

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460**

OFFICE OF  
SOLID WASTE AND EMERGENCY  
RESPONSE

Karen Florini  
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Dear Ms. Florini:

This letter concerns the hazardous waste listing determination EPA has undertaken for Organobromine production wastes. In a notice published on May 11, 1994 (59 FR 24530) EPA proposed to list as hazardous waste solids and filter cartridges from the production of 2,4,6-tribromophenol. In response to comments and information received since the proposal, EPA reexamined the listing decision, and this letter provides notice to you of the Agency's further evaluation. EPA has decided to provide an opportunity for further comment on its reevaluation. As discussed below. EPA continues to believe that this particular waste warrants listing.

One commenter disputed the plausible mismanagement scenario used by the Agency to support the proposed listing of 2,4,6-TBP production wastes (disposal in unlined Subtitle D landfills), and noted that the proposed rule contained errors in the description of 2,4,6-TBP waste quantities and management practices. The commenter stated that it was the sole generator of TBP wastes covered by the proposed listing and that all of its solid streams containing TBP are shipped to a Subtitle C disposal facility. The generator subsequently submitted information showing that it disposed of these wastes in Subtitle C facilities for many years. (See letter to Anthony Carrell, EPA, from Stephen M. Wallace, Great Lakes Chemical Corporation, dated April 23, 1997). The generator reported sending the waste to various Subtitle C landfills since 1981 (1981-1990, Chemical Waste Management, Emelle, AL; 1991-1994, Chemical Waste Management, Carliss, LA; 1995-1996, American Ecology, Winona, TX; 1997, Philips Environmental, Avalon, TX). The commenter noted that the only waste from 2,4,6-TBP production disposed in a Subtitle D landfill consists of 10 tons of empty soda ash bags that do not contain any TBP. The commenter stated that the other combined waste solids from TBP production (floor sweepings, off-specification product and spent carbon from filters) total approximately 34 tons annually. The commenter argued that EPA's selection of an unlined Subtitle D landfill as a plausible mismanagement scenario is erroneous and, therefore, EPA's risk analysis significantly overstates the risk.

Based on the information provided by the commenter, EPA agrees that the

quantity of waste solids from 2,4,6-TBP production that contain 2,4,6-TBP levels of concern should be approximately 34 tons, and should not include the 10 tons of empty bags. The Agency also acknowledges that the generator apparently has a long record of disposing the wastes with high 2,4,6-TBP content in a lined Subtitle C hazardous waste landfill. However, EPA continues to believe that the waste solids from production of 2,4,6-TBP should be listed as hazardous, even if the waste continues to be sent to Subtitle C landfills. EPA considered several critical factors in deciding to list this waste stream.

First, Congress clearly expressed its intent that the Agency is not to place excessive reliance on confidence in landfill design and liners for problematic wastes. In the Hazardous and Solid Waste Amendments (HSWA) of 1984, Congress explicitly added as one of the "findings" to RCRA that "land disposal facilities are not capable of assuring long-term containment of certain hazardous wastes" and that "reliance on land disposal should be minimized or eliminated." RCRA section 1002(b)(7), 42 USC 6902(b)(7). As a result of this finding, and others, Congress added the land disposal restriction (LDR) program to RCRA, which significantly restricts land disposal of hazardous wastes. Further, it was made very clear in the Conference Report for HSWA that the new findings in RCRA were intended to "convey a clear and unambiguous message to the regulated community and EPA: reliance on land disposal of hazardous waste has resulted in an unacceptable risk to human health and the environment. Consequently, the Conference intend that through the vigorous implementation of the objectives of this Act, land disposal will be eliminated for many wastes and minimized for all others, and that advanced treatment recycling, incineration and other hazardous waste control technologies should replace land disposal. In other words, land disposal should be used only as a last resort and only under conditions which are fully protective of human health and the environment."

House Report No. 98-1133, 98th Cong., 2d Sess. at 80-81 (Oct. 3, 1984). EPA views the statute and legislative history as sufficient justification to evaluate in a listing determination all risks of land disposal, including in appropriate cases risks from voluntary disposal in permitted Subtitle C facilities. This is particularly true where risks presented by a waste might be high if releases occur, and treatment under Subtitle C would significantly reduce these risks.

Accordingly, EPA has added to the rulemaking record additional data on the effects of disposal in Subtitle C landfills and has reevaluated its analysis of the factors contained in 40 C.F.R. section 261.11(a)(3) that are relevant to listing the 2,4,6-tribromophenol waste solids. The following analysis describes EPA's evaluation of, in particular, the inherent toxicity of the hazard constituent in the waste (261.11(a)(3)(I)), concentration of the hazardous constituent in the waste (261.11(a)(3)(ii)), the potential of the hazardous constituent to migrate into the environment (261.11(a)(iii)), the relevance of the quantities of the waste generated (261.11(a)(3)(viii)) when compared with these

other factors, and how these factors are weighed when considered with the plausible management scenario of voluntary disposal of the waste in a Subtitle C landfill (261.11(a)(3)(vii)). EPA concludes, after balancing these factors in accordance with the Agency's listing determination policy described in its December 22, 1994, proposed rule listing certain wastes generated during the production of dyes and pigments (59 FR 66073-78) that the 2,4,6-tribromophenol waste solids are capable of posing a substantial present or potential hazard to human health or the environment.

Review of the scientific data, particularly sample analysis and Structure Activity Relationships (SAR), shows that evaluation of disposal in subtitle C facilities is especially appropriate for untreated 2,4,6-tribromophenol waste solids. The waste contains a highly toxic chemical, 2,4,6-TBP, which may present significant carcinogenic risk even at low concentrations. This chemical was also found to be present in the wastes of concern at extremely high concentrations. EPA's analytical data show levels up to 40% (equivalent to 400,000 ppm) in the waste solids. Thus, while the volume of wastes generated (approximately 34 tons annually) is not very large, the extremely high levels of 2,4,6-TBP render this waste highly toxic.

Furthermore, EPA's data show that 2,4,6-TBP is relatively mobile and will leach out of the waste at high concentrations. In the proposal, EPA used the TCLP method to estimate the potential concentration of waste constituents that could be in leachate generated from disposal of the waste in a landfill, and found up to 760 mg/L of 2,4,6-TBP in the TCLP leachate. This level is 76,000 times the health-based criteria of 0.01 mg/L that corresponds to the  $10^{-6}$  cancer risk level for ingestion. The proposed rule estimated risks of  $7 \times 10^{-4}$  from migration to groundwater, if this waste were placed in an unlined landfill (see the proposed rule, 59 FR 24538). Although the generator has sent this waste to a lined Subtitle C facility in the past, EPA believes that the risks estimated from migration from an unlined landfill provide an indication of the potential risks that could occur if 2,4,6-TBP is released from the lined landfill due to failure of the unit to contain the waste leachate. The Agency agrees that the liner/leachate collection system in a Subtitle C unit would serve to contain the waste, and would lessen the risk even in the case of liner failure. However, EPA believes that the uncertainty in the long-term integrity of this containment is high, and that significant risks may result. The purpose of the RCRA hazardous waste treatment requirements (as expressed by Congress) is to reduce this uncertainty.

In past rulemakings EPA has assumed that waste containment systems will tend to degrade with time. In the proposal for the Land Disposal Restrictions (January 14, 1986, 51 FR 1641) EPA noted that in the long-term (beyond the post-closure period) the efficiency of cover and liner systems will degrade. Eventually synthetic liners will degrade and leachate collection systems will cease operation. In the proposed Liner and Leak Detection Rule (May 29, 1987; 52 FR 20218) EPA also stated that no liner can be expected to remain impervious forever. As a result of interactions with waste,

environmental effects, installation problems, and operating practices, liners eventually may degrade, tear, or crack and allow liquids to migrate out of the unit. In evaluating the benefits of this rule (see 52 FR 20270), EPA noted that a properly installed double liner and leachate collection system, together with a final cover placed at closure, substantially reduces release during the operating life and post-closure care period. However, these technologies may not effectively reduce the longer-term risk for landfills, especially for persistent and mobile compounds, because the containment system may only delay leachate release from the landfill until after post-closure, when the cap and leachate collection system begin to fail.

EPA has attempted to account for the effect of Subtitle C containment (covers and liners) in the Regulatory Impact Analyses (RIA) completed for other recent rulemakings. (See the RIA for the Land Deposal Restrictions--Phase II rule, page 5-10, in the docket for the final Phase II rule, published September 19, 1994, 59 FR 47980; and the RIA for the final rule on Corrective Action Management Units, Appendix C, in the docket for the rule published February 16, 1993, 58 FR 8658). These documents are incorporated by reference into the docket for this rule. As EPA noted in the source document used in these RIAs (Technical Guidance Document, "Indexing of Long-Term Effectiveness of Waste Containment Systems for a Regulatory Impact Analysis," Office of Solid Waste, November 1992; this document has been placed in the public docket for the Organobromine listing determination, F-94-OBLP-FFFF), the structural integrity of waste containment systems degrades over time due to stresses on system components. EPA noted that failures of multi-component liner systems have been reported in the literature, and that some liners fail unpredictably with time. While acknowledging the uncertainties in predicting long-term effectiveness, EPA estimated that the effectiveness of Subtitle C composite liner systems may decrease significantly with time.

Although it is difficult to quantify the impact of the long-term degradation of liner systems, the high level of risk estimated from disposal of this waste in an unlined landfill ( $7 \times 10^{-4}$ ) means that even a modest reduction in long-term liner effectiveness would present risks of concern. For example, if the long-term effectiveness of the landfill liner and containment system were on the order of 95%, which would reduce the potential risks from releases to groundwater by 20-fold, the residual risk would exceed  $3 \times 10^{-5}$ . The risks for this particular waste, therefore, would remain above EPA's presumptive level of concern for listing ( $>10^{-5}$ ), whether they were sent to an unlined landfill or a Subtitle C landfill (for a discussion in risk levels used in listing determination see December 22, 1994, 59 FR 66075).

The Agency recognizes that a recent court decision (Dithiocarbamate Task Force v. EPA, 98F 3d1394D.C. Cir 1996) raised questions as to what constitutes "plausible" mismanagement under the listing regulations (261.11 (a)(3)). However, EPA has not yet fully evaluated the recent court decision to determine how to weigh possible future changes in management practices and is not relying on projecting new

management practices in this listing decision. For the purposes of this analysis in this letter, EPA is assuming the current waste management practices continue (i.e. disposal of the untreated waste in Subtitle C landfills).

To respond to the commenters concern related to waste solids that do not contain 2,4,6-TBP, EPA is considering revising the regulatory language to clarify that the wastes covered in the listing are those of concern, i.e., those containing high levels of 2,4,6-TBP. This avoids capturing the empty soda ash bags, and possibly other waste solids downstream from the production unit that EPA did not intend to cover in the listing. Therefore, the final listing would read as follows: K140---Floor sweepings, off-specification product, and spent filter media from the production of 2,4,6-tribromophenol.

Another commenter stated that the high concentrations of TBP in the floor sweepings sampled by EPA provide singular justification for the listing of these wastes. EPA agrees with the commenter that the high concentration of the toxic chemical, 2,4,6-TBP, is a major concern. However, EPA did not consider this factor in isolation, but also considered the mobility of the waste and its inherent toxicity as equally important factors, and balanced all of these factors in the risk assessment. As noted above, the risk assessment predicts TBP leaching from unlined (and possibly lined) landfills to receptor drinking-water wells at concentrations well above health-based levels of concern.

Pursuant to a consent decree in *Environmental Defense Fund (EDF) v. Browner* (Civ No. 89-0598 D.D.C.), EPA had committed to making a final listing determination for organobromine wastes by September 30, 1997. However, EPA and EDF have agreed to request to the court to extend the date for the final rule in order to provide comment on the evaluation described above. The Agency is reopening the comment period only for the limited purpose of obtaining information and views on the new evaluation described in this letter, and is not opening up any other aspects of the proposed organobromine listing determination for comment. Comments on the information in this letter will be accepted up to 30 days from the date of this letter. Due to the limited time EPA anticipates will be available for promulgating the final rule, EPA does not plan to grant any extensions of the comment period.

Commenters must send an original and two copies of their comments referencing docket number F-94-OBLP-FFFF to: RCRA Docket Information Center, Office of Solid Waste (5305G), U.S. Environmental Protection Agency Headquarters (EPA, HQ), 401 M Street, SW, Washington, D.C. 20460. Hand deliveries of comments should be made to the Arlington, VA, address listed below. Comments may also be submitted electronically by sending electronic mail through the Internet to: [rcra-docket@epamail.epa.gov](mailto:rcra-docket@epamail.epa.gov). Comments in electronic format should also be identified by the docket number. All electronic comments must be submitted as an ASCII file

avoiding the use of special characters and any form of encryption. If comments are not submitted electronically, EPA asks commenters to voluntarily submit one additional copy of their comments on labeled personal computer diskettes in ASCII (TEXT) format or a word processing format that can be converted to ASCII (TEXT). It is essential to specify on the disk label the word processing software and version/edition as well as the commenter's name. This will allow EPA to convert the comments into one of the word processing formats utilized by the Agency. Please use mailing envelopes designed to physically protect the submitted diskettes EPA emphasizes that submission of comments on diskettes is not mandatory nor will it result in any advantage or disadvantage to any commenter.

Commenters should not submit electronically any confidential business information (CBI). An original and two copies of CBI must be submitted under separate cover to. RCRA CBI Document Control Officer, Office of Solid Waste (5305W), U.S. EPA, 401 M Street, SW. Washington. D.C. 20460.

Public comments and supporting materials are available for viewing in the RCRA Information Center (RIC), located at Crystal Gateway I, First Floor, 1235 Jefferson Davis Highway, Arlington, VA. The RIC is open from 9 a.m. to 4 p.m., Monday through Friday, excluding federal holidays. To review docket materials, it is recommended that you make an appointment by calling (703) 603-9230. You may copy a maximum of 100 pages from any regulatory docket at no charge. Additional copies cost \$0.15/page. If you have any questions related to this letter, please contact Robert Kayser at (703) 308-7304 or Anthony Carrell at (703) 308-0458 in the Office of Solid Waste (E-mail address: [kayser.robert@epamail.epa.gov](mailto:kayser.robert@epamail.epa.gov) or [carrell.anthony@epamail.epa.gov](mailto:carrell.anthony@epamail.epa.gov).)

Sincerely,

Elizabeth A. Cotsworth, Acting Director  
Office of Solid Waste

cc: David Lennett