TRASH, ASH, AND THE PHOENIX
Waste-to-Energy Facilities After the Supreme Court Decision of May 2, 1994

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INTRODUCTION

On May 2, 1994, the Supreme Court ruled in *City of Chicago v. Environmental Defense Fund (EDF)*[1] that ash generated by municipal waste-to-energy (WTE) facilities is not exempt from regulation as hazardous waste under Subtitle C of the Resource Conservation and Recovery Act (RCRA). The opinion required the Environmental Protection Agency (EPA) to revise its prior position that ash derived from burning household wastes alone or in combination with nonhazardous wastes from industrial and commercial sources was exempt from hazardous waste regulation. As a result of the decision, persons who generate WTE combustion ash must determine whether the waste is hazardous under EPA's hazardous waste identification rules. Since EPA has not listed WTE combustion ash as hazardous waste, generators must test whether the ash exhibits any of the characteristics of hazardous waste (i.e., ignitability, corrosivity, reactivity, or toxicity). For ash that does exhibit such a characteristic, WTE facilities would have to either treat ash on-site to eliminate the characteristic or make arrangements for the proper disposal of their ash at approved Subtitle C facilities. However, the Supreme Court decision does not necessarily represent the last word on municipal solid waste (MSW) ash management. Either EPA or Congress may take up the issue and craft alternative approaches. Based on general WTE industry data and findings on WTE combustion ash, this paper presents and analyzes legislative and regulatory options and proposals that may result from the Supreme Court decision.

FINDINGS ON THE WTE INDUSTRY IN GENERAL AND WTE COMBUSTION ASH IN PARTICULAR

In light of more than 196 million tons of MSW being generated annually, local governments have supported the emergence of WTE plants because they can reduce waste volume and weight while recovering energy from discarded products. As a component of energy strategies, the WTE option will play a role in meeting America's future energy needs. Also, these facilities help to alleviate the problem of shrinking landfill capacities.

Data on WTE Plants

As of 1993, there were 125 WTE facilities with a total annual capacity of 30.9 million tons of trash operating in the U.S.[2] Adding the plants under construction or in the planning stage, the number rises to 180 plants with an annual capacity of 44.01 million tons of trash. Florida, Minnesota, New York, Massachusetts, and Virginia host the largest numbers of WTE facilities. WTE plants currently operating in the U.S. have a combined capacity to produce between 2,300 and 2,500 MW of electrical power. Some WTE plants produce thermal energy in the form of steam, hot water or chilled water for district heating/cooling systems. A few plants "cogenerate" both electrical and thermal energy. For 1992, WTE tipping fees averaged $52, while average MSW landfill tipping fees were $32 per ton of trash.[3]

Data on WTE Ash

Ash remains as the residue of the combustion process, which can reduce the volume of the waste stream by 60 to 90 percent, and its weight by 75 percent. WTE plants generate bottom and fly ash. Bottom ash is the large and moderate-sized unburnable matter left after the waste has passed through the combustion chamber. Fly ash, which is collected in the air-pollution-control equipment, is the light flue-gas entrainable particulate material carried off the furnace grate during combustion by updrafting of underfire air. In 1993, the 125 WTE facilities produced an estimated 7.73 million tons of ash,[4] containing between 5.8 and 6.96 million tons of bottom ash and between 0.77 and 1.93 million tons of fly ash. The 180 WTE plants that are operational, under construction, or planned are projected to generate 11.01 million tons of ash annually, comprising between 8.26 and 9.91 million tons of bottom ash and between 1.10 and 2.75 million tons of fly ash. Issues of ash toxicity are highly controversial. Heavy metals, however, are considered a major driver in ash toxicity. The 125 operational WTE facilities are estimated to produce 10,800 to 58,000 tons of lead and 247 to 595 tons of cadmium per year, while the corresponding figures for the 180 operating, under construction, or planned WTE plants are estimated at 15,414 to 82,575 tons of lead and 352 to 848 tons of cadmium per year.[5]

For ash disposal, roughly two-thirds of the WTE facilities utilize an ash monofill, a specialized type of land-disposal site, designed to isolate the ash residue. It employs an impermeable liner to protect ground water from potentially hazardous leachate formed when rainwater passes through wastes containing heavy metals or organic compounds. Ash disposal costs in MSW landfills average between $30 and $50 a ton. Disposing of ash in licensed hazardous waste landfills, which have double plastic liners, sophisticated moisture collection systems, and tighter operating procedures can cost $200 to $500 a ton.

POSSIBLE IMPACTS ASSOCIATED WITH OPTIONS ADDRESSING THE SUPREME COURT DECISION

Prior to the Supreme Court decision, EPA had interpreted Section 3000(i) of RCRA (the "clarification of household waste exemption") to exempt ash produced by WTE facilities burning household wastes and nonhazardous wastes from RCRA Subtitle C. This policy was articulated in a September 1992 memorandum signed by then EPA Administrator William Reilly. The memorandum also announced that ash could be disposed safely in landfills meeting the standards for MSW facilities promulgated in 40 C.F.R. Part 258. On May 2, 1994, the Supreme Court decided that combustion ash produced by WTE plants that burn household waste alone or in combination with nonhazardous wastes from industrial or commercial sources is not exempt from regulation under RCRA Subtitle C. The following paragraphs address the situation in the aftermath of the Supreme Court decision and alternative options for modifying the impacts of the judgment. It should be noted that such alternatives may be implemented via legislative or regulatory means.

Situation in the Aftermath of the Supreme Court Decision
In response to the May 2, 1994, Supreme Court decision, EPA proceeded with its implementation strategy, which consisted of the release of a draft document on ash sampling and analysis;[6] a memorandum to regional administrators on RCRA Subtitle C compliance issues;[7] and an extension of the date for submitting treatment, storage, and disposal facility (TSDF) permit or pre-permit applications for facilities that manage WTE ash.[8]

Results of the Supreme Court Decision and EPA Implementation Policy. According to EPA regulations, barring certain exclusions, any person who generates a solid waste must determine if that waste is a hazardous waste. As a result of the Supreme Court decision and EPA's implementation strategy, WTE combustion ash is not excluded from hazardous waste regulation. Since EPA has not listed WTE combustion ash as hazardous waste, WTE facilities have to implement a program for determining whether the ash exhibits a hazardous characteristic. Under the EPA draft guidance document on sampling and analysis of municipal refuse incinerator ash,[9] WTE ash would have to be tested four times a year. For ash that does exhibit a hazardous characteristic, WTE facilities would have to either treat ash on-site to eliminate the characteristic or make arrangements for the proper disposal of their ash at approved Subtitle C facilities.

Impacts. Potential impacts of the Supreme Court decision are numerous and should be viewed simultaneously rather than in an isolated fashion. Likely repercussions on ash management activities include the following:

- Communities discovering that the ash they had previously managed under RCRA Subtitle D should have been managed under RCRA Subtitle C may face RCRA penalties.
- Some WTE owners and operators seeking to dispose of their combustion ash have already experienced adverse reactions from MSW landfill owners.
- If all WTE ash tested hazardous, the current hazardous landfill capacity in the U.S. could soon be exhausted.
- RCRA Subtitle C disposal is far more expensive than RCRA Subtitle D management.
- WTE industry representatives feel further discouraged from exploring ash reutilization avenues.
- Government units may face significant Superfund liability if they owned or operated a facility that accepted WTE combustion ash or if they arranged for the transportation of such ash.
- Potential liability and litigation may negatively affect the bond ratings of communities. This holds especially true for another Supreme Court decision that struck down local

flow-control legislation (i.e., requiring all waste generated within a local jurisdiction to be processed at designated facilities). Lower bond ratings make borrowing more risky and expensive.

Unresolved Issues. Besides the identifiable impacts described above, there are several WTE ash issues for which there is insufficient information to pinpoint the potential effects. These matters include the following:

- The waste management industry opposes source separation of toxic materials by households and commercial waste generators, and pre-processing and screening of waste received at combustors, so as to divert to recycling or hazardous waste disposal such toxic materials.

- In general, opinions on the toxicity of incinerator ash vary. The Environmental Defense Fund (EDF) argues that the ash poses major environmental problems, and cites a considerable body of data indicating that the combustion ash exceeds the toxicity characteristic (TC) limits for lead, cadmium, or both.[10] On the other hand, industry reports that the first round of tests required by the Supreme Court decision seems to indicate a very low Toxicity Characteristic failure rate for ash.[11] Industry also contends that new air-emission specifications will further neutralize the hazardous content of ash through the addition of lime to the process. (This is important in relation to fly ash, which is collected in the air-pollution equipment and more likely than bottom ash to contain toxics.) Lime residues from scrubbers or injectors would mitigate the effects of any toxics in the ash in the following way: when ash from air pollution control devices is landfilled, the lime would react with liquids in the soil to form a concrete-like substance in a matter of a few weeks, which would then decrease metal leachability; additionally, lime would neutralize acids produced from the biodegradable waste, thereby reducing the potential for pollutants to leach from the ash.

- With regard to the method used to test the ash for toxicity, EPA's guidance document recommends the toxicity characteristic leaching procedure (TCLP). Industry sources emphasize that the TCLP may overestimate leaching potential, especially in monofills, because the test would be relatively aggressive in extracting pollutants in comparison to natural processes. Moreover, in monofills ash would not be co-mingled with other MSW constituents, which could create acids that could in turn lead to a leaching of hazardous constituents.[12] Some environmentalist groups have asked that the TCLP be replaced by a new protocol that will discover metal content rather than only what leaches out. Critics charge that this approach would not factor in exposure and therefore may cost more money than necessary. Furthermore, some environmentalists suggest that ash should be tested daily rather than quarterly, and that regulatory agencies -- in addition to combustor operators -- conduct the tests. Assuming that one test costs between $1,000 and $1,500, a daily as opposed to a quarterly testing requirement would represent a significant

financial burden. EPA is reviewing comments on its guidance document recommending the TCLP, but does not anticipate issuing the final guidance document before March 1995.

- Several interested parties have suggested extending the transition periods or even staying the rule in order to ensure that the requirements are interpreted in an optimal fashion. Other companies have asked EPA to accord an overall transition period of twenty-four months to WTE-plant operators to phase in a new regime.[13] So far, there is no indication that such extensions will be offered, but practically speaking, EPA may not write final rules until it undertakes Phase V of the land disposal restrictions (LDRs), which is not expected for several years.

- EPA has not yet decided upon the issues of testing of ash already disposed and retroactivity.[14] One company is concerned about retroactive effects and suggests that EPA not retroactively apply the new ash rules, since landfill owners whose ash tests hazardous will sue every past customer whether private or public, and whether for garbage or ash. On these issues of "effective date" and "retroactivity," EDF asserts that MSW combustion ash has been subject to regulation as a hazardous waste at least since the effective date of the 1984 amendments to RCRA.[15]

Alternative Options

Alternative options for dealing with the Supreme Court decision on WTE combustion ash may be developed through legislative as well as regulatory vehicles. The major alternatives include easing the RCRA Subtitle C regime; establishing special waste management standards; and reverting to RCRA Subtitle D regulation.

Easing the RCRA Subtitle C Regime. EPA could alleviate potential impacts from the RCRA Subtitle C regime by setting an industry-friendly late point in time for the testing requirement to attach, encouraging early on-site ash management activities, and spurring innovative technologies and potential reuse applications of treated ash.

Implications of Fixing the Point in the WTE Process for the Testing Requirement. EPA plans to make its own determination of the point at which MSW ash must be tested for toxicity. According to EPA sources, the Agency is looking at three options:

- Requiring owners and operators of WTE facilities to make separate toxicity determinations for bottom and fly ash;

- Allowing owners and operators to combine bottom ash and fly ash outside the combustion facility and test for toxicity then; and

- Deferring the decision until the agency proposes the ash management standards in Phase V of the LDRs. (These are not expected in the near future; phase III standards are not

anticipated before March 1995. In the meantime, EPA would retain the current policy of allowing bottom ash and fly ash to be mixed prior to toxicity testing.)

EDF maintains that fly and bottom ash should be separately tested under all circumstances; and if they are mixed prior to disposal, then the mixture, too, should be tested. It argues that EPA promulgated a prohibition on dilution of wastes that exhibit the toxicity characteristic as measured by the TCLP. Mixing of fly and bottom ash, which are generated at different points within the combustor and physically distinct, would violate the dilution prohibition if either fly or bottom ash were TCLP-positive while the combined ash was TCLP-negative. EDF also criticizes as "unworkable" an approach that would depart from separate testing if the ashes were mixed as a consequence of the design of the facility and never managed separately.

Industry sources oppose a separation requirement as a serious threat to combustion as a waste-management alternative,[16] since the costs to retrofit a plant could amount to as much as $1 to $3 million per plant.[17] Furthermore, industry representatives dispute EPA's authority for such a requirement under RCRA.[18] These sources assert that, for combined ash handling systems, the point of generation is the collection point for the combined ash. Industry representatives also cite environmental benefits based on the management of a single ash stream (combining fly and bottom ash).[19] The management of a single combined stream could reduce the potential for release of particulates from fly ash streams and create a cement-like matrix more resistant to leaching. Another reason why industry opposes separate testing of bottom ash and fly ash lies in the fear that the EPA would invoke its control within the "four walls" of a facility. One source points out that intrusion inside the four walls of a facility to declare materials wastes could set precedents for testing a variety of materials that have not yet been discarded.[20] The United States Conference of Mayors, which represents municipal interest in the WTE issue, maintains that ash should be tested at the point at which it is discarded; in the case of WTE combustors this is at the end of the ash management processing system of the resource recovery facility.[21] A typical plant processes solid waste by combustion, collects the ash from the combustion process, and then recombines the ash stream as part of a continuous, on-site waste management system. This process would not be complete until the final ash is generated and ready for landfill disposal.

EPA is in the process of weighing the arguments regarding the point at which ash should be tested and will choose one of the options by end of 1994.[22]

Ash Management Activities. WTE owners and operators have asked EPA to provide guidance in relation to ash management on-site. Any such activity, they suggest, should not be governed by RCRA Subtitle C TSDF requirements. They allege that the Supreme Court decision would only subject ash generation -- as opposed to ash management -- to RCRA Subtitle C. One company operating 5 WTE plants suggests that EPA mandate the on-site treatment of fly ash and bottom ash, either as separate ash streams or in combination according to the facility owner's preference and the plant's operating procedures.[23]

EDF, however, expresses doubts about the effectiveness of commercially available handling and management methods that could make WTE combustion ash safer.[24] At any rate, the group argues, any post-generation treatment of TCLP-positive ash would require either a permit or compliance with the generator accumulation requirements. EDF asks EPA to clearly state that all treatment of ash whether occurring on- or off-site should be governed by RCRA Subtitle C TSDF regulation.

Ash Weathering as Management. According to industry sources, studies of natural "weathering" of combustion ash indicate that some metals (e.g., nickel, copper, zinc, lead) are immobilized by incorporation into clays formed by the weathering process, while some anionic metals (e.g., molybdenum) are immobilized by precipitation as secondary compounds (e.g., calcium molybdate).[25] MVA, Inc. and Dutch researchers believe that it will be possible to develop a treatment technique for minimizing the environmental impact of MSW combustion bottom ash (and in the future fly ash) through "controlled aging."[26] This would consist of maximizing those environmental factors which would lead to a stable, inoffensive product suitable for use in construction materials or long-term storage. However, according to the senior research scientist of MVA, EPA has not agreed to support pilot plants and basic research.[27] Commercial availability in the U.S. thus seems remote due to EPA's apparent lack of interest, even though the process is explored in other countries such as the Netherlands.

Reutilization of On-Site Treated WTE Combustion Ash. WTE industry representatives would like EPA to announce that from a federal perspective, beneficial use of treated ash as landfill cover or landfill road subbase aggregate is acceptable to EPA. One company refers to the following example. At a 1,380 ton-per-day (tpd) plant, an ash treatment and screening facility was installed in order to pass the California Waste Extraction Test for ash. According to the source, the incremental cost of operating the ash treatment and screening system to the city amounts to $2 million per year. However, in turn, the landfill operator now accepts the treated ash for free and reuses it at the landfill at gross savings advantage to the city of $3 million a year. Thus, the City earns a net savings of $1 million per year, while the landfill operator reportedly saves some $500,000 a year.

Establishing Special Waste Management Standards. Such an intermediate Category between RCRA Subtitle C and RCRA Subtitle D regulation could be set up through a contingent exclusion or specific legislation.

Federal Contingent Exclusion of Ash. Under a federal contingent exclusion, WTE combustion ash failing the TCLP (or possibly other designation tests) would be considered hazardous unless it was managed in accordance with a specified contingent management program. Appropriate methods for such contingent management could include handling in accordance with state regulatory programs; disposal in an ash monocell; and disposal in double-lined monofills with leachate collection and removal.

Advocates of this option justify their approach on the basis of EPA's past analytical determinations that ash would not pose a threat to human health or the environment. These sources also refer to the exclusion of certain hazardous wastes that are managed through reinjection and the exclusion of petroleum-contaminated cleanup media as regulatory precedents.[28]

Legislative Route. EDF and MSW combustion ash managers have been discussing legislative options for ash management as an alternative to EPA's May 24 implementation strategy. In the summer of 1994, a coalition of environmental groups and industry representatives crafted draft legislation, which while never introduced in the 103rd Congress, would have traded EPA's requirement to test and treat ash for its hazardous characteristics for a plan with special waste management standards for all WTE ash generated. The standards would be phased in over several years and require that combustion ash would have to be disposed in a dedicated landfill (monofill) or in a dedicated space in a landfill (monocell). However, ash reuse would be prohibited. In exchange for the imposition of those requirements, industry would be protected from retroactive liability before the May 2, 1994, Supreme Court ruling.

The coalition is expected to pursue ash legislation in the 104th Congress, however, the basis will most likely be modified. When the compromise was drafted in the summer of 1994, there was a fear within the WTE industry that a larger percentage of WTE ash would fail the test. Now, after the first round of tests, which indicated a low TC failure rate, WTE industry representatives feel they have a stronger position and do not want to lose the chance of being able to continue disposing ash that does not test hazardous in a MSW landfill.[29]

Reverting to RCRA Subtitle D Regulation. Another legislative proposal forwarded to Congress is to exempt MSW ash from hazardous waste regulation and regulate the ash under RCRA Subtitle D. Such an option would revert to the situation prior to the Supreme Court decision and reinstate the effects of the 1992 Reilly memorandum.

Under the plan, WTE owners and operators or possibly host communities would have to establish a program to divert batteries containing heavy metals from MSW combustors. The proposal would allow ash to be utilized for secondary purposes, according to regulations to be promulgated by EPA after the bill's enactment. Furthermore, the regulations would have to account for all potential exposure pathways. EPA would be required to promulgate implementing regulations for new ash management standards within 12 months of the bill's enactment.

OTHER VIABILITY CONSIDERATIONS SURROUNDING WTE OPERATIONS

The economic viability of future WTE operations -- absent future moratorium legislation, which has repeatedly been defeated -- do not only revolve around costs associated with the combustion and ash management processes. At the stage when siting inquiries for a WTE plant begin, the not-in-my-backyard (NIMBY) syndrome becomes a factor difficult to overcome. The public often equates WTE plants with junkyards or dumps and fears that the values of surrounding property will decrease if a WTE plant is built. A local government hosting the WTE plant must also consider a number of other feasibility issues, which can be aggravated by increased management costs. This paper does not discuss another area of potential concern to the WTE industry regarding air quality regulations for MSW, exacerbated by a recent EPA report which identified MSW as one of the culprits for dioxin pollution.

Finding a Long-Term Energy Market

In 1978, Congress passed the Public Utility Regulatory Policy Act (PURPA)[30] to help small-power generators (i.e., those having a power-production capacity not greater than 80 MW), including those producing electric energy solely from waste . Such generators are referred to as having "qualifying facility status." PURPA promotes small-power production by obligating local utilities to connect with small-power producers, to furnish back-up power when necessary, and to purchase the small producer's excess electricity at the utility's "avoided cost," that is, the cost avoided by not generating the energy themselves. Many WTE industry representatives as well as trade associations and lobbying groups would like to see the 80 MW cap removed. WTE plants that produce 80 MW of power have design capacities of over 2,500 tpd. Removal of the cap would affect an estimated 10 out of 125 operating plants in 1993. However, the cap is viewed as a disincentive to expand capacities in general. The National Energy Strategy also favors the removal of the ceiling for all power plants that use renewable and waste-energy sources. While the Solar, Wind, Waste, and Geothermal Power Production Incentives Act of 1990 provides for a five-year window of non-applicability of the 80 MW cap, it does not apply to WTE plants. Thus, if policy makers were to view energy recovery from waste as part of a renewable energy strategy, a removal of the cap for WTE plants could be justified.

Flow Control

Flow-control laws may be described as legislation by local governments requiring all waste generated within their jurisdiction to be processed at designated facilities. Such policies raise several issues including: whether the local governments can require private haulers to bring the waste to WTE plants, and if they do not, whether the local government can still require the haulers to pay tipping fees to WTE facilities regardless of where the haulers dispose of the waste. It is estimated that these fees may account for 25 to 40 percent of plant revenues. In its *C & A Carbone, Inc. v. Town of Clarkstown, N.Y.* decision of May 16, 1994,[31] the U.S. Supreme Court struck down local laws that control the movement of garbage, reasoning that they violate the Commerce Clause of the U.S. Constitution. After weeks of intense negotiations among lawmakers, local government representatives, private haulers, recyclers, and financial institutions,

a flow-control compromise stalled before the adjournment of the 103rd Congress on October 8, 1994. Thus, the Supreme Court decision remains the cornerstone of flow-control law. The high court's *Carbone* judgment has meanwhile sparked lawsuits in seven states challenging individual local or state government flow control ordinances.

WTE plants are expected to suffer some harm from the loss of flow control if private haulers have cheaper landfill alternatives (older landfills that still have some capacity, or far away landfills in areas where landfills are not as expensive to construct and operate). While some local governments are lowering their tipping fees to become more competitive with other solid waste management facilities, other local governments are continuing to rely on flow control until they are challenged in court. Facilities in states where such court cases are pending are at risk of having their bonds devalued or downgraded. When the *Carbone* decision was handed down, the municipal bond market weakened, but when flow-control bills emerged in Congress, the market strengthened. However, in light of stalled Congressional efforts, some sources indicate that WTE facilities have had trouble selling bonds to finance facilities.[32]

Interstate Waste Transport

The issue of interstate waste transport has been discussed in Congress since the late 1980s, when the Supreme Court struck down state and local laws banning waste imports, reasoning that only Congress has the right to regulate interstate commerce. As for the 103rd Congress, the House, on October 7, 1994, unanimously approved legislation representing a compromise that would have set parameters for when state and local governments can close their borders to shipments of out-of-state waste, but the Senate failed to get unanimous consent prior to adjournment. It is expected that the 104th Congress will revisit interstate waste transport. For the time being, the lack of Congressional action signifies that interstate shipments of waste can continue unimpeded. The question of whether to restrict interstate waste transport or not may impact the MSW management and the waste-ash generation components of WTE operations. Most interstate transport issues arise from moving trash from densely populated areas (e.g., New Jersey and New York) to rural areas (e.g., Ohio and West Virginia).

If states were allowed to restrict transport, future WTE projects may be helped because wastes that might have gone out of state will have to be managed in-state. If states are not allowed to restrict waste transport, adjacent states can work together on MSW projects under "interstate compacts." In terms of combustion ash, interstate waste transport restrictions may make ash disposal more expensive. Allowing cross-border shipments of WTE ash gives plant owners and operators the opportunity to seek the most economical disposal alternative on a national scale.

Integrated Waste Management Systems

According to EPA, in 1990 over 17 percent of MSW was recovered for recycling, while over 16 percent was combusted. Landfill disposal was the management practice for over 66 percent of MSW. The Agency estimates that by the year 2000, 32 percent of MSW will be managed by recycling, just under 21 percent by combustion, and over 47 percent by landfilling. These

management alternatives do not necessarily have to be mutually exclusive; rather, they can all be included as part of an integrated waste management system.

Analyzing the impacts of recycling on WTE plants shows mixed results. On the one hand, removing combustibles, such as paper, reduces the Btu content of the fuel, meaning that more waste needs to be burned to generate the same amount of power. On the other hand, recycling may take out noncombustible materials that interfere with burning, such as bottles and cans, thereby allowing the trash to burn more efficiently and reducing the amount of ash produced. Furthermore, the removal of certain materials from the incoming waste stream may reduce pollutants associated with combustor emissions and combustion ash toxicity. Recycling, in turn, may have cost and operational limitations. The American Institute of Chemical Engineers has estimated that a typical municipal recycling program (including collection and processing) may cost between $100 and $200 per ton of collected materials, before sale.[33] For example, residential recycling can require a second fleet of trucks and drivers, and substantial investments in processing plants. Collection cost may not be offset by the sale of recycled materials.[34] This means that recycling costs will be passed on to end consumers as trash fees, property taxes, or other municipal financing schemes.

Despite some perceptions that WTE competes with recycling and that the two are mutually exclusive, the main alternative to WTE is landfill disposal, which, as indicated above, is the disposal method for the vast majority of MSW. Landfilling itself is not without problems. Among requirements for landfills are impermeable liners and leachate collection systems; and under the Clean Air Act, EPA has proposed new source performance standards for new landfills and provided guidance for controlling and collecting methane emissions.[35] (Some landfills have systems that collect methane and use it as an energy resource.)

Most waste management organizations actively promote an integrated solid waste management scheme, which accommodates concerns associated with one particular waste-management activity by optimally merging or combining the following closely managed components: (1) reducing the use of waste at the source (e.g., homes and businesses); (2) collecting recyclable materials; (3) converting solid waste to energy; and (4) safely landfilling combustion residue, as well as wastes which cannot otherwise be handled (e.g., bulk wastes).

SUMMARY AND CONCLUSIONS

The Supreme Court decision of May 2, 1994, required EPA to revise its prior position that WTE combustion ash was exempt from hazardous waste regulation under RCRA Subtitle C. Since EPA has not listed WTE ash as hazardous, the ash must be tested to determine whether it exhibits a hazardous characteristic. Ash that tests toxic under the TCLP triggers full RCRA Subtitle C requirements.

A possible EPA mandate requiring MSW source separation and pre-processing, the appropriate testing method for toxicity, stay and transition periods, and grandfathering remain unresolved. On the most important issue, the point at which testing must occur, EPA is still considering the following options: (1) requiring separate toxicity determinations for bottom ash and fly ash; (2) allowing the combination of bottom ash and fly ash prior to testing; and (3) deferring the decision, while retaining the current policy of testing the combined ash streams.

Conceptually, the impacts of the Supreme Court decision could be mitigated in the following ways: (1) easing RCRA Subtitle C requirements for WTE ash; (2) establishing special waste management standards; or (3) reverting to RCRA Subtitle D. Within the RCRA Subtitle C regime, EPA could provide that the ash be tested at the end of the WTE cycle -- i.e., after the bottom and fly ash streams are mixed -- and could allow on-site ash management activities without triggering TSDF status. A special waste management category, which could be achieved through a federal contingent exclusion of ash or through legislation, would trade the TC test for stringent management for all ash including that which would not have tested toxic. Reverting to RCRA Subtitle D regulation would reinstate the effects of the 1992 Reilly memorandum. The drivers for selecting an option that reconciles efficient operation of WTE plants and the protection of human health and the environment should be the desirability of WTE as a MSW management and energy-generation avenue, and the need to ensure that the risks to the environment associated with ash disposal are not significant.

On the first issue of WTE desirability, RCRA, generally speaking, strives to strike a balance between protecting the environment and encouraging efficient waste management activities, including resource recovery. In its opening line, the statute states: "[t]he objectives of this chapter are to promote the protection of health and the environment and to conserve valuable material and energy resources" (42 U.S.C. @ 6902[a]). Thus, it seems that WTE forms part of a comprehensive approach implementing these twin goals.

The issue of ash toxicity is a scientific question. After the first round of tests most (combined) WTE combustion ash passed the TC. The question of whether to require separate testing for bottom and fly ash streams should be assessed in terms of risks posed. It should be noted in that context that non-incinerated MSW may be disposed in ordinary landfills, despite the presence of potentially hazardous substances. Current ash management practices that reduce the risk of exposure to contaminants include neutralizing toxic elements in the combined ash, adding lime to solidify the ash, and disposing it in monofills.

The situation at the end of 1994 is not conclusive. More data on ash toxicity will be generated as testing results are verified and assembled. Other areas potentially impacting WTE operations, such as flow control and interstate waste transport, are also likely to be revisited in the near future.

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