision is aimed primarily at protecting you against likely tort suits by persons in-

Indemnities are corporate (or partnership or personal) promises to pay. They are unsecured obligations. Indemnities are worth only as much as your contractor's applicable insurance coverage or available credit. Your contract may require that your contractor secure insurance (or performance bonds) from insurers (or sureties) having specified capitalization or credit rating ranked and rated by A.M. Best. But A.M. Best does not rate the creditworthiness of your contractor. Strive to require performance assurance by third parties (such as banks issuing letters of credit) that cover your contractor's indemnity obligations. Visualize indemnification obligations that may be covered by insurance proceeds. (For further discussion, see "Evaluating Indemnification Clauses," *MSW Management*, May/June 1999.)

Indemnification may have the effect of lulling you and your elected officials into a false sense of protection.

Indemnification

Beware of false security. The form of your contract will doubtless contain indemnification-and-defense provisions. Your contractor promises to pay or to reimburse you for liabilities that you may incur rising out of the contractor's (negligent) performance or nonperformance of the contract. Your contractor further agrees to defend you in related litigation. You may have one of

jured or property damaged in accidents with the contractor (such as auto collisions with the contractor's collection vehicles, or self-haulers injured unloading their vehicles at the contractor's transfer station or landfill), or statutory liability (such as Superfund/CERCLA cleanup costs).

However, indemnification may have the effect of lulling you and your elected officials into a false sense of protection.

Insurance

Insurance backstops your contractor's indemnification. Your risk management department doubtless specifies that all public contracts contain insurance requirements detailing named additional insureds (and requiring applicability to each named

- ▶ Effective Dust Control
- ▶ EPA Approved Method
- ▶ Complete Odor Control
- ▶ Environmentally Safe

Control Dust and Odor

MICRO COOL
TM

MicroCool®
760.322.1111
Thousand Palms, CA
Toll Free 1.800.322.4 FOG

info@microcool.com www.microcool.com

Circle #62 on Reader Service Card

insured), types and amounts of coverage, deductible levels, covered risks and (im)permissible exclusions, insurer licensing and rating qualifications, notification requirements, self-insurance conditions, and miscellaneous provisions regarding primary coverage, and excess/not-contributory status. Commercial general, auto, employers and umbrella, or excess liability insurance address the probable tort damages. More specialized environmental impairment/pollution liability policies (or endorsements) address concerns of cleanup of landfill leaks and associated liability. (For MSW transport by barge, include wharfing liability. With respect to workers' compensation, include US longshoremen and harbor workers' coverage as per the Jones Act, seaman.)

But your risk-management department may not frequently deal with MSW risk issues. And there may be more questions than ready answers with respect to MSW liability. You may be well-served to work with a knowledgeable broker who can grapple with MSW coverage questions, such as the following:

1) Require a pollution overturn endorse-

ment (generally to an automobile liability policy) to delete the pollution exclusion relating to discharges of pollutants that are in or upon, being transported or towed by, being loaded onto or being unloaded from a covered vehicle. Here, the question arises: Is there a gap in coverage for intentional discharge? (For example, what if a driver dumps a burning load onto the street and it pollutes the storm sewer? What if the driver tips the load at the landfill and hazardous waste is exposed?) To cover intentional discharges, consider pollution liability coverage for transported cargo.

2) The value of commercial general liability coverage can be diluted if your contractor includes you as an additional insured along with tens or maybe hundreds of other municipalities. The question now is: Can you avoid coverage dilution in parent contractor policies by endorsement (such as Endorsement CG 25 034 97) providing that general aggregate limit applies to you? Or does it much matter? What is the major risk covered by commercial policies? If it is accidents and damage caused by dumpsters that crush fingers or roll into parked cars,

contractors may routinely pay associated damages as part of their deductibles without ever making claims on their commercial liability policies.

3) Contractual indemnity provisions in a commercial general liability policy may support the indemnities that your contractor provides in your contract, but read the definitions and conditions in the policy closely. Your contract may have to be specifically named by endorsement to trigger contractual liability coverage. The question here becomes: Does a contractual indemnity provision cover comparative negligence or non-tort liabilities, such as CERCLA?

Pollution/environmental liability policies are often written on a claims-made basis, which means claims must be filed while the insurance is in effect. However, pollution/environmental liability claims may not arise until many years after your contract has expired or terminated. Consider requiring your contractor to continue naming you as an additional insured and secure a claims-made endorsement to extend the reporting period. Make that obligation survive the expiration or termination of your

wheelwashing

mobydick
Wheel Washing Systems

We solve the problem of
dirty roads and highways

The World Market Leader
in the supply of
Wheelwashing Systems

www.mobydick.com

Wash and go! Automatic, fast, effective and with water recycling. Pick-Ups to Off-Road Dump Trucks, MobyDick provides more cleaning solutions than any other wheel wash manufacturer.

With its extensive range of options and ability to engineer specific systems, MobyDick will solve YOUR TRACK-OUT problem
- No matter what the site conditions may be!

Tel: 866-858-3353 Toll free

Circle #44 on Reader Service Card

contract. But develop an in-house protocol ensuring that you and your staff will monitor that continuing contractual obligation.

4) If your jurisdictional waste ends up in a Superfund site, you will likely be named a "potentially responsible party" (PRP). You must ask: As an additional insured required under a disposal contract, are you covered for your liability as a PRP? Remember, an additional insured is covered only for the named insured's (contractor's) primary liability. As a PRP, your liability does not derive from your contractor's.

Yet another relevant question is: Can you be an additional insured (for example, on disposal facility policy) if you have no contractual relationship with the primary insured (for example, if you have a collection contract that includes disposal)?

What about deductibles? Specify deductible levels prior to securing proposals or bids. If you require higher deductibles after awarding the contract (after competition has dispersed), your selected contractor may raise his service fees and recoup more than the incremental premium cost. You might conservatively size deductibles

based on projected contract profit—mindful that the lower the deductibles, the larger the premiums and the higher the service rates. However, many contractors—especially larger companies—have relatively high deductibles in omnibus policies that cannot be tailored for your contract. (Some contracts also require letters of credit that cover the gap between contractually required deductible levels and lower, actual deductible levels.) When allowing exceptions to deductible requirements, remember: The insurer must pay claim regardless of whether the insured contractor pays the deductibles. Yes, deductibles raise indirect contractor creditworthiness issues. But they may be a red herring. The more important credit issue is that of self-insured retention (SIR). An insurer is not obligated to pay SIR, which raises direct creditworthiness issues. Prohibit an SIR unless the contractor provides additional performance assurance (letter of credit).

In summary, this is the most important insurance lesson: Liability insurance from rated insurers is superior to indemnification that is not supported by ongoing

financial covenants. Allocate and devote more time to establishing or negotiating insurance requirements than indemnification provisions. (For further discussion, see "Insuring Against Integrated Waste Management Risks," *MSW Management*, July/August 1996.)

Assignment

Why do you care if your contractor sells its business to another company? You may have foregone a competitive procurement and contracted with a local, family-owned hauler that has provided service in your community for many years. The next generation of the principal's family may not want to stay in the garbage business; a larger company may give your small contractor a lucrative offer it can't refuse. For either reason, you may find yourself faced with a contractor you did not choose for a price you did not competitively procure.

Contrariwise, you may have conducted competitive procurement and awarded your contract after careful consideration of many factors in addition to price, such as experience, references, creditworthiness, environ-



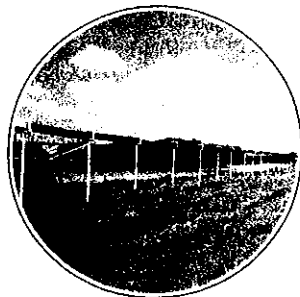
Enzymatic Odor Solutions, Inc.

(954) 442-8331

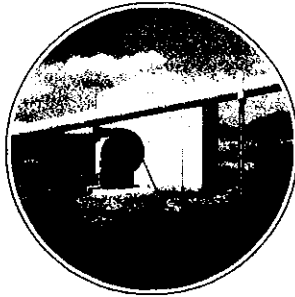
www.enzymaticodorsolutions.com

Enzymatic Odor Solutions, Inc. (EOSI) is a biotechnological corporation serving the entire waste industry with more than ten years of experience. We are a team of professionals who possess the knowledge, practical experience, expertise, skills, state-of-the-art technology, ability, and capability to solve your malodor problems.

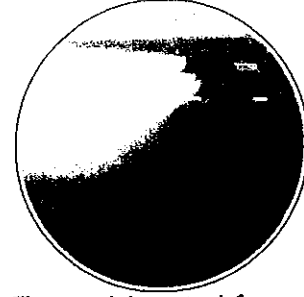
EOSI specializes in treating malodors at Waste Water Treatment Plants, Landfills (including soil remediation), Transfer Stations, Waste-to-Energy Facilities, Lift/Pump Stations, Yard Waste and Compost/Sludge Facilities, and Waste Hauling Operations.



Turbo Flow 2000 Vapor Pipeline



Turbo Flow 2000 Vapor System



Tractor Mounted Sprayer
Landfill and compost application

Circle #43 on Reader Service Card

mental responsibility, and litigation and regulatory compliance record. You don't want to work with a contractor that doesn't meet those same criteria.

Your region may be experiencing MSW industry consolidation, and you want to maintain service provider diversity in the face of monopolistic price threats.

In order to foreclose the possibility that you may be forced to work with a service contractor that you did not choose or do not want over the remaining term of your agreement, your contract should give you the right to consent to a broadly defined assignment or transfer of your contract—or the “transfer” of a parent guaranty that provides credit support for your contract—to another company. Transfer should include:

- Sale, exchange, or other transfer of “ownership” or control of your contractor
- Issue of new stock or sale, exchange, or other transfer of x% or more of the then outstanding common stock of, or partnership shares or equity interest in, your contractor
- Dissolution, reorganization, consolidation, merger, recapitalization, stock issuance or reissuance, voting trust, pooling agreement, escrow arrangement, liquidation, buyout, or other transaction resulting in a change of ownership or control of your contractor
- Assignment by operation of law, including insolvency or bankruptcy, making assignment for the benefit of creditors, writ of attachment of an execution being levied against your contractor, or appointment of a receiver taking possession of any of your contractor's tangible or intangible property
- Sale or other transfer of x% or more of the value of assets of your contractor, except in the event of closely held contractors, for sales or transfers to parents, grandparents, siblings, children, and grandchildren of persons having a shareholder, partnership, or other equity interest in your contractor on the agreement execution date (“immediate family”) or trust created primarily to benefit members of the immediate family
- Substitution by a surety company providing any performance bond of another person or entity for your contractor to perform services under your contract
- Assumption of any of your contractor's rights under your contract or assumption by, delegation to, or takeover of any

of your contractor's obligations, duties, or responsibilities under the contract, by anyone other than your contractor, whether by subcontract (unless you approve it), or any other mechanism

- Any combination of the foregoing (whether or not in related or contemporaneous transactions), with or without consider-

Although including a list may not weaken your straightforward, contractual, and legal right to grant or deny consent in your sole discretion, it may create political or practical constraints on exercising that discretion. The assignee company may produce documentation demonstrating compliance or reasonable satisfaction of every item on

One important lesson is the superiority of liability insurance from rated insurers to indemnification that's not supported by financial covenants.

ation, which has the effect of any transfer or change of “ownership” or control of the your contractor

One can define *ownership*, for example, by reference to provisions of the Internal Revenue Code.

Cost Recovery

Provide for your contractor's up-front deposit to cover your assignment due diligence, together with obligation to reimburse you for additional investigation costs and the cost of enforcing your assignment consent rights.

Sole Discretion

Although it may seem reasonable to agree that you will be “reasonable” in granting or withholding your assignment consent, this is an important instance where you do not want to be second-guessed in court as to whether or not your denial was “reasonable.” It may be important to your elected officials and citizens to do business with locally owned and managed haulers or to do business with environmentally responsible contractors. If the proposed acquiring company shows billions in assets and credit lines, millions of residential and commercial accounts, and many thousands of municipal contracts, a court may find that your denial is unreasonable. Reserve your right to consent in your sole discretion.

Some contracts list documentation that the assignee company must submit covering your potential due diligence concerns.

the list, making it difficult to raise unlisted or less quantifiable concerns. If you reserve sole discretion, presumably the acquiring company will be cooperative in providing you with requested documentation to facilitate consent, whether or not the documentation is itemized in your contract or merely in your due diligence request letter.

Due Diligence

When you solicit competitive proposals (or bids) for services, you may often begin with a request for qualifications or request for proposals that contains detailed requests with respect to the proposer's financial creditworthiness, applicable waste service experience, litigation and environmental compliance history, or municipal references. Make these same enquires about a proposed assignee. And due diligence is now easier when you can surf the Web. Helpful sites include *Edgar*, which lists securities filings, related news articles, and analysts' reports: www.sec.gov/edgar.shtml. You can access news articles for papers located in the relevant local jurisdictions. McGraw Hill offers its *Focus* reports on industries, including date of founding, employees, shareholders, subsidiaries, revenues, officers, directors, auditors, banks, news items including new offerings, and mergers and acquisitions, as well as litigation lists.

Conditioning Consent

After conducting your due diligence, you may conclude that you will consent—but

only if you receive additional protection. For example:

Criminal conduct—Local events may make you or your elected officials more or less sensitive to assorted criminal conduct. If your contract does not already include criminal conduct prohibitions, you might add one such as the following, specifying bad acts by named bad actors (persons or related corporations):

- Fraud or criminal offense in connection with obtaining, attempting to obtain, procuring, or performing a public or private agreement related to recyclables, greenwaste, or solid waste services of any kind
- Bribery or attempting to bribe a public officer or employee of a local, state, or federal agency
- Embezzlement, extortion, racketeering, false claims, false statements, forgery, falsification or destruction of records, obstruction of justice, knowingly receiving stolen property, theft, or misprision (failure to disclose) of a felony
- Unlawful disposal of hazardous or designated waste
- Violation of antitrust laws, including laws relating to price-fixing, bid-rigging, sales and market allocation, and unfair and anti-competitive trade practice laws, including with respect to inflation of waste collection, hauling, or disposal fees

In the event of criminal conduct by the named persons or related corporations, the contractor may effectuate a cure, such as firing the responsible person or removing that person from your contract administration. If the proscribed conduct occurs within your jurisdiction or with respect to your contract, you may want to have

termination rights.

Flow-control challenges—competition with local government, transfer, processing, and disposal. Large companies experience enormous volumes of litigation, including insurance and employment claims, which may or may not be directly relevant to providing waste collection service in your community. However, your staff or elected officials may be very concerned about a history of litigation with municipalities, especially with respect to flow-control challenges. Your decision to allow assignment may depend on what integrated waste management services you provide. If leaking waste from your system to the proposed assignee contractor's own vertically integrated system concerns you, add a facility designation provision to your contract. Make the designation clause non-severable, cite its breach as an enumerated event of default, and specify compensatory (or liquidated damages) for breach.

Vertical integration—collection, transfer, and disposal. If vertical integration is an issue for your community, you might qualify your assignment consent as follows:

- Secure the right to consent to provision of goods and services by the proposed hauler's related companies in order to preclude circumvention of existing assignment rights.
- Require a rate adjustment to share cost savings resulting from the consolidation with your rate-payers.
- Secure contractual termination-for-convenience rights, including buyout prices so that you would have greater flexibility to substitute a new service provider in the event that the proposed hauler's business strategy adversely affects competition in your collection market or threatens the economic viability of your waste system.
- Secure equipment acquisition rights under your collection agreement to further facilitate hauler substitution in adverse circumstances.
- Condition consent on the proposed hauler's committing not to compete with you (if legal under your state law) for waste disposal if its counsel delivers an opinion that non-competition commitments were legal, valid, and enforceable.
- Get a guaranty of performance from the parent of the proposed hauler, including guaranty cross defaults under the collection agreement.
- Be sure to secure a schedule of payments for any future consented assignments.

For further discussion of contractual assignment language, due diligence requests, and consent conditions, see "Protecting Yourself From the Vertical Integration Grab," *MSW Management Elements* 1999.

You may dismiss these contract provisions as "boilerplate," but they can determine your destiny when performance goes awry.

Definitions

Precision, precision, precision! Use defined terms, even for those that may seem obvious but lie at the heart of service ("residential/commercial," "solid waste," etc.). Beware the danger of inconsistency between the text of the contract and appended attachments, such as rate methodologies, acceptance tests, or hazardous-waste screening protocols written by different authors.

It's not micro-managing or nit-picking: Define time-sensitive words and phrases, such as *prompt*, *immediate*, *as soon as possible*. (These prove especially important if you want to assess liquidated damages for breached performance obligations.) Specify if a day is uniformly a calendar day or your contractor's or your own workday.

**RADIOACTIVE
WASTE
MONITORS**
by
**Ludlum
Measurements,
Inc.**
www.ludlum.com

P.O. Box 816 • Sweetwater, Texas 75646
800-823-8828 • Fax: 325-335-4872
www.ludlum.com

Serving The Nuclear Industry Since 1962

Circle #59 on Reader Service Card

Say it once in a contract section governing construction and interpretation of the contract (for example, *including* means “including, without limitation” everywhere it occurs in the contract). Don’t interject such modifiers in some places and not others, thereby risking that a litigator subsequently cites uses or omissions of such words to draw negative inferences.

Provide that all discretionary actions, such as consents or approval, are deemed to be exercised “reasonably” unless sole discretion is reserved.

Include an “integration” clause. It provides that the contract language supersedes RFP/RFB, proposals, correspondence, drafts, or minutes. You may feel that you put much time and effort into drafting your RFP/RFB, and that your contractor spent much thought and consideration into preparing its proposal. You may be loath to relegate them to the file cabinet. Do it, or you’ll be sorry! Inconsistency born of proposals that are incorporated by reference into the executed agreement can lead to litigation. Instead of appending procurement documents, substitute detailed findings such as preambles or “whereas” clauses to tell your story.

Specify that the contract will be governed by the law of your state, “without giving effect to the states’ principles of conflicts of laws.” Especially if your contractor is a national company, you want assurance that your state law applies.

Excise or sever contract provisions that courts having jurisdiction should hold unenforceable, unconstitutional, illegal, void—but perhaps do not sever a facility designation clause. If designation is central to your deal, retain the right to terminate.

Consider contract interpretation rules such as the following: “This Agreement must be interpreted and construed reasonably and neither for nor against either Party, regardless of the degree to which either Party participated in its drafting. Contractor acknowledges that it determined to participate in the procurement of this Agreement upon its own choice and initiative and during the course of that procurement [City] solicited Contractor’s comments, exceptions, and proposals with respect to provisions in the Agreement and incorporated certain of those comments, exceptions and proposals. The Parties have negotiated this Agreement, including liquidated damages, at arm’s length and with advice of their respective attorneys, and no provision in this Agreement is construed against the City solely because it prepared this Agreement in its executed form.”

Plain English

A savvy city attorney once admonished: “Give me an easy-to-read MRF agreement. I want the shift supervisor to be able to throw this contract down on the sort line, read it, understand it, and enforce it!” Much talk circulates on transforming opaque, abstruse (some would say “maddening”) legal-cse language into plain English and make it reader-friendly.

This need may not be wishful thinking. You can begin with these suggestions:

- In the explanatory preambles or findings at the beginning of the contract, using the word *whereas* is not necessary. You can use complete sentences, even paragraphs, to tell your story.

NEW

20K Steer

CAT'S EYE
TIRE PRESSURE MAINTENANCE SYSTEM

PROPER PRESSURE UNDER INFLATED SEVERELY UNDER INFLATED

Link[®] Mfg., Ltd. Phone: 800.222.6283 Fax: 712.722.4876 www.linkmfg.com

Circle #56 on Reader Service Card

- Don't use *herein*, but rather *in this contract*; instead of *hereafter*, use *after the execution date*.
- Outline (sub)sections, clauses, and lists; avoid run-on sentences and "provisos." Using outline and bullets can clarify meaning and is easier to read.
- Avoid defining terms parenthetically within a sentence. The meaning may seem clear to you, but later on litigators may question where the definition inserted in a long, compound sentence begins or ends.
- Limit *such* to examples. *Such* actually ex-

ment, do a global replacement of *will* for *shall*.

And when you proofread those substitutions, invest another hour or two to transform all passive sentences into clear contractor obligations using active verbs: not *All reports shall be submitted* but *Contractor will submit reports*.

Expiration or Termination

Words matter, especially in contracts. A contract *expires* automatically after a stated term, such as seven years. A contract *terminates* only by affirmative action of one of

Termination—Depending on the circumstances of termination, your options—and contractor's obligations—vary. For example, you may have the option, or the contractor may have the obligation, to purchase/sell or transfer assets. Determine asset purchase price, if any, under the following scenarios:

- **Convenience no-fault**—Convenience termination provides an alternative to litigious default termination or where you want to implement new program changes at a competitive, market price. Pay the contractor its unamortized capital investment plus a specified "lost profit." Specify the time/manner of depreciation for asset type (such as a seven-year, straight-line depreciation for carts), or a protocol to select a mutually acceptable appraiser to determine market value. Consider having compet-

Termination may never occur, but sooner or later—even after extensions or renewals—every contract will expire. Be prepared.

pands meaning. For precise reference, use *that* (or *which*) or simply *the*.

- *Shall* is not what it seems. And this is the most surprising plain English suggestion: purge *shall*, replacing it with *must*, *will*, or *may*. (This is referred to as the "A-B-C rule" in Britain and Canada.) Or use *shall* only when the actor is the subject of sentence. (This is referred to as the "American rule.") Think about it: *Shall* is not only used to mandate an action. *Shall* actually has many meanings, some of which are not obligations. For example:
- *Contractor shall perform* imposes a duty on the subject contractor, but *notice shall be made* imposes a duty on an unnamed person.
- *Contractor shall be insured* seems to impose duty on the contractor, but it actually imposes a duty on an unnamed person.
- *Time shall not further be extended* means *Time may not be extended*.
- *Objections shall be filed* is a discretionary or a conditional duty rather than an absolute one.
- *Contractor shall have provided notice* is in the future-perfect tense. Use the present tense.
- *City shall be reimbursed* is an entitlement, not a contractor obligation.
- *Party filing claim shall notify* is directory, meaning *should*.

Before sending out your next draft agree-

its parties in accordance with the language of the agreement, such as for 1) defaults, 2) continued uncontrollable circumstances, or 3) convenience.

For more detailed suggestions on how to provide for smooth transition to new contractors upon expiration or termination of your contract (especially for collection services), and how to articulate your rights and contractor's obligations after your contract ends, see "In the Beginning Is the End: Planning for a Smooth Transition Following Expiration or Termination of Your Collection Contract," www.enr.com/resources/article/0,4184,391116,00.html.

In summary, consider:

Expiration—Termination may never occur, but sooner or later—even after extensions or renewals—every contract will expire. Be prepared.

Absent specific purchase rights and obligations, in the contract your contractor should acknowledge that it has no right to recover any unamortized asset value upon the expiration of the agreement.

The contractor must leave premises (such as a MRF or transfer station) clean—including hazardous waste remediation; convey/discharge any ground or site lease.

If the contractor has financed capital assets on your behalf, the contractor must transfer title of real or personal property, along with requisite warranties/deed, as negotiated.

ing contractors propose the "lost profit" component. In competitive procurements, you have greater likelihood of securing a liquidated dollar amount or prescribed formula (such as nine months defined "net" service fees based on contract-to-date average).

- **Uncontrollable circumstances**—Termination for contractually defined "uncontrollable circumstances" that continue for a specified period of time is an exercise in risk-sharing. This can include not only prolonged labor disputes but changes in law that require additional capital investment or altered operational protocols that increase the service fee more than a specified amount annually or in the aggregate over the contract term.
- **In event of default**—In this type of termination, the contractor has not fully or timely met its obligations. It is at fault. Ask this: Should the contractor forfeit its assets (such as cart ownership)? Consider assessing compensatory damages for costs of contract enforcement and reprocurement and also for your projected increased incremental costs of substitute service. (These damages—as well as unpaid fees, reimbursement costs, and other damages—should be covered by your performance assurance. Be careful—many performance bonds may not only limit liquidated damages, judgments, and regulatory fines and penalties, but also

contain broad exclusions that prevent recovery or your compensatory damages.)

For facility operation agreements, the same issues described above under "Expiration" apply (acquire assets; clean the site; reconvey or transfer title, etc.).

But, in addition, your facility contract should obligate your contractor to assign subcontracts, supply contracts, operating permits, or maintenance agreements to you. For either expiration or termination with respect to collection services, make certain that the responsibilities of the outgoing and incoming collection contractor dovetail, especially with respect to containers: Who picks up old ones? Must they remain for a specified time, or until new ones are delivered? Consider container purchase options upon both expiration and termination (convenience, uncontrollable circumstances, and default) scenarios.

Termination Protocol

In competitive procurements where proposers lose evaluative points for taking

exceptions to contract terms, you can often secure termination protocols that are simpler to effectuate:

- Instead of arguing over materiality, list the major performance defaults that trigger termination (such as failure to pick up specified number or percentage of customers, not accepting waste for specified number of consecutive/aggregate days, failing to provide insurance or performance assurance, failure to pay fees).
- Avoid the cycle of breach-cure-breach. Make repeated breaches an itemized default.
- Allow contractor to cure the balance of minor breaches within specified time periods. Tailor notice periods to the type—and seriousness—of the breach. Avoid open-ended cure periods and arguments over "diligent" efforts to fix the breach.
- De-politicize the termination protocol.
- Tailor the notice period to each default immediately to protect health and welfare or failure to maintain insurance, and 30 days for other defaults.

- Indicate which defaults (such as service defaults) are excused by "uncontrollable circumstances" and which are not (fraud, misrepresentation, failure to procure insurance, or failure to pay monetary amounts).
- Give your contractor a second chance by including temporary suspension in lieu of termination.

Survival

For most things, it's not over till the fat lady sings. But for MSW, it's never over. There's always garbage. Make certain that you protect yourself after your contract expires or is terminated.

In legal parlance, these provisions should *survive*, meaning that you can continue to enforce them:

- Leaving, removing, or selling assets
- Paying damages or reimbursement
- Defenses and indemnities
- Completing and submitting reports (for example, disposal reports for potential Superfund defense, or financial date for franchise fees)
- Maintaining insurance (endorsements



www.mccloskeyinternational.com

It just doesn't get any easier than this...
or more flexible.

Roll onto your job site with a McCloskey portable trommel and you're ready to get right to work.

Every McCloskey trommel screener sets up in just minutes with **no tools required**. Simply move it into place and **turn the key**. Next, position the 180° conveyor.

Setup is complete.

McCloskey trommels take the downtime out of changing sites to make it easy for you to take on more jobs and complete your work profitably. And when you need to change grades or materials, we make that easy, too, with our patented Drum X-Change System.

For the best in portable screening equipment, the choice is simple. **Count on McCloskey** to make screening easy.

McCloskey
INTERNATIONAL

McCloskey International Limited
1-877-TROMMEL
(1-877-876-6635)



Circle #60 on Reader Service Card

to extend reporting the periods on claims made policies or to make you additionally insured)

- Record inspection / audit rights
- Notice of record destruction
- Right to take custody of records that may be lost or destroyed
- Acknowledgments and contractor's representations and warranties that speak as of the date you and the contractor executed your contract or when the contractor submitted a report or certification

Secure the right to specifically enforce (enjoin) these continuing obligations. Require that the contractor maintain performance assurances until these specified obligations satisfied.

Conclusion

In conclusion, be prepared to implement these practical 10 tips:

1. **Term**—Begin structuring your business deal by setting contract term. Consider capital amortization. Pick the most appropriate corresponding service fee adjustment methodology. Allow short-term, monthly term extension options, at a minimum.

2. **Enforcing Service Scope and Performance Standards**—Offer performance bonuses. Create remedies short of termination, such as compensatory and modest liquidated damages reflecting degree of contractor control. Control the purse strings for damage offsets.

3. **Excuses for Non-Performance**—Allow labor disputes for a limited time period with your right to provide effective substitute service with the contractor's service assets.

4. **Performance Assurance**—Secure performance with letters of credit rather than performance bonds. Size them based on your contract enforcement timing protocol and service fees. Also secure parent guaranties.

5. **Indemnification**—Don't be lulled into a false sense of security by securing contractor indemnities without credit assurances.

6. **Liability Insurance**—Get good advice on insurance coverage. Read the fine print of policies knowledgeably.

7. **Assignment**—Secure the right to consent to the broadly defined "transfer" of your contract.

8. **Contract Construction and Interpre-**

tation—Don't scorn "boilerplate" rules of contract construction and interpretation. Spend a day to convert your draft agreement to plain English.

9. **Expiration or Termination**—Visualize service transition at the end of the contract. Analyze different reasons to terminate and prescribe what happens with service assets. Sit down in a quiet moment and walk yourself through the termination protocol.

10. **Obligations That Survive Expiration or Termination**—List the obligations you need to enforce after contract ends in order to preserve health and safety and maintain customer satisfaction.

And finally, even in a competitive procurement, solicit your potential contractors' comments on the contract that you prepare.

Address your contractors' comments and questions. Consider their requests so that you procure a win-win contract that works for you both, throughout the term of your mutual agreement.

MSW

Author Constance Hornig, Esq., heads her own law firm in Los Angeles, CA.

WALINGA

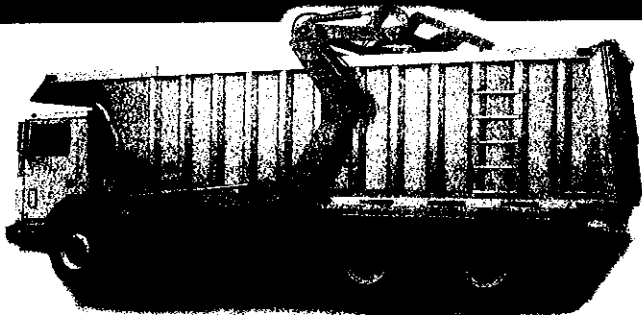
RECYCLING AND RENDERING UNITS

WALINGA 'CHAMPION' RECYCLER

46 Yard Capacity, Single or Dual Loading, FRP Smooth Side Construction, 4-7 Yd Hydraulic Bustle Gate

Optional Equipment:

Hydraulically Operated Moveable Dividers, Expandable Buckets, Automatic Cart Lifters, Double-sided Units, and Compactors. Walinga 'Custom' Cab Conversions



RENDERING/COMPOST LOADER

All Aluminum Welded Construction
Full Opening Tailgate
Heavy Duty Lifting Mechanism
Available in Lengths of 18Ft Trucks to 45Ft Trailers

Some of the many options are:

In Cab Remote, Salad Buckets, Loading Winch, Rear Access Controls, Load Dividers, Wireless Remote Controls, Pressure Washer, Sealed Tailgates and Variable Fork/Buckets

www.walinga.com



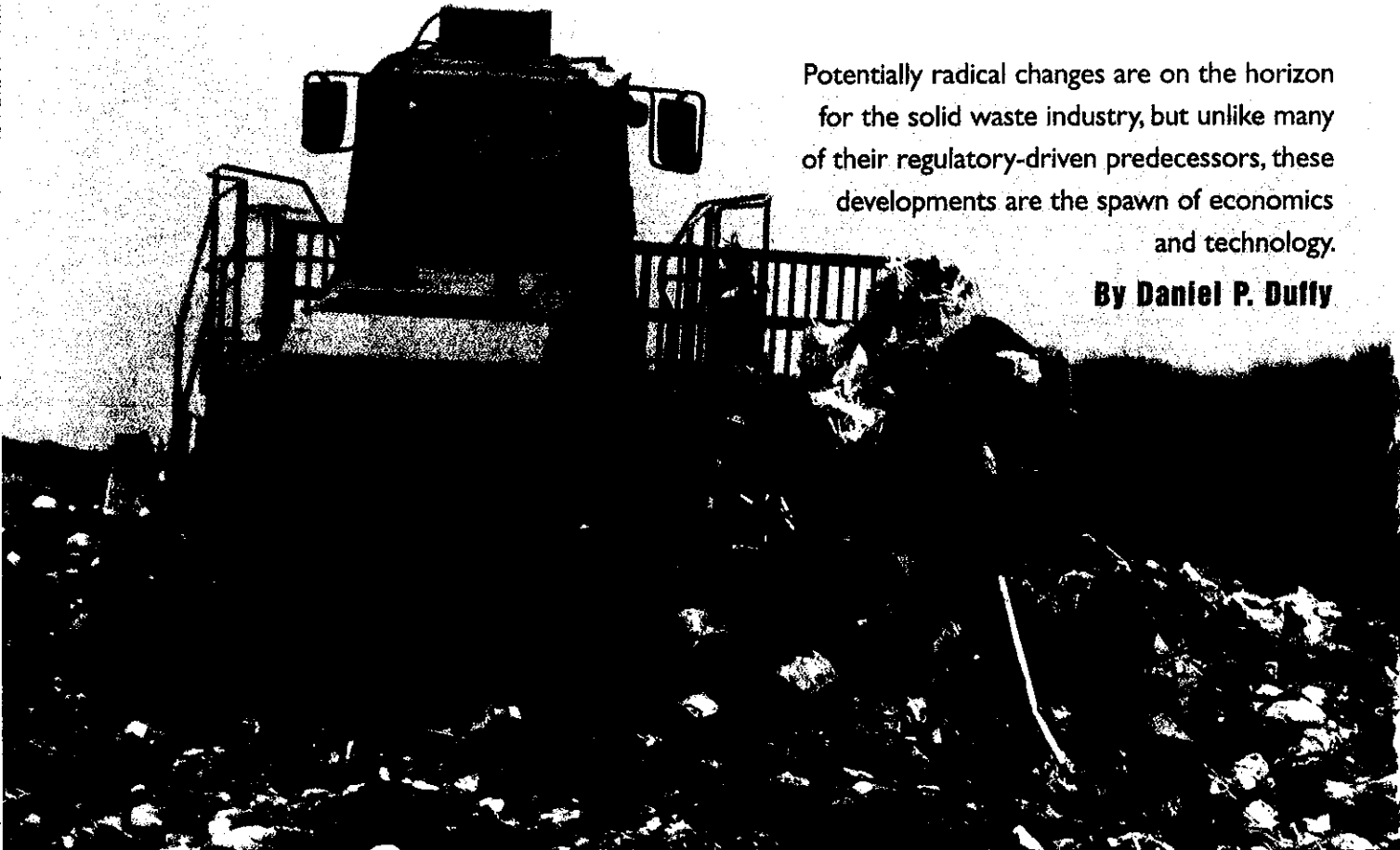
WASTE MANAGEMENT DIVISION

Head Office:
R.R. #5, Guelph
ON Canada N1H 6J2
Tel: (888) 925-4642
Fax: (519) 824-8520

70 3rd Ave. N.E. Box 1790
Carman, Manitoba
Canada R0G 0J0
Tel: (204) 745-2951
Fax: (204) 745-6309

1190 Electric Ave.
Wayland, MI 49348
Tel: (800) 466-1197
Fax: (616) 877-3434

Circle #94 on Reader Service Card



Potentially radical changes are on the horizon for the solid waste industry, but unlike many of their regulatory-driven predecessors, these developments are the spawn of economics and technology.

By Daniel P. Duffy

MSW Processing: Past, Present, and Future

Faced with the increasing political difficulty and economic cost of permitting and constructing landfills in expensive real estate markets, communities in high-population-density areas are giving new waste management technologies a serious look. Adoption of these future technologies may mean the end of the landfill's monopoly on waste management operations. But before we can see where we're going, let's start by looking at where we have been and where we are now.

Pre-Subtitle D Waste Management Practices

Prior to the publication of the Subtitle D regulations governing MSW management and disposal, waste management techniques (collection, disposal, protection of health and the environment, etc.) were at best haphazard. Waste was deposited in unlined

landfills that were often no more than pits excavated down until groundwater was encountered, which prevented further excavation. Waste would therefore be in direct contact with groundwater, creating extensive contaminant plumes. The waste was rarely covered on a regular basis, and open-dump burning of the waste was a regular practice resulting in air pollutants and blown debris. Burning was done to minimize airspace utilized by the deposited waste, and it was a form of volume reduction that was rarely done. When a landfill was closed, it received a simple soil cover of varying thickness on irregular slopes. Surface-water runoff was rarely controlled, and sheet flows often resulted in gully formation, serious erosion, and the carrying of sediment into local surface waters. When landfill gas was a noticeable problem (made noticeable not by

monitoring but by a serious odor problem or the killing of large areas of vegetation), passive vents would be installed around the perimeter or in the middle of the dead vegetation. Environmental sampling and testing of groundwater, surface water, and leachate was unknown.

In addition to these serious environmental shortcomings, pre-Subtitle D landfills tended to be small and scattered dumps. Instead of being serviced by one big landfill or a few large landfills, many municipalities had multiple small dumps ringing their communities. Subtitle D's impact was not just environmental; it was economic. The small mom-and-pop town dumps could not hope to raise the capital needed to construct and operate a landfill that met the new requirements. Subtitle D indirectly gave rise to the large regional and nationwide landfill and waste management companies that are



transfer stations and rail hauling from out of state or even cross-country.

Current Waste Management Practices

Subtitle D replaced the old haphazard methods of landfilling with a single, uniform, minimum standard for landfill construction and operation. The states have the option to make these federal regulations stricter (and many have), and many of these regulations have been tweaked and refined over the years by guidelines and rulings that have removed much of their original ambiguity.

The landfill industry now operates on a level playing field where every waste management firm has to meet the same standards. Each MSW landfill has to have a composite liner system consisting of compacted clay overlain by a flexible membrane liner, a layer of sand and piping installed above this liner to extract and remove accumulated leachate, and a final cap of similar construction. In addition to these structural elements, each landfill has to have mechanical systems designed to remove and incinerate explosive landfill gas, collect surface-water runoff and remove accumulated sediment prior to offsite discharge, pre-treat and dispose of extracted leachate, and reduce groundwater buildup. Lastly, each landfill has to meet a set of minimum monitoring requirements and sampling frequencies for leachate, groundwater, explosive gas, and surface water.

Disposal operations require the placement, spreading, and in-place compaction of the waste. This is usually performed with specially designed, heavy earthmoving equipment equipped with dozer blades and

for environmental protection with the placement of daily cover material (either a layer of soil or a synthetic tarp cover) to minimize odors, vectors, blown debris, and the infiltration of precipitation. Modern landfill operations are marked by uniformity to nationally applied standards. Though they may vary significantly in size, configuration, and setting, each landfill's component and operational tasks are shared in common with little variation.

However, compared with the uniformity of the present, the future presents us with a variety of new methods for the safe management, disposal, and even beneficial reuse of MSW. So let's stare into the crystal ball and take a look at those technologies most likely to impact the MSW management industry in the foreseeable future.

Plasma Arc Reduction

What if we could completely eliminate our waste while generating electricity and a combustible synthetic gas? The technique to do so is called plasma-arc reduction, and it takes classic waste incineration to the next level by vaporizing waste with temperatures hotter than the sun (over 10,000°F, or 5,500°C). A plasma arc is basically a controlled lightning bolt that passes through the waste, resulting in extremely high temperatures. Its intense heat breaks down organic waste (paper, plastics, food scraps, wood, etc.) into elemental hydrogen and carbon atoms, which combine to make natural gas. The inorganic materials (metals, glass, etc.) are melted down and vitrified into a hard slag material. After the waste is vaporized, only steam, natural gas, and the hard slag

the norm today.

Oddly enough, with fewer and larger waste companies, the industry is more cost-competitive than when we had many more—but smaller—operators. The small operators of pre-Subtitle D times lacked the capacity to increase the amount of daily waste intake. They lacked the volume, and they lacked the operational resources (staff and equipment) needed to manage increased waste volumes. They had no "surge capacity," unlike a modern landfill. A large, modern landfill can compete for larger waste receipts (up to its permit limits), gearing up staff and equipment to handle the increased workload and having enough designed airspace to allow for the increased waste disposal without having to immediately expand the landfill's permitted volume. This increased capacity is fed by improved waste hauling techniques, such as regional

Subtitle D replaced the old haphazard methods of landfilling with a single, uniform standard for landfill construction and operation.

sheepsfoot rollers. Placement is performed in a controlled manner with tracking of airspace utilization and quantitative measurement of the compaction efforts. Landfill operations also take into account the need

residue are left. The steam is vented off, while the gas is used to generate power and the slag is used as a building material. In theory, the process could be a net generator of electricity (the gas turbines producing

more kilowatts than are needed to operate the plasma arc) and result in a near complete consumption/utilization of the waste material, making landfills unnecessary.

But as the saying goes, "We should all move to Theory, because everything works in Theory." The jury is still out regarding the question of whether or not this technology works as advertised. Some pilot projects have ended badly. Furthermore, if chlorine is present in significant quantities, the process may result in dioxin emissions.

However, analysis of this (or any other) technology's market potential should not be performed in isolation. Even if the process is a net consumer of electricity, if there is no market for the slag as building material, if the managing of dioxin emissions results in additional operational costs, or if the plasma-arc process is otherwise oversold and does not work as advertised, it may still have market viability. If its overall operational costs or losses still do not exceed the capital and operating costs of regional landfilling, plasma-arc waste reduction would be an attractive option to communities strapped for disposal airspace and unable to either expand existing landfills or build new ones.

St. Lucie County, FL, is one community that is deciding in favor of plasma-arc technology. The county intends to build a \$425 million, 100,000-square-foot facility designed to vaporize 3,000 tons per day. Not only does it intend to divert its wastestream into this new facility instead of the county landfill, but it intends to dig up the waste in the landfill itself and eliminate it with plasma-arc reduction. The goal is to have the landfill completely eliminated and opened up for commercial development within 18 years. The steam generated by the process will be sold to a local juice plant to run its turbines. It is also likely that the projected value of the land (in a county experiencing skyrocketing real estate costs) that will be made available by elimination of the landfill was a factor in determining the economic viability of this project. Needless to say, these are ambitious goals, and it will be worth watching the progress.

Waste Pyrolysis and Gasification

Similar in objectives to plasma-arc reduction but different in technique are pyrolysis and gasification of waste. As with the previ-

ous technology, pyrolysis and gasification aim to produce a useable source of clean energy while radically reducing the waste mass. Instead of incineration, the processes heat the waste under strictly controlled pressure, atmospheric, and moisture conditions that prevent combustion from occurring. Instead, the waste is converted to liquid and gaseous fuels.

Pyrolysis isn't really a new process, being as old as the conversion of wood to charcoal. During pyrolysis, waste is degraded by intense heat in the absence of oxygen, which

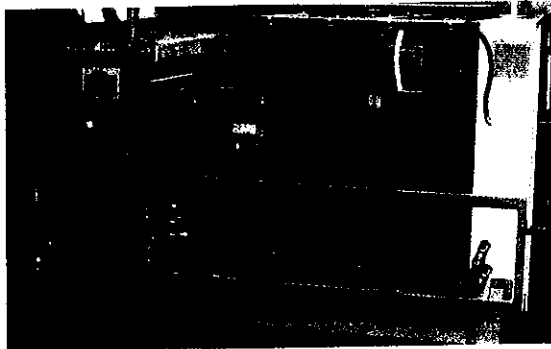


Photo: Eriez

Metal separation systems are in widespread use.

makes combustion impossible. What results is a mixture of solid chars, liquid oils, and synthetic gas. Gasification differs somewhat with the addition of limited and controlled amounts of oxygen. This breaks down hydrocarbons in the waste to make synthetic gas. Again, this is not strictly a new process, going back to coal gasification techniques, but it is a new application when used on waste. To put it simply, both processes substitute waste for the more traditional wood and coal feedstocks.

An apples-to-apples comparison would require matching pyrolysis and gasification to the established technology of mass incineration of waste. When waste is incinerated, it produces heat to make steam, exhaust byproducts that have to be scrubbed from emissions, and ash residue. The ash is typically landfilled, though it takes up only a tiny fraction of the original waste volume (usually less than 10%). By comparison, pyrolysis and gasification can provide a wide spectrum of recoverable byproducts. Not only can the liquids and gases be used as fuel, but they can also be further refined and used as chemical feedstock for industrial applications. A bonus byproduct of gasification is hydrogen, which can be sequestered and utilized as a source for fuel cells and other applications for the "hydrogen economy." Though it requires the application of energy

to create these fuels, they can run gas engines and turbines at much greater efficiencies compared with steam produced by direct incineration of the waste. If not used as the primary waste management option, pyrolysis and gasification at smaller scales can be used to manage residue waste from recycling operations or in conjunction with composting or traditional landfilling.

Waste to Oil

Operating at temperatures and pressures much lower than those required for plasma arcs, pyrolysis, or gasification, thermodepolymerization (TDP) works to accelerate the natural process of organic decomposition and production of hydrocarbons. Instead of a complete breakdown of the organic waste materials into elemental atoms, TDP causes the materials' long polymer chains to break down and disassociate into shorter, simpler molecules. A sudden venting of steam causes a rapid drop in pressure. Distillation then results in crude oil and natural gas. Earlier TDP

techniques utilized direct incineration, but the modern method substitutes the injection of a stream of water under high pressure.

Most famously, this process has been referred to as "turkey guts to oil" since its first large-scale application has been at a facility rendering turkey entrails and other waste from a slaughterhouse. Biological waste is not the only material that can be treated by TDP. Scrap tires, organic sludges, agricultural waste, wood pulp, paper, and other organic wastes can be fed into the process. Like plasma-arc reduction, the economic viability of this process remains to be seen. While the sale of the resultant crude oil can defray costs somewhat, it is still not known if the overall net costs will keep it competitive with standard landfilling operations or other new technologies. Additional operating costs will also be required for odor controls and exhaust scrubbing. While not a magic bullet, TDP does have the potential to become the waste management option of choice for regions with high landfill operating costs.

While these processes primarily manage organic wastes, they still represent a potentially significant change in waste management techniques. Approximately 75% of the MSW stream consists of organic materials. While much of this is already diverted from landfills by mandatory composting programs in many states, these techniques could

potentially cut in half the amount of waste that needs to be landfilled. They also represent a high-tech fix to the problem of waste disposal. Some decidedly low-tech options are available that involve changes in landfill site operations.

Landfill Mining

In addition to the various components of the MSW stream, a typical landfill consists of 5% to 25% dirt by volume. This dirt is cover soil used in daily cover and intermediate closure operations. Landfill mining and reclamation involves the excavation of previously deposited waste. The excavators (clamshells, backhoes, front-end loaders, and hydraulic excavators) load the partially decomposed waste into transporters (hauling trucks or conveyors) that take the waste to be filtered (by shredders, vibratory screens, sieves and trommels). The goal is to recover the up to 10% of the landfill mass that consists of potentially valuable metals and other recoverable materials with sufficient market value.

Given the environmental and health hazards that result from the exposure of par-

tially decomposed waste (explosive gases, disease vectors, organic contaminants, etc.), landfill mining should be limited to those landfills old enough to be sufficiently stabilized. Through stabilization, the percentage of the landfill volume consisting of organic materials is reduced to its minimum. Once started, landfill excavation isn't much different than strip mining. Neither the equipment nor the method is new. Where possible, any significant strata of soil cover are excavated and stockpiled separately.

Other materials and the soil mixed up in the waste present a more unique challenge. Pre-shredding the waste material into small particles allows for the efficient use of sorting screens. Smaller soil and organic particles pass through the screens, leaving behind larger objects consisting mostly of metals (primarily aluminum). Eddy-current separators (using rapidly spinning magnetic rotors) create an electrical current even in nonferrous (but conductive) aluminum, creating a localized magnetic field that allows for easy separation of the material. Other metals, such as steel and copper, are also recovered.

For most market conditions, the landfill-mining and waste-separation process isn't cost-effective, though it does result in secondary cost savings. For example, the cost of separating aluminum from excavated waste is significantly lower than the cost of processing aluminum from ore. Another indirect cost saving results from the freeing up of additional airspace. For every cubic yard of airspace made available by landfill mining, there is less need to permit, construct, and operate either an expansion to the existing landfill or a brand-new landfill. By extending the life of existing landfills, significant capital costs can be postponed or completely avoided. Still, only very high scrap-metal prices or prohibitive land costs allow for the economical use of landfill mining. Of the two, the most common justification of landfill mining is high real estate costs and the need to avoid building more landfill areas.

Bioreactor Landfills

Bioreactor landfills use a more indirect approach to reduce existing landfill volume. Most landfills are "dry tomb" landfills where waste is deposited and decomposes very slowly

LOADRITE

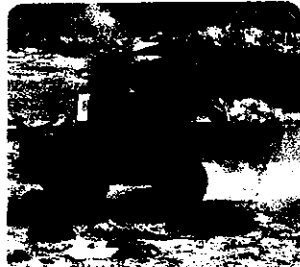
Let Loadrite help you improve your productivity

Onboard weighing systems for waste management, including transfer stations, landfills and recycling

Track daily productivity levels



Loads trucks right the first time



Prevent costly overload fines



We come to you!

We've got every state covered with our nationwide service and support network.

Tel: 1 800 528 5623

E-mail: info@loadritescales.com

Circle #57 on Reader Service Card

over a very long period of time. The relative dryness is caused by the efficient removal of leachate and waste contact liquids by the landfill's leachate-collection and extraction piping system. One of the interesting things about dry landfill waste is how little of it actually decomposes. Organics, especially food products, tend to "mummify" over long periods. Newspapers and magazines can still be read decades after disposal.

The bioreactor landfill takes the opposite approach by purposely introducing large quantities of water into the landfill in order to accelerate the typically slow decomposition process. An additional aid to decomposition is provided by the injection of air into the waste mass, greatly increasing the rate of aerobic decomposition. Instead of being tightly packed in place, waste is kept loose and often shredded to facilitate decomposition. The result is a rapid decomposition of organic waste. This in and of itself is a good thing, but it can have an important side benefit as a precursor to other alternate landfill operations. For example, decomposition of the greater part of a landfill's waste would make subsequent landfill-mining operations simpler and less costly.

There are actually three styles of bioreactor landfills; each utilizes a different method for decomposition. Aerobic bioreactors utilize oxygen-based decomposition, with the removal of leachate from the bottom of the landfill, the storage of the leachate in adjacent surge tanks, and the recirculation of the leachate back into the waste mass via controlled injection. Simultaneously, air is injected into the waste by vertical well fields or horizontal pipe arrays to promote aerobic bacterial activity. Anaerobic bioreactors recirculate the leachate but without the injection of air, leading to biodegradation in the absence of oxygen. The goal here is to maximize the production of landfill gas (methane) as an energy source. A hybrid bioreactor utilizes a combined aerobic-anaerobic treatment cycle, with aerobic processes applied to the upper portions of the landfill to promote rapid decomposition and anaerobic processes used in the lower half of the landfill to promote landfill-gas production.

Bioreactors occupy a nebulous area under most state environmental regulations. Few state agencies have any regulations directly governing the design and operation of bioreactors. The EPA has an ongoing program of data collection that it will use to establish operating standards and ascertain the advantages and disadvantages of the bioreactor approach.

Onsite Energy

Bioreactors produce methane as a side product, but what about really harnessing the energy potential of a landfill? Waste has always been a source of energy, beginning with the old practice of open-dump burning (though this particular energy was never captured and put to use) and continuing with the extraction of methane as a fuel for making steam to drive small turbines. Now comes a new approach, the conversion of methane into the liquid fuel methanol.

Landfill gas typically consists of methane (50%-55%), carbon dioxide (40%-45%), and trace levels of volatile organic compounds (VOCs, <1%). But before it can be used to make methanol, landfill gas has to be scrubbed of its impurities. First it passes through a scrubber that removes hydrogen sulfide, and then it passes through a distiller that liquefies and removes water vapor. Lastly it passes through a carbon-dioxide "wash" tower that refrig-

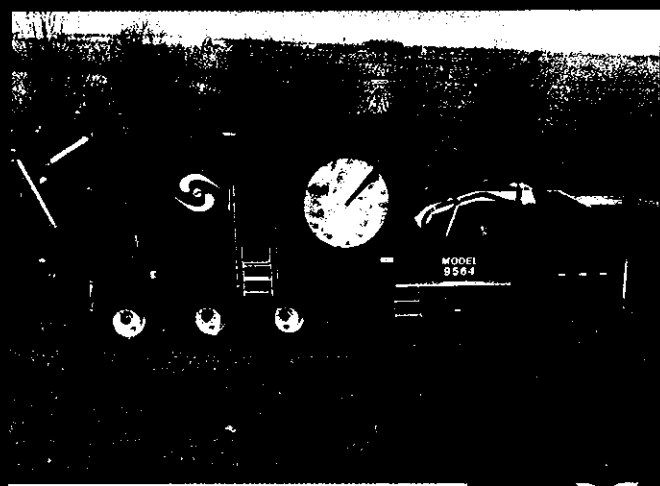
This Grinder Means Business.

9564 Industrial Horizontal Grinder

You know DuraTech has a history of reliability, durability and efficiency. And that hasn't changed with this grinder. We mean business. We've taken the best features of every DuraTech grinder, combined them and manufactured one massive machine. It's the 9564 Industrial Horizontal Grinder.

With a 40 x 60.5 inch feed opening and a 950 HP CAT Diesel Engine, this massive machine can grind an entire tree, large stumps, branches or wood pallets. Equipped with an enclosed engine compartment producing the lowest decibel reading in its class and the only self-cleaning air intake system on the market, the 9564 is heavy duty and safe. And, with the downward drive of the hammermill, more debris will stay contained.

The 9564 Industrial Horizontal Grinder makes grinding easy.



PRODUCT FEATURES:

- 40° oscillating unloading conveyor
- CAT C27 Tier II 950 HP Diesel Engine
- PT Tech HPTO 15 Wet Clutch
- Weight of 91,500 lbs.
- 315 cubic foot hopper capacity
- 4340 sq. inch screen area
- 42" diameter feed roller
(assists feeding of hammermill)
- 64" 12,100 lb. hammermill with:
24 hammers (tip swing of 51 in.)
8 hammer rods (3.25 inch diameter)
39" diameter x 1.5" thick rotor plates

**A TRADITION
OF INNOVATION
SINCE 1940**

888-748-1950

www.duratech.info/mswman

DURATECH®

PO Box 1940
Jamestown, ND 58402-1940

Circle #39 on Reader Service Card

erates and removes carbon dioxide in liquid form along with other volatiles. What is left is almost pure methane. The technology for making methanol from methane has been around for a long time, but this new process makes it economical.

The purified landfill-gas fuel is combined with steam in a catalytic reformer and then sent through a catalytic methanol synthesizer and an optional purifier. As a result, 3 million cubic feet of landfill gas can be converted into 15,000 gallons of methanol.

Conversely, the landfill gas can be passed through a shift reactor to produce hydrogen for fuel cells. The EPA estimates that about 500 landfills nationwide are large enough to produce enough landfill gas to make this process worthwhile. It has the potential to provide significant quantities of fuel and chemical feedstocks for local markets.

Pushing Operations

"Fewer" and "larger" are the words that will describe landfill operations in the future.

For landfill customers, these words translate into "distance" and "time" as they scramble to find landfills within a reasonable distance capable of handling their wastestreams.

Multimodal transport (the hauling of waste by different modes, such as road, rail, or canal) is the answer to the problem of distance. This has been an established part of waste hauling since the first trash barge or transfer station, and it is based on the simple observation that transport becomes economical only when there is a higher tonnage-to-vehicle ratio. The cost of using waste collection trucks for long-hauling waste is prohibitively high.

Typically, in multimodal-transport operations, waste gets funneled into fewer and larger transport vehicles. Collection trucks haul wastes locally to transfer stations, where the waste is transferred into large, open-topped semitrailer trucks for regional transport. The semitrailers haul the waste to regional waste-baling operations, where the waste is further compacted and then loaded onto railroad freight cars for cross-country transport. At first, this may seem extreme and costly, but political opposition and high real estate costs often preclude the development of new or expanded landfills in high-population areas. Compared to the costs of new landfill disposal or even incineration, long-hauling waste by rail can be a bargain.

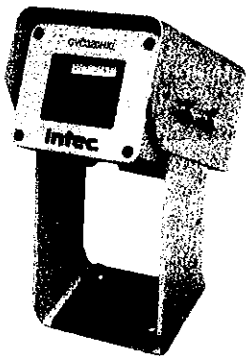
The problem of time is easy to solve on paper but harder to solve in execution. As the trend toward fewer and larger landfills accelerates, it becomes apparent that a normal eight-, 10- or even 12-hour workday and a traditional five-day workweek is no longer sufficient to receive the ever-increasing amounts of waste coming through the gate. What will be required are landfill disposal operations 24 hours a day, seven days a week. For several landfills in California and New Jersey, the future is already here. To accommodate increased wastestreams, landfills work longer hours. Simple, right?

Well, as inevitable as this appears, it presents the industry with serious operational challenges. First are the negative impacts on surrounding communities from the noise, truck traffic, and bright lighting required at all hours of the night. But to accommodate the ever-increasing amounts of waste during a normal business day would in many cases require multiple working faces or even multiple open disposal cells with their potentially serious environmental impacts.

**"The 8 Year Warranty
Tells Me Everything
I Need to Know
About Intec's Quality."**



Intec Video Systems stands behind their products with the longest warranty in the industry - a level of support made possible by a high standard of quality and durability.



Intec's CVC320HXL
Mil-Spec Connectors
8 Year Warranty

Intec's extreme-duty cameras are built specifically for tough environments, performance proven in waste collection and hauling for over 25 years. No other camera manufacturer can match Intec's reliability record, and longer life means lower cost over the long haul.

Eliminate blind spots with a camera system you can trust. Call Intec today for the proven visibility solution.

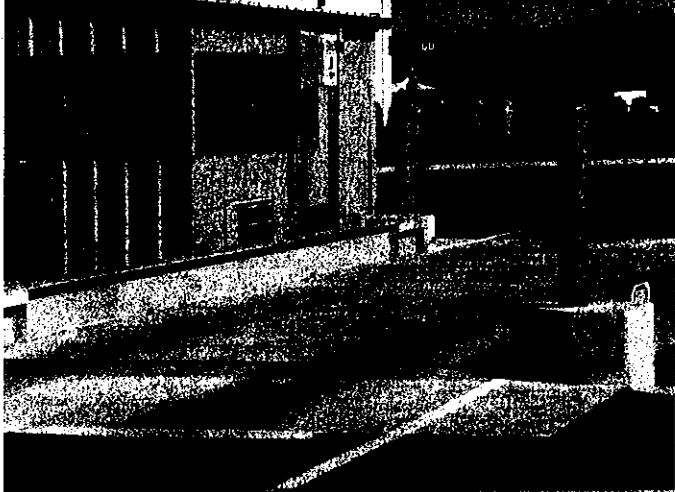
West: 888-468-3254
East: 888-468-3272
www.intecvideo.com



Intec. Quality first for performance that lasts.

Circle #51 on Reader Service Card

INTEGRATED WEIGHING SOLUTIONS



With the advent of high-tech weighing solutions, the commercial truck scale business is fast becoming a specialized industry.

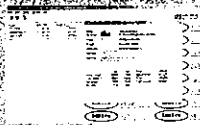
To meet the challenges and opportunities presented by the new marketplace, **Unitec**, a manufacturer of heavy-duty Truck Scales, based in the Pacific Northwest, now offers a fully integrated total system approach to your weighing needs.

Our products focus on the relationship between scale manufacture and installation, automation hardware, software, data management and on-computer use. This offers you total system integration of your new scale installation with the hardware and software you need to meet your total weighing needs and demands.

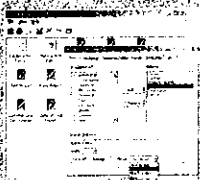
Contact us today to learn more about how **Unitec** can provide your total system solution for your weighing needs.



www.unitec.com 1-800-578-1104



Scale software clean, easy-to-understand Windows interface.



The new Unitec software is easy to use and provides a total system solution for your weighing needs.

On the other hand, 24-hour operations present significant safety and management challenges.

Traditional Landfilling

So is there a future for traditional landfills? That depends on a host of market conditions: population density, transportation costs, and regulatory environment, to name a few. Higher population densities increase demand (number of people throwing out waste) while reducing supply (available land for landfill development), resulting in increased costs.

The costs of transporting waste cross-country, either by rail or by barge, to lower-population-density areas depend on the ever-volatile price of fuel. And while the regulations for landfill construction and operation are mature, regulatory changes governing the operations of these new technologies will go a long way toward determining whether or not they are competitive with old-fashioned landfilling.

One thing is for certain, there is no physical shortage of potential landfill development areas that can meet the most stringent environmental standards for landfill construction, even in such regions as the Northeast Corridor. Shortages are almost always artificially created by local politics, NIMBY, and so on.

And the amount of airspace needed to meet America's landfilling needs is not as great as commonly believed. At a waste-generating rate of about 4.5 pounds per day, an American population of 300 million will throw away 675,000 tons of MSW each day. Arriving at a landfill with an average density of 0.30 ton per cubic yard, this waste is compacted in place to half its volume and twice its density, or 0.60 ton per cubic yard. Each day, America utilizes, on average, 1,125,000 cubic yards of landfill airspace. At 1,613 cubic yards per acre-foot, this volume is equivalent to almost 700 acre-feet per day. A square mile has an area of 640 acres, equating our daily disposal-volume rate to a little over 1 foot of waste per square mile. A single landfill of 1 square mile with an average thickness of 365 feet would meet all of America's annual MSW disposal needs.

The nationwide average for landfill tipping fees (according to the most recently available EPA data) is approximately \$30 per ton with regional variations based on population density and landfill availability. The bottom line for these potential competitors is whether or not they can provide services to their customers at the same market price as traditional landfilling while providing their owners and investors with the same net profit margins seen with traditional landfilling. A similar test awaits those new fuels (biodiesel, synthfuel, ethanol, tar sands, shale oil, hydrogen, etc.) with the potential to replace regular gasoline at the pump. To replace traditional gasoline, these new fuels must sell at the same or cheaper cost per Btu while providing suppliers with the same or higher profit margins as gasoline. In both cases, advances in technology that reduce the price of the replacement technology combined with shortages that drive up the price of existing technology may create a tipping point where the new technology achieves market viability and displaces the old technology. **MSW**

An environmental engineer employed by the URS Corp. in Akron, OH, author Daniel P. Duffy, PE, writes on environmental topics.

Circle #87 on Reader Service Card



A look at how two Pennsylvania landfills select and use alternative daily covers.

By Michael Fickes

STATES MAKE THEIR OWN rules about alternative daily cover (ADC) materials for use by landfills. And while different states have different rules, all states approach the issue of regulating ADC materials in more or less the same way.

All states set requirements and approve ADC materials that meet those requirements. A landfill manager who comes up with an innovative idea for an ADC material may apply to the state and demonstrate how that material meets the requirements. If the appropriate state authorities agree, the material will be approved for use in the landfill.

"Pennsylvania is one of the leaders in terms of technological advances and regulatory requirements related to daily cover," says Tim O'Donnell, general manager of Republic Services' Modern Landfill in York, Pa.

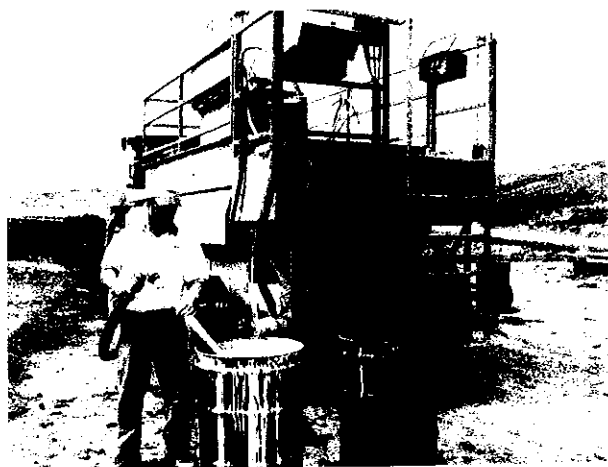
Pennsylvania's ADC regulations state: "A uniform cover of the approved daily cover material shall be placed on exposed solid waste at the end of each work-

ing day or at the end of every 24 hours, whichever interval is less. The composition of the daily cover material shall meet the following performance standards. The daily cover shall:

- Prevent vectors, odors, blowing litter and other nuisances.
- Cover solid waste after it is placed without change in its properties and without regard to weather.
- Be capable of allowing loaded vehicles to successfully maneuver over it after placement.
- Be capable of controlling fires.
- Be consistent with the waste acceptance plan of the facility (if the facility isn't permitted to take the material, it cannot be used as an ADC).

Pennsylvania's regulations also require that landfills maintain a five-day supply of cover material on site.

Generally speaking, the regulations require the use of daily cover to promote safe working conditions in the landfill and to prevent landfilled waste and associated odors from harming or becoming



NO BLOWING IN THE WIND: Alternative daily covers must prevent blowing litter, vectors and odors.



AIR CONSERVATION: Landfill managers that use tarps as ADCs tout their ability to conserve air space as a significant appeal.

a nuisance to neighboring communities. To date, Pennsylvania has approved nearly 20 ADC materials. They include foam, sludge-derived synthetic soils, water treatment sludge, fly ash, river dredge material, municipal incinerator ash, metal processing sludge, C&D waste fines and paper sludge.

Also: foundry sand, tarps, steel mill slag, steel mill scale, coal ash, mine spoil, refractory materials, auto-fluff, contaminated soils and Posi-Shell, a thin, spray-on cement-based product.

The Pioneer Crossing Plan

Landfills build daily cover strategies around materials approved by their states. At the Pioneer Crossing Landfill in Birdsboro, Pa., General Manager Thomas O'Conner has used three of the state's 16 approved ADC materials: foam, tarps and contaminated soils. Of the two commercial ADCs, O'Conner prefers tarps. And he uses contaminated soils whenever those materials become available.

Pioneer Crossing, which is owned by Audubon, Pa.-based J.P. Mascaro &

Sons, takes in an average of 1,550 tons of solid waste per day. Two tarps, each 80 feet by 60 feet, provide daily cover for the relatively small daily disposal area required for that volume of solid waste.

Prior to 1999, the facility used foam. "But we found there was a lot of waste with foam," O'Conner says. "The disposal sites would get too large, and we would tend to foam areas outside the daily disposal area. In addition, there were costs to repair and replace damaged application equipment."



Southwestern Sales Co.

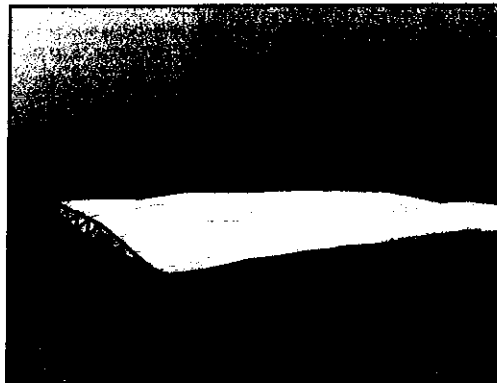
Tarp Solutions

Quality ☆ Service ☆ Price

Our

® line of Alternative Daily Covers:

- ★Sturdy polypropylene material in 6.5 ounce and 8.5 ounce. Special order materials available.
- ★Fire-retardant materials available
- ★Water resistant/UV stable
- ★Standard stock size is 50 x 50 (48 x 50 finished)
- ★Light enough to be spread by manpower or existing equipment.
- ★Replacements for automatic tarping systems
- ★Other standard and custom sizes available
- ★Heavy duty webbing around the perimeter and the seams.
- ★Corners are reinforced.
- ★Heavy duty straps and D-rings
- ★Provides economical overnight protection
- ★Provides affordable long term coverage
- ★Saves valuable airspace



**29 years
in business**

800-636-1975

www.swsalesco.com

Reader Service No. 30
or visit www.freeproductinfo.net/wsa

In 1999, O'Conner carried out a one-year demonstration project with tarps and earned approval from Pennsylvania's Department of Environmental Protection. He finds that tarps offer several benefits important to Pioneer Crossing.

"They are relatively simple to deploy," he says. "They require no special equipment to put out. We don't use an automated system. Our employees deploy the tarps. They satisfy all of the state's requirements for ADC. At \$875 for a tarp that lasts several months, they are cost-effective."

"The biggest benefit is the savings on air space," O'Connor adds. "We net about 0.80 tons per cubic yard of in-place density, and tarps take up literally no airspace."

Drawbacks of tarps include exposing employees to the waste as they deploy the tarps, O'Conner says. Tarps can tear as they are pulled across waste, and they can be difficult to deal with on windy days. Landfill personnel use a sewing machine to repair the occasional tears.

"Foam and tarps are the only com-

mercial daily covers that we have used," O'Conner says. "However, we also use contaminated soils as they become available — that, of course, is cost-effective," since the facility charges a tipping fee to accept those materials and then puts them to productive use.

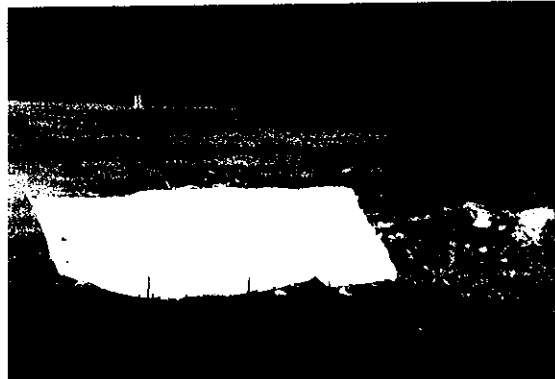
Some landfills have found that automatic tarp deployment devices can lengthen the life of tarps, reduce labor, and, over time, reduce costs even more.

Menu Of ADCs

General Manager Tim O'Donnell has worked out a basic menu of daily covers that make sense for the 5,000 ton per day Modern Landfill in York County, Pa., which requires about an acre's worth of daily cover each day. "Our menu always includes a component of clean soil, which I think is superior to all other covers," he says. "Aesthetically, it is superior, and I have a cheap source close by.

"We use several alternative covers where it makes sense," he adds. "We have two regular ADC sources for incinerator ash and auto shredder fluff, which we use for economic reasons — they produce revenue. And we use tarps. I like tarps because they consume no airspace. They are probably the cheapest of the commercial ADCs."

At one time, most landfills used six-inches of clean soil as a daily cover. During construction, large quantities of clean soil



A DRAWBACK: One downside to tarps can be exposing workers to waste as the devices are being deployed.



**KEITH, THE FIRST NAME IN
SELF-UNLOADING.**



first things first.

Since the introduction of the **WALKING FLOOR**® unloader to the waste industry more than 25 years ago, **KEITH**® has provided equipment you can trust. **KEITH** is dedicated to designing equipment that solves your problems—from our LeakProof technology to our durable V-Floor system. When you need a solution, contact **KEITH** first.



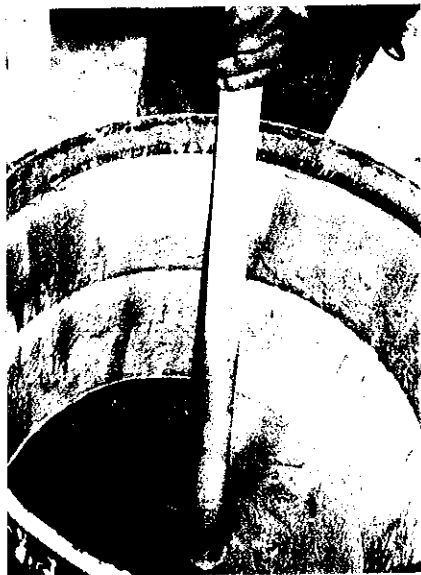
KEITH Mfg. Co.
1.800.547.6161
www.keithwalkingfloor.com

Mid-America Trucking Show
March 22-24, booth 6400 & 6500

WALKING FLOOR
ONLY BY KEITH®

2007 KEITH Mfg. Co. KEITH, KEITH logo and WALKING FLOOR are registered trademarks of KEITH Mfg. Co. Manufactured under license.

Reader Service No. **31**
or visit www.freeproductinfo.net/wsa



AVANCE EQUIPMENT Pennsylvania has approved nearly 20 ADCs, including a spray-on cement-based product.

were excavated and stockpiled.

"But as landfills got bigger, the cover story changed," O'Donnell says. "Larger landfills tend to deplete on-site soils and make it necessary to look elsewhere for cover material. If there is no dirt on site

then you have to buy it. That's when ADCs became important."

O'Donnell goes on to say that his first instinct is to find ADCs that produce revenue, such as incinerator ash, auto fluff and foundry sand. Another revenue-generating material that is receiving a lot of attention today is construction and demolition fine, a soil-like material left over when construction and demolition materials are processed for recycling.

O'Donnell also pays for commercial ADCs for certain daily cover applications. "In my opinion, commercial ADCs have one great advantage over the others: they conserve airspace," he says. "Tarps take up no space at all, and they can be reused."

At the end of each day, O'Donnell puts together a daily cover menu. Flat surfaces that will be driven on the next day receive clean soil, which provides the best seal and the sturdiest base. The slope of the working face, which won't be driven over, receives ADCs.

Which ADCs? Depending on availability, cost and revenue, application

procedures, effectiveness and the preparation of the waste surface, O'Donnell makes his selections.

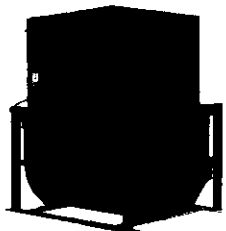
"I might roll out a tarp on slopes that aren't very smooth," he says. "In areas where we will ultimately grow grass, we'll take more time to prepare the surface and use ash or auto fluff."

"My chief concern in selecting ADCs is aesthetics," O'Donnell adds. "At various times over the years, we have tried to minimize the use of soil. After doing that, I would think that it didn't look as good as I want it to look. In my opinion, the success of a landfill has a lot to do with what the surrounding community thinks of you. The old days of only worrying about what goes on inside the gates are gone.

"As landfill operators, we must consider and evaluate the performance of daily covers. As members of a community, we have to be concerned with the impressions we create and what our neighbors think of us. That's why I think aesthetics are critical."

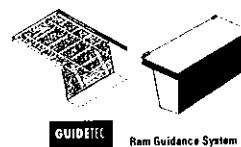
Michael Fickes is a contributing writer based in Cockeysville, Md.

MIGHTY MAC



Compaction: Its what we do!

Mighty Mac features advanced engineering, innovative design, and a particular commitment to quality workmanship. Add to that Mighty Mac's Guide Tec™ ram guidance system, and our Smart Tec™ power unit control system and you are beginning to see how Mighty Mac accomplishes COMPACTION.



GUIDE TEC Ram Guidance System



Standard Power Unit

RJM Waste Equipment

21st Brookside Rd.
Waterbury, CT 06708-1428
Toll Free 1-866-663-8833
Fax 1-203-597-8865

RJM Waste Equipment

120 Alan St.
Easley, SC 29640
Toll Free 1-866-719-2783
Fax 1-864-855-2628

RJM Waste Equipment

2605 West 1st St
Tempe, AZ 85280
Toll Free 1-888-379-0662
Fax 1-480-557-0382

Waterbury, CT

Easley, SC

Tempe, AZ

RJM
WASTE EQUIPMENT

P.O. Box 1969
Easley, SC 29640
Toll Free 1-866-719-2783
(864) 855-8545
Fax (864) 855-2628

Reader Service No. 32
or visit www.freeproductinfo.net/wsa

SURVEYING THE LANDSCAPE!

E-waste collection programs

Starting in 2003, *E-Scrap Now* conducted an annual survey of e-waste collection programs throughout the U.S. What do they collect? How much? Where coming from? How much do they charge to collect it?

Since 2003, a variety of regulations and legislative programs have been implemented, altering the practices of this industry. The results of the fourth annual survey reveal the impacts of regulation, changing markets, public awareness and other factors. With four consecutive years of polling, some of the more informative data comes from the changes that are documented over time.

The results of this survey have been divided into two categories: non-regulated states and three uniquely regulated areas – Alberta, California and Ontario. This year's response was good; surveys were received from 147 non-regulated programs from 41 states and the District of Columbia. The California response rate was 11 percent and Ontario's response

rate was 22 percent. Sixteen of Maine's collection responses, representing 85 percent of the state's communities. This 22-percent response rate for non-regulated programs, combined with the broad geographical representation from all of the surveyors, create a statistically solid picture of e-waste collection programs in North America.

Non-regulated collection programs

The list of equipment accepted by these programs has changed over the years. Over 70 percent of the programs have easy-to-understand rules to define an acceptable item. The most common description (38 percent) is "anything with a circuit board." This category includes all consumer electronics, but not home electrical appliances. The second most popular category is "anything with a cord" (32 percent). The remaining 30 percent of the collectors have a prescriptive list of acceptable items.

This 30 percent represents an increased number of programs that are limiting collections to specific items, as opposed to the above mentioned inclusive categories. And those specific items are changing. One year earlier, in the 2005 survey, monitors, CPUs, peripherals, faxes, TVs, cellphones, printers and scanners were accepted by over 80 percent of the programs. Monitors are still accepted at over 90 percent of the sites and CPUs at over 80 percent. However, acceptance of televisions, smaller items and periph-

erals has decreased. In this survey, acceptance of these items has decreased over 30 percent.

Charging fees for items has decreased for the first time since this survey began. According to respondents in non-regulated programs that charge fees, the dollar amount ranges from just a few dollars up to over \$30 for items such as console televisions. Signs are strong, however, that these fees are stabilizing, with 84 percent of the collections listing no price change from the previous year.

More processors are decreasing the fees charged for obsolete electronics, and there is a long list of possible reasons for this trend. The increased value of e-scrap and the strong market for PC boards is a strong factor, but the increased prescriptive list of items may be an influencing factor in the fee structure of these programs as well. A few more collection programs are eliminating the costly-to-process items, instead focusing on the higher-value or easier-to-recycle products.

The method of collection from households and businesses has changed slightly in the four-year period. Curbside collection was used by 11 percent of respondents in 2005. Today, none are using that exclusively, and just three percent offer curbside collection as part of the mix of services. Collection is about evenly divided between two methods. Offering permanent sites as the only method of collection

Betty Patton is president of Environmental Practices LLC and resource director of the Association of Oregon Recyclers (Portland). She can be contacted at BPatton@EnvironmentalPractices.com.

represents just over 44 percent. Periodic collection events happen with just fewer than 44 percent of the collectors, leaving 12 percent to offer a combination of services.

The volume of collected material has not leveled off; the percentage of collectors experiencing an increase in material flow has increased steadily. Now, 81 percent of the collectors are reporting additional volume over their previous collection year. This increased volume is attributable to increased service offerings, more consumer awareness and reduced fees.

Regulated areas

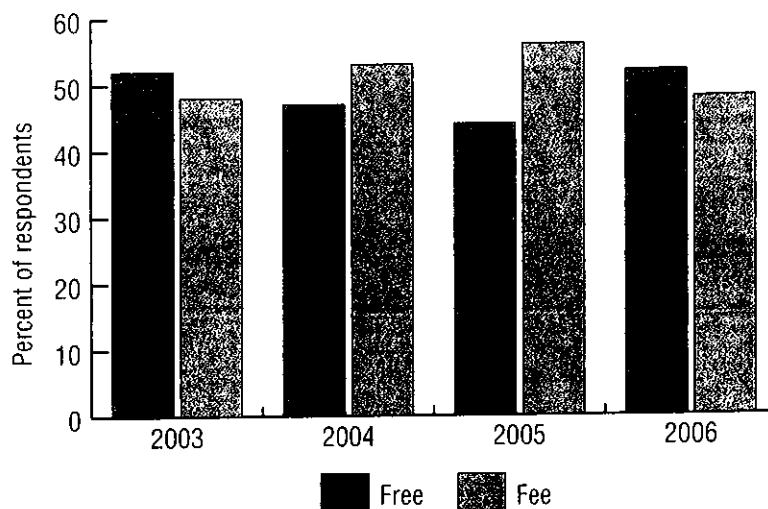
Alberta and California both implemented advanced recovery fee (ARF) programs in early 2005. Maine's extended producer responsibility (EPR) program started a year later, in January of 2006. The regulations in both California and Maine cover computer monitors and televisions. Alberta's system adds desktops, laptops, notebooks, printers, servers and all-in-one computer systems to that list.

These collection program managers were asked similar questions to the service providers in the non-regulated areas. Where does your material come from? How much are you getting? How do you perceive the future material flow? In addition, the service providers were polled regarding the regulations under which they work, the implementation of these programs, the public outreach and the level of service that the industry in general was capable of offering.

The primary source of e-scrap for Alberta and Maine collectors is residents. California's collections are about 54 percent residential, 37 percent businesses, three percent non-profits and six percent educational institutions.

Both California and Maine are given the option of charging a fee. The 13 percent of California collectors that levy a fee assess

Figure 1 Characteristics of non-regulated collection programs



Source: E-Scrap News 2006

between \$2 and \$25 per item. Maine's 37.5-percent fee-based collections range from \$2 to \$10 per item. All of Alberta's collections are free to the generator.

Almost all of the collectors in the three jurisdictions perceive the level of regulation as appropriate. The three programs are managed by California's Integrated Waste Management Board (Sacramento), the Alberta Recycling Management Authority (Edmonton) and the Maine Department of Environmental Protection (Augusta). California's service providers expressed the least satisfaction with their system, with approximately 22 percent of them saying the regulations were excessive.

In all regulated arenas, reporting is necessary. Local managers were polled about their

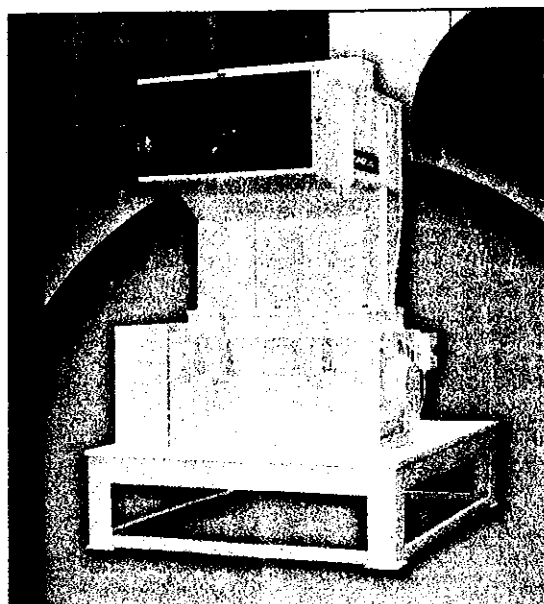
Table 1 Volumes collected (in percent)

Reported volumes	Risen each year	Stayed the same	Fallen
2003	75	13	4
2004	79	17	4
2005	80	14	7
2006	81	16	3

Source: E-Scrap News 2006

perception of bookkeeping and recordkeeping requirements. Approximately one-third of all collectors under each of the three programs expressed a concern about excessive recordkeeping.

The collection infrastructure in California consists of a combination of municipal and county agencies, and for-profit companies.



QUALITY. DURABILITY. DEPENDABILITY.

For 70 years, we have been the leading supplier of equipment to the reclamation industry. When quality and dependability are needed to insure your profitability, only one supplier that can meet your needs. **We have the equipment and systems to make you successful.**



Welcome to the Land of Innovation

Call 888.575.3338 or 508.399.6400 For Our No-Risk Granulator Guarantee.
www.cumberland-plastics.com

Reader service #196

Table 2 California's sources of e-scrap

Primary source	Percent of California respondents
Residents	54.3
Businesses	37.1
Educational institutions	5.7
Non-profits	2.9

Source: *E-Scrap News*, 2006.

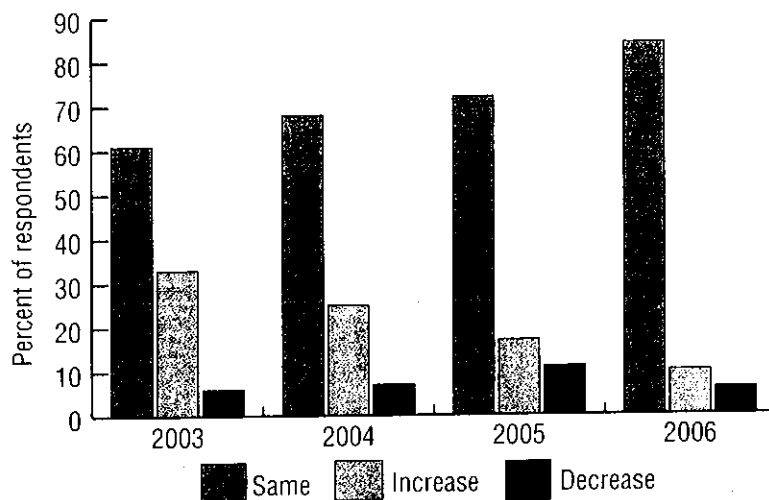
Table 3 What makes a good national model?

Program	Yes, this program is a good model
Alberta	84.6%
Maine	75.0%
California	67.8%

Source: *E-Scrap News*, 2006.

In Alberta, all of the collections are municipally operated. The reimbursement system is different between the two, also. California collectors receive at least 20 cents per pound; Alberta collectors receive about two cents (\$US) per pound. Even with the ten-fold difference, 42 percent of Alberta's collectors find

Figure 2 Fees charged to participants



Source: *E-Scrap News*, 2006.

it to be adequate and just over 47 percent of California's collectors feel adequately, or more than adequately, compensated. The overwhelming majority of California's collectors that feel inadequately reimbursed (53 percent) are for-profit companies.

Both Alberta and California collectors that complained about low reimbursement rates

were concerned about the cost of time required to cover the record keeping requirements. In 2005, 33 percent of California's collectors charged residents a fee to drop off the targeted items. That number declined in 2006 to 13.2 percent.

Regulated systems rely on the convenience of the service to the generators. Since both

The Only Setup Tool You Need

www.mccloskeyinternational.com

It just doesn't get any easier than this... or more flexible.

Roll onto your job site with a McCloskey portable trommel and you're ready to get right to work.

Every McCloskey trommel screener sets up in just minutes with **no tools required**. Simply move it into place and **turn the key**. Next, position the 180° conveyor. **Setup is complete.**

McCloskey trommels take the downtime out of changing sites to make it easy for you to take on more jobs and complete your work profitably. And when you need to change grades or materials, we make that easy, too, with our patented Drum X-Change System.

For the best in portable screening equipment, the choice is simple. **Count on McCloskey** to make screening easy.

See us at Waste Expo Booth #4880

McCloskey

INTERNATIONAL

McCloskey International Limited
1-877-TROMMEL
 (1-877-876-6635)

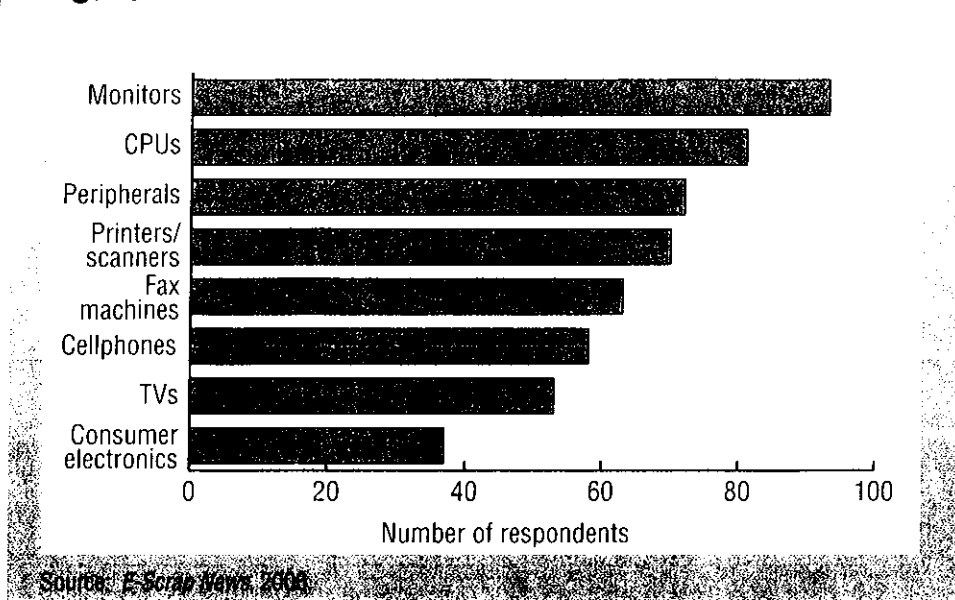
See all the latest in industry leading innovations.
McCloskey International Open House April 3rd & 4th.
 For your personal invitation, please contact us at openhouse@mccloskeyinternational.com.

programs had been active for well over a year, the current participants in both the Alberta and California programs were polled about their perception of adequate collectors and processors. California has 350 collectors serving 36 million people, or 102,850 people per collector. Alberta has 121 collectors for three million residents, resulting in 24,800 people per site. In Maine, about 560 programs serve 1.3 million people or 2,325 people per collection location. The Maine program does not yet have the longevity to test for level of service. However, almost 27 percent of the collectors in Alberta see room for additional service, as compared with less than nine percent in California. None of Alberta's collectors believe that the market is saturated, as compared to 41 percent of Californians that do.

All regulated programs need education and outreach for success. The paid advertising in all three programs was predominantly in newspapers. Each of them used about 20 percent of their budgets on radio for advertising. Alberta did no television outreach. However, all three extensively used free methods of information distribution, mostly Web sites.

Almost all of the collectors in the three regulated areas are receiving enough material to meet or exceed their expectations. So the advertising is working. The word is getting out to the program participants, and, because of that, half of the participating Cal-

Figure 3 Types of e-scrap collected



ifornia programs plan on expanding in the near future, compared to 25 percent in Maine and 11 percent in Alberta.

One of the biggest areas of change across all collectors was toward permanent collection sites. Others are adding drop-off sites and/or extending drop-off hours. The collectors that are offering periodic events are

increasing the frequency and length of those events. Residents are receiving more service for longer hours and closer to home.

In regulated programs, information and guidance are the keys to success, providing it to both service providers, as well as the customers. Responsibility rests with the management agency. In Maine, the DEP did a



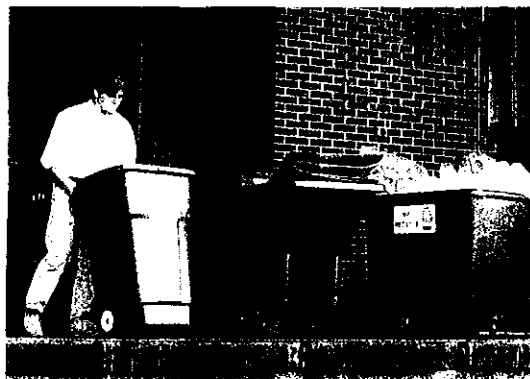
Rubbermaid® products for collection and separation of recyclables.

OFFICE PAPER



Recycling waste paper begins with Rubbermaid® recycling containers.

COMMERCIAL/INDUSTRIAL



Tilt trucks, hampers & mobile containers available in many sizes.

*Rubbermaid® & Recycling:
A Commitment For A
Better Tomorrow.*

CURBSIDE



Rubbermaid® products start the recycling process at home.

Recycling Products Inc.
P.O. Box 5009 • Bradford, MA 01835
1-800-875-1735 • 978-372-9349 • Fax 978-372-3953
email: recycle@recyclingproducts.com
www.recyclingproducts.com

• Many sizes & styles • Custom imprinting •

Reader service #63

thorough job of working with collectors. They held informative classes before the program began, continue providing excellent ongoing technical support and are responsive to inquiries. DEP advertises the program well, so that customers are aware of the service, and are motivated to use it. However, more research is needed on issues facing smaller communities. The distance to service puts a burden on the generator and the collector. DEP also should provide more support to collectors on compliance issues.

In Maine's EPR program, the public was unaware of the payment structure and responsibility of the manufacturers. Residents know why they should recycle cathode ray tubes, because they are aware of the lead content and the environmental impacts. They also know where to take their electronics for recycling. But they have very little knowledge about what happens after the products are collected.

Other structural and tracking questions have come up. In Maine, collectors are sending materials to consolidators and those consolidators are billing the original equipment manufacturers (OEMs) for the product. OEMs have been questioning the amount of material coming out of this program; the size of the community does not seem to reflect the amount of material generated. On the flip side, the volume of material is much higher than expected, as reported

by the collectors. This has allowed the fee-based collections to lower fees by as much as half.

These three regulated programs can be used as tests, or pilots for legislation that is in the works throughout the nation. The collectors in each of the three jurisdictions were asked if their program was a recommended model for other areas, or for a national plan. Two-thirds of California's collectors would recommend their program, 88 percent of Albertans approve of theirs and 100 percent of the Maine collectors want it replicated throughout the nation.

The e-scrap collection industry is maturing. More states and regions were represented by this year's survey, plus more material was collected. There is a trend toward free residential e-scrap collections as volumes and values increase.

Regulated collection programs need more efficient startup payment procedures and attention needs to be paid to efficiency in reporting requirements. Sales of personal and business electronics are increasing, houses and offices are getting more electronically populated, and more demand is being put on the end-of-life issues with this equipment.

The new programs, both regulated and non-regulated, will be explored for the 2007 survey. Stay tuned. **RR**



HANG OUT WITH NORTHEAST

At a park, playground, or parking lot, your roll-offs are like billboards. So why not look your best by specifying the best? This colorful recycling roll-off was full-welded throughout. The customer not only invested in recyclers with extra strength, safety, and durability, but also the confidence to advertise its name. There are measurable differences in roll-off containers — differences you can see. For competitive price quotes or a visit to our 20-acre site, call 1-800-879-6464.

www.northeastind.com



The WEIMA 2-Stage Shredding & Grinding System



Size Reduction Equipment

P: 803-802-7170

F: 803-802-7098

Info@weimaamerica.com

Reader service #163

Reader service #29

E-Waste Not

Governments and the solid waste industry are making a push to recycle electronic products.

By Kim A. O'Connell

AS YOU READ this magazine, stop and count the number of electronic devices within a 10-foot radius of you. Chances are you're near a computer, printer, cordless telephone and cell phone, and you may have an iPod and a personal digital assistant in your briefcase. Furthermore, you probably bought at least one of these items new in the last year, which means that an older version of the technology was cast aside.

In the United States alone, more than 100 million computers, monitors and televisions become obsolete each year, according to the U.S. Government Accountability Office in Washington. Some estimates surmise that around 150 million cell phones will be discarded before this year ends.

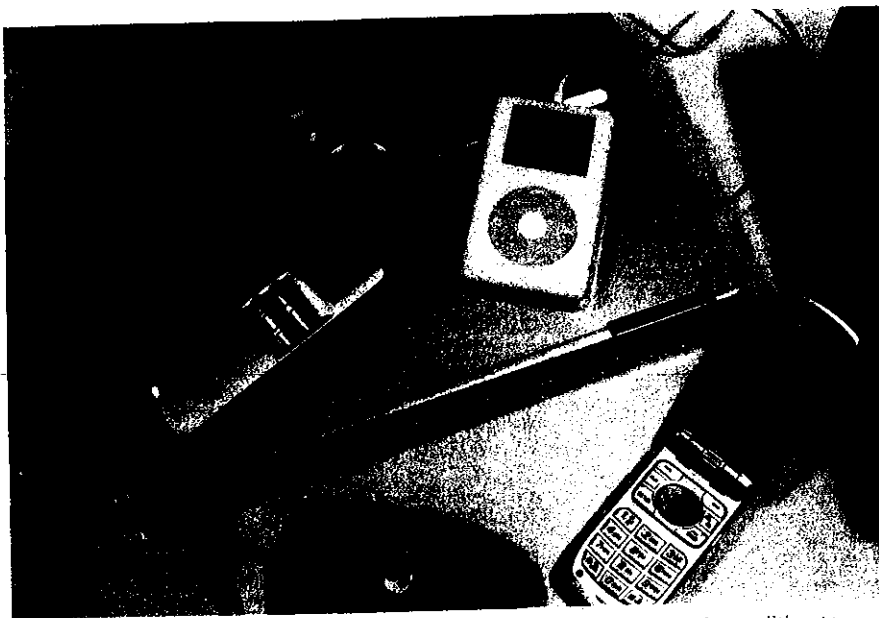
Although electronic devices are used worldwide, the United States is by far the largest consumer — and therefore

the largest disposer — of electronic waste (e-waste). In 2005, the last year for which complete data is available, the U.S. Environmental Protection Agency (EPA) reports that an estimated 2.6 million tons of major consumer electronics were generated. Of this, only approximately 330,000 tons were recovered for recycling. Consumer electronics include products such as TVs, VCRs, DVD players, video cameras, stereo systems, telephones and computer equipment. According to the San Francisco-based nonprofit Computer TakeBack Campaign, e-waste constitutes the fastest growing portion of our waste stream — growing almost three times faster than the overall rate of MSW generation.

In the last decade, environmental organizations have raised concerns about the landfilling of this material, which is known to contain toxic sub-

stances such as lead, mercury, arsenic, cadmium, and hexavalent chromium. EPA estimates that e-waste accounts for a significant amount of the heavy metals found in landfills. While the National Solid Wastes Management Association (NSWMA), Washington, and the Solid Waste Association of North America (SWANA), Silver Spring, Md., both support the recycling of e-waste (see below), the organizations also maintain that there is no evidence that toxic substances leach from e-waste when the devices are placed in Subtitle D landfills.

Meanwhile, groups such as the Seattle-based Basel Action Network have claimed that up to 80 percent of the e-waste collected in the United States for “recycling” is actually sent to developing countries in Asia or elsewhere, where these products are disassembled or reused under lax or toxic conditions.



COMING TOGETHER: Four prominent waste associations have formed a coalition to promote the widespread recycling and reuse of electronic waste in the United States.

100% Recycling

In December, four leading waste associations — SWANA, NSWMA, the Integrated Waste Services Association (IWSA), Washington, and the National Recycling Coalition (NRC), Washington

— joined forces to promote reuse and recycling as the preferred method of e-scrap management. E-waste recycling can reduce the need for environmentally harmful and energy intensive mining operations, while also boosting local

economies, creating jobs, transferring technologies to the developing world, and keeping the materials out of landfills, the coalition says.

The associations offered their assistance in the development of a nationwide system that would capture these goods for recycling or reuse and that could be complemented by each state. As a goal, the coalition hopes to greatly increase the recycling of e-scrap in the United States to nearly 100 percent within 10 years. All electronic product manufacturers, recyclers, retailers, federal, state and local governments, environmental groups, trade associations and other stakeholders should work toward this goal, the associations say.

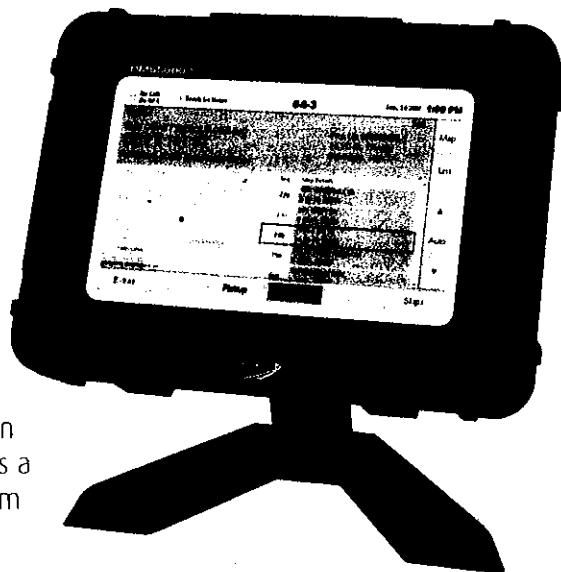
Furthermore, the organizations will work to “ensure that recycling electronics products does not become an unfunded mandate for local governments or their private sector recycling contractors,” said Bruce Parker, president and CEO of NSWMA, in a press release announcing the coalition.

To begin with, the coalition is supporting the adoption of financial incentives

Drive your profits and golf game for free.

Come see the new **DMS5000™** system from **Routeware®** at Waste Expo.

Come by booth #3269 at Waste Expo and see the new **DMS5000™**. It is a breakthrough, fully upgradeable and automated route to back office system. Customer pick-up and landfill data is fully automated and loaded based on in vehicle GIS mapping. The new Routeware system provides a suite of views into your operation that are customized from the driver to the CEO. It's technology to drive your profits.



We have a free offer for you too. Just come by booth #3269 and we will automatically enter you into our daily drawings for the **Nike Sasquatch Driver with Graphite Shaft**. We will also give you a **free ROI analysis**. It's our way of saying thank you.

Visit www.routeware.com/wasteexpo to register for your free demo, analysis and drawing.

ROUTEWARE®

Power to Drive Profits

such as federal tax credits for consumers, manufacturers, retailers and recycling operators for recycling unwanted computers, monitors and other e-waste. This proposal was included in a federal bill, S. 510, introduced two years ago by Sens. Ron Wyden, D-Ore., and Jim Talent, R-Mo. The bill has to be reintroduced now that the 110th Congress has convened, and it didn't have any hearings in the last Congress. Whether it will gain support in the new Congress remains to be seen.

State and Local Efforts

Under federal regulations, electronic equipment that contains a cathode ray tube or mercury is considered hazardous waste, but these rules do not apply to household electronics, those so-called "small-quantity generators," much to the chagrin of environmental groups who argue that the rule allows the landfilling of most of our electronic waste. Some states, such as California, Maine, Maryland and Washington, already have enacted laws and regulations addressing e-waste. Legislation includes bans on the disposal of e-waste in landfills and incinerators or front-end fees on consumer electronics that help offset the cost of recycling them later.

In California, consumers purchasing computer monitors, laptops and televisions pay a recycling fee that ranges from \$6 to \$10 per device, which can be adjusted every one to two years. The retailer collects this money and remits it to the state quarterly. The state then reimburses registered collectors or recyclers at 20 cents per pound for collection, and 28 cents per pound for recycling (for a total of 48 cents per pound).

In Maine, the burden of financing e-waste recycling is shared between local governments and manufacturers. Cities and counties collect the products and take them to consolidation facilities, which store the material for shipment to recyclers and record the amount and type recycled. The facilities then invoice manufacturers for the costs of handling, transport, recycling and consolidation.

Maryland has launched a five-year pilot program (ending in 2010) in which electronics manufacturers pay a \$5,000 registration fee per year to the state's recycling fund (or \$500 if they have instituted a product takeback program). If local governments set up computer collection/recycling programs, they

P Series

Booth #3647

Harris rolls out our
NEW HP Series baler.
We are excited -
you will be too.



Call today for more information on Harris' full line of products

Reader Service No. **69**
or visit www.freeproductinfo.net/wsa

WasteExpo Booth #3647

**Curbside Carts & Cans,
Litter & Recycle Bins, Organic
Waste & Commercial Containers
Call Rehrig Pacific today!**

Waste Expo Booth #3155

Los Angeles, CA 800-849-8780	Atlanta, GA 800-241-9693	Erie, PA 800-458-0403
---------------------------------	-----------------------------	--------------------------

4010 East 26th Street
Los Angeles, California 90023
Ph: 323.262.5145 1.800.421.6244
www.rehrigpacific.com
email: info@rehrigpacific.com

Reader Service No. **70**
or visit www.freeproductinfo.net/wsa

WasteExpo Booth #3155

can apply to the state recycling fund for grants to offset some costs.

According to the Computer TakeBack Campaign, Washington state has just enacted the most comprehensive e-waste recycling law in the country. The bill requires electronics manufacturers to pay for the collection, transportation and recycling of computers, monitors, and TVs from consumers, small businesses, schools, local governments and charities throughout the state.

While some recycling advocates hail these measures, others say that state-by-state programs are a piecemeal approach to a nationwide problem. Last October, the National Center for Electronics Recycling, Davisville, W.Va., released a report titled "A Study of the State-by-State E-Waste Patchwork." The study is a first-ever effort to quantify the existing and potential economic effects of state-level electronics recycling requirements on industry, government and consumers. Drawing from estimates provided by principal public and private sector entities in state e-cycling programs, the study identifies "dead weight" costs that would not be

present with a national electronics recycling program. Recurring dead weight costs of the four existing state programs are estimated at \$25 million per year.

Private Initiatives

But implementing a national program is easier said than done. Not surprisingly, more regulation-friendly countries such as Japan, South Korea and most of Europe have passed laws requiring electronics manufacturers to pay for recycling programs for their products. Although widespread mandates are not likely in the United States and would be vigorously opposed by many U.S. manufacturers, some electronics manufacturers also are doing their part to deal with the mountains of waste their companies produce.

Palo Alto, Calif.-based Hewlett-Packard (HP) and Round Rock, Texas-based Dell Inc., for example, which reportedly sell more than half the nation's personal computers, both have instituted recycling campaigns and sought to use more environmentally friendly parts. "The computer companies are

definitely embracing the idea that they need to deal with their products at the end of their useful life," Barbara Kyle, national coordinator of the Computer TakeBack Campaign, said in a CNN special report. "There's been a complete turnaround."

Dell was an early leader in addressing its e-waste. In recent months, the company has pledged to phase out certain toxic chemicals and began offering free recycling for all its products. In 2005, the company reportedly recovered 80 million pounds of equipment. HP recycles about 50 million pounds of equipment at its U.S. plants and refuses to send any of that waste to landfills or overseas. The company charges for recycling, but consumers get a coupon that goes toward the purchase of new products.

Rather than new taxes or front-end fees that the company says are a turn-off to consumers, HP favors a product stewardship solution that relies on the private sector to implement workable recycling programs. Such an approach, according to a recent company report on the topic, should include the following elements: an efficient recycling framework that involves all stakeholders; the expertise and innovation of the private sector; opportunities for environmental and cost improvements over time; the avoidance of new government or quasi-government bureaucracies and new taxes or fees; and the flexibility to accommodate different business models and new products over time.

"HP supports uniform national legislation to achieve this goal," the company stated in a recent report, "but we recognize that some states may seek to address this issue prior to the enactment of federal legislation [and that] consumer awareness of the issue is limited."

Looking ahead, the focus of e-waste recycling advocates is shifting back from computer equipment and peripherals to televisions. As Americans increasingly purchase flat-panel TVs, untold numbers of large cathode-ray tube boxes will soon be looking for a new home. Whether that new home is a landfill—or whether those parts get a new life through recycling—is something to which many stakeholders are paying increasing attention.

Kim A. O'Connell is a contributing writer based in Arlington, Va.

**DO YOU HAVE QUESTIONS
ABOUT ON-BOARD WEIGHING
SYSTEMS FOR YOUR APPLICATION?**

**STOP BY BOOTH #1930
AT WASTE EXPO 2007 IN
ATLANTA, GA FOR THE ANSWERS**



VULCAN
ON-BOARD SCALES
800 237-0022
www.vulcanscales.com

Reader Service No. **ZP**
or visit www.freeproductinfo.net/wsa

WasteExpo Booth #1930

WWW.WASTEAGE.COM

The China challenge

By Steve Toloken

Too much of China's electronics recycling is done in ways that aren't good for the people doing it or for the environment. Groups like the Basel Action Network and Greenpeace have documented how recycling plants will burn plastic openly to get at more valuable materials, or how farmers will run primitive backyard recycling operations to melt circuit boards.

But my recent visit to a Guangzhou factory offers an interesting glimpse into what could be an environmentally sustainable approach.

There, a 1-year-old joint venture between U.S. electronics waste recycler MBA Polymers Inc. and steel recycler Guangzhou Iron & Steel Enterprises is using the latest technology to mine a stream of ground-up plastic and materials from things like computers and kitchen appliances and extract valuable ABS, high-impact polystyrene and polypropylene.

Contrast that with local recycling operations. According to reports, government officials in

Guangdong province, where Guangzhou is, started an investigation Jan. 24 into whether plastic recycling factories are releasing chemicals into rivers, or forcing their \$100-a-month employees to breathe hazardous fumes.

The \$12 million MBA-GISE plant is the first commercial venture for California-based MBA, with funding by GE Plastics and electronics contract maker Flextronics International Ltd., along with the U.S. government, to develop its technology and provide seed capital.

The technology is not a panacea for environmental problems caused by Chinese recycling, particularly if, as BAN and Greenpeace report, some Chinese farmers feel they have no other way to make ends meet. On the other hand, China's government is talking as though it wants more sustainable development.

That makes MBA's presence there interesting. During a recent tour of the plant, managers told me they are happy with how things have fared so far, but say they are still fine-tuning.

There are challenges in relying

on someone else's trash as your raw material. MBA-GISE has a radiation detector to screen incoming loads, but it has yet to find any contamination. There are more subtle challenges. The plant can wind up with waste plastic from products made 10 years ago that may contain additives that since have been declared environmental contaminants, such as brominated flame retardants.

Ultimately, the operation wants to sell its material to users like Flextronics or GE Plastics. "The economics are improving," said Darren Arola, MBA global director of product development and sales. But, "they are not where we want them to be," he added.

MBA relies on government-mandated collection programs for e-waste, and the Guangzhou plant was built partly with Japan's extensive e-waste recycling systems in mind. Its second plant is going up in Europe, where there also is a legislative push.

Given that China is considering similar legislation, it seems likely there is going to be more use for MBA's approach, rather than less. ■

Toloken is Hong Kong correspondent for Crain Communications' Plastics News



Electronic Recyclers expands reach

By Joe Truini

Electronic Recyclers Inc. has bought Massachusetts-based ElectroniCycle Inc. for an undisclosed amount, marking its first step toward expanding outside of California.

The Gardner, Mass.-based acquisition will give Electronic Recyclers the capacity to process more than 70 million pounds of electronics annually, said John Shegarian, chairman and CEO.

"We are extremely proud to be combining talents with an existing business that is legendary in Massachusetts," he said.

The move will allow Fresno,

Calif.-based Electronic Recyclers to better serve its national accounts and positions the company to grow nationally, Shegarian said. ElectroniCycle has a great track record of increasing its business each year and quality of service, he said.

The deal will benefit both companies, said Dick Peloquin, founder and president of ElectroniCycle.

"After several years of solid growth, ElectroniCycle has reached a point where we need an organization such as Electronic Recyclers to take us to the next level," he said. "We are proud and excited to join that team and do our part to create

one of the largest and finest recycling organizations in the world."

The acquisition is Electronic Recyclers' first step toward nationwide expansion, Shegarian said.

"We've seen firsthand in California that the recycling of electronic waste is a dynamic industry that brings more jobs and a cleaner environment," he said. "Now we can bring our successful model and blend it with ElectroniCycle's existing foundation to make our services available to a broader spectrum of national customers." ■

Contact Waste News reporter Joe Truini at (330) 865-6166 or jtruini@crain.com



HHW Programs: From One-Day Events to Integrated Strategies

BY BRUCE J. EDMONDS III AND CHACE ANDERSON

Year after year in chain hotels across the country, convention rooms are filled with circular folding tables dressed with thin, pressed linens used by public servants who poke their flatware into overcooked chicken and excessively whipped mashed potatoes while silent hotel servants move slowly, too slowly, from table to table delivering desserts that each participant had silently sworn beforehand he would not eat. But as the sinful-looking tart or cake is placed within striking distance, yet so deliciously far away from home, the guest quietly sets aside the dinner plate and pulls forward the sweet while a speaker at the lectern implores the participants to focus on the upcoming announcements of household hazardous waste management awards.

Although household hazardous waste (HHW) is exempt from federal Subtitle C regulations, the commodities it collects can still be ignitable (e.g., household cleaners), corrosive (e.g., automotive batteries), reactive (e.g., explode when combined with ignitable source), or toxic (e.g., oil paint).

Each of us generates 4 pounds a year of this material, adding up to 530,000 tons annually. When this material collects and mixes in the compactor of a trash truck, fires can ignite causing harm to workers and pedestrians as well as damage to equipment.

**Once considered the
afterthought of solid
waste management,
household hazardous
waste operations
are a growing profession.**

These materials can contaminate our septic tanks and wastewater treatment systems if poured down the toilet. If they leak into storm drains or migrate out of landfill cells they can contaminate the wildlife and drinking water.

Men and women from Lilliputian-type

counties to Gulliver-like cities, from regional empires to lone jurisdictional ranges, and from progressive communities to those cultures barely out of the 19th century attend conferences that present these awards. These participants may sit at the same tables, be on the same dais, or share their experiences in the same workshops. Whether it is the award for Longstanding Program Excellence to King County, WA, in 2005; Best New Program of 2003 to Larimer County, CO; Program Excellence to Sedgwick County, KS, in 2005; program innovation to Boise and Ada County, ID, in 2002; or many of the other award categories, each of these national awards speaks to a growing professionalism in the field of HHW. Gary "Red" Yenser, the regional manager of Big Lakes Regional HHW Program in northeast Kansas, values his program's award from the North American Hazardous Materials Management Association (NAHMMA) above all the nine awards his operation has won.

"NAHMMA," says President Kolin Anglin, "sees its task as going back to its roots

and helping the managers of HHW programs do their work in an increasingly professional manner." In 1986, the EPA held the first of several successive annual national conferences on HHW management. When the EPA finalized its determination that HHW would not be classified as hazardous waste, it stopped having the annual conference. HHW managers, who had attended these now-defunct conferences, formed NAHMMA in November 1993 to continue to get together and share information.

day HHW collection event—and all of whom profess not to be professional paint contractors—puts you in a bad mood, then you should not attempt to perform a detailed survey of 25 jurisdictions on their HHW operations and costs. Yet the Metro Solid Waste and Recycling Department in Portland, OR, did just that. Performing a survey involves many callbacks and much pushing, prodding, and fact-checking with people who are too busy doing their daily work to worry about answering each question perfectly.



Portland, OR's Metro Solid Waste and Recycling Department performed a detailed survey of its operating costs.

The fledgling association, like so many others in the emerging environmental field of the past three decades, oscillated between the need to attract operating funds by having bigger conferences and providing direct services for its members. In 2004, NAHMMA created a new strategic plan focused on serving its members and professionalizing its field. "Since we implemented the 2004 Strategic Plan," Anglin says, "membership has increased from 110 to 400."

No survey has perfect data. There are too many variables and too many people who have different parts of the answers. Surveys, like polling data, are snapshots of how HHW operations are being managed.

The Survey

If waving good morning to 1,000 participants lined up for the opening of a one-

Jim Quinn, hazardous waste program

manager with Portland's Metro Regional Authority, oversaw a survey that asked extensive questions to quantify the programs of 25 communities across the nation. Quinn led a team from the Cascadia Consulting Group to collect a year's worth of data from these communities. The data used were primarily from 2004 and included gross costs, pounds, and people served. It attempted to break down the workload between contractors versus in-house staff, assess what types of material were collected, and estimate

"I need a blower that can handle corrosive gases in my landfill."

At Gardner Denver, we have solutions. For flare or methane gas recovery in larger landfill applications, our Gardner Denver® cast series multistage centrifugal blowers/exhausters with packing or carbon ring seals provide superior sealing and reliability when used in corrosive gas applications: Built rugged and efficient, various drive options are also available. For smaller landfill gas applications, the Gardner Denver regenerative blower/exhauster delivers quiet, clean, continuous flow, pulse-free air with the lowest typical free-field noise levels at three feet. Both Gardner Denver centrifugal and regenerative blowers/exhausters are specifically coated for landfill applications to prevent corrosion.

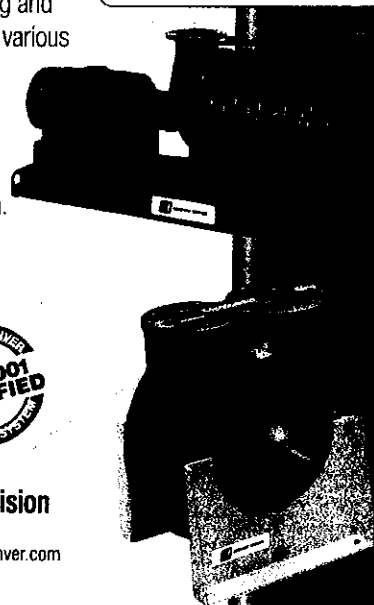
Learn more about the blowers that can handle corrosive gas in your landfill application. Call Gardner Denver today at 800-543-7736 or 770-632-5000 for a brochure and the name of your local representative.

Tell us about your application needs today at
BlowerSolutions@gardnerdenver.com

1-800-543-7736



Gardner Denver Engineered Products Division
100 Gardner Park • Peachtree City, GA 30289
Ph 770-632-5000 • Fax 770-486-5629 • www.gardnerdenver.com



MULTISTAGE CENTRIFUGAL

Airflow to 41,000 cfm
Pressure to 22 psig
Vacuum to 17.6 "Hg



REGENERATIVE

Airflow to 900 cfm
Pressure to 13 psig
Vacuum to 14 "Hg

Circle #45 on Reader Service Card



Alachua County, FL, has developed an effective network of permanent and mobile collections.

what percentage of the material collected went to landfills and what went elsewhere. The survey also quantified how many of the programs ran fixed and/or mobile operations and what the safety record was for each jurisdiction's operations.

To Contract or Not to Contract

"Doing the work yourself is more cost-efficient. We have four people doing the work and saving the county money," says Kurt Seaburg who is the hazardous waste coordinator for Alachua County, Florida's

Department of Environmental Protection. Prior to 1999, Alachua County had three-day collection events operated by contractors, and the cost was very high. In 1999, the county's permanent facility opened with trained county employees.

Scott Windsor, hazardous waste coordinator for Spokane Regional Solid Waste System in Washington state,

oversees a program that began with expensive, but well run, one-day events and moved toward collaborative efforts with community volunteers, contractors, and agency employees. Currently his operation places emphasis on cross-training employees so that the workforce can lab-pack and bulk flammables and transport material from its two drop-off points located at waste transfer stations to its central HHW facility located at the waste-to-energy plant.

Joe Brunk, director of the HHW and Obnoxious Weeds Program in Sedgwick County, led the transition from a contrac-

tor-operated HHW operation managed by Wichita City to an employee-operated HHW program managed by the county. "When we took it over in 2001-2002," Brunk says, "we began weeding out contractor labor and saved money. We then went to multiple disposal vendors to lower the cost even more."

Former Laidlaw hazardous waste manager and technician and now current president of NAHMMA, Anglin states the difference between contractor and staffed operations clearly: "Contractors need to show a profit. They are going to be more expensive."

Yet some jurisdictions find a contractor's resources for expertise and ability to handle volume surges more economical in the long run. Steve Cooper, engineering technician for Anchorage, AK, believes the relative isolation of his location lends itself well to contracting experts to assist with that city's HHW operation.

Joe Reilly, with the Sanitation Districts of Los Angeles County, oversaw the collection of nearly 9 million pounds of HHW in 2004 at \$0.57 per pound, a figure hovering just above the middle of the surveyed communities with respect to cost. His contractor

Vector Engineering, Inc. Has Provided Quality Engineering Services to the Solid Waste Industry Since 1986



VECTOR ENGINEERING, INC.

143E Spring Hill Drive
Grass Valley, CA 95945
(530) 272-2448 – phone
(530) 272-8533 – fax
vector@vectoreng.com
www.vectoreng.com

- ❖ Liner & Cover Design
- ❖ Bioreactor Design
- ❖ Landfill Siting / Permitting
- ❖ Stability & Hydraulic Analyses
- ❖ Landfill Master Planning
- ❖ Construction Quality Assurance Services
- ❖ Leak Location / Geoelectric Surveys
- ❖ Geotechnical / Geosynthetics Laboratory

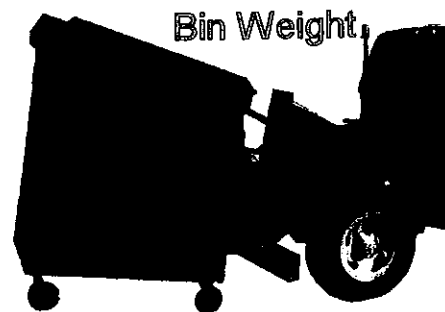
USA • CENTRAL & SOUTH AMERICA • PHILIPPINES

Circle #88 on Reader Service Card

American Forklift Scales Bin Retriever Scales Accurate, Easy and Profitable!



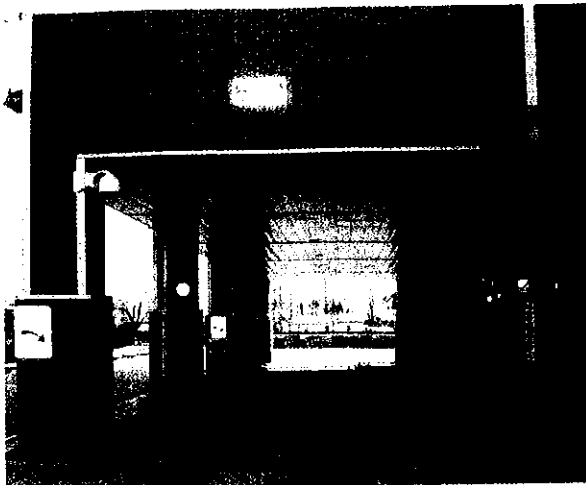
Try Our
Test-Drive Today!



American Forklift Scales

3600 S. Harbor Blvd. #160
Oxnard, CA 93035 USA
Toll-Free: 888-385-5623
FAX: 805-644-4884
<http://www.americanforkliftscales.com/>

Circle #29 on Reader Service Card



Sedgwick County, KS, was a 2005 recipient of an award for program excellence in the handling of HHW.

performed all 57 single-day collection events handling on average 1,102 customers each—nearly 63,000 customers annually. Utilizing, he believes, a contractor for such huge collection days makes the best economic sense for his districts.

Perhaps it goes without saying that public HHW operations are necessarily subject to the same political cultures that influence

nearly all public operations. The policy decision may be to contract out the operations of a program, but an HHW program does not have to simply bid the work out to one contractor. More are looking at multiple vendors in an attempt to lower disposal costs, specifically, and operational costs, generally. Santa Barbara, CA, contracts its HHW permanent facility to another public institution, the University of California at Santa Barbara.

used permanent facilities.

Montgomery County, MD, held 21 mobile collection events and had one permanent facility open 10 days in 2004. It estimated servicing 11,530 households of the total 376,000 households in the county that year. Since 2004, however, the hours of the facility have been expanded to seven days a week, and consequently, the number of households serviced have jumped to 41,736. Halfway through this current fiscal year the jurisdiction had serviced 27,220 households and was on course to surpass the previous year's total.

Some communities are formed into regional cooperatives through intergovernmental agreements, authorities, trusts, special districts, non-profit corporations, or regional councils. In Kansas, Pottawatomie, Riley, Marshall, and Morris counties decided to work together to collect HHW under the umbrella of the Big Lakes Regional Council. Governed by a board made up of three elected officials from each participating county, the Regional Council assesses fees on participating counties and is eligible for grants. The organization determined that

Permanent or Mobile Collection

Most HHW programs began as one-day collection events. Over time some collection events were replaced with permanent facilities. Although 72% of surveyed programs offered mobile service in 2004, only Los Angeles used mobile collection events exclusively. Conversely, all but one program



The Benefits:

- Water resistant
- Highly durable
- Lightweight
- Applies evenly, rain or shine
- Designed for many months of use
- Controls disease vectors
- Most cost-efficient synthetic cover on the market
- Spread by manpower or existing machinery in minutes
- Easily anchored with sandbags or tires
- Odor and vapor suppression
- Tarpomatic compatible

Also Available:

- Truck Tarps
- Dumpster Tarps

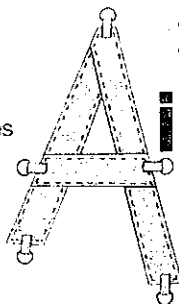
Save Millions in Tipping Revenues

Don't waste valuable airspace with a daily dirt cover.
Use an Airspace Saver™ Daily Cover.

Our Strapping System (Patent Pending)

makes this cover the longest-lasting cover on the market! The exact usable life expectancy can vary. One major landfill used an Airspace Saver™ daily for over 24 months!

- Standard size - 2400 sq. ft. (48' x 50')
- Custom sizes made to customers' specifications.



**airspace
Saver®**
DAILY COVER

Now Available in Flame-Resistant Material

Fax: 1-985-386-9066 • Website: www.tarpsandcovers.com • Email: marlon@airspacesaver.com

Call Nationwide **1-800-694-5515**

Circle #25 on Reader Service Card

SCRAPING BOTTOM HAS NEVER LOOKED BETTER



PREVENT TIPPING FLOOR DAMAGE WITH THE NEW CUTTING EDGE FROM SCHUYLER RUBBER

Our heavy-duty cutting edge made from recycled rubber protects your concrete floor and equipment with its innovative easy slide T-track adjustable channel. A custom fit — with no gaps — every time!

Find out how you can better protect your tipping floor. Call 1-800-426-3917 or go to www.schuylerubber.com



Circle #75 on Reader Service Card

FULL DROP LIFT AXLE FOR THE ROLL-OFF INDUSTRY



AA270 FULL DROP LIFT AXLE



- 6" FULL DROP AXLE
- SUSPENSION RATED AT 14,000#
- HIGH PIVOT POINT FOR LESS HANGER STRESS
- URETHANE BUSHINGS AT ALL PIVOT POINTS
- INSIDE CAB CONTROLS INCLUDED
- DESIGNED FOR MAXIMUM CYLINDER CLEARANCE
- INSTALLATION KITS AVAILABLE



1300 Arizona Place SW • Orange City, IA 51041
800-658-3866 • www.silentdrive.com

Circle #81 on Reader Service Card

it would be less expensive, through economies of scale, to perform the HHW tasks as a single entity.

This rural regional operation in northeastern Kansas maintains a multicounty program through 25 mobile collection events and fixed drop-off points with a central HHW facility where the material is consolidated and prepared for shipment via a single contractor. Yenser has been doing the mobile collection and consolidation since the facility opened its doors in the early 1990s, keeping costs down to \$0.21 a pound—the lowest in the survey.

If some programs were designed to be partly mobile by the very nature of their regionalized beginnings, then others were formulated as a way of pulling in customers who would, perhaps, not regularly, if ever, drive to a permanent facility.

Alachua County has a network of permanent and mobile collections that together serviced a very high rate (24%) of household participation in 2004. The county's 874 square miles of land mass are home to the state's flagship college, the University of Florida. Cresting over 50,000 students a year, the college's student body is the third largest in the United States. The attraction to the university means that Alachua County has a greater percentage of high school graduates (88%) and college graduates (39%) than the statewide average. Yet per-capita income is approximately \$18,000, and median income per household is \$31,000.

Seaburg has managed the program for the past eight-and-a-half years. He believes there is a progressive nature to the county as a whole. The university's influx of students helps push up the percentage of households served but so do the mobile collections strategically placed into the areas farthest away—and, perhaps, not as progressive—and lower socioeconomic neighborhoods. County workers go out in a truck and trailer to these sites and set up collection operations. This service helps draw more people into the system.

Seven of the 25 communities (28%) surveyed also provide door-to-door service for the elderly and disadvantaged. (An interesting Web site on door-to-door service is one of a vendor's, Curbside Inc., which performs such service: www.curbside.com. It provides a case study of a door-to-door collection program in Emerald Bay, CA. Although the principal's name is Anderson, there is no relation between one of the authors of this article and the company or its personnel.) An evaluation of a door-to-door service is included in a report released in January 2007 by Ken Wells of the Sonoma County Waste Management Agency in Sonoma County, CA. The agency had contracted with Larry Sweetser of Sweetser & Associates and David Nightingale of Special Waste Associates to evaluate and benchmark Sonoma's HHW system.

Sonoma's Toxic Rover collects at the door from seniors, disabled residents, and conditionally exempt small-quantity generators. The cost per stop, Sweetser and Nightingale found, amounts to \$245. It is understandable how the cost mounts up. First, Sonoma is 1,575 square miles, so even if the collections are geographically clustered, there is a lot of windshield time. Second, the crew most likely has to enter the home, move material around, weave themselves through narrow passageways, confront disturbed domestic animals, listen to the historical origins of each toxic material being discarded, and politely stop to eat a cookie for the road.

Sweetser and Nightingale found that travel time and time on-site is between four and eight hours. The program has an average of 18 stops per month, totaling 220 per year. In 2005, the Toxic

Rover program collected "an average of 381 pounds from each" of its stops.

Problem Items

Every HHW manager has a story of odd material, such as crystallized ether, coming into the facility and causing a commotion. Although a problem item, crystallized ether is rare, whereas latex paint, a non-lethal commodity, is in abundance, taking up a great deal of space, and adding to the expense of many programs.

Somewhere between 30% and 40% of a program's volume will be latex paint. The strategy a program manager implements for this one item will greatly impact the cost of the program. If an agency can solidify the paint and burn it in its own waste-to-energy plant, such as the way it's handled in Spokane, cost can be controlled.

Programs that do not have their own means to dispose of the material may elect to send it to a recycler. Angela Deckers and Ken Wall, hazardous materials coordinators for Ada County, including Boise, ID, color-separate the latex paint and ship the materials to Amazon Environmental Inc., which accepts water-based paint wastes. Amazon makes reusable paint into new paint products and processes non-reusable paint into cement additives.

In 1992, the Metro Regional Authority in Portland, OR, began recycling paint. It sells 100% recycled paint, MetroPaint, in 17 colors. Currently, MetroPaint has 5% of the market share in Portland's latex-paint sales. It now has crossed state borders and entered into Washington State's paint market. MetroPaint sells for \$5 to \$9 per gallon and \$15 to \$39 for a 5-gallon pail.

According to Metro's Jim Quinn, the HHW operation takes in approximately 200,000 gallons of latex paint and makes MetroPaint out of 65% of the total. Making virgin paint produces air emissions and waste discharge to surface waters. The process of making new paint also produces sulfuric acid, metal sulfates, and metal chlorides that are harmful to the oceans.

MetroPaint reduces the cost of the collection program by its development and maintaining a market to sell its paint. "The net cost of Metro's paint recycling program," Quinn writes, "when revenue is taken into account, is lower than any other option for managing the paint collected in our HHW program."

Electronic waste collection is rivaling the volume of latex paint, and concern among HHW managers is growing that electronic waste will not flatten in volume as many of the other categories of waste have. Leslie Robinson, program specialist for Santa Barbara County, CA, notes that her jurisdiction initiated an electronic waste recycling program in April 2001, and every year it has grown. In 2005, for instance, 375,000 pounds were collected. The following year this figure jumped to 842,000 pounds.

Currently for Santa Barbara and other California jurisdictions, grant monies are available for electronic waste collection. The state provides Santa Barbara \$0.20 per pound to recycle and dispose of the material. The grant money exactly covers the cost of the collection and disposal for Santa Barbara.

Oncoming Challenges

Managers of HHW operations mention electronics as an example of where product responsibility, or product stewardship, would come into play. Four states have legislation requiring electronic manufacturers to take responsibility for their products. Washington State has spearheaded this kind of product stewardship. Washington's WAC 173-900 was adopted in 2006 requiring manufacturers to provide convenient recycling of computers, televisions, computer monitors, and laptops used by households, small governments, small businesses, and charities.

Whether it is Angela Deckers in Idaho, Policy Analyst Liz Tennant in King County, WA, Kolin Anglin in Kansas, or Leslie Robinson in Santa Barbara, the disposal of pharmaceuticals is stated by all to be a major issue before the profession. For years wastewater treatment facilities have educated citizens to flush pharmaceuticals down the toilet. Now scientists suspect that the drugs are not being filtered out by the wastewater treatment process and are having an adverse effect.

Drugs going down the toilet may be ending up back in our food. The executive director of Commonweal, Charlotte Brody made news when she went to Mount Sinai School of Medicine in New York City with Bill Moyers to have her body burden of toxic chemicals tested. The doctors found she was a host for 45 carcinogens and 56 chemicals that can potentially strike the

StormCon Pre-Conference Programs

Become certified in one of three areas of expertise or take a one- or two-day workshop with the nation's leading experts. For more details visit www.stormcon.com.

Stormwater Compliance in SWPPP Preparation and Construction Site Inspections

Sunday and Monday, August 19-20, 2007,
8:30 a.m.-4:30 p.m. (both days)

Instructor: Shirley D. Morton, CREC

New Technology and Development

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

Presented by: Shirley D. Morton, CREC
Instructor: Shirley D. Morton, CREC

StormCon

The North American Surface Water Quality Conference & Exposition

August 20-23, 2007

JW Marriott Desert Ridge

Phoenix, AZ, USA

www.StormCon.com



Santa Barbara County holds an annual waste roundup.

brain and nervous system.

No one knows whether the drugs going through the wastewater treatment plant are directly responsible, but studies of the effects are growing.

Emily Rogers, a current Ph.D. candidate in natural resources at the University of Tennessee, completed a master's thesis on environmental toxicology and provided pictures of tadpoles used in her project. Rogers took each of the pictures on the same day. The tadpole on the left was fully de-

veloped and was in the control group. The tadpole on the right was exposed to fluoxetine (Prozac) from hatching until completion of metamorphosis. The tadpole on fluoxetine is not nearly as developed in its hind limbs and forelimbs.

Many HHW managers want product stewardship to solve the growing pharmaceuti-

cal problem. They want drug manufacturers, through pharmacists, to take the drugs back from consumers.

But there is a catch-22 to this plan as Special Agent Steve Roberts of the Drug Enforcement Agency in Washington, DC, points out: "The DEA prohibits pharmacists who dispense controlled substances from receiving them."

Only legal authorities, such as the DEA or local police departments, can legally receive controlled substances (addictive drugs).

Roberts says that the DEA knows this is a problem, and a committee made up of representatives from the EPA, DEA, US Fish and Wildlife, and the White House Office of National Drug Control Policy currently is meeting to try to resolve this issue.

If anyone thinks that HHW programs have reached their zenith, he is wrong. They are still evolving into integrated systems of waste management that, perhaps, are further along than some other areas of post-consumer handling. "Management means," writes Peter Drucker, "... the substitution of thought for brawn and muscle, of knowledge for folkways and superstition, and of cooperation for force. It means the substitution of responsibility for obedience to rank, and of authority of performance for the authority of rank." The profession of HHW managers has taken Drucker's message to heart.

MSW

Bruce J. Edmonds III is the Recycling and HHW Manager for the Rivanna Solid Waste Authority in Charlottesville, VA. Chace Anderson is a consultant with Gershman, Brickner & Bratton Inc., in Fairfax, VA.

BENTOMAT GCL | CLAYMAX GCL | AKWASEAL POND LINERS | EASY ROLLER GCL DEPLOYMENT SYSTEM
GLOTEXILES | TEXDRAIN GEOCOMPOSITES | VOLCLAY SOIL SEALANTS | PVC PREFABRICATED PANELS

SERVICE

WE'VE GOT YOU COVERED!

Discuss your project with our experienced
Technical Sales Managers or Design Engineers.

Place your orders with our dedicated
customer service team.

847.392.5800

CETCO[®]
LINING TECHNOLOGIES

www.cetco.com/lt

Circle #38 on Reader Service Card

Waste Walker[®]



Take your operations on the go & eliminate long lines with **Waste Walker**. From the developers of **WasteWORKS**, **Waste Walker** gives free range & allows solid waste management personnel to process transactions quickly & with ease. Call Carolina Software, Inc. for details: 910.799.6767 ext. 2.

WasteWORKS
See our ad in the Classifieds!

WWW.WASTEWORKS.COM

Circle #34 on Reader Service Card

Don't Charge Away the Future—Recycle Now

HHW managers refer to the Rechargeable Battery Recycling Corp. (RBRC) collection system for rechargeable batteries and cell phones as a model to follow for product stewardship. Manufacturers of batteries and portable electronic items that use batteries formed RBRC in 1994 and began collecting the material in 1996.

Seven entities make up the board of directors: Varta Microbattery, Forest Stewardship Council, Panasonic Battery Corp., Green Electronics Council, Sanyo Energy, Saft America, and Sony Electronics, which acts as chairman. The money for the program comes from licensing fees manufacturers pay for the privilege of placing RBRC's Battery Recycling Seals on the rechargeable batteries and portable electronic products. Approximately 90% of the industry pays this

licensing fee. The remainder work independently to collect their products.

In May 1996, federal battery legislation was adopted that removed some of the regulatory hurdles to recover batteries. This Mercury-Containing and Rechargeable Battery Management Act established requirements for national battery labeling helping make education and collection easier.

RBRC has set up a free battery and cell phone collection program segregated into three categories:

- Residential consumers
- Businesses
- Institutions

Each signs up in the same manner. If a retailer wishes to implement the service of recycling batteries and cell phones for its customers, it goes to RBRC's Web site and fills out the "Sign Me Up" form. Once that occurs, the information is provided to one of RBRC's recycling coordinators in the retailer's area. The coordinator gets in touch

with the retailer to go over the policies with its managers and then sets them up. The retailer is then sent either several 20- or 40-pound boxes to place the recycled batteries in. These boxes are made, at least in part, of post-consumer material and once full are easily sealed and sent to RBRC. The retailer does not pay for the box and its shipment or for the processing of its batteries and cell phones. Some retailers have such a large volume of material that RBRC provides them with a metal container supporting two 40-pound boxes. The full boxes are scanned upon receiving, and replacement boxes are automatically sent to the client.

If a business or a public works department happens to use a large number of batteries and cell phones, RBRC will set it up with this free service. HHW programs can set up a collection program that packs these items into a 55-gallon drum approved by the Department of Transportation.

Once the boxes or drums are filled, they are shipped to the International Metal Reclamation Co. (INMETCO) in Ellwood City, PA. The EPA has determined that thermal recovery for nickel-cadmium batteries is the best demonstrated available technology for cadmium processing, and INMETCO believes it is the only facility in North America that uses this process.

At the facility, reclaimed cadmium is returned to nickel-cadmium battery manufacturers, nickel and iron are separated out and sent to where they are used to make new stainless steel, and the facility's wastewater treatment plant utilizes the battery electrolyte. Thus, nearly 100% of the battery is recycled.

At the metals facility, the phones are separated from the batteries and sent to ReCellular Inc., where they are refurbished or recycled.

Linda Gabor of RBRC says the Call2Recycle program collected 5.6 mil-

lion pounds of rechargeable batteries in the US and Canada. "Each home," she says "has on average six cordless products." The pounds collected in 2006 are the most so far.

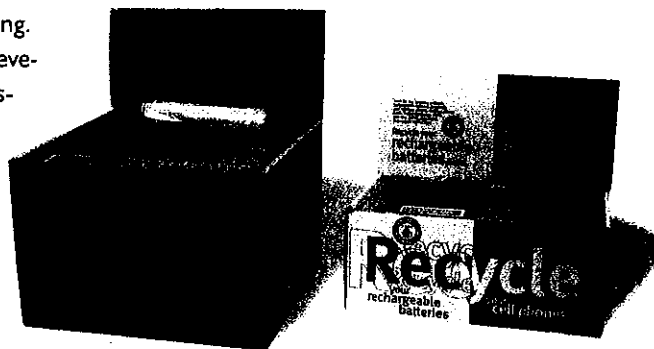
The increase, she says, comes from signing 1,000 new communities and 1,200 new business partners. She also points out that California and New York City have helped increase the pounds collected by passing legislation requiring retailers who sell batteries and portable electronic products to collect them for the purpose of recycling.

Given that the revenue from the licensing fee outstrips the money currently spent on collection and recycling, RBRC is attempting new avenues to attract recyclers.

It has constructed a 53-foot tractor-trailer education module for use on the NASCAR circuit to exhibit the benefits of recycling.

According to surveys conducted by Simmons Market Research, fans of NASCAR are 20% more likely to own electric hand-held power tools than non-fans are.

RBRC is a free service that would like programs and businesses to use its resources to recycle more.



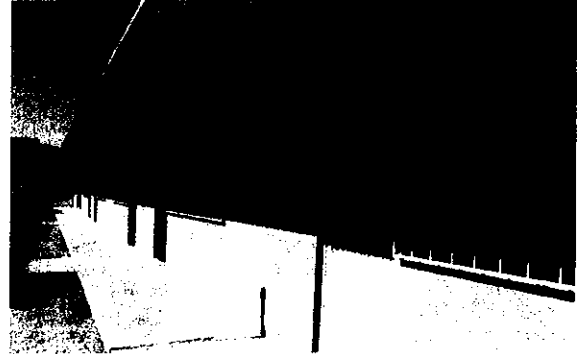
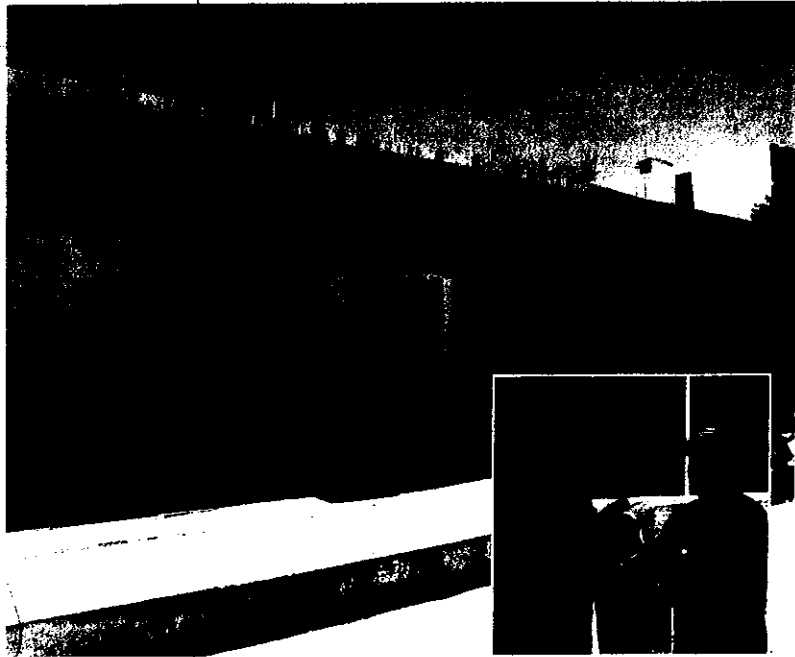
More Rubber

Long Lasting



Collecting Color

Norcal finds an innovative use for San Francisco's unwanted paint.



HUES YOU CAN USE: Recycled paint from San Francisco is donated to brighten public buildings in Mexico.

ALTHOUGH THE MESSAGE that paint doesn't belong in the trash is getting out to consumers, there still is no set approach on how to deal with unwanted paint. Some communities ask customers to dry out paint cans before disposal, while others hold hazardous material drop-off days a few times a year. But San Francisco's approach to dealing with the problem is unique.

San Franciscans can drop off up to 15 gallons per car-load of unwanted house paint, free of charge, at the city's drive up Household Hazardous Waste Facility—and they don't even have to get out of their car. The facility, which is open three days a week and is operated by SF Recycling & Disposal Inc., a subsidiary of Norcal Waste Systems, takes in 30,000 gallons of paint annually. Only San Francisco residents can use the facility.

After receiving the paint, workers immediately separate it by type. Any oil-based paint is shipped to companies that burn it to generate electricity. Far more common is latex paint, about 20 percent of which is too rusty or moldy to recycle and winds up as a binder for cement. The remaining latex paint deemed salvageable is then carefully re-mixed.

Depending on its color, the latex paint is poured over a screen into one of three 55-gallon drums. Blues, grays and greens go into the cool drum. Beige hues make it into the off-white barrel, and reds, tans and browns end up in the warm container. Without sorting, the resulting paint would always end up a light brown hue.

The three color categories can be custom mixed into many more colors. The end product — hundreds of five-gallon buckets of house paint — is available free to San Francisco residents. But local demand for the paint is limited because many residents assume that recycled paint is inferior to virgin paint. This is a misconception, says Norcal's Paul Fresina, who oversees the center. "Because aged paint has developed a higher solids content over time, it actually covers better than virgin paint."

To find a use for this reclaimed paint, the mostly immigrant employees at the center proposed sending some of it back to their home countries. So in 1995 the first shipment of more than 700 5-gallon buckets of paint was sent to Tonga. Since then, similar shipments have made their way, free of charge to the recipients, to San Salvador, El Salvador; Tepetitlan (or Tepa), Los Cabos and Santiago, Mexico; and Mali. The paint is used for schools, churches and other community buildings.

In its most recent shipment last November, Norcal sent 731 buckets of paint equaling 3,655 gallons to Durango, Mexico. As with past donations, workers from the facility paid their own way to travel to Durango to verify the paint's arrival at its intended location.

The cost of shipping the reprocessed paint depends on its destination. In 2002, a container of 700 5-gallon buckets cost \$3,000 to ship to Los Cabos, Mexico. In 1998, a similar shipment to Mali in southwest Africa cost \$7,000. In both cases, Norcal says that it, not its local customers, picked up the shipping costs. Moreover, the company notes, sending paint to Mexico and other nearby countries is often cheaper than shipping it to a cement factory in Los Angeles, where it is assessed a \$130 per barrel disposal fee.

—Paul Kilduff is a freelance writer based in San Francisco.

Building

MO

By William Turley

CONSTRUCTION AND demolition (C&D) debris used to be a waste stream that was almost hidden from public view. While the general public focused on municipal solid waste (MSW) and the recycling of the cans, bottles and paper, not much attention was given to the much larger stream (by weight) that includes concrete, asphalt, wood, metals, drywall, asphalt shingles, old corrugated containers (OCC) and plastics from C&D activity at both buildings and road and bridge projects.

That has changed in recent years, as all levels of government have looked to recycle as much as possible from every waste stream, and as the economics of recycling C&D debris have become more attractive. Furthermore, the push to undertake environmentally friendly, or "green," building projects has placed the material closer to the recycling spotlight.

And, why not? There is certainly a lot of material available. According to the Eola, Ill.-based Construction Materials Recycling Association (CMRA), about 350 million tons of C&D debris is generated every year in the United States, and that is a conservative estimate. The U.S. Environmental Protection Agency (EPA) has tried to get a handle on how much C&D debris is out there. In 1997, the agency estimated that 136 million tons of the material is generated annually. Currently, EPA is trying to update that number, but is finding it a slippery fact to nail down.

The growing C&D recycling industry faces a number of issues. First, numerous jurisdictions in recent years have passed laws mandating the recycling of C&D debris, requiring builders and recyclers to navigate a broad range of

mentum

A look at the issues facing the growing C&D recycling industry.

regulations. In addition, the industry is fighting rail-waste transfer stations that handle building materials without government oversight and is lobbying for tax credits to spur markets for recycled C&D debris.

Regulations

Whatever the amount of C&D debris generated, there definitely has been a rise in the number of regulations and legislation related to the material. For example, Chicago now mandates that construction and demolition sites recycle at least 50 percent of the debris they generate. Local governments in California — such as San Diego, Palo Alto, Woodward, Contra Costa County and Tulare County — have passed similar ordinances.

California's well-known AB 939 law, which requires local governments to recycle at least 50 percent of the waste they generate, has sparked interest in C&D recycling as a way of reaching the targeted rate. In its last session, the California Legislature passed the CMRA-backed SB 420, which directs the state to use recycled aggregates in its highway projects unless doing so is economically unfeasible.

California legislators are expected to push for additional pro-C&D recycling steps, such as requiring local governments to mandate the use of recycled aggregates in their roadway project bids and adding C&D material to the list of recycled products that governmental agencies must mandate in their requests for proposals.

One of the most famous examples of C&D legislation is the Massachusetts Department of Environmental Protection's (DEP) ban on the landfill disposal of concrete, asphalt, brick, metals, OCC and wood. Those materials are to be

diverted to a recycling center instead.

DEP determined there were markets for those materials, and, to a degree, the department is correct. But the state highway department, MassHighway, does not use recycled aggregates in its projects, and DEP has placed stringent regulations on the use of C&D fines in the state.

About 30 percent of what a C&D recycling center takes in are pieces of material that are less than 1 or 2 inches in length. These small pieces are created by the demolition or construction process or by the act of hauling the material to the center. Much of this material is dirt, concrete dust, small pieces of wood and other debris, and gypsum drywall. The fines can, under certain conditions, create hydrogen sulfide gas, which has a rotten egg smell.

During discussions with the recyclers before the ban was implemented, the DEP was told that if there was a ban, the recyclers needed a steady output for the fines product as either an alternative daily cover (ADC) in landfills, or as a shaping and grading material for the state's old landfills to bring them up to modern standards. The material had been used in this way for years with little problem.

But after the ban took effect on July 1, 2006, some landfill operators and others used the fines in such a way that hydrogen sulfide gas was created at a level high enough to nauseate people nearby. And therein lies the key to the problem: the ADC product must be used properly at the site by the landfill operator. If it isn't, the odor can be created.

DEP's response was to require financial



AN ABUNDANCE OF MATERIAL: CMRA estimates that 350 million tons of construction and demolition debris is generated every year and says that is a conservative guess.

3 BILLION INJECTIONS

...don't let your employees
be one of them.

The HexArmor™ 7080 offers the protection you need against needlesticks. Over 3 billion injections are given each year outside of traditional health care facilities. When not properly disposed of, these needles pose a risk to you and your employees. From waste management to law enforcement, we have you covered. Call us to find out how HexArmor can dramatically reduce your needlestick injuries and make your workplace safer.

We have your armor solution.

For more information on HexArmor safety products, exclusive Patented SuperFabric™ fabric material and our guaranteed trial program, please visit www.hexarmor.com or call us at 877-MY-ARMOR. Please refer to page ENR 2407-1.

 **HEXARMOR**
SuperFabric

Reader Service No. 27
or visit www.freeproductinfo.net/wsa

assurance mechanisms at any site using the fines, effectively making it economically unfeasible to use them. This makes C&D recycling a money-losing proposition for most recyclers and has created a negative perception of the ban among C&D recyclers. CMRA, along with several of the stakeholders, is working with the DEP to find ways to use the fines and to pinpoint more markets for them.

Overall, innumerable legislative and regulatory actions that have the intention of promoting C&D recycling have been passed across the country. Many of those regulations mandate that a certain amount of a site's C&D debris be diverted from landfill disposal. Many in the C&D recycling industry believe it would do more good to have government support for recycled products instead of disposal bans.

Rail Yard Concerns

The C&D recycling industry joins with the entire solid waste industry in its opposition to rail-yard transfer stations, which have sprung up in recent years primarily in the Northeast.

These facilities mostly handle C&D debris. And as rail operations, they can operate under a special federal exemption for railroads that shields such companies from state and local permitting and oversight. CMRA, the National Solid Wastes Management Association, the Solid Waste Association of North America, and several recycling and waste hauling companies are members of a coalition that is fighting these rail facilities. As Chaz Miller pointed out in the January 2007 issue of Waste Age ("Fearless Forecasts, p. 16), if the Surface Transportation Board, the federal entity in charge of railroads that permits the railroad exemption, does not fix this problem, then expect federal legislators to move to eliminate the exemption.

Another issue facing the C&D recycling industry is tax credits. While a movement exists to create tax credits for firms that purchase equipment to recycle MSW, C&D recyclers would like to see credits for the entity buying the recycled C&D products, especially in the non-aggregate arena. This will help to develop the market for these products.

Looking Ahead

So, in the final analysis, how does the future look for C&D recycling? CMRA estimates that C&D recycling of all types of material has been growing by at least 10 percent, by weight, each year for the past 10 years. From road contractors buying a crusher to process what they generate, to large waste companies buying out strategically placed mixed C&D recyclers, all types of businesses are entering the market.

Pressure for more C&D recycling is also being applied by the green building movement, which emphasizes both the recycling of C&D waste and the use of recycled products in new construction. Couple this with government emphasis on the diversion of C&D debris from landfills, and the C&D recycling industry can expect to enjoy double-digit growth for the foreseeable future.

William Turley is the executive director of the Construction Materials Recycling Association, which promotes the recycling of construction and demolition materials.



Optimizing multi-family recycling systems, part 3:

Influencing fulfillment of desired diversion behaviors

by Stephan Pollard, Ph.D. and Jennie Popp, Ph.D.

This series of articles on improving recycling participation and quality in multi-family dwelling (MFD) settings began two issues ago with an introduction to the powerful role of several key on-site recycling system support variables:

- 1) The on-site manager
- 2) The owner and/or property management company
- 3) The residents
- 4) The jurisdictional government or agency
- 5) The haulers.

Last month, we discussed the importance of easy and convenient access to recycling systems for MFD residents.

Our purpose, this month, is to continue suggesting strategies to increase recycling participation, and decrease improper source-separation (i.e., contamination); in this article's case, strategies focused on motivation of preferred MFD resident recycling behavior. We conclude with a summary of characteristics common to successful MFD discard diversion programs.

Influence: Getting started

Motivational strategies intended to increase recycling intensity and decrease contamination are numerous and vary in their:

- 1) Ability to produce desirable behaviors, durable or otherwise
- 2) Cost-effectiveness
- 3) Ease of implementation.

These strategies can be motivational instances that either take place before a behavior (e.g., causing action, such as recycling steel cans or proper source-separation), or occur as a result of a specific outcome (e.g., after having performed some amount of recycling or contaminated a recycling container). In general terms, strategies for prompting recycling include system engineering and design, educational materials, example setting, demonstrations, feedback, commitment development, and regulatory or mandatory incentives.

Prompts can come in many different flavors, such as a general request or catchphrase (e.g., "We proudly reduce, reuse and recycle.") or a specific instruction (e.g., "Please do not include butter tubs!"). Dissemination of educational information such as this, that does not include an explicit suggestion of preferred recycling behavior, is considered general prompting.

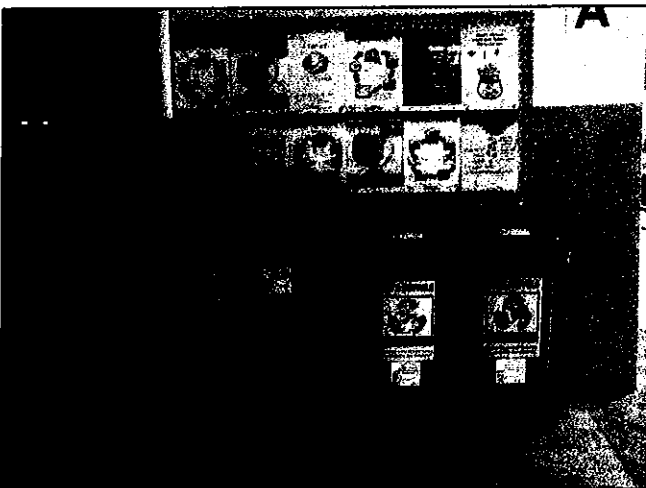
Some other prompts announce a reward or a penalty, such as "Participate or get evicted!" These sorts of prompts have been labeled consequence motivators by social psychologists. Using consequence strategies can be relatively expensive and difficult to

COMPLIANCE TACTICS DESIGNED TO INFLUENCE DESIRED HOUSEHOLD RECYCLING BEHAVIOR OFFER EFFECTIVE MEANS OF IMPROVING PROGRAM NUMBERS.

administer, but also can add significantly to the effectiveness of prompting tactics.

Without consequences, prompts are more effective when they are respectful and non-insistent, convey a well-defined appeal, occur in close range to the point where the preferred response can be carried out and call for an action (or inaction) that is convenient to carry out. Strategies involving the dissemination of educational material are more likely to succeed when they include incentives serving to better ensure performance of preferred behaviors, especially those that require time and effort.

Another strategy for inducing preferred recycling behavior is example-setting. Respected property managers can play a critical modeling role. For MFD residents, the image of their property manager and her or his employees as dedicated recycling participants is a powerful one. Engaging these people in demonstrations at the MFD that include a specific appeal coupled with announcement of either rewards or penalty can increase the likelihood of an effective campaign.



Stephan Pollard holds a doctorate in environmental dynamics and has done doctoral-level research involving waste characterization and promotion of household discard diversion in multi-family dwelling settings. He can be contacted at stephan.pollard@gmail.com. Jennie Popp holds a doctorate in agricultural and resource economics and serves on the faculty of the University of Arkansas (Fayetteville). She can be contacted at jhpopp@uark.edu.

The problem with many strategies involving material incentives and disincentives is that the implementation may not be reliable and the durability limited. Requiring recycling program administrators to perpetually intervene to maintain preferred recycling behaviors may be unrealistic. Feedback, commitment strategies and regulatory incentives (including MFD management mandated resident participation) also can be particularly effective in certain situations.

Collecting feedback

Feedback strategies involve providing information regarding the performance or non-performance of recycling behaviors. Such strategies can be useful in generating preferred recycling behaviors by eliciting behavior through the activation of social and personal norms working on an individual's belief systems regarding the behavior of others and feelings of moral obligation to perform a particular action.

For feedback to be successful, a couple of conditions first must be met:

- ◆ Individuals need to be able to draw a connection between behavior and the feedback
- ◆ Targeted individuals generally must be interested in changing their behavior, otherwise this form of intervention (a term used in psychology to describe behavior directing tactics) is not effective. More

research, however, is needed to substantiate the proposition.

Feedback intervention strategies can occur at the individual or group level. At the group level, a strategy might include weekly information about the recycling behavior of a particular MFD complex sharing the amount of materials collected weekly, the amount of contamination or the average weekly MFD recycling rate. At the individual, household level, similar information might be provided regarding the individual household's recycling behavior relative to others.

This technique is most effective where what is believed to be normal is actually lower relative to what is truly the case. If the normative information provided is not higher than that of the resident's it will not be effective.

The propensity for preferred behavior changes to fade with the removal of feedback constitutes a weakness of the approach. Evidence suggests that group-level feedback may produce longer lasting, albeit slower, changes towards preferred behavior. Feedback could be transmitted through the use of emails, door hangers, postcards, face-to-face communication and posted messages.

Committing to the program

Applied research has shown that signature commitments (signed pledges to recycle or

statements otherwise supportive of recycling), whether in group commitment form or individual commitment form, results in significant and immediate improvements in recycling intensity. Additionally, these improvements have a strong tendency to last.

The positive outcomes of group commitments to recycle last longer in well-structured, highly cohesive settings, such as in nursing or retirement homes, rather than in less cohesive environments, such as college dormitories. When signature commitments are made at the individual-level, the improvements tend to last the longest.

Whether it be group or individual commitments, securing pledges in a manner perceived as non-coercive through direct, personal contact (e.g., face-to-face) rather than indirect contact (e.g., mailings, door hangers) is more likely to produce persistent higher rates of recycling. Though acquiring signature commitments is a labor intensive process, the approach affords a maintenance-free, overhead-free, lasting remuneration that stands a higher probability of being cost-effective, particularly if volunteers of high credibility (e.g., faith-based groups, scouts) are used to personally approach residents and acquire a signed pledge.

Behavioral science and recycling

Though behavioral scientists prefer the use of positive reinforcement, laws, ordinances

You're not going to believe what dad and grandpa came up with now!

Watch for our NEW PRODUCT RELEASE coming summer 2007!



It's How You Haul It.



IN-HOUSE FINANCING THROUGH...



CAPITAL PARTNERS

Pro-Tainer Inc.
It's How You Haul It!

Your Complete Source for Refuse & Recycling Equipment

P.O. Box 427 • Alexandria, MN 56308
www.protainer.com

800-248-7761

Reader service #147

and mandated resident participation (each a form of negative reinforcement) deserve consideration as prompting strategies. Requiring recycling program availability and participation by residents can serve to greatly increase recycling intensity, with and without the support of penalties.

Several factors associated with mandatory recycling can help explain the strategy's increased effectiveness over voluntary programs:

- ◆ Regulations and mandates announce norms and obligations. As such, they can enhance the behaviors and attitudes that have come to be accepted in the form of a moral norm.
- ◆ The public debate often associated with arguing and passing a recycling ordinance generates additional publicity and awareness.
- ◆ The commitment of resources on the part of government or MFD management serves to better ensure program success.
- ◆ Because mandated programs often receive greater scrutiny, they are often accompanied by more effective promotional and educational efforts.
- ◆ The desire to avoid unpleasant consequences (e.g., fines, refusal of service or warnings) drives individuals to recycle more fully and correctly.

The primary disadvantage of regulations and mandates is that they can be difficult and

expensive to enforce, but not always. Depending on the willingness of the MFD owner/manager to implement on-site recycling, the application and enforcement of regulatory and mandatory incentives may not be necessary. While many owner/managers are resistant, some are simply waiting for the provision of collection services. Others, while being on-board, could use help with enforcement tools such as lease addendums specifying participation. An increasing number of people and businesses are showing signs of willingness to help with environmental issues as well.

However, regulatory and mandatory incentives may lead to a negative response, such as deliberate collection bin contamination and complete disregard of the request. Fortunately, and even when non-compliance is unlikely to result in punishment, recycling intensity is still likely to improve significantly.

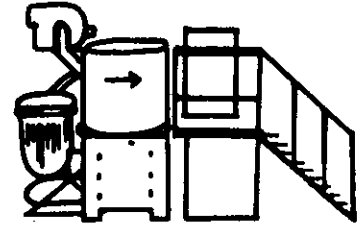
Prompting and message delivery

The ecological and political climate can influence the effectiveness of a motivational strategy. Strategies highlighting the connection between greenhouse gas emissions and solid waste management stand to benefit from piggy-backing on the current rise in climate change awareness. Such a strategy can be just as effective as acquiring a signature-commitment.

Messages should be polite, suggest a behavior that is easily or conveniently per-

DENSIFIERS FOR SALE

NEW 100 HP — 400 HP
FOR LDPE • HDPE • PP
LLDPE • EPS
AUTOMATIC CONTROLS
DRYING CAPABILITIES ALSO



STANDARD OR CUSTOMIZED
PLASTICS EQUIPMENT
TO MEET YOUR NEEDS

Quality Machines Built Here

Cal-Sierra Machine

CONTACT BRUCE

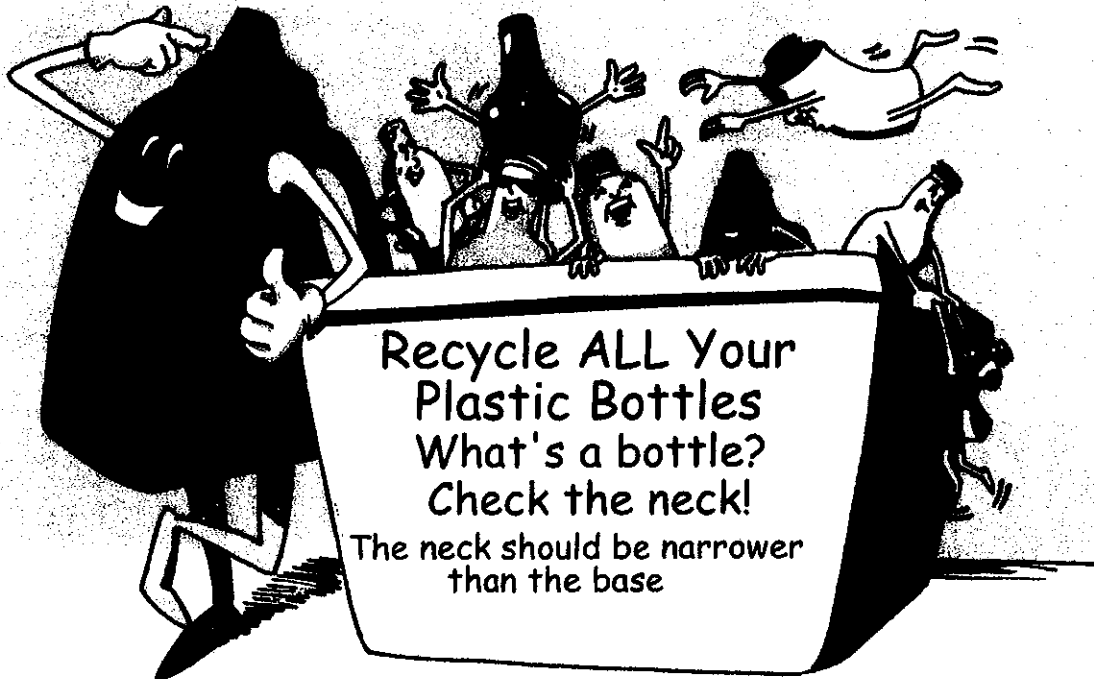
PH 909-627-9807

Fax 909-627-8750

www.cal-sierramachine.com

Reader service # 152

Remember! Recycle ALL Plastic Bottles



www.AllPlasticBottles.org

formed, precisely communicate the desired behavior and be strategically timed. Signage should meet all of these criteria with the added requisites that it be:

- 1) Eye-catching
- 2) Visible from a distance
- 3) Placed in the line of sight and close to where the behavior should occur
- 4) Contain a message taking no longer than a few seconds to understand (e.g., a short action request in large font, details in smaller)
- 5) Be supplemented by specific, redundant verbiage and corollary props in common traffic areas, such as above mailboxes, or in laundry or other communal rooms.

Message delivery should be on-going, include a range of different media and be performed using quality materials. Finally, when used wisely, communication media plays an integral role in directing people to a preferred behavior; from increasing awareness to motivating behavior change.

Successful MFD programs

Evidence suggests that MFD recycling programs are more apt to be successful in the following conditions:

- ◆ A multitude of proven effective strategies are employed together
- ◆ Signature-commitment strategies are employed

- ◆ Feedback is used on individuals with a greater interest in change (e.g., college students)
- ◆ Messages and signage are designed with the visitor in mind
- ◆ MFD owners/managers are supportive
- ◆ Block leaders, perhaps in the form of building managers, are used to facilitate a sense of community (serve as initiators of social norms; may prompt public commitment)
- ◆ There is resident interest (an owner/manager motivator)
- ◆ Operation of the program occurs within a legislated or mandated setting backed up by sanctions
- ◆ Program resources allocated to informing and motivating are predominantly spent on medium-sized complexes
- ◆ Collection of MFD recyclables occurs on the same route as single-family collection, using the same truck and crew
- ◆ Recyclables collection is performed either through a private firm under contract or through an exclusive charter issued to local government
- ◆ The service area consists primarily of smaller complexes (smaller complexes tend to recycle much more with less contamination on a per unit basis than do medium or larger complexes; possibly due to increased social pressure to recycle and sense of community)
- ◆ A nominal monthly recycling fee is

charged to each MFD unit, coupled with a variable fee for garbage

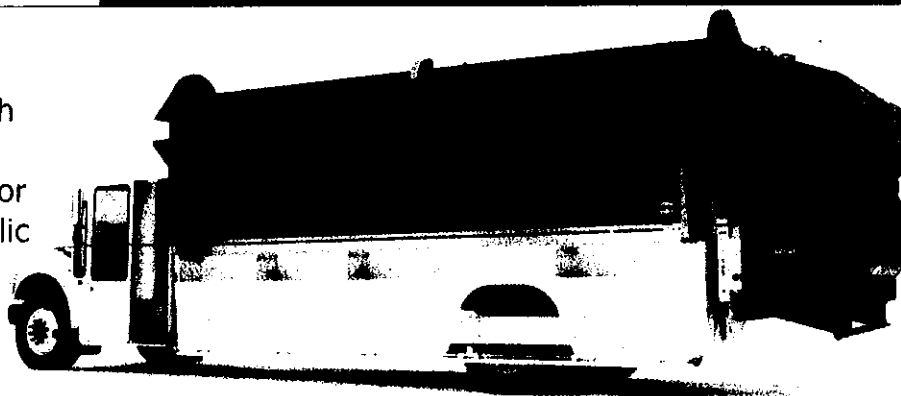
- ◆ Attention is given to convenience and cleanliness of collection containers and the recycling area
- ◆ Enough interior storage space exists for residents to process recyclables
- ◆ A proper balance exists between support provided by local government and responsibilities assumed by ownership and management of apartment buildings
- ◆ Multi-material collection programs requiring separation into several containers (reduces contamination)
- ◆ A collection container set exists for every 15 to 19 households
- ◆ Collection containers are large (e.g., 90-gallons)
- ◆ The recycling collection system is centrally located within normal patterns, of movement and is located in close proximity to Dumpsters.

Returning to the question posed at the beginning of this series: What is the best way to optimize both recycling quantities and quality? The answer lies in combining as many techniques as possible. Alone, each of the suggested strategies can yield positive results; however, combining as many of them as possible further increases the likelihood of substantially improving participation and quality. **RR**

WALINGA® INC. RECYCLING & RENDERING UNITS

"CHAMPION" RECYCLER

- 46 yard capacity • FRP Smooth Side Construction • 4-7 Yd Hydraulic Bustle Gate • Single or Dual Loading Buckets • Hydraulic Flexible Rack & Pinion
- Bucket Lift Mechanism
- WALINGA Custom "Cab Conversion"



ULTRA-LITE RENDERING/ORGANIC BUCKET LOADER

- All Aluminum 100% Welded Construction • Full Opening Tailgate • Heavy Duty Lifting Mechanism
- Remote Controls

www.walinga.com

Guelph, Ontario 519•824•8520

Caledonia, Michigan 800•466•1197

Carman, Manitoba 204•745•2951

Reader service # 199