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ENVIRONMENTAL DEFENSE FUND

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December 5, 1974

Mr. Don R. Goodwin
Emission Standards and Engineering Department
Environmental Protection Agency
Research Triangle Park
North Carolina 27711

Re: Proposed Amendments to National Emission Standards for Asbestos and Mercury

Dear Mr. Goodwin:

The following are EDF's comments on the proposed amendments to the asbestos and mercury hazardous emission standards. Generally we are quite pleased with the proposals concerning asbestos emissions, since they are consistent with our previous negotiations and the understanding which was reached between us in anticipation of settling the major issues in EDF's lawsuit challenging the asbestos, beryllium and mercury standards as originally proposed.

Our comments as to specific sections of the proposed regulations are as follows:

1. §61.22(d)(2)(vii) -- Suspension of the wetting requirements for demolition in freezing weather should not be automatic. Instead, we suggest that an extra permit procedure be instituted in order to discourage demolition in freezing weather. If the owner or operator of a demolition or renovation operation were required to obtain permission after stating with particularity the need for conducting the operation in freezing weather, the incentive to do demolition in such conditions and thereby avoid the wetting requirements, should be minimized.

2. §61.22(i) -- EDF strongly supports the proposal to prohibit the use of friable asbestos insulation products as necessary to protect public health.

3. Sections 61.22(j)(3)(i)(C) and (l)(2) -- The legends proposed for the warning label on asbestos wastes and for the warning signs at waste disposal sites do not convey their deadly significance. EDF therefore proposes that the legend "Breathing Asbestos is Hazardous to Your Health" be replaced with "Breathing Asbestos May Cause Cancer." Placement of

such warning signs at the gates of disposal sites is also suggested since it would be likely to prompt complaints of violations from local residents and thereby aid compliance.

4. §61.22(k)(4)(iii) -- Because of the proximity of waste piles to the public, especially children, cover should be clearly required wherever practical. EDF therefore recommends that the following language be substituted for inactive sections of asbestos mill tailings disposal sites:

   (A) Cover as provided in paragraphs (1)(4)(ii)(A) or (1)(4)(ii)(B) of this section shall be applied wherever practical to all inactive asbestos mill tailings disposal sites or sections of such sites.

   (B) Where cover as provided in paragraphs (1)(4)(ii)(A) or (1)(4)(ii)(B) is not practical, a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion shall be applied to all inactive asbestos mill tailings disposal sites, or sections of such sites. Such agents shall be mixed in the concentration and applied at the rate recommended for the particular asbestos tailings waste by the dust suppressant manufacturer. Other equally effective dust suppressant agents may be used upon approval by the Administrator.

5. Has EPA ever measured the level of emissions which occurs downwind of large sources whose emissions are not visible? We recommend that EPA impose a standard of .03 grains/ft.^{3} for asbestos emissions in addition to the "no visible emissions" standard in order to assure that ambient asbestos levels are minimized. Such a standard is technically feasible and has been adopted by Maryland and other states for control of industrial particulate emissions.

With respect to the proposed mercury emission standard, we are attaching an analysis performed by James L. Repace, one of the parties represented by EDF in the suit. His analysis indicates that the proposed standard for sewage sludge incinerators is unacceptable at an emission limit of 3200 grams/day of mercury. Rather, the limit which has been proposed for mercury plants, i.e., 2300 grams/day, should be considered the maximum acceptable, with an emission of 1000 grams/day regarded as the preferable limit. In addition, a mercury analysis program for sewage sludge incinerators should be mandatory. We also believe that the 30-day averaging time proposed for sludge incinerators is not protective of public health and that the 1-day averaging time which is used for mercury plants should be retained.

The great need to restrict mercury intake from the air has been underscored by the FDA's recent proposal of an action level of 0.5 ppm of mercury in fish and shellfish. This proposal assumes a dietary intake of 30 ug/day of mercury rather than the 10 ug/day level upon which the EPA proposed standard is based. (See 39 Fed. Reg. 42740 (December 6, 1974)). Although we do not necessarily agree that the 30 ug/day figure is safe, especially for susceptible members of the population since it provides a safety factor of only 10 for 70 kg males, we urge EPA to consider the FDA proposal in setting the mercury standard. EDF also requests that EPA investigate mercury emissions from coal-fired power plants and the mercury levels in the air of rooms painted with paints containing mercury fungicide as other possible sources of hazardous emissions of mercury.

EDF would very much appreciate your serious consideration of these comments.

Very truly yours,

Jacqueline M. Warren

Jacqueline M. Warren
Washington Counsel

JMW:jkr

A CRITIQUE OF THE PROPOSED AMENDMENT TO THE NATIONAL EMISSION STANDARD FOR THE HAZARDOUS AIR POLLUTANT MERCURY

J. L. Repace

The following comments will apply to the document entitled EPA-450/2-74-009a, Background Information on National Emission Standards for Hazardous Air Pollutants: Proposed Amendments to Standards for Asbestos and Mercury, October 1974.

The amendment as proposed by EPA, in summary, states that "Emissions to the outside air from sludge incineration plants, sludge drying plants, or a combination of these that process waste-water treatment plant sludges shall not exceed 3200 grams of mercury per 24-hr period."

1. The current standard for mercury lists an emission limitation on mercury ore processing facilities and mercury cell chlor-alkali plants in the amount of 2300 grams per day, which limit was derived from dispersion estimates as the level which would protect against the violation of an average daily ambient concentration of 1 microgram per cubic meter (1). The intent of the regulation, as described in the Federal Register, is to limit the total intake of mercury to 30 micrograms per day, assuming 10 micrograms from dietary sources, and 20 micrograms from airborne sources. The Federal Register also states, "Assuming inhalation of 20 cubic meters of air per day, the air could contain an

average daily concentration of no more than 1 microgram per cubic meter" (1).

2. Although the existing mercury regulation is replete with references to an average daily concentration of 1 microgram per cubic meter, the proposed amendment (page 73, bottom line) refers to a health effects limit of 1 microgram per cubic meter averaged over a 30-day period. This represents a dangerous weakening of the regulation. Again quoting the Federal Register, "An expert group concluded ... that 4 micrograms of methylmercury per kilogram of body weight per day would result in intoxication of a sensitive adult" (1). If the health effects limit is weakened to a 30-day average, we can postulate that on day 1 the 70-kilogram man described in the regulation inhales 600 micrograms of mercury, ingests 10 micrograms of dietary mercury, and on days 2 through 30 inhales no mercury, but ingests 10 micrograms of dietary mercury per day, for a total 30-day mercury intake of 900 micrograms, or an average of 30 micrograms per day. However, on day 1 his mercury intake was 610 micrograms, or 8.71 micrograms per kilogram of body weight, which is more than double the threshold for intoxication. Thus the change to a 30-day averaging time would not be sufficient to protect public health.

3. In its Proposed Amendment to the Mercury Standard, EPA states that test results suggest that a significant quantity of mercury

is collected by water scrubbers, but that the control efficiency of the scrubbers is unpredictable and may be low in some cases. The EPA Task Force Report on Sewage Sludge Incineration (2) states that all of the mercury (in the sludge) is classified into the combustion gas stream. Thus the mercury has only two places to go: in the stack gas or in the scrubber water. EPA presents the results of six stack gas analyses, five of which it says may not be representative samples, and no scrubber water analyses. Without a mass balance reflecting nearly simultaneous analyses of sludge, scrubber water, and stack gas, conclusions regarding scrubber collection efficiencies for mercury must be treated with suspicion. Experiments in a pilot plant under rigorously controlled conditions with good statistics are clearly warranted; until then, it is prudent to assume a zero collection efficiency.

4. EPA has rejected four data points in Table 6-2, "Mercury Concentration in Sewage Sludges, Dry Solids Basis," without ample justification. EPA's comparison of the November 1973 average of 9.2 ppm for the Waldwick and Elizabeth, N.J. incinerators with the October 1973 average of 75.5 ppm could reflect the effects of industrial discharge of mercury into wastewater during October. Northeastern New Jersey contains one of the largest concentrations of heavy industry on the East Coast; one N.J. manufacturer was cited several years ago for dumping 20 lbs of Hg into New York Harbor daily. We believe that the Proposed

Amendment to the Mercury Standard should contain provisions that require mandatory daily mercury analyses in order to protect public health against such large changes in Hg concentration in the sludge. The data presented in Table 6-2 in fact reflect variability in the mercury concentration of sludge from individual plants by as much as a factor of 25, with factors of 2 and 3 common.

5. EPA attempts to justify a higher emission limitation for sewage sludge incinerators than for mercury plants on the basis of aerodynamic downwash and topographic considerations. However, there are sewage sludge incinerators which suffer from the same conditions. One of these is the WSSC Piscataway Sewage Sludge Incinerator in Maryland. According to the Final Environmental Impact Statement for the Piscataway Plant (3), the temperature of the effluent gas is 305° Kelvin, the stack height 18.6 meters, and aerodynamic downwash of the plume will occur whenever the windspeed is greater than 1.8 meters/sec, or 3.5 knots. According to the DCA Wind-Stability Rose (4) wind speeds of 0 - 3 knots occur about 10% of the time, with calms about 2 1/2% of the time; thus, for about 85% of the time aerodynamic downwash will occur from this short stack.

Moreover, according to a 1971 U.S. Geological Survey Map for the Piscataway Quadrangle (5), within 1200 meters of the plant the topography climbs to 61 meters. Clustered on the slopes from

the NE to the NW sectors are the subdivisions of Tantallon Hills and Piscataway Hills, with dwellings as close to the incinerator as 700 meters, currently. These factors do not appear more favorable than the ones described for chlor-alkali plants or mercury extraction plants. Thus the emission limit of 2300 grams per day should logically be applied to this incinerator.

6. EPA's dispersion calculations assume Pasquill-Turner Stability Classes C and D as being applicable to sewage sludge incinerators. This does not represent worst-case meteorology. Under the conditions described in point 5 of this critique, Stability Classes E and F represent worst-case meteorology. Furthermore, according to Turner (6), "Under conditions of irregular topography, the direct application of a standard dispersion equation is often invalid ... for example, to calculate concentrations on a hillside downwind from and facing the source at about the effective source height, the equation for concentrations at ground level from a ground level source ... would closely approximate the situation, under stable conditions, when the pollutant plume would be most likely to encounter the hillside." The equation thus described is given by eq. 3.4, page 6 of Turner's Workbook:

$$\chi(x,0,0;0) = \sum_i (Q/\pi\sigma_{y_i}\sigma_{z_i}u_i)\,\phi_i \qquad \text{(eq. 6.1)}$$

where the sum is taken over E and F stability conditions.* The

*Based on 6 stability classes. Our "E" and "F" stability correspond respectively to the F and G classes of reference (4), which is based on 7 stability classes.

input parameters are as follows:

Q_{Hg} = 3200 g/day (source strength)

x = 750 meters (source-receptor distance)

$\sigma_z(x,E)$ = 18.0 m; $\sigma_z(x,F)$ = 11.5 m (dispersion coefficients)

$\sigma_y(x,E)$ = 37.0 m; $\sigma_y(x,F)$ = 26.5 m (dispersion coefficients)

u_E = 6.2 knots; u_F = 4.4 knots (average windspeeds) SSW sector

The dispersion coefficients are taken from Turner's workbook, the average windspeeds are taken from the DCA Wind-Stability Rose for the month of August for the period 1/68 to 12/72, as are the probabilities of occurence of E and F stability for the period:

ϕ_E = 0.032258; ϕ_F = 0.47785 SSW sector August 30-day* (average probability of occurence of stability condition)

The results of these calculations are:

$$\chi_E = \phi_E \times 5.6 \text{ micrograms/cubic meter.} \qquad \text{(eq. 6.2)}$$

$$\chi_F = \phi_F \times 17.12 \text{ micrograms/cubic meter.}$$

7. Assuming an inhalation rate of 20 cubic meters/day, it would require only 1.4 hours of the combination of F stability and SSW wind to exceed a bodily intake of more than 20 micrograms/day; for E stability and SSW wind, the minimum time is 4.34 hours. The minimum time for F stability is dangerously short and in our opinion does not provide an ample margin of safety. A reduction of the emission limitation to 2300 grams/day increases the minimum time to almost 2 hrs/day, which still seems extremely short, but

*We recognize that August has 31 days but have nevertheless used the 30-day period specified in the regulations.

certainly represents an improvement. A reduction to 1000 grams per day would increase the minimum time to 4.48 hrs/day, which represents a much greater margin of safety, and also reduces the accumulation of mercury in the environment by two-thirds. This last is significant, since measurements of air-borne mercury fallout from chlor-alkali plants indicate that the concentrations within 500 m from the factories may be very high (7).

8. If a 30-day averaging time were to apply, as opposed to a 1-day averaging time, it can be shown that 3200 g/day is unacceptable. In comment 6 above we cited the August 30-day average probability of E and F stabilities for the SSW windsector (wind blows NNE). Assuming the ratio $\phi_E/\phi_F = 0.68$ to hold generally for all August periods, we calculate:

$$\chi_{E+F} = .68\ \phi_F \times 5.6 + \phi_F \times 17.12$$

or

$$\chi_{E+F} = \phi_F \times 20.92\ \text{ug/m}^3 \qquad \text{(eq. 8.1)}.$$

We calculate an intake of mercury vapor of

$$I = \chi_{E+F} \times R = (418.46\ \text{ug/day})\phi_F, \qquad \text{(eq. 8.2)}$$

where R = 20 m^3/day. Therefore, for the intake to exceed 20 ug/day

$$\phi_F \geq I/418.46 = 20/418.46 = 0.04779 \qquad \text{(eq. 8.3)}.$$

But ϕ_F(observed) <u>averaged</u> 0.47785, and therefore at some time, i.e., some monthly period, <u>actually exceeded</u> 0.04779 by some amount. Thus, on a 30-day average basis, the 3200 gram/day emission limit would cause 1 ug/m^3 to be exceeded.

9. A comment on whether this incinerator could be reasonably expected to emit more than 3200 g/day. According to the Final EIS for Piscataway (3), a 108" pipeline will be constructed from the Blue Plains Sewage Treatment Plant in Washington, D.C., which pipeline is capable of carrying 457 MGD of liquid effluent to Piscataway. Assuming 1 ton of sludge per MGD, we have 4.15×10^8 grams of sludge per day. EPA has measured Hg levels in Blue Plains sludge as high as 7.9 ppm (8). This could mean an emission of 3280 g/day (uncontrolled). Even if a 50% control efficiency obtained, the variability mentioned in comment #4 could easily yield Hg sludge concentration factors of 2 or 3 times higher. Although Piscataway is currently only 12 MGD, it has been approved by EPA for expansion to 30 MGD, by the Prince Georges County Council to 95 MGD, and by the Maryland Dept. of Environmental Services to 155 MGD. The pipeline diameter tells the last chapter of the story.

10. In summary, we have argued that:

I. The proposed emission standard of 3200 grams/day for sewage sludge incinerators is too high; a limit of 2300 grams/day is better, but 1000 grams/day is preferable.

II. The 30-day averaging time proposed by the regulation is unacceptable; the 1-day average should be retained.

III. The control efficiency of scrubbers for mercury is unknown and should be assumed to be zero until proven otherwise.

IV. The Proposed Amendment to the mercury standard governing sewage sludge incinerators should require mandatory daily mercury analyses in order to protect public health against variability.

V. EPA's diffusion calculations do not represent worst-case meteorology.

11. References

(1) Federal Register 38 #66, p. 8820, April 6, 1973.
(2) "Sewage Sludge Incineration," EPA-R2-72-040. August 1972.
(3) Final E.I.S. for Piscataway STP, EPA Region III, Phil., Pa.
(4) "Wind Distribution by 7 Pasquill Stability Classes for the period 1/68 to 12/72" NOAA, Ashville, N.C., 1/74.
(5) U.S. Geological Survey Topographic Map, Piscataway Quadrangle, Md., 1971.
(6) "Workbook of Atmospheric Diffusion Estimates," D. B. Turner, EPA Publication AP-26, 1970 revision.
(7) A. Jernelöv & T. Wallin, "Airborne Hg Fallout in Snow," Atmos. Env. 7 (1973) 209.
(8) EPA Internal Memorandum from Sims L. Roy, Jr., Standards Emission Section, to Bob Walsh, Chief, Eng. Serv. Branch, 5 July 1973, "Hg Content of Proposed Blue Plains Incinerator Raw Sludge."