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

OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE

May 23, 1994

MEMORANDUM

SUBJECT: RCRA Policy Statement: Clarification of the Land Disposal  
Restrictions' Dilution Prohibition and Combustion of Inorganic  
Metal-Bearing Hazardous Wastes

FROM: Elliott P. Laws, Assistant Administrator

TO: Waste Management Division Directors, Regions I - X

## I. Introduction

### A. Purpose

This memorandum sets out a Statement of Policy under the Resource Conservation and Recovery Act (RCRA) clarifying the application of the Land Disposal Restrictions (LDR) prohibition on dilution (see 40 CFR § 268.3) to combustion (see Footnote 1) of certain inorganic metal-bearing hazardous wastes. Because combustion normally does not represent effective treatment of these wastes, such burning can be considered impermissible dilution. In such cases, these hazardous metal-bearing wastes cannot be combusted legally. This Policy Statement clarifies the general situation regarding combustion of these metal-bearing hazardous wastes, but application of this policy will vary depending on particular circumstances.

### B. Regulatory Background

Under RCRA, the LDR prohibition on dilution states generally that no person "shall in any way dilute a restricted waste ... as a substitute for adequate treatment to achieve compliance with [a treatment standard for that waste]". 40 CFR 268.3(a). This prohibition implements the requirement of section 3004(m) of RCRA, which requires that hazardous constituents in hazardous wastes be destroyed, removed or immobilized before these wastes can be land disposed. Hazardous constituents are not destroyed, removed or immobilized if they are diluted. *Chemical Waste Management v. EPA*, 976 F.2d 2, 16, 17, 19-20 (D.C. Cir.

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1992), cert. denied 113 S.Ct. 1961 (1993); see also S. Rep. No. 298, 98th Cong. 1st Sess. 17 (1983) ("the dilution of wastes by the addition of other hazardous waste or any other materials during waste handling, transportation, treatment or storage is not an acceptable method of treatment to reduce the concentration of hazardous constituents").

Consistent with these authorities, the Agency has stated that the dilution prohibition serves one chief purpose -- "to ensure that prohibited wastes (see Footnote 2) are treated by methods that are appropriate for that type of waste." 55 FR at 22532 (June 1, 1990). Impermissible dilution can occur under a number of circumstances. The most obvious is when solid wastes are added to a prohibited waste to reduce concentrations but not volumes of hazardous constituents, or to mask their presence. Impermissible dilution also may occur when wastes not amenable to treatment by a certain method (i.e., treated very ineffectively by that treatment method) are nevertheless 'treated' by that method. 55 FR 22666 (June 1, 1990) (biological treatment does not effectively remove toxic metals from wastes; therefore, prohibited wastes with treatment standards for metals ordinarily would be impermissibly diluted if managed in biological treatment systems providing no separate treatment for the metals). See also 52 FR at 25778-79 (July 8, 1987) (impoundments which primarily evaporate hazardous constituents do not qualify as section 3005(j)(11) impoundments which may receive otherwise-prohibited hazardous wastes that have not met the treatment standard).

EPA is providing guidance today clarifying how the LDR dilution prohibition could apply to certain inorganic metal-bearing hazardous wastes that may be placed in combustion units, other than metal recovery furnaces.

## II. General Distinction Between "Adequate Treatment" and Potential Violations of the Dilution Prohibition

This memorandum deals with the question of whether combustion of prohibited inorganic hazardous wastes can be a type of impermissible dilution. An "inorganic hazardous waste" is one for which EPA has established treatment standards for metal hazardous constituents, and which does not otherwise contain significant organic or cyanide content (see further discussion, last paragraph page 3, clarifying what constitutes an insignificant organic or cyanide content).

The Agency has evaluated the listed wastes and has determined that 44 of the RCRA listed wastes (as set forth in 40 CFR § 261) typically appear to be such inorganic hazardous wastes; i.e., they typically do not contain organics, or contain only insignificant amounts of organics, and are not regulated for organics (see Footnote 3) (see Appendix A to this memorandum for a list of these wastes).

The Best Demonstrated Available Technology (BDAT) for these inorganic, metal-bearing listed wastes is metal recovery or stabilization. Thus, impermissible dilution may result when these wastes are combusted.

There are eight characteristic metal waste codes; however, only wastes that exhibit both the toxicity characteristic (TC) and the extraction procedure (EP) for D004 - D011 are prohibited now (see 55 FR 22660-02, June 1, 1990). Characteristic wastes, of course, cannot be generically characterized as easily as listed wastes because they can be generated from many different types of processes. For example, although some characteristic metal wastes do not contain organics or cyanide or contain only insignificant amounts, others may have organics or cyanide present which justify combustion, such as a used oil exhibiting the TC characteristic for a metal. Thus, it is difficult to say which D004-D011 wastes would be impermissibly diluted when combusted, beyond stating that as a general matter, impermissible dilution would occur if the D004-D011 waste does not have significant organic or cyanide content but is nevertheless combusted.

EPA ordinarily would not consider the following hazardous wastes to be strictly inorganic (or to contain "significant organic or cyanide content") for which combustion would otherwise be impermissible dilution. Combustion of the following wastes is therefore not prohibited under the LDR dilution prohibition: (1) any of the 44 listed wastes and 8 characteristic wastes in Appendix A that, at point of generation, or after any bona fide treatment such as cyanide destruction prior to combustion, contain hazardous organic constituents or cyanide at levels exceeding the constituent-specific treatment standard for F039, which represents a compilation of numerical limits for hazardous constituents; (2) organic, debris-like materials (e.g., wood, paper, plastic, or cloth) contaminated with an inorganic metal-bearing hazardous waste; and (3) any of the 44 listed wastes and 8 characteristic wastes that, at point of generation, have reasonable heating value such as greater than or equal to 5000 Btu (see 48 FR 11157 (March 16, 1983)). The foregoing three categories of waste typically would contain sufficient organic content to indicate that combustion can be a reasonable means of treating the wastes prior to land disposal. However, as noted above, mixing practices such as fuel blending to add organics to inorganic metal-bearing hazardous wastes ordinarily would be considered to be impermissible dilution. This is because the dilution prohibition applies at the point a hazardous waste is generated. *Chemical Waste Management v. EPA*, 976 F.2d at 22-3; also 48 FR 11158, 11159 and nn. 2 and 4 (March 16, 1983); 53 FR at 522 (Jan. 8, 1988) (determinations of legitimacy of recycling are made on a waste-by-waste basis before any blending occurs).

This Policy Statement is also reflective of the Agency's concerns about the hazard presented by toxic metals in the environment. When an inorganic metal-bearing hazardous waste with insignificant organics is placed in a combustion

unit, legitimate treatment for purposes of LDR ordinarily is not occurring. No treatment of the inorganic component occurs during combustion, and therefore, metals are not destroyed, removed, or immobilized. Since there are no significant concentrations of organic compounds in inorganic metal-bearing hazardous wastes, it cannot be maintained that the waste is being properly or effectively treated via combustion (i.e., thermally treated or destroyed, removed, or immobilized).

In terms of the dilution prohibition, if combustion is allowed as a method to achieve a treatment standard for these wastes, metals in these wastes will be dispersed to the ambient air and will be diluted by being mixed in with combustion ash from other waste streams. Adequate treatment (stabilization or metal recovery to meet LDR treatment standards) has not been performed and dilution has occurred. It is also inappropriate to regard eventual stabilizing of such combustion ash as providing adequate treatment for purposes of the LDRs. Simply meeting the numerical BDAT standards for the ash fails to account for metals in the original waste stream that were emitted to the air and for reductions achieved by dilution with other materials in the ash. (In most cases, of course, the metal-bearing wastes will have been mixed with other wastes before combustion, which mixing itself could be viewed as impermissible dilution).

These inorganic, metal-bearing hazardous wastes should be and are usually treated by metal recovery or stabilization technologies. These technologies remove hazardous constituents through recovery in products, or immobilize them, and are therefore permissible BDAT treatment methods. However, EPA believes that this statement of policy clarifying application of LDR dilution prohibition is needed because we have observed that some of these wastes may be going to conventional combustion devices such as incinerators or cement kilns. For example, some owners/operators may be willing to accept inorganic lead wastes with insignificant organics at their combustion facilities (which can still apparently meet their air emissions limits at the stack). As explained above, land disposal of combustion residuals from these facilities would typically violate the land disposal restrictions prohibition on dilution. Combustion is not usually an appropriate treatment for these wastes because hazardous constituents are not removed, destroyed, or immobilized.

Consequently, the general principles set out in this memorandum, subject to appropriate consideration of individual circumstances, are: (1) that a prohibited inorganic metal-containing hazardous waste (listed in Appendix A to this memorandum) without significant organic content can be considered to be diluted impermissibly when combusted (even if the treatment standards for metals are achieved in part by subsequent treatment of combustion ash); and (2) that the determination of whether a waste is an inorganic metal-bearing

hazardous waste is made at the point of generation. (see Footnote 4) This means that, ordinarily, such a waste would be considered to be diluted impermissibly even if it is blended with organic wastes for which combustion would otherwise be an appropriate treatment method.

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Footnote 1 - Combustion for purposes of this memo does not include metal recovery units engaged in metal reclamation or vitrification units engaged in metal stabilization.

Footnote 2 - A "prohibited" hazardous waste is one which is actually subject to a prohibition on land disposal without first being treated, or disposed in a no-migration unit. See 54 FR 36968 (Sept. 6, 1989)

Footnote 3 - To the extent that these wastes or residues of these wastes (i.e., biological treatment sludges) contain significant organic content, combustion may be an appropriate treatment technology. See later discussion regarding this point.

Footnote 4 - This is the point at which the waste becomes hazardous. (See 45 FR 33095-33096, May 19, 1980).

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## Appendix A. Description of Wastes Affected by this Policy

### Waste Code Listed Wastes

F006\* (see Wastewater treatment sludges from below) electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.

F007\* Spent cyanide plating bath solutions from electroplating operations.

F008\* Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.

- F009\* Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.
- F010\* Quenching bath residues from oil baths from metal treating operations where cyanides are used in the process.
- F011\* Spent cyanide solutions from salt bath pot cleaning from metal heat-treating operations.
- F012\* Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.
- F019\* Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum car washing when such phosphating is an exclusive conversion coating process.
- K002 Wastewater treatment sludge from the production of chrome yellow and orange pigments.
- K003 Wastewater treatment sludge from the production of molybdate orange pigments.
- K004 Wastewater treatment sludge from the production of zinc yellow pigments.
- K005 Wastewater treatment sludge from the production of chrome green pigments.
- K006 Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).
- K007 Wastewater treatment sludge from the production of iron blue pigments.
- K008 Oven residue from the production of chrome oxide green pigments.
- K061 Emission control dust/sludge from the primary production of steel in electric furnaces.
- K069 Emission control dust/sludge from secondary lead smelting.
- K071 Brine purification muds from the mercury cell processes in chlorine production, where separately prepurified brine is not used.

K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.
K106	Sludges from the mercury cell processes for making chlorine.
P010	Arsenic acid $H_3AsO_4$
P011	Arsenic oxide $As_2O_5$
P012	Arsenic trioxide
P013*	Barium cyanide
P015	Beryllium
P029*	Copper cyanide $Cu(CN)$
P074*	Nickel cyanide $Ni(CN)_2$
P087	Osmium tetroxide
P099	Potassium silver cyanide
P104*	Silver cyanide
P113	Thallic oxide
P114	Thallium (1) selenite
P115	Thallium (1) sulfate
P119	Ammonium vanadate
P120	Vanadium oxide $V_2O_5$
P121*	Zinc cyanide
P122	Zinc phosphide
U032	Calcium chromate
U145	Lead phosphate

U151	Mercury
U204	Selenious acid
U205	Selenium disulfide
U216	Thallium (I) chloride
U217	Thallium (I) nitrate
Waste Code	Characteristic Wastes
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium
D008	Lead
D009	Mercury
D010	Selenium
D011	Silver

\* = Assuming wastes do not contain treatable concentrations of cyanide.