The garbage incineration industry is in serious trouble. For nearly a decade they have been promoting incinerators all across the United States without asking themselves one crucial question: where will we put the toxic ash produced by these machines?

This particular mistake was first made by builders of nuclear weapons and nuclear power plants, who built nuclear facilities all across the country without ever asking themselves, "Where will we put all the radioactive waste?" Today, fifty years into the nuclear enterprise, no one has yet found a satisfactory answer to the question, "Where can we safely store these wastes for the duration of the hazard, which is thousands of years?" Now the garbage incinerator people are being forced to ask the same difficult question.

(Perhaps it is significant that a majority of the companies now making municipal incinerators used to make nuclear power plants, before American power companies stopped buying nuclear plants.)

In any case, the crucial unresolved question of waste disposal is now threatening to wreck the economics of the municipal solid waste incineration industry. If incineration ash must be handled as a legally-designated "hazardous waste" and hauled to a legally-designated hazardous waste landfill, the increased costs of shipping and burial will make garbage incineration intolerably expensive and the whole industry will collapse. Clearly, ash is an achilles heel.

The problem of waste disposal for the garbage industry is as difficult as it was for the nuclear industry. The nub of the problem is that the wastes from both industries contain substantial quantities of very toxic material. In the case of nuclear power, it's the radioactive metals (cesium, strontium, plutonium and so forth). In the case of garbage incinerators, it's the toxic metals lead and cadmium, but the problem is essentially the same. The offending substances are metals and they do not degrade. (In the case of nuclear power, if you wait long enough [250,000 years, in the case of plutonium], the radioactivity will cease. In the case of garbage incinerator wastes, the lead and cadmium will retain their toxicity forever. In this sense, garbage incinerator wastes are even less manageable than nuclear wastes.)

The main proposed solutions for nuclear waste all involve very deep burial in the ground. Some people want to bury them half a mile below ground in a salt mine in southern New Mexico; other people want to bury them half a mile below ground in Nevada. The long-term safety of both these proposals has been challenged on technical grounds, and the debate continues while the nuclear wastes pile up all across the nation (and, for that matter, all across the industrialized world).

These deep-burial solutions are not even being considered for the toxic ash from garbage incinerators simply because the garbage industry simply can't afford such an expensive solution.

Instead, we have a coalition of EPA (U.S. Environmental Protection Agency) officials, incinerator company "experts," and "independent" consultants (who derive their income from the EPA and from the incineration industry) conspiring to fool the public into thinking that incineration ash is not dangerous. It's a classic attempt at "linguistic detoxification."

Back in 1980, the EPA established a test for determining whether a particular waste is a "hazardous waste" or not. This is the "EP Toxicity" test. The EPA recently reported that "[Incinerator] ash frequently fails EPA-approved [EP toxicity] tests for determining whether wastes are regulated as hazardous, because it leaches lead and cadmium at levels of concern." [1] You might think this simple statement would close the book on this matter, that ash would hereafter be treated as a hazardous waste. However, for reasons that are not entirely clear, William Reilly's EPA wants to do special favors for the incinerator industry and so EPA has declared that the EP toxicity test is unrealistic, that ash "in the field" may not leach as rapidly as it does under laboratory conditions required for the EP toxicity test.

The EPA has therefore begun a series of tests to see how quickly ash leaches toxic lead and cadmium under "realistic" conditions.[2]

Pure, natural rainwater is slightly acid (pH of 5.6 or 5.7). Acid rain has an even lower pH (down to 4 or even 3). But even pure rainwater is sufficiently acidic to leach metals like lead and cadmium. However, modern incinerator ash contains not only the ash itself (the burned waste) but also the lime from the air pollution scrubber system. The lime is basic or alkaline (the opposite of acid); it has a high pH (10 or 11). The presence of the lime is sufficient to prevent slightly acidic rain from immediately leaching the metals out of incinerator ash. So long as the lime is present, rainwater will not leach the metals out; instead, the rainwater leaches the lime out. This leaching of lime reduces the pH of the ash; but eventually the lime will be completely leached out, the pH of the ash will drop dramatically, and rainwater will then begin to leach the metals out. U.S. EPA agrees with this analysis; indeed, the point is hardly arguable. As if to confirm the obvious, EPA recently experimented with ash and lime mixed; they poured slightly acidic water over it and measured the pH and the metals that were leached. Not surprisingly, few metals were leached because the whole concoction was so alkaline that it neutralized the acidic water. EPA concluded, "The results of these limited laboratory studies suggest that the alkalinity of municipal incinerator fly ash probably controls and determines the release of elements [metals] into leachate until this alkalinity is exhausted." Just what a chemist would predict.

The EPA tests showed that after nine washings with acid rain, the pH of the ash-plus-lime mixture dropped from 10.9 to 9.4 because the lime was being removed by each successive washing. This is also what one would expect, and the EPA said so. "However, due to time constraints the work was discontinued after nine extractions," said EPA, thus avoiding the need to state the inevitable result that the incineration industry doubtless doesn't want put to paper:

Slightly acid water (like natural rainwater or like acid rain) leaches out the lime from incinerator ash. Eventually the lime's alkalinity will be entirely exhausted; then the rain will leach the toxic metals quickly. It's only a matter of time, and nature has all the time in the world. The hazard from the metals in ash will not degrade with time--the hazard is eternal; and the phenomenon called rain certainly shows no sign of letting up. It is inevitable, therefore, that sooner or later ash monofills (which are nothing more than standard double-lined landfills, which even EPA says will all eventually leak--see RHWN #37) will spill their toxic contents into the local environment. Water supplies will become toxic. Living things nearby will be poisoned, including humans. Short of heroic (and prohibitively expensive, and unproven) measures like deep burial in the earth, there seems to be no solution to this problem. Not making incinerator ash is the only affordable remedy in sight.

--Peter Montague(National Writers Union, UAW Local 1981/AFL-CIO)

[1] We are quoting an EPA "Environmental Fact Sheet" [EPA/530-SW-90-029c] announcing release of a thick study called CHARACTERIZATION OF MUNICIPAL WASTE COMBUSTION ASH, ASH EXTRACTS, AND LEACHATES completed for the EPA by NUS Corporation of Gaithersburg, Md; the fact sheet is available from the RCRA Hotline at 800/424-9346; the thick study is available for $39.00 from National Technical Information Service [NTIS], Springfield, Va 22161; phone 703/487-4650 and request publication No. PB 90-187-154.

Quality From Municipal Incinerator Ash Monofills.” In Theodore G. Brna and Raymond Klicius, eds., Vol. 1 of PROCEEDINGS INTERNATIONAL CONFERENCE ON MUNICIPAL WASTE COMBUSTION, HOLLYWOOD, FL, APRIL 11-14, 1989, pgs. 3b-39 through 3b-52. Ottawa, Cn: Minister of Supply and Services Canada, 1989. Catalog No. En 40-11/14-1989e. NTIS is going to publish this volume but hasn't yet; we received a copy from Theodore Brna at 919/514-2350 ext. 2683.”

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