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Report to the Chairman, Committee on Governmental Affairs, U.S. Senate

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ENVIRONMENTAL PROTECTION

Interim Actions to Better Control Cement Kiln Dust

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United States
General Accounting Office
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Resources, Community, and
Economic Development Division

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August 14, 1995

The Honorable William V. Roth, Jr.
Chairman, Committee on Governmental
Affairs
United States Senate

Dear Mr. Chairman:

Cement kilns use large amounts of fuel to break down raw materials, such as limestone, in the process of making cement. While coal and other fossil fuels have been the primary fuels burned in most cement kilns, there has been a trend toward using other lower cost fuels, such as hazardous waste. In February 1995, the Environmental Protection Agency (EPA) determined that dust from cement kilns burning hazardous waste as well as from those kilns that do not burn hazardous waste warrants greater federal control to protect human health and the environment. In making that determination, EPA noted that as of 1990, cement kilns generated about 3.6 million metric tons of dust that was placed in waste piles, quarries, or landfills, most of which were unlined and uncovered. EPA also announced that it would develop a tailored set of standards for cement kiln dust rather than subject this dust to the entire set of regulations controlling hazardous waste because of the severe negative economic impact these regulations would have on the cement kiln industry. Establishing different standards has stirred debate between the cement kiln industry and the hazardous waste incinerator industry because cement kilns burning hazardous waste may be required to comply with less costly standards than those the hazardous waste incinerator industry must comply with. Also, some environmental groups have stated that cement kilns burning hazardous waste should be subject to all hazardous waste regulations.

You expressed interest in our looking at EPA's decision-making process with respect to regulating cement kiln dust. Therefore, we are providing you with information on (1) what priorities EPA set for making its determination about cement kiln dust; (2) whether EPA is authorized to modify hazardous waste management requirements in regulating cement kiln dust; (3) whether EPA believes that dust from cement kilns burning hazardous waste should be regulated the same as dust from those not burning hazardous waste; and (4) whether interim actions can be taken to control cement kiln dust, in light of the risks EPA believes that this dust poses.

Results in Brief

According to EPA, making a determination on cement kiln dust was not given as high a priority as developing standards for other wastes, such as hazardous waste deposited in landfills, which were also under statutory time frames but were considered to be a higher risk. By statute, EPA has the authority to modify its hazardous waste regulations to control cement kiln dust so long as those regulations adequately protect human health and the environment. EPA believes that cement kiln dust from both types of kilns, if improperly managed, has the potential to adversely affect human health and the environment. While EPA maintains that dust from kilns burning hazardous waste as well as dust from kilns not burning this waste should both be regulated, it has not yet determined whether it will subject the dust generated by the two types of kilns to the same regulations. Because it could take EPA several years to develop regulations to control cement kiln dust, EPA and the states are considering such actions as making greater use of existing regulatory authority to enforce current controls over cement kiln dust as well as entering into an agreement with the cement kiln industry that could result in the industry's imposing additional controls over cement kiln dust.

Background

The Resource Conservation and Recovery Act (RCRA) requires EPA to identify which wastes should be regulated as hazardous waste under subtitle C and establish regulations to manage them.[1] For example, hazardous waste landfills, such as those used for disposing ash from hazardous waste incinerators, generally must comply with certain technological requirements. These requirements include having double liners to prevent groundwater contamination as well as groundwater monitoring and leachate collection systems.[2] In 1980 the Congress amended RCRA to, among other things, generally exempt cement kiln dust from regulation under subtitle C, pending EPA's completion of a report to the Congress and subsequent determination on whether regulations under subtitle C were warranted.[3] The Congress required that EPA's report on cement kiln dust include an analysis of (1) the sources and the amounts of cement kiln dust generated annually, (2) the present disposal practices,

[1]Nonhazardous solid wastes are covered under subtitle D of RCRA, which is primarily implemented by state and local governments.

[2]Leachate, created by liquids percolating through layers of wastes or soil in a landfill, can enter surrounding soils, underlying groundwater, or nearby surface water.

[3]The Congress also directed EPA to study wastes from the extraction, beneficiation, and processing of ores and minerals; the exploration, development, and production of crude oil, natural gas, and geothermal energy; and the combustion of coal and other fossil fuels. These wastes, like cement kiln dust, were viewed as high-volume, low-toxicity wastes and exempt from hazardous waste regulations pending the results of EPA's reports and determinations.

(3) the potential danger the disposal of this dust poses to human health and the environment, (4) the documented cases of damage caused by this dust, (5) the alternatives to current disposal methods, (6) the costs of alternative disposal methods, (7) the impact these alternatives have on the use of natural resources, and (8) the current and potential uses of cement kiln dust.

As of May 1994, there were about 115 cement kiln facilities operating in 37 states and Puerto Rico.[4] Of these, 24 were authorized to burn hazardous waste to supplement their normal fuel. Even with the 1980 exemption, certain aspects of cement kilns' operations must comply with some environmental controls. Under the Clean Air Act, EPA requires cement kiln facilities to comply with ambient air quality standards for particulate matter. Under the Clean Water Act, EPA regulates the discharge of wastewater and storm water runoff from cement kiln facilities. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), EPA can require cement kiln facilities to clean up contamination resulting from cement kiln dust.

In August 1991, EPA's regulations for boilers and industrial furnaces that burn hazardous waste took effect. While every cement kiln that burns hazardous waste is subject to these regulations, its dust is not classified as hazardous waste if at least 50 percent (by weight) of the materials the kiln processes is normal cement-production raw materials and the kiln's owner or operator demonstrates that burning hazardous waste does not significantly affect the toxicity of the dust. According to EPA Office of Solid Waste officials, of the 24 cement kilns authorized to burn hazardous waste, they are not aware of any that are required to manage the dust as a hazardous waste.

Despite these existing controls, in making its regulatory determination in February 1995, EPA stated that additional controls over cement kiln dust are warranted under RCRA because of its potential to harm human health and the environment. EPA also determined that existing regulations, such as those under the Clean Air Act, may also need to be improved because they are not tailored to cement kiln dust or because their implementation is inconsistent among the states. As partial justification, EPA cited 14 cases in which cement kiln dust has damaged groundwater and/or surface water and 36 cases in which cement kiln dust has damaged the air.[5] EPA also

[4]The data cited in this report are the latest available.

[5]EPA defined damage as contamination from metals that exceeds federal or state standards for maximum concentrations in groundwater, surface water, and/or air.

cited the general lack of groundwater monitoring systems around dust management units at cement kiln facilities and the current lack of federal regulations to protect groundwater from the risks posed by cement kiln dust. Furthermore, after collecting and analyzing site-specific information, EPA concluded that potential risks did exist at some facilities.

EPA Delayed Its Determination Because of Higher Priorities

Although in 1980 the Congress directed EPA to complete its report on cement kiln dust by 1983 and to determine within 6 months thereafter whether regulations were warranted, EPA did not do so. It completed its report in December 1993[6] and issued its determination in February 1995.[7] EPA officials said that the agency did not meet these statutory deadlines because, at that time, EPA viewed completing its report on cement kiln dust as a lower priority than other work.

According to EPA's Acting Chief of the Special Wastes Branch, the agency ranked completing its report and determination on cement kiln dust a low priority because cement facilities were considered to pose minimal risk because of the very small proportion of them on EPA's National Priorities List.[8] In addition, cement kiln dust exists in smaller volumes in comparison to other high-volume wastes that EPA was required to study, such as wastes from mining for ores and minerals and exploring for oil and gas. EPA wanted to complete studies of these high-volume, temporarily exempt wastes prior to completing its study on cement kiln dust. For example, EPA estimated that the mining industry generated 1.3 billion metric tons of waste in 1982, and it completed its study on these wastes in 1985. EPA officials said that they also needed to meet other statutory time frames for completing standards for other wastes that the agency placed a higher priority on, such as treatment standards for land disposal of hazardous waste.

In settlement of a 1989 lawsuit filed against EPA because of its failure to comply with the statutory time frames, EPA entered into a consent decree to publish a report to the Congress on cement kiln dust on or before December 31, 1993. This decree also called for EPA to make a regulatory determination on cement kiln dust by January 31, 1995.

[6]Report to Congress on Cement Kiln Dust (EPA530-R-94-001, Dec. 1993).

[7]Federal Register, Vol. 60, No. 25 (Feb. 7, 1995).

[8]The National Priorities List identifies the most serious uncontrolled or abandoned hazardous waste sites for potential long-term cleanup under Superfund.

EPA Is Authorized to Modify Hazardous Waste Management Requirements in Regulating Cement Kiln Dust

RCRA specifically authorizes EPA to modify several requirements that apply to hazardous waste in regulating cement kiln dust. EPA is authorized to modify those requirements that would impose minimum technological standards on new landfills or expansions of existing landfills as well as those that impose corrective action to clean up releases of wastes from units used to dispose of cement kiln dust. EPA is authorized to modify these requirements to accommodate practical difficulties associated with implementing them when disposing of cement kiln dust as well as such site-specific characteristics as the area's climate, geology, hydrology, and soil chemistry. However, any modifications must ensure the protection of human health and the environment.

Although RCRA allows EPA to modify several requirements and thus propose different standards for cement kiln dust than those for hazardous waste, EPA has not yet determined which standards might differ and how they might differ. For example, according to Office of Solid Waste officials, it is not clear whether EPA will include a corrective action requirement to clean up releases from cement kiln dust disposal units that is similar to its corrective action requirement to clean up hazardous waste disposal units. These officials said that EPA will likely focus its management standards on dust generated in the future, as opposed to dust that already exists at cement kiln facilities, because RCRA allows EPA to consider several factors in developing standards for cement kiln dust management, including the impact or cost any management standard may have on the cement kiln industry. Furthermore, these officials said that EPA has to be sensitive to the Congress's regulatory reform efforts as well as the agency's goal of taking a more common sense approach to regulating industry.

EPA Has Not Determined If Dust From All Types of Kilns Should Be Regulated the Same

Even though EPA has determined that additional controls are warranted over dust from cement kilns burning hazardous waste as well as dust from those kilns that do not, it has not determined if it will impose the same standards or controls over dust from both types of kilns. EPA's analysis found that concentrations of 12 metals in dust from both types of cement kilns were at higher than normally occurring levels. Dust from cement kilns burning hazardous waste had concentrations of nine of these metals that were the same or lower than dust from cement kilns that did not burn hazardous waste. Conversely, EPA found that concentrations of three metals—cadmium, chromium, and lead—were higher in dust from cement kilns that burn hazardous waste. (See app. I.) Even though the concentrations of these three metals were higher, EPA found that these increases did not result in discernible differences in risk estimates

between dust generated by cement kilns that burn hazardous waste and those that do not. EPA also analyzed the extent to which these metals leached, or washed, out of the dust and found no significant difference between cement kilns that burn hazardous waste and those that do not burn this waste.

Although EPA has not yet determined what management standards it will impose on cement kiln dust, Office of Solid Waste officials said that the agency may regulate air emissions from cement kilns burning hazardous waste differently from those that do not burn hazardous waste. According to these officials, because dioxins and furans were found in dust from cement kilns burning hazardous waste, EPA is considering revising its regulations for boilers and industrial furnaces to control their emissions. Even though the levels of these hazardous wastes were generally low, EPA believes their presence warrants concern.

Interim Actions Could Be Taken to Manage Cement Kiln Dust

Even though EPA did not conclude that cement kiln dust should be classified as a hazardous waste, EPA did conclude that some facilities (in addition to those where damage to surface and/or groundwater and the air has been found) do have the potential to pose a threat to human health and the environment. While EPA plans to propose a program to control cement kiln dust within 2 years, if the agency proceeds with developing federal regulations, it could be several more years after that until cement kilns are required to implement these controls. Interim and possible final actions to reduce the current threat that cement kiln dust may pose at some facilities include requiring the cement kiln industry to adopt dust control standards without EPA's first having to proceed through a lengthy regulatory development process and making greater use of existing regulatory authority to control cement kiln dust.

One action EPA is considering to control this dust is the use of a cement kiln industry proposal called an enforceable agreement. After drafting the general terms of the agreement, the cement kiln industry has been working with EPA and other interested parties to negotiate what controls would be needed to protect human health and the environment. Some possible industry controls are to require landfills used to dispose of cement kiln dust to have such site-specific features as hydrogeological assessments, groundwater monitoring, surface water management, and measures to control emissions of cement kiln dust. The agreement would also specify that EPA would not impose subtitle C regulations on cement kiln dust. EPA is currently analyzing the agreement's general terms to determine if it is

allowable under RCRA and whether it would sufficiently protect human health and the environment.

EPA's consideration of this enforceable agreement to manage cement kiln dust has triggered a negative response from environmental groups. For example, the Environmental Defense Fund has questioned EPA's authority to enter into these agreements and their enforceability if EPA does not first develop regulations that contain specific standards. In addition, the Fund questions whether these agreements would provide the same level of protection as federal regulations and whether they would allow for the public involvement that occurs in developing regulations. The Fund also questions how these agreements would affect the citizens' ability to sue and to obtain information through the Freedom of Information Act and whether these agreements would limit federal and state criminal and civil enforcement authorities. Finally, the Fund questions whether these agreements would limit the development of state programs to control cement kiln dust. According to an Office of Solid Waste official, EPA intends to decide by late September 1995 whether it will pursue developing enforceable agreements to control cement kiln dust. Should this approach be challenged in the courts, however, controls over cement kiln dust could be further delayed.

A second action under consideration is for EPA and the states to make greater use of existing regulatory authority to control cement kiln dust. Although EPA has determined that current regulations need to be improved for the proper management of cement kiln dust, in the past EPA regional offices and the states have used existing authorities at some facilities to control surface water runoff, emissions from dust piles, and groundwater contamination (i.e., the damage cases mentioned earlier). For example, according to an environmental inspector in Ohio, the state used an enforcement authority under its Remedial Response Act to better control runoff from waste piles that was contaminating a nearby stream. According to a waste management official in Michigan, the state used enforcement authority under its Air Pollution Control Act to better control emissions from dust piles. EPA has also used the Superfund program to clean up groundwater contamination at two facilities.

In the course of completing its regulatory determination, EPA's Office of Solid Waste collected information on 83 cement kiln facilities and conducted a series of studies on risk-screening and site-specific risk-modeling that could be used to determine whether existing regulatory authority should be used to control cement kiln dust at particular cement

kilns. On the basis of the information collected and analyzed, EPA projected that several cement kiln facilities may be posing a high risk because of such factors as the amount of metals that may exist in dust disposed at those facilities, the lack of dust management controls at those facilities, and other facility-specific factors, such as proximity to agricultural lands. However, EPA's Office of Solid Waste has not provided the results of its risk-screening and risk-modeling studies to other EPA offices or the states that are responsible for investigating facilities and taking necessary enforcement actions. (See app. II for additional information on the results of these studies.) According to Office of Solid Waste officials, much of this information is available in the public docket and EPA's contractor has the computer tapes that were used to develop the risk estimates. However, because they did not believe that most facilities posed the degree of risk that warranted emergency action, they did not provide this information directly to EPA's Office of Enforcement and Compliance Assurance, its regional officials, or state enforcement officials.

EPA's RCRA officials in four regions with cement kilns whose dust potentially poses a risk to groundwater said they would be interested in having the facility-specific information EPA's Office of Solid Waste developed to prepare its report and determination. They said that they could provide the information to state environmental officials for the states' use or could take enforcement action themselves if the regions believed the situation warranted it. In those instances in which EPA or the states lack clear enforcement authority, other actions, such as assessing facilities to better understand the risks and working cooperatively with cement kiln owners/operators to reduce these risks, could be taken. Similarly, EPA air and water officials said they would be interested in having facility-specific information for these purposes.

Conclusions

It may be several years before EPA completes its management control program for cement kiln dust regardless of whether it decides to issue new regulations or adopt the use of an enforceable agreement to control this dust. EPA obtained information on 83 cement kiln facilities that it used to conduct a series of risk-screening and site-specific risk-modeling studies. While this information is readily available and much of it is in the public docket, EPA has not distributed it to EPA's regional or state enforcement officials because the agency did not believe that the estimated risks warranted emergency action. Even so, EPA believes that some facilities, because of the manner in which their cement kiln dust is managed, could

pose a risk. EPA regional and state enforcement officials believe that this information could assist them in determining if action should be taken at some facilities prior to EPA's finalizing its management program to control cement kiln dust.

Recommendation

We recommend that the Administrator, EPA, provide to EPA's regional officials and state enforcement officials the risk-screening and site-specific risk-modeling information developed during its study of cement kiln dust so they can use this information to determine whether interim actions are needed to protect human health and the environment.

Agency Comments

We provided a draft of this report to EPA for its comments. We met with EPA officials, including the Acting Director, Waste Management Division, Office of Solid Waste, who generally concurred with the information presented in this report. They agreed that it would be appropriate for them to provide EPA's regional officials and state enforcement officials information that may be useful to determine whether action should be taken to reduce the risks posed at cement kiln facilities prior to the agency's finalizing its management program to control dust from cement kilns. Office of Solid Waste officials also suggested we clarify certain technical points. We have revised the report accordingly.

Scope and Methodology

To determine what priorities EPA set for making its regulatory determination on cement kiln dust, we interviewed officials from EPA's Special Wastes Branch in its Waste Management Division, Office of Solid Waste. To determine if EPA is authorized to modify hazardous waste management requirements in regulating cement kiln dust, we reviewed RCRA and EPA's regulatory determination on cement kiln dust. To determine whether EPA believes that dust from cement kilns that burn hazardous waste should be regulated the same as dust from those not burning such waste, we reviewed EPA's Report to Congress on Cement Kiln Dust, its regulatory determination, and public comments received on that report as well as on other documents. We also discussed the basis for EPA's determination with its Special Wastes Branch officials as well as officials representing the hazardous waste industry, the cement kiln industry, and environmental groups. To determine whether interim actions could be taken to control cement kiln dust while EPA is developing its management control program, we reviewed EPA's legal authority for taking action at facilities that may pose a threat to human health and the environment,

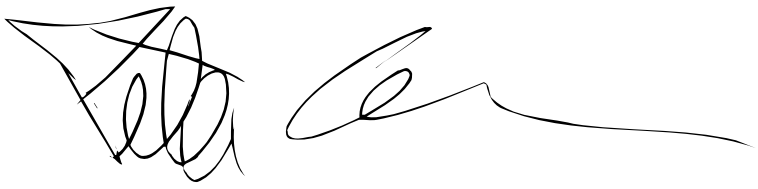
reviewed cases in which EPA or the states have used this authority in the past, and discussed EPA's risk-screening and risk-modeling results with Office of Solid Waste officials. We also discussed options EPA and the states have with Special Wastes Branch officials in the Office of Solid Waste, Office of Enforcement and Compliance Assurance officials, EPA attorneys, and EPA and state environmental enforcement officials. We conducted our review between March and June 1995 in accordance with generally accepted government auditing standards.

As discussed with your office, this report does not address new information that you provided us recently relating to metals in cement kiln dust. We agreed that we will address that information separately.

As arranged with your office, unless you publicly announce this report's contents earlier, we plan no further distribution until 30 days after its publication. At that time, we will send copies of this report to the Administrator of EPA and make copies available to others upon request.

Please contact me at (202) 512-6112 if you or your staff have any questions. Major contributors to this report are listed in appendix III.

Sincerely yours,



Peter F. Guerrero
Director, Environmental
Protection Issues

Metals Found in Cement Kiln Dust at Both Facilities Burning Hazardous Waste and Facilities Not Burning Hazardous Waste

Metal	Comparison of the amounts of metals found in dust from kilns burning hazardous waste to the amounts found at kilns not burning hazardous waste
Antimony	Same or lower
Arsenic	Same
Barium	Lower
Beryllium	Same or lower
Cadmium	Higher
Chromium	Higher
Lead	Higher
Mercury	Same or lower
Nickel	Same
Selenium	Same
Silver	Lower
Thallium	Lower

Source: EPA's Office of Solid Waste.

Results of EPA's Studies on Risk-Screening and Site-Specific Risk-Modeling for 83 Cement Kiln Facilities

EPA used a model to analyze the effect cement kiln dust could have at 52 facilities if they did not have adequate dust suppression controls for their waste piles. EPA's model projected that over half of these facilities would exceed EPA's health standards for fine particulate matter at plant boundaries and, potentially, at nearby residences. Although almost all of these facilities have some controls to suppress cement kiln dust, EPA does not have information on the adequacy of these controls and EPA officials also noted that they saw cement kiln dust blowing during some visits to 20 facilities.

EPA used the same model to analyze the effects of water running off of dust piles at 83 of the facilities. The model projected that 25 facilities could pose higher than acceptable cancer risks or noncancer threats to subsistence farmers and fishermen. Seven of these facilities did not have runoff controls. EPA also estimated that 19 facilities could pose a risk because of dioxins and furans. EPA cautioned, however, that these risk results were based on very limited sampling and modeled worst-case scenarios of unusually high dioxin and furan levels. EPA further cautioned that all of the results from its analyses of indirect exposure risks should be carefully interpreted because its model was still under peer review. Even so, Office of Solid Waste officials said that the results of all of EPA's analyses were cause for concern.

EPA's analysis of the effects of cement kiln dust on groundwater found that about half of the cement kiln facilities were built on bedrock having characteristics that allow for the direct transport of groundwater offsite. In its analysis of 31 of these facilities, EPA found that dust from 13 of them could contaminate groundwater at levels that could exceed health standards. None of these 13 facilities had installed man-made liners under their dust piles and 11 lacked leachate collection systems. EPA also found that groundwater at three of these facilities was within 10 feet of the bottom of their dust piles; EPA did not have information on the depth to groundwater at the remaining 10 facilities. In addition, some facilities managed cement kiln dust in quarries that could subsequently fill with water; if this occurs, leachate could more readily contaminate groundwater.

In addition to the potential risks from the disposal of cement kiln dust, EPA is concerned over the use of this dust as a substitute for lime to fertilize agricultural fields. According to EPA, this use of cement kiln dust could pose cancer risks and noncancer threats for subsistence farmers if that dust contains relatively high levels of metals and dioxins.

Major Contributors to This Report

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