

US EPA ARCHIVE DOCUMENT

**ENVIRONMENTAL PROTECTION  
AGENCY**

40 CFR Part 261

[SW FRL 1639-1a]

**Hazardous Waste Management  
System: Identification and Listing of  
Hazardous Wastes****AGENCY:** Environmental Protection  
Agency.**ACTION:** Proposed rule.

**SUMMARY:** Pursuant to Section 3001 of the Resource Conservation and Recovery Act of 1976, as amended (RCRA), the Environmental Protection Agency is proposing to amend the characteristic of Extraction Procedure (EP) toxicity (40 CFR 261.24, 45 FR 33122) to apply to hexavalent chromium instead of total chromium. The effect of amending the EP toxicity characteristic will be to narrow the scope of the EP characteristic, making it applicable to a more limited category of chromium-containing wastes. These wastes will then be subject to the management standards issued by EPA under Sections 3002 through 3006 and 3010 of RCRA (Parts 262 through 265, 122 through 124 of this Chapter and 45 FR 12746). As part of this proposal, the Agency is proposing a new analytical method for use in analyzing waste extracts for the presence of hexavalent chromium.

**DATES:** EPA will accept public comments on the proposed amendment until December 30, 1980. Any person may request a hearing on this proposal by filing a request with John P. Lehman, whose address appears below, by November 20, 1980. The request must contain the information prescribed in § 260.20(d) of this chapter.

**ADDRESSES:** Comments should be addressed to Docket Clerk, Office of Solid Waste [WH-562], U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460. Requests for hearing should be addressed to John P. Lehman, Director, Hazardous and Industrial Waste Division, Office of Solid Waste [WH-565], U.S. Environmental Protection Agency, Washington, D.C. 20460. Communications should identify the regulatory docket number "Section 3001 chromium standard."

The public docket for this proposed rulemaking is located in Room 2711, U.S. Environmental Protection Agency, 401 M St., SW., Washington, D.C. 20460 and is available for viewing from 9:00 a.m. to 4:00 p.m., Monday through Friday, excluding holidays.

**FOR FURTHER INFORMATION CONTACT:** Matthew A. Straus, Office of Solid Waste [WH-565], U.S. Environmental Protection Agency, 401 M St., SW., Washington, D.C. 20460, (202) 755-9187.

**SUPPLEMENTARY INFORMATION:** The Environmental Protection Agency is proposing today to amend the characteristic of EP toxicity (40 CFR 261.24, 45 FR 33122) to apply to hexavalent chromium instead of total chromium. This preamble describes the reasons for this proposed amendment, the precise standard being proposed, and a proposed new analytical method for distinguishing between tri- and hexavalent chromium.

**I. Basis For a Distinction in the  
Hazardous Waste Management  
Regulations Between The Different  
Valence States of Chromium**

On May 19 and July 16, 1980, EPA published its initial regulations implementing Section 3001 of the Resource Conservation and Recovery Act of 1976 (RCRA), as amended (see 45 FR 83084 and 47832). These regulations define the scope of a comprehensive Federal and State program to effectively control the management of hazardous wastes.

Under these regulations, a solid waste becomes subject to the hazardous waste management system in either of two ways: the specific waste is listed in Part 261 Subpart D (45 FR 33122-33124), or exhibits any of the characteristics of hazardous waste identified in Subpart C (45 FR 33121-122). The criteria for listing hazardous wastes and the characteristic of EP toxicity are based upon the total chromium present in the waste and in the waste extract respectively, without differentiating the *type* of chromium present. These regulations thus specify "chromium and compounds, N.O.S." as hazardous constituents for purposes of listing hazardous wastes (see Appendix VIII to Part 261, 45 FR at 33132), and specify a maximum concentration level for "chromium" when identifying wastes by means of the EP toxicity characteristic. (See § 261.24, 45 FR at 33122.) A number of wastes listed in the May and July regulations contain chromium as a constituent of concern (specifically EPA Hazardous Waste Nos. F006, K002-006, K048-051, K053-058, K061-063, K069, K074, K078-082, K086, and K090-092). Additional wastes are expected to be identified as hazardous because they fail the EP toxicity characteristic for chromium.

Chromium, however, occurs in a number of valence states, of which the trivalent (Cr (III)) and the hexavalent (Cr (VI)) are environmentally

significant.<sup>1</sup> The Agency has received many comments arguing that trivalent chromium is sharply distinguishable from hexavalent chrome in its potential to cause significant human health and environmental harm under normally-occurring solid waste management conditions. These commenters' ultimate point is that solid wastes containing exclusively, or virtually exclusively, trivalent chromium are not hazardous due to chromium concentrations, and should not be regulated as if they contain hexavalent chromium.

The Agency has reviewed these comments carefully, and has conducted its own investigation of this question in promulgating the regulations and in response to the comments. We believe that the toxicity and environmental fate of trivalent chromium merits further study, and we intend to investigate these questions further. It is our conclusion, however, that at the present time the hazardous waste management regulations should be amended to reflect a distinction between trivalent and hexavalent chromium. The principal points of distinction between the two types of chromium which we believe justify this regulatory amendment are the differing toxicities and the differing potentials for migration and mobility of chromium (III) and chromium (VI), and the apparent low likelihood that trivalent chromium will oxidize to hexavalent chromium under most plausibly-occurring types of improper waste management. These distinctions are discussed in more detail below.

**A. Distinctions in the Environmental  
Hazards Posed by Trivalent and  
Hexavalent Chromium**

It is generally agreed among the scientific community that the available data show that trivalent chromium is less toxic than the hexavalent form. The carcinogenicity of various hexavalent chromium compounds in human and animal models has been well documented (NAS, 1974; NIOSH, 1975; U.S. EPA, 1978). EPA's Carcinogen Assessment Group (CAG) has determined that there is substantial evidence that hexavalent chromium compounds are carcinogenic in man. Data on the carcinogenicity of trivalent chromium are inadequate. There have been no epidemiological studies on workers using trivalent chromium compounds; rats showed a weak carcinogenic response to chromium (III)

<sup>1</sup>Chromium valence states of -2 to +6 have been reported, but most of these are too unstable to be of significance in biological and environmental processes. See generally, U.S. EPA, *Water-Related Environmental Fate of 129 Priority Pollutants*, Vol. I, EPA-440/4-78-029a (1978).

acetate. (Hueper and Payne, 1962; Maltoni, 1974).

It is further agreed that only hexavalent chromium presently is known to pose a serious threat of mutagenicity. Chromium compounds induce chromosomal aberrations in human and animal leukocytes, and mutations in bacteria and yeasts (EPA, 1978; Petrilli and deFlora, 1977, 1978; Nakumoro, 1978). In these studies, trivalent chromium compounds have a weak response, while hexavalent compounds show significantly higher activity.

Acute and chronic toxicity problems associated with exposure to hexavalent chromium include penetrating skin ulcers, perforation of the nasal septum, inflammation of the larynx, as well as damage to kidneys and lungs. (Casarett and Doull, 1979; NAS, 1974; NIOSH, 1975; Bovett et al., 1977.) These effects do not occur upon exposure to chromium (III). The only well-documented adverse consequence of exposure to trivalent chrome is allergic dermatitis (also a property of hexavalent chromium compounds) (Casarett and Doull, 1979)<sup>2</sup>

Various direct applications of trivalent chromium to humans are actually considered to be desirable. Trivalent chromium is required for proper metabolic functioning. It serves as a cofactor for the action of insulin, and is necessary for normal glucose utilization (Toepfer, et al., 1977). The Food and Drug Administration also has approved the use of trivalent chromium-containing pigments in cosmetics. (21 CFR 73.2326 and 73.2327.) No such applications of hexavalent chrome have been approved, nor are they considered to be beneficial.

Thus, at the present time, there are well-recognized distinctions between the human health and environmental hazards posed by tri- and hexavalent chromium.

#### *Migratory Potentials of Trivalent and Hexavalent Chromium*

Trivalent chromium appears to have significantly lower migratory potential than hexavalent chromium, and to have significantly less mobility should it migrate from a waste matrix. Most trivalent chromium salts are virtually insoluble. Trivalent chromium, moreover, is strongly adsorbed by clays and by organic soil materials (U.S. EPA, 1978; Bartlett, 1976; and Griffin, 1979), decreasing the possibility of exposure via a groundwater exposure pathway even if migration occurs. In contrast,

hexavalent chromium salts are very soluble and therefore have high migratory potential.

Groundwater and leachate monitoring data submitted by various leather tanners appear to confirm the relative immobility of trivalent chromium under normally-occurring waste disposal conditions. (See, e.g., Comments of Tanners' Council of America, August 18, 1980, pp. 7-13; Comments of Dr. Robert M. Lollar, Technical Director of Tanners' Council, August 12, 1980, pp. 6-7.) In addition, the Agency has obtained groundwater and leachate monitoring data from sites accepting large quantities of tannery waste (which wastes contain high concentrations of trivalent chrome), in some cases for long periods of time (from 20 to 86 years). These sites show no evidence of chromium contamination of groundwater. (Comments of Berwick Sewer District, June 30, 1980; Comments of Irving Tanning Co., July 15, 1980.) Groundwater contamination did not occur even in cases of prolonged worst-case management of trivalent chromium-containing wastes (see Comments of Wolverine World Wide, Inc., August 15, 1980, Attachment 1, pp. 2, 9-13 (improperly sited landfill with high water table and permeable soil co-disposing tannery wastes with other industrial wastes without any particular precautions still does not show evidence of trivalent chromium groundwater contamination)).

#### *C. Potential of Trivalent Chromium to Oxidize to Hexavalent Chromium*

In developing the present regulatory regime based upon total chromium, the Agency was aware of the differing potentials for hazard of tri- and hexavalent chromium, and also of their differing migratory potentials. Our concern was that trivalent chromium, under waste management conditions, could oxidize to the hexavalent form, which would render it highly mobile and toxic. (See, e.g., U.S. EPA, Listing Background Document for Leather Tanning and Finishing Industry, pp. 733-34, May 2, 1980.) Further analysis indicates, however, that such oxidation is not likely to occur under most waste management practices. Although the oxidation of trivalent chromium can occur on a theoretical basis (Carlin, 1965; U.S. EPA, 1977), oxidation is unlikely to occur in normal land disposal situations. Thus, oxidation does not take place except under alkaline and aerobic conditions (Robertson, 1975). Even then, the rate of oxidation is very slow unless manganese dioxide is present (Schroeder and Lee, 1975). These conditions are not ordinarily found in

landfill or impoundment disposal situations, since these are typically anaerobic environments. (Ham, 1979.) Monitoring data submitted in comments likewise supports the conclusion that oxidation of trivalent chromium is unlikely when these wastes are land disposed. (See Comments of Alley, Young & Baumgartner, Inc., July 11, 1980; Comments of Salz Leathers, Inc., July 14, 1980, exh. B.)<sup>3</sup>

Given the relatively low toxicity of trivalent chromium, its low migratory potential, and the lack of indication of potential for oxidation under usual land disposal conditions, the Agency does not believe that land disposal of trivalent chromium-containing wastes in common landfill or impoundment situations poses a present or potential hazard to human health or the environment via soil migration to groundwater. We therefore believe it necessary to recognize a distinction between tri- and hexavalent chromium-containing wastes when land disposed.

Our research indicates, however, that trivalent chromium oxidizes to the hexavalent form when materials containing chromium (III) are incinerated or similarly treated by a destructive oxidation process. The incineration ash will certainly be contaminated with chromium (VI) (Comments of Tanners' Council of America, *supra*, p. 6), and we expect that hexavalent chromium will be present in incinerator emissions as well (U.S. Dept. of the Interior, 1979). As a result, we believe that chromium-bearing wastes (*i.e.*, wastes containing both valence types) continue to require Subtitle C regulation when managed by incineration or similar processes. Our contemplated regulatory approach for these wastes is described in Part II. C below.

#### *D. Impact of the Proposed Distinction On Other Regulatory Programs*

We note, at this point, that certain other of the Agency's regulatory programs regulate on the basis of total chromium. Our proposed action involves only the hazardous waste management program, and is based on a perceived distinction in the substantiality of hazard posed by tri- and hexavalent chromium-containing wastes when disposed on land.

Different considerations underly the Agency's other programs. For example,

<sup>3</sup>Ultraviolet light-sensitized oxidation of trivalent chromium has been demonstrated under laboratory conditions (Stephens, 1977). This oxidation did not take place, however, when lake water was tested. In any case, we do not believe that these experimental conditions reflect those normally occurring in a waste disposal environment.

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<sup>2</sup>Various aquatic species likewise are more susceptible to the hexavalent form of chromium.

the National Interim Primary Drinking Water standards are for total chromium. This is because pre-treatment of drinking water by chlorination may result in oxidation of trivalent chromium. (Guidelines for Canadian Water Quality, 1978; Sorg, 1979; U.S. EPA, 1976.) Total chromium is thus the appropriate parameter. (U.S. EPA, 1976.)

All chromium compounds also are regulated as toxic under the Clean Water Act (CWA). In part, this reflects the Congressional determination to list all chromium compounds as toxic pollutants under CWA Section 307(a)(1). In addition, the Administrator has a great deal of flexibility in making listing (or delisting) determinations under CWA Section 307. He is to consider a series of enumerated factors, to assign appropriate weight to each, and to arrive at a final determination by balancing the different elements. The identification process under RCRA is much less flexible and is to some extent more stringent, in light of the significantly more impactful consequences of a RCRA hazardous waste determination. Thus, wastes are not to be identified as hazardous unless they are capable of posing a "substantial" hazard to human health or the environment. In light of these differing statutory schemes, regulatory action affecting chromium-containing wastes has no direct bearing on the status of chromium as a toxic pollutant under CWA Section 307(a).

## II. Regulatory Action

### A. Proposal To Amend the Characteristic of EP Toxicity

In order to reflect the differing environmental hazards posed by trivalent and hexavalent chromium-containing wastes when disposed on land, the Agency is proposing to amend the extraction procedure to apply to hexavalent chrome instead of to total chromium. We are not, however, proposing to change the maximum concentration level of hexavalent chromium in the EP extract, which would consequently remain at 5.0 mg/L. This level is based on the National Interim Primary Drinking Water Standard, which was established to reflect the known toxicity of the hexavalent form.<sup>4</sup> (Sorg, 1979; U.S. EPA, 1976.)<sup>5</sup> Other countries and organizations also have adopted this

<sup>4</sup>The maximum concentration level of the EP toxicity characteristic, of course, is established at two orders of magnitude above the Drinking Water Standard.

<sup>5</sup>As noted above, the standard also establishes a margin of safety in light of oxidation of chromium as a result of drinking water treatment (Sorg, 1979).

level for chromium in drinking water, and have indicated explicitly that the standard is for hexavalent chromium. (WHO, 1970; NAS, 1977; Sorg, 1979 (describing Japan's drinking water standard for hexavalent chromium).) Since the underlying drinking water standard in fact reflects human health and environmental dangers of hexavalent chromium, we feel justified in retaining this standard when regulating solely on the basis of hexavalent chrome.

We stress that under our proposal, all wastes are to be tested for the characteristic of EP toxicity based on hexavalent chromium when the amended characteristic is finalized. We wish particularly to clarify this point because of other regulatory action taken today delisting certain chromium-bearing wastes and granting temporary exclusions from hazardous waste status for other such wastes (published elsewhere in Part XI of this issue).

All of these wastes will be subject to the amended EP toxicity characteristic and generators of these wastes consequently will have to test their waste extracts for the presence of hexavalent chromium.

### B. Proposed Analytical Method Distinguishing Between Tri- and Hexavalent Chromium

The proposal to amend the EP toxicity characteristic to apply only to hexavalent chromium requires that there be an analytical method which distinguishes between these two valence states. EPA's Office of Research and Development has developed such a procedure. The method (fully described in Appendix A to this preamble) is based on the separation of hexavalent chromium from solution by the coprecipitation of lead chromate with lead sulfate at a pH of 3.5. The precipitate is resolubilized in nitric acid and quantified by atomic absorption spectroscopy. Since trivalent chromium does not precipitate under such conditions, the method offers a means of determining the presence and concentration of the hexavalent state in admixture with the trivalent form. Comments are solicited on the application of this method to EP extracts.

This method has been evaluated using effluents containing high concentrations of organic material, samples where matrix interferences have been encountered with the more usual chelation/extraction procedures. Further evaluation presently is being conducted with a wide variety of industrial wastes and EP extracts. The procedure will be finally promulgated after review of

comments and after an adequate supportive data base is available.

### C. Incineration of Chromium-Containing Wastes

The Agency contemplates regulating wastes which contain both tri- and hexavalent chromium in one circumstance,<sup>6</sup> namely when a chromium-bearing waste is incinerated or destructively oxidized by a similar process. Such control is necessary because trivalent chromium oxidizes to hexavalent chromium during incineration. (U.S. Dept. of Interior, 1979). Incinerated wastes containing trivalent chromium thus should be regulated as if they contain hexavalent chromium. The Agency intends in the near future to adopt appropriate regulations under Parts 261 and 266 regulating these types of chromium-bearing wastes. Regulatory action is being deferred at the present time, however, due to the need to implement other parts of the hazardous waste management program, and also because incineration of trivalent chromium-containing wastes does not appear to be widespread,<sup>7</sup> limiting the possibility of environmental insult during this interim period. Furthermore, the Agency needs more time to develop regulatory standards to apply to facilities incinerating trivalent chromium-containing wastes. For these reasons, we are not proposing any standards for incineration of trivalent chromium-containing wastes at this time.

EPA is, however, anxious to obtain comments on this contemplated approach. We specifically solicit comments to the following questions:

1. When incineration of chromium-containing wastes causes oxidation of

<sup>6</sup>There also is one other situation where wastes might be regulated based on total chromium. The Agency still has some concern that trivalent chromium from waste disposal sites could migrate to public water systems where it would be oxidized during chlorination to the hexavalent state. We believe the likelihood of this occurring to be remote in light of the low migratory potential of trivalent chromium. However, should migration of trivalent chromium from improper waste disposal occur in concentrations sufficient to interfere substantially with treatment of public water systems, or otherwise cause public health concerns, we view our imminent hazard authority under Section 7003 of RCRA as sufficient to enjoin further contamination. We are also prepared in this circumstance to exercise our listing authority under Subtitle C to address the particular site creating the problem.

<sup>7</sup>For example, the tanning industry, a principal generator of trivalent chromium-bearing wastes, does not presently incinerate any of its wastes, although a few individual tanneries and the Tanners' Council in collaboration with the U.S. Bureau of Mines are investigating the feasibility of waste incineration. (U.S. Dept. of Interior, 1979.) Several POTW's do, however, use the Zimpro process to incinerate tannery sludges.

trivalent chromium to hexavalent chromium, will this oxidized hexavalent chromium be emitted to the air as a result of incineration or will it remain in the incinerator ash? How effective are available stack scrubbing devices in removing any chromium from the off-gases?

2. If chromium-bearing wastes are to be regulated as hazardous when incinerated or when subjected to similar destructive oxidation processes, what concentration of chromium should be present in the waste to trigger regulatory controls? What is the correlation between concentrations of total chromium in a waste, and concentrations of hexavalent chromium, in incinerator emissions? Do conditions of incineration or pyrolysis affect this ratio?

3. What management standards should be applied to facilities incinerating chromium-bearing wastes during the interim status period? Are subparts A, B, C, D, E, G, H, and O of the Part 265 interim status standards appropriate?

Dated: October 27, 1980.

Douglas M. Costle,  
 Administrator.

It is proposed to amend Title 40 CFR Part 261 as follows:

§ 261.24 [Amended]

1. In § 261.24, *Characteristic of EP Toxicity*, amend by revising the entry for EPA Hazardous Waste Number D007 Table 1 as follows:

EPA hazardous waste number	Contaminant	Maximum concentration (milligrams per liter)
D007	Chromium (VI)	5.0

2. In Appendix II to Part 261 EP Toxicity Test Procedure, revise *Analytical Procedures for analyzing Extract Contaminants* as follows:<sup>1</sup>

*Analytical Procedures For Analysing Extract Contaminants*

The test methods for analyzing the extract are as follows:

(1) For arsenic, barium, cadmium, lead, mercury, selenium, silver, endrin, lindane, methoxychlor, toxaphene, 2, 4-D [2, 4-dichlorophenoxyacetic acid], or 2, 4, 5-TP [2, 4, 5-trichlorophenoxypropionic acid]: "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods." Solid Waste Information, U.S. Environmental Protection

Agency, 26 W St. Clair Street, Cincinnati, Ohio 45268 [SW-846, 1980].

(2) For chromium (VI): Method 8.545 in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods." Solid Waste Information, U.S. Environmental Protection Agency, 26 W. St. Clair Street, Cincinnati, Ohio 45268.

Appendix A—Method of Analysis for Hexavalent Chromium

Method 8.545 Hexavalent Chromium by Coprecipitation With Lead Sulfate

1. Scope and Application

1.1 This method covers the determination of dissolved hexavalent chromium Cr(VI) in Extraction Procedure EP extracts.

1.2 The method may be used to analyze samples containing more than 5 µg of Cr(VI) per liter. In many cases, dilution of the extract will be necessary to achieve an optimal concentration range for Furnace Atomic Absorption spectrometry. The dilution of the sample extract is desirable since it will reduce the likelihood of interferences from sulfate and chloride ions (see 4.1) which are present in many extracts and to increase the reproducibility of the method.

2. Summary of the Method

2.1 The method is based on the separation of Cr(VI) from solution by coprecipitation of lead chromate with lead sulfate in a solution of acetic acid. After separation the supernate (containing Cr(III)) is drawn off, the precipitate is resolubilized in nitric acid as trivalent chromium Cr(III) and quantified by furnace atomic absorption spectrometry.

3. Sample Handling and Preservation

3.1 For guidance on sample handling and glassware cleaning procedures see Section 8.49.

3.2 The sample to be evaluated for the Extraction Procedure characteristic should not be acidified, but instead transported and stored at 4°C until analysis.

3.3 Since stability of Cr(VI) is not completely understood at this time, the analysis should be carried out as soon as possible.

4. Interferences

4.1 Samples containing either sulfate or chloride in concentrations above 1000 mg/liter should be diluted before proceeding to step 9.1.

5. Instrument Parameters [Furnace Atomic Absorption Spectrometry]

5.1 Drying Time and Temperature: 30 sec at 125°C.

5.2 Ashing Time and Temperature: 30 sec at 1000°C.

5.3 Atomizing Time and Temperature: 10 sec at 2700°C.

5.4 Purge Gas Atmosphere: Argon

5.5 Wavelength: 367.9 nm

5.6 Other operating parameters should be set as specified by the particular instrument manufacturer.

6. Special Apparatus

6.1 Glassware

6.1.1 Filtering flask, heavy wall, 1 liter capacity

6.1.2 Centrifuge tubes, heavy duty, conical, graduated, glass stoppered, 10 ml capacity

6.1.3 Pasteur pipets, borosilicate glass, 0.8 cm

6.2 Centrifuge: any centrifuge capable of reaching 2000 rpm and accepting the centrifuge tubes described in 6.1.2. may be used.

6.3 pH Meter: a wide variety of instruments are commercially available and suitable for this work.

6.4 Test Tube Mixer: any mixer capable of thorough vortex is acceptable.

7. Reagents

7.1 Lead Nitrate Solution: Dissolve 33.1 grams of lead nitrate, Pb(NO<sub>3</sub>)<sub>2</sub> (analytical reagent grade), in deionized distilled water and dilute to 100 ml.

7.2 Ammonium Sulfate Solution: Dissolve 2.7 grams of ammonium sulfate, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> (analytical reagent grade) in deionized distilled water and dilute to 100 ml.

7.3 Calcium Nitrate Solution: Dissolve 11.8 grams of calcium nitrate, Ca(NO<sub>3</sub>)<sub>2</sub>·4H<sub>2</sub>O (analytical reagent grade) in deionized distilled water and dilute to 100 ml. 1 ml = 20 mg Ca.

7.4 Nitric Acid, Concentrated, distilled reagent grade or spectrograde quality.

7.5 Acetic Acid, Glacial: ACS reagent grade 7.5.1 Acetic Acid, 10% (v/v): Dilute 10 ml glacial acetic acid to 100 ml with deionized distilled water.

7.6 Ammonium Hydroxide, 10% (v/v): Dilute 10 ml concentrated ammonium hydroxide, NH<sub>4</sub>OH (analytical reagent grade), to 100 ml with deionized distilled water.

7.7 Hydrogen Peroxide, 30%: ACS reagent grade.

7.8 Potassium Dichromate Standard Solution: Dissolve 2.8285 grams of dried potassium dichromate, K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> (analytical reagent grade), in deionized distilled water and dilute to 1 liter. 1 ml = 1 mg Cr (1000 mg/l).

7.9 Trivalent Chromium Working Stock Solution: To 50 ml of the potassium dichromate standard solution (7.8) add 1 ml of 30% H<sub>2</sub>O<sub>2</sub> (7.7) and 1 ml concentrated HNO<sub>3</sub> (7.4) and dilute to 100 ml with deionized distilled water: 1 ml = 0.5 mg Cr(III). Prepare fresh monthly or as needed.

8. Calibration

8.1 At the time of analysis, prepare a blank and a series of at least four calibration standards from the Cr(III) working stock (7.9) that will adequately bracket the sample and cover a concentration range of 5 to 100 µg Cr/l. Add to the blank and each standard, before diluting to final volume, 1 ml 30% H<sub>2</sub>O<sub>2</sub> (7.7), 5 ml concentrated HNO<sub>3</sub> (7.4), and 1 ml calcium nitrate solution (7.3) for each 100 ml of prepared solution. These calibration standards should be prepared fresh weekly, or as needed.

8.2 The listed instrument condition (5) and calibration concentration range are for a Perkin-Elmer HGA-2100 based on the use of a 20 µl injection, continuous flow purge gas and non-pyrolytic graphite. The use of simultaneous background correction is required for both calibration and sample analysis.

9. Procedure

9.1 Transfer a 50 ml portion of the filtered sample to a 100 ml Griffin beaker and adjust to a pH of 3.5 ± 0.3 by adding dropwise volumes of 10% acetic acid. Note: Care must

<sup>1</sup> Note: See FR Doc. 80-33871 published at the end of this Part IX of the Federal Register.

be exercised not to take the pH below 3. If the pH is inadvertently lowered to <3, 10% NH<sub>4</sub>OH (7.6) should be used to readjust the pH to 3.5 ±0.3.

9.2 Pipet a 10 ml aliquot of the adjusted sample into a centrifuge tube (6.1.2). Add 100 ul of the lead nitrate solution (7.1), stopper the tube, mix the sample and allow to stand for 3 minutes.

9.3 After the formation of lead chromate, to help retain Cr(III) complex in solution, add 0.5 ml glacial acetic acid (7.5), stopper and mix.

9.4 To provide adequate lead sulfate for coprecipitation add 100 ul of ammonium sulfate solution (7.2), stopper and mix.

9.5 Place the stoppered centrifuge tube in the centrifuge, making sure that the tube is properly counterbalanced. Start the centrifuge and slowly increase the speed to 2000 rpm in small increments over a period of 5 minutes.

Note.—The speed of the centrifuge must be increased slowly to insure complete coprecipitation.

9.6 After centrifuging remove the tube and withdraw and discard the supernate using the apparatus detailed in Figure 1. As the pasteur pipet is lowered into the tube the supernate is sucked over into the filtering flask. With care the supernate can be withdrawn to within approximately 0.1 ml above the precipitate.

9.7 To the remaining precipitate add 0.5 ml concentrated HNO<sub>3</sub> (7.4), 100µl 30% H<sub>2</sub>O<sub>2</sub> (7.7) and 100µl calcium nitrate solution (7.3). Stopper the tube and mix using a vortex mixer to disrupt the precipitate and solubilize the lead chromate. Dilute to 10ml, mix and analyze in the same manner as the calibration standard (8.2).

#### 10. Verification

10.1 For every sample matrix analyzed verification is necessary to determine that neither a reducing condition nor chemical interference affecting precipitation is present. This must be accomplished by analyzing a second 10 ml aliquot of the pH-adjusted filtrate that has been spiked with Cr(VI) (7.7). The amount of spike added should double the concentration found in the original aliquot. Under no circumstance should the increase be of less than 30µg Cr(VI)/1. To verify the absence of an interference the spike recovery should be between 85% and 115%.

10.2 If the addition of the spike extends the concentration beyond the calibration curve the analysis solution should be diluted with blank solution, and the calculated results adjusted accordingly.

10.3 If the result of verification indicates a suppressive interference, the sample should be diluted and reanalyzed.

#### 11. Analytical Notes

11.1 Nitrogen should not be used as a purge gas because of possible CN band interference.

11.2 The use of pyrolytic graphite should be avoided when possible, since in some situations an enhancement effect has been reported.

11.3 Pipet tips have been reported to be a possible source of contamination.

11.4 The method of standard addition should be used in accordance with the general methods given in the manual "Test Methods for Evaluating Solid Waste," SW-846.

BILLING CODE 6560-30-M

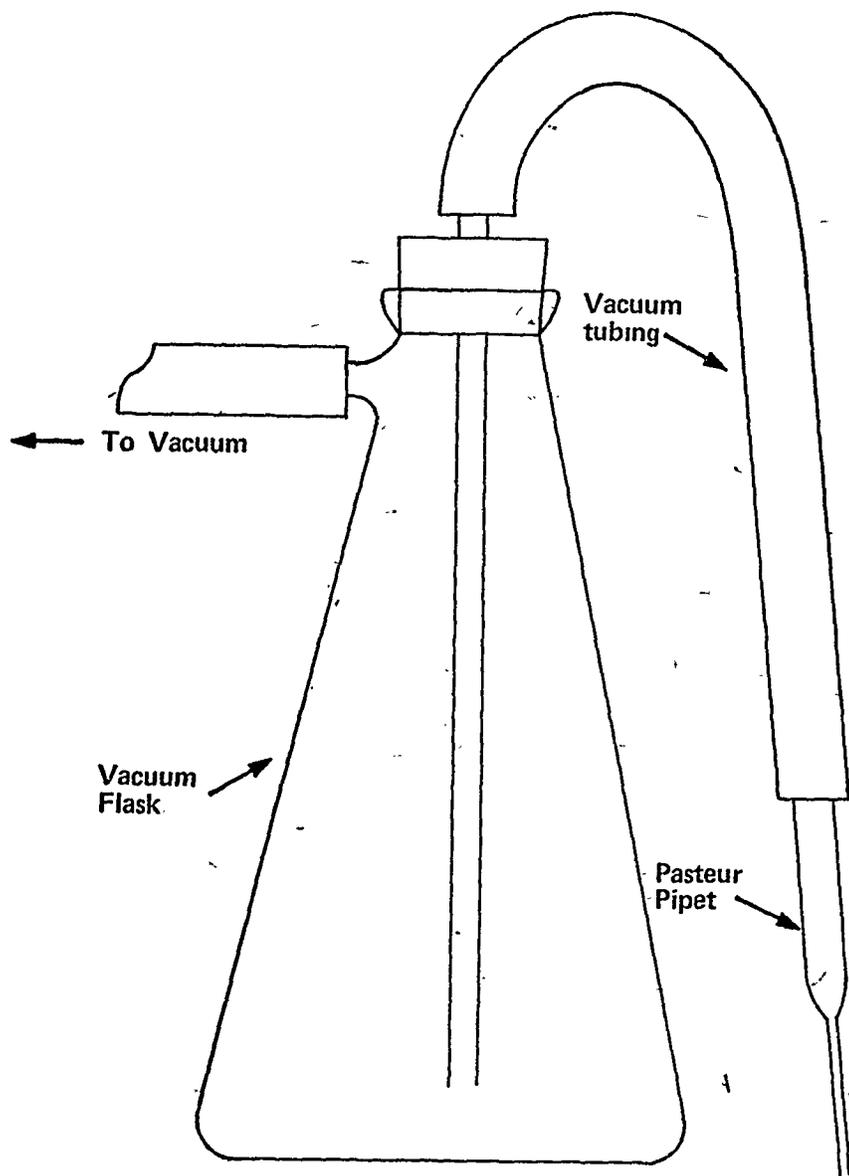


FIGURE 1

[FR Doc. 80-33807 Filed 10-29-80; 8:45 am]

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**ENVIRONMENTAL PROTECTION AGENCY**

40 CFR Part 261

[SW FRL 1639-1b]

**Hazardous Waste Management System: Identification and Listing of Hazardous Wastes****AGENCY:** Environmental Protection Agency.**ACTION:** Interim Final Rule and Request for Comments.

**SUMMARY:** This rule amends § 261.4 of the Resource Conservation and Recovery Act (RCRA) hazardous waste management regulations by temporarily excluding from hazardous waste status wastes which presently are deemed hazardous solely due to the presence of chromium, but contain trivalent chromium exclusively (or nearly exclusively), are generated from processes which use trivalent chromium exclusively (or nearly exclusively), and are typically and frequently managed in non-oxidizing environments. Specific wastes excluded under this standard are tannery wastes listed as hazardous in § 261.32 (EPA Hazardous Waste Nos. K053 to K058); waste leather scrap from the leather tanning industry, the shoe manufacturing industry and other leather product manufacturing industries; and wastewater treatment sludges from the production of TiO<sub>2</sub> pigment using chromium-bearing ores by the chloride process listed as hazardous in § 261.32 (EPA Hazardous Waste No. K074).

Other wastes also may be temporarily excluded if they meet the standard set out above. To be eligible for a temporary exclusion, a waste generator or group of generators must petition the Agency to grant their waste a temporary exclusion and show why their waste meets the temporary exclusive standard. Petitions will be processed under the procedures set forth in § 260.20 of the hazardous waste regulations. Generators of wastes already determined to be within the temporary exclusion need not file petitions.

This amendment is taken in conjunction with two other regulatory actions. The first is a proposal to amend the characteristic of EP toxicity to apply only to hexavalent chromium. These temporary exclusions will remain in effect only until that proposed amendment is acted upon finally. The second regulatory action is a final delisting of certain chromium-bearing waste streams. The temporary exclusion provision is necessary to allow these delistings to have their intended effect, and therefore is being adopted as an interim final regulation.

**DATES:** Effective Date: This amendment, in the form published today, is interim final Agency action. It becomes effective on November 19, 1980.

EPA will accept public comments on this interim final regulation until December 30, 1980. Any person may request a hearing on this interim final rule by filing a request with John P. Lehman, whose address appears below, by November 20, 1980. The request must contain the information prescribed in § 260.20(d) of this chapter.

**ADDRESSES:** Comments should be sent to Docket Clerk, Office of Solid Waste (WH-562), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Requests for hearing should be addressed to John P. Lehman, Director, Hazardous and Industrial Waste Division, Office of Solid Waste (WH-565), U.S. Environmental Protection Agency, Washington, D.C. 20460. Communications should identify the regulatory docket number "Section 3001/Temporary Exclusion."

The public docket for this interim final rule is located in Room 2711, U.S. Environmental Protection Agency, 401 M St., SW., Washington, D.C. 20460 and is available for viewing from 9 a.m. to 4 p.m., Monday through Friday, excluding holidays.

**FOR FURTHER INFORMATION CONTACT:** Matthew A. Straus, Office of Solid Waste (WH-565), U.S. Environmental Protection Agency, 401 M St., SW., Washington, D.C., (202) 755-9187.

**SUPPLEMENTARY INFORMATION:****I. Temporary Exclusion From Subtitle C Regulation for Certain Chromium-Bearing Wastes**

The Agency today has proposed to amend the characteristic of EP toxicity in 40 CFR 261.24 to apply to hexavalent rather than to total chromium (published elsewhere in Part XI of this issue of the Federal Register). The Agency also has taken final regulatory action today with respect to a number of hazardous waste listings (published elsewhere in Part XI of this issue), including the delisting of certain trivalent chromium-bearing waste streams. The present action is necessary to allow these other actions to have their intended effect. Thus, until the characteristic of EP toxicity is amended finally, all wastes remain subject to the existing standard based upon total chromium. We are concerned that the characteristic as it now stands identifies as hazardous certain trivalent chromium-bearing wastes which are unlikely to create a substantial present or potential hazard to human health or the environment when mismanaged,

imposing significant regulatory burden without achieving any statutory purpose. A temporary exclusion for this limited class of wastes is needed to prevent this result.

We consequently will exclude temporarily from hazardous waste status certain chromium-bearing wastes. It must be emphasized that this exclusion will apply only insofar as the wastes would be hazardous because they fail the EP toxicity characteristic for chromium or because they are listed solely because of their chromium content. If they are hazardous for any other reason (i.e., they fail the EP characteristic for any constituent but chromium, fail any other characteristic, or are listed for any other reason) they remain in the RCRA control system. The factors which must be present for a chromium-bearing waste to qualify for this temporary exclusion are:

- The waste contains trivalent chromium exclusively (or nearly exclusively);
- The waste is generated from an industrial process which uses trivalent chromium exclusively (or nearly exclusively), which process does not generate hexavalent chromium; and
- The waste is typically and frequently managed in non-oxidizing environments.

If a generator or an industry-wide group of generators can demonstrate that its (or their) wastes satisfy these prerequisites, the Agency will grant the waste a temporary exclusion and the waste will not require subtitle C management during an interim period. When the amended EP toxicity characteristic becomes final, this temporary exclusion will no longer be in effect, and waste generators will have to analyze their EP extracts for the presence of hexavalent chromium.

Our basis for selecting these factors and our views as to how these factors will be applied are as follows. In light of our decision to distinguish between tri- and hexavalent chromium for purposes of subtitle C regulation, wastes containing exclusively or nearly exclusively trivalent chromium may well not be hazardous. There is, however, a problem in demonstrating the absence of hexavalent chromium, due to the present lack of an analytical method which distinguishes between trivalent and hexavalent chromium at low ppm concentrations in waste extracts. (The Agency today proposed adoption of such a method, but is undertaking further study of the method before final promulgation.) In evaluating requests for temporary exclusions, we therefore will regard waste and waste extract

analytical data for chromium (VI) as highly relevant, but not as determinative. We also contemplate that generators will demonstrate the absence of hexavalent chromium by using process chemistry information, *i.e.*, showing that the industrial process generating the waste does not generate hexavalent chromium, so that hexavalent chromium will not be found in the wastes or will be present only in minimal concentrations.<sup>1</sup> In addition to process information, leachate and groundwater monitoring data and EP extract analyses are highly probative, since if chromium is shown to be present in substantially immobile form, the likelihood is that it is present in the trivalent state.

We also believe that at present there is no adequate assurance that chromium-bearing wastes do not contain potentially harmful concentrations of hexavalent chromium unless the industrial process itself is trivalent chromium-based. Although we are aware that the standard method of treatment of hexavalent chromium-containing wastewaters is to reduce the chromium and to precipitate it as chromium (III) hydroxide, we believe that this process is often incomplete, absent a strong economic incentive to fully reduce all chromium present. Certainly, we believe it would be highly imprudent to exclude from regulation these wastes, even temporarily, absent much greater assurance that they do not contain potentially dangerous amounts of hexavalent chromium.

Finally, to assure that any trivalent chromium which migrates from the waste will not oxidize to the hexavalent state, we will require that the wastes be managed typically and frequently in non-oxidizing environments. A non-oxidizing environment is one in which there is either a relative lack of oxygen or one which contains reducing agents sufficiently strong to cause reduction of the contaminant in question. These conditions ordinarily are present in landfills and surface impoundments. (Ham, R. A., et al., 1978, Background Study on the Development of a Standard Leaching Test.)

The Agency believes that site monitoring data is particularly important in demonstrating that chromium-bearing wastes are being managed in non-oxidizing environments. Thus, a demonstration by means of leachate and groundwater monitoring data that chromium remains essentially

<sup>1</sup> Hexavalent chromium concentrations below 5 mg/l certainly will be considered minimal. This level is based on the maximum concentration level for hexavalent chromium to be contained in the amended characteristic of EP toxicity.

immobile in its actual management environment indicates that chromium remains in the insoluble and strongly adsorbed trivalent state, and therefore is not being oxidized (*see e.g.*, Comments of Berwick Sewer District, July 16, 1980; Comments of Alley, Young & Baumgartner, July 11, 1980 where appropriate leachate and groundwater monitoring data is presented).

## II. Wastes Meeting the Temporary Exclusion Factors

We are presently aware of three groups of wastes meeting the temporary exclusion factors. The first group are the tannery wastes listed as hazardous in § 261.32 (EPA Hazardous Waste Nos. K053-058), and any other waste scrap leather generated by the leather tanning industry. As shown in the comments of many individual tanners and the comments of the Tanners' Council of America, these wastes contain nearly exclusively trivalent chromium. The industrial process generating the waste likewise utilizes trivalent chromium. Hides, in fact, cannot be tanned successfully with hexavalent chromium. Tanners thus either use trivalent chromium as a tanning agent, or should trivalent chromium be unavailable, use hexavalent chromium and reduce it so that the tanning process can be completed. In either case, there appears to be an overwhelming commercial incentive to keep hexavalent chromium out of the process and hence out of the process wastes.

These wastes furthermore ordinarily are managed in non-oxidizing landfill environments. We therefore believe that an adequate showing has been made to justify the temporary exclusion of these wastes due to their chromium content.<sup>2</sup>

The second group of wastes within the temporary exclusion is waste leather scrap from the shoe manufacturing and other leather product manufacturing industries.<sup>3</sup> These wastes are substantively identical to tannery wastes (being composed of the same trivalent chromium-tanned hides involved in the tanning process), and so

<sup>2</sup> Since these wastes were listed for reasons in addition to their chromium concentrations, the temporary exclusion for chromium does not by itself remove them from the hazardous waste management system. We are, however, delisting tannery wastes for these additional factors in an action taken elsewhere in today's Federal Register. The net result of these actions will be that these tannery wastes will no longer be listed, will not be considered hazardous if they fail the EP toxicity characteristic for total chromium, but will be hazardous if they fail the EP toxicity characteristic for any other constituent, or fail any other characteristic.

<sup>3</sup> These wastes were not listed, but some may fail the test for the characteristic of EP toxicity for chromium.

contain trivalent chromium exclusively or nearly exclusively. These wastes also are ordinarily managed in landfills, and so are unlikely to be oxidized.

The third group of wastes within the temporary exclusion are wastewater treatment sludges from the production of TiO<sub>2</sub> (titanium dioxide) pigment using chromium bearing ores by the chloride process (EPA Hazardous Waste No. K074). The chromium in the process effluent is trivalent, arising directly from the entirely trivalent component of the rutile or ilmenite ores used as a raw material. At no stage of the manufacturing process is there an opportunity for oxidation of the trivalent chromium. The resultant sludges thus are expected to contain only trivalent chromium. (*See* Comments of E.I. du Pont de Nemours & Co., September 15, 1980, pp. 8-10 describing the TiO<sub>2</sub> manufacturing process, and showing that only chromium (III) is present; leachate data submitted in these comments likewise tends to show that only trivalent chromium is present.) These wastes are usually disposed of in landfills or by ocean dumping. One plant uses a lined lagoon and one uses deep-well injection. (U.S. EPA Hazardous Waste Listing Background Document, July 7, 1980, pp. 87-89.) These disposal situations do not offer opportunity for the oxidation of the chromium component. (Ham, 1979; Fukal, R., 1967, Valency State of Chromium in Sea Water, *Nature* 213: 901).

## III. Procedures for Obtaining a Temporary Exclusion

The temporary exclusion is not limited to the wastes discussed specifically in Part II above. Other wastes also may meet the temporary exclusion factors and will be excluded if a proper showing is made to the Agency. Eligibility for a temporary exclusion may be requested by filing a petition for rulemaking under § 260.20(a). Petitions may be filed by individual generators, or on an industry-wide basis. Each petition must demonstrate why the wastes in question meet the temporary exclusion standards. Petitions then will be processed by the Agency in accord with the procedures set forth in § 260.20 (c)-(e). It should be noted that generators of the wastes which already have been determined to be within the temporary exclusion (*i.e.*, the wastes discussed in II. above) are not required to petition the Agency.

## IV. Interim Final Promulgation

The temporary exclusion for this limited class of chromium-bearing wastes is being promulgated in interim final form. Thus, the three types of

wastes now within the temporary exclusion are no longer subject to the hazardous waste regulations based on their chromium content. The provision also is final for purposes of the 90-day petition deadline under Section 7006. The public will, however, have an additional opportunity to comment on the provision before it is published as a "final final" regulation.

The Agency does not take this procedural course lightly, but believes that unusual circumstances justify our action. First, many affected persons effectively have had the opportunity to comment on the substance of the provision by virtue of their comments on the interim final portions of the May 19 and July 16 regulations, principally the hazardous waste listings in § 261.32. Thus, much of the data supporting today's action was supplied in comments submitted by the tanning industry and (to a lesser extent) the titanium dioxide production industry. We therefore believe that the policy underlying the prior notice and comment requirement has been substantially satisfied here.

Second, as already noted, immediate action is necessary to give effect to final regulatory action taken today delisting waste streams from the tanning and TiO<sub>2</sub> production industries. These delisting actions present no prior notice and comment issues because the listings themselves were not yet promulgated in final form. However, certain of the delisted wastes might still fail the EP for total chromium, and would consequently remain in the system until the EP toxicity characteristic is amended finally. Immediate promulgation of the temporary exclusion consequently is necessary to allow the delistings to have their intended consequence.

Finally, we believe that use of advance notice and comment procedures would be impracticable and contrary to the public interest, and therefore that good cause exists for adopting these regulations in interim final form (see 5 U.S.C. 553(b)(B)). Although the "good cause" exception is narrow, courts have emphasized that "(i)t is an important safety value to be used where delay would do real harm." *U.S. Steel Corp. v. EPA*, 595 F.2d 207, 214 (5th Cir., 1979). We believe delay in promulgating the temporary exclusion could cause significant harm to the regulated community, particularly to the tanning industry. The tanners have indicated that there is a severe shortage of hazardous waste landfill capacity, especially in New England where many tanneries are located, so that disposal costs will increase very substantially

even if hazardous waste management is required for only a short period. (See, e.g., Comments of A. C. Lawrence Leather Co., July 10, 1980.) Courts have approved immediate promulgation of rules in like circumstances where failure to implement regulations would cause severe market dislocations. See *De Rieux v. Five Smiths, Inc.*, 499 F.2d 1321, 1332 (TECA), cert. denied 419 U.S. 896 (1974) (promulgation of government price controls); *Reeves v. Simon*, 509 F.2d 455, 458-59 (TECA 1974), cert. denied, 420 U.S. 991 (1975) (gasoline station fuel allocation regulations). The same principle applies here.

Dated: October 27, 1980.

Douglas M. Costle,  
Administrator.

Title 40 CFR Part 261 is revised as follows:

1. In § 261.4, Exclusions, paragraph (b)(6) is added to read as follows:

§ 261.4 Exclusions.

\* \* \* \* \*

(b) \* \* \*

(6) (i) Wastes which fail the test for the characteristic of EP toxicity because chromium is present or are listed in Subpart B due to the presence of chromium, which do not fail the test for the characteristic of EP toxicity for any other constituent or are not listed due to the presence of any other constituent, and which do not fail the test for any other characteristic, if it is shown by a waste generator or by waste generators that:

(A) The chromium in the waste is exclusively (or nearly exclusively) trivalent chromium; and

(B) The waste is generated from an industrial process which uses trivalent chromium exclusively (or nearly exclusively) and the process does not generate hexavalent chromium; and

(C) The waste is typically and frequently managed in non-oxidizing environments.

(ii) Specific wastes which meet the standard in (i)(A), (B) and (C) (so long as they do not fail the test for the characteristic of EP toxicity, and do not fail the test for any other characteristic) are

(A) Chrome (blue) trimmings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearing.

(B) Chrome (blue) shavings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish;

hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearing.

(C) Buffing dust generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue.

(D) Sewer screenings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearing.

(E) Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearing.

(F) Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; and through-the-blue.

(G) Waste scrap leather from the leather tanning industry, the shoe manufacturing industry, and other leather product manufacturing industries.

(H) Wastewater treatment sludges from the production of TiO<sub>2</sub> pigment using chromium-bearing ores by the chloride process.

[FR Doc. 80-30888 Filed 10-29-80; 8-16 am]

BILLING CODE 6560-30-M

#### 40 CFR Part 261

[SW FRL 1639-1c]

#### Hazardous Waste Management System; Identification and Listing of Hazardous Wastes

AGENCY: Environmental Protection Agency.

ACTION: Final action amending interim final regulation.

**SUMMARY:** This regulation removes from the list of regulated hazardous wastes the wastes from the leather tanning industry and the titanium dioxide production industry which were listed as hazardous in interim final form in the Federal Register on May 19, 1980 (45 FR 33124) and July 16, 1980 (45 FR 47834). The preamble also discusses why other listed waste streams containing chromium will still be listed due to the presence of chromium. This action is

being taken as a result of other regulatory action taken concerning the regulation of chromium-bearing wastes under the hazardous waste management program in documents published elsewhere in this Part XI of this Federal Register.

**EFFECTIVE DATES:** This action is effective on publication.

**ADDRESSES:** The public docket for this regulation is located in Room 2711, U.S. Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460, and is available for viewing from 9 a.m. to 4 p.m., Monday through Friday, excluding holidays.

**FOR FURTHER INFORMATION CONTACT:** Matthew A. Straus, Office of Solid Waste (WH-565), U.S. Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460, (202) 755-9187.

**SUPPLEMENTARY INFORMATION:**

**Decision To Delist Wastes From TiO<sub>2</sub> Production and From the Leather Tanning and Finishing Industry**

In other regulatory action taken today, the Agency has indicated that its principal regulatory concern in regulating chromium-bearing wastes under the hazardous waste management program is hexavalent rather than total chromium. The Agency consequently has reviewed all of the interim final and proposed waste listings in 40 CFR Part 61, Subpart D which listed chromium as a waste constituent of concern, and reevaluated these wastes to determine if they should continue to be listed due to the presence of chromium. We have decided that two groups of wastes, those from titanium dioxide production by the chloride process, and those from leather tanning and finishing, no longer should be listed due to chromium. We have further determined that leather tanning and finishing industry wastes also should not be listed for any other basis at the present time. We consequently are delisting both groups of wastes.<sup>1</sup>

We also reviewed all of our other listings of chromium-bearing wastes except for those wastes for which the comment period has been extended). We believe that all of these other wastes are likely to contain significant concentrations of hexavalent chromium, and therefore we are not amending our initial listings. We note further, that many of these wastes are listed for constituents other than chromium, and our actions today do not in any way affect these additional bases for listing.<sup>2</sup>

<sup>1</sup> We also are removing any reference to these wastes from Appendix VII to Part 261.

<sup>2</sup> We also note that the Agency may choose not to finalize the listing of certain of these waste streams or independent reasons when finalizing the May 19 interim final list of hazardous wastes.

**A. Wastes Generated From TiO<sub>2</sub> Production**

On July 16, 1980, the Agency adopted as an interim final listing, under 40 CFR § 261.32 wastewater treatment sludges from TiO<sub>2</sub> production via the chloride process (see 45 FR at 47834). On reevaluation, we have decided not to list this waste stream because it is derived from a trivalent chromium-based process and contains trivalent chromium exclusively or virtually exclusively. The titanium dioxide production process results in a waste stream which contains chromium (III) chloride. The presence of this compound results from the fact that the rutile and ilmenite ores used as raw materials can contain as much as 45% chromium (III) oxide. The chromium-bearing waste stream from this process thus contains chromium only in the trivalent form, and the resulting wastewater sludges therefore are not expected to contain any hexavalent chromium.

**B. Wastes Generated by the Leather Tanning and Finishing Industry**

The Agency's May 19 interim final waste listings included seven waste streams generated by the leather tanning and finishing industry (EPA Hazardous Waste Numbers KO53-059). These wastes were listed for the presence of chromium, chromium and lead, and (in the case of the wastewater treatment sludges generated by plants in certain subcategories) chromium and reactivity. With respect to chromium, the Agency has determined that these wastes contain exclusively or virtually exclusively trivalent chrome and therefore do not warrant listing on this basis. The leather tanning process depends on the chemical reaction of trivalent chromium with the free amine and hydroxyl groups on the hides' protein chains. This reaction will not occur if hexavalent chromium is used, so that there is a very strong commercial justification for the absence of hexavalent chromium in these wastes. Although it is true that if the trivalent tanning agent is not readily or economically available, tanneries use hexavalent chrome as a starting material, the chromium is then reduced to the trivalent state either before use in the tanning process or *in situ* during the tanning process (a "two bath" process now largely obsolete). Both economics and the recognized dangers inherent in the unnecessary risk in handling hexavalent chromium serve to assure the conversion to the trivalent form.<sup>3</sup>

<sup>3</sup> Thus, in one tanning facility visited by the Agency, when trivalent chromium is not available, a twenty percent excess of reductant is added to the

The wastes resulting from the tanning process, therefore, are overwhelmingly in the trivalent state. In addition, leachate and groundwater monitoring data submitted by individual tanners indicate that the chromium contained in these wastes has low migratory potential under most waste management conditions, and also that it has very limited mobility should migration occur, confirming that these wastes contain chrome (III), rather than the highly mobile hexavalent chromium.

Certain tanning wastes were listed because of the presence of lead.<sup>4</sup> Substantial data submitted by industry indicate convincingly, however, that lead is not typically used in the tanning process, nor is it found in process wastes, in regulatorily significant amounts or concentrations. We consequently believe continued listing on this basis is inappropriate. Furthermore, these wastes remain subject to the EP toxicity characteristic, so that those wastes containing excessive concentrations of lead will still be brought into the hazardous waste management system.

Two wastewater treatment sludges were listed as hazardous due to reactivity, more specifically because of the possibility of release of harmful concentrations of hydrogen sulfide gas under usual waste management conditions. Historical waste management data submitted by industry indicates, however, that harmful release of hydrogen sulfide does not occur typically and frequently in waste management practice. Rather, this problem is more likely to occur during the tanning process, prior to waste generation. (Comments of Robert M. Lollar, Technical Director, Tanners' Council of America, August 12, 1980.)

We have determined to delist these sludges for reactivity. We again note, however, that the wastes remain subject to the reactivity characteristic, so that these wastes should be deemed hazardous if harmful hydrogen sulfide generation occurs, or has occurred, during waste management. For example, if a generator is aware of prior dangerous release of hydrogen sulfide in managing these sludges, for example from storing these sludges in enclosed tanks, EPA must be notified that the wastes are reactive, and the wastes must be managed pursuant to Subtitle C regulatory controls. We also note that the Agency is working to quantify the present provision in the reactivity characteristic governing hydrogen sulfide and hydrogen cyanide-generating

<sup>4</sup> hexavalent chromium to ensure that reduction will go to completion.

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wastes (§ 261.23(a)(5)), and that these sludges will be subject to the revised characteristic when promulgated.

EPA is also investigating the possibility that these tannery wastes may be hazardous for reasons other than those for which they were listed originally. A possible source of waste contamination is use of hexavalent chromium-containing chrome pigments, and of benzidine and benzidine congener dyes in the finishing process. For example, dyes derived from the chemicals benzidine, 3,3'-dimethylbenzidine, and 3,3'-dimethoxybenzidine comprise approximately one fourth of the 3.1 kkg of dyes used by the tanning industry (MRI, 1979, "A Preliminary Materials Balance for Dyes and Pigments from Benzidine and Three Benzidine Derivatives." EPA Contract No. 68-01-3896, Draft Final Report, August 31, 1979), and may be present in these wastes. We are concerned about the potential carcinogenicity of the dyes themselves, and about the possible reduction of the dyes in the waste streams by heat, light, and chemical reducing agents, or their metabolism *in vivo* to the carcinogenic parent compounds benzidine, 3,3'-dimethylbenzidine and 3,3'-dimethoxybenzidine. In addition, certain biocides (notably phenolic derivatives) are used in the tanning process, and may contaminate process wastes. The Agency solicits information as to these practices, as to concentrations of these materials and their breakdown products in process wastes, and as to whether the wastes thereby should be considered to be hazardous.

## II. Retention of Chromium as a Waste Constituent of Concern in Other Hazardous Waste Listings

Certain of the other May 19 and July 16 interim final and proposed waste listings are of wastes containing chromium as a waste constituent of concern. (See 45 FR 33123-124, 33137; and 45 FR 47833-834, 47836). We have reevaluated these listings to determine if the wastes should continue to be listed due to the presence of chromium.<sup>4</sup> It is our conclusion that all of these chromium-bearing waste streams should continue to be listed as hazardous due to chromium content because all derive from processes which use or produce a waste stream which contains hexavalent chromium. The basis for our conclusion is set out below.

<sup>4</sup>This discussion does not apply to chromium-containing waste streams for which the comment period has been extended. Industrial painting wastes, paint manufacturing wastes, and wastes from ferroalloys production are in this category.

The chromium-containing waste streams we have listed in interim final form or have proposed for listing are generated in the manufacture of inorganic pigments (EPA Hazardous Waste Nos. K002-008), in petroleum refining (EPA Hazardous Waste Nos. K048-051), in the manufacture of iron and steel (EPA Hazardous Waste Nos. K061-063), in secondary lead smelting (EPA Hazardous Waste No. K069), in electroplating (EPA Hazardous Waste No. F006), and in ink formulation (EPA Hazardous Waste No. K086). The chrome pigment process wastes are believed to contain hexavalent chromium because the production process requires the use of chromates, which are necessarily hexavalent chromium-containing compounds. Electroplating industry wastes likewise derive from processes using chromates, and so also are expected to contain hexavalent chromium. Chromate (Cr (VI)) pigments are constituents of the listed ink formulations, so that process wastes also should contain hexavalent chromium.

The various listed petroleum refining wastes likewise use chromates, in this case as corrosion inhibitors in cooling towers. The listed wastes from this industry are all derived from cooling tower wastewater streams, and thus are expected to contain hexavalent chromium.

The iron and steel industry and secondary lead industries generate chromium-containing emission control dusts and sludges. These production processes involve oxidative processes occurring at elevated temperatures, conditions known to cause oxidation of chromium (III) to chromium (VI). Spent pickle liquor, another listed waste from the steel industry, likewise is generated in oxidizing conditions (the pickling operation itself), and so will contain chrome (VI).

We are aware that treatment of chromium-containing wastewaters most often consists of the reduction of hexavalent chromium to the trivalent state and the subsequent precipitation of chromium (III) hydroxide. If the reduction is not carried out to completion, however, the hexavalent chromium may be entrained in the chromium (III) hydroxide precipitate. Further, in light of the large concentrations of chromium present in these wastewater streams, and the very small concentrations of the carcinogen hexavalent chromium needed to make a treatment sludge hazardous, we do not believe that the chromium in these wastewater streams will be fully reduced, so that these wastes remain

capable of causing substantial harm if mismanaged.

Dated: October 27, 1980.

Douglas M. Costle,  
Administrator.

Title 40 CFR, Part 261 is amended by deleting from the lists of hazardous wastes contained in § 261.32 the following waste streams:

### § 261.32 [Amended]

- K063—Chrome (blue) trimmings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.
- K064—Chrome (blue) shavings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.
- K065—Buffing dust generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue.
- K066—Sewer screenings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.
- K067—Wastewater treatment sludge generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.
- K068—Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; and through-the-blue.
- K069—Wastewater treatment sludges generated by the following subcategory of the leather tanning and finishing industry: hair save/non-chrome tan/retan/wet finish.
- K074—Wastewater treatment sludges from the production of TiO<sub>2</sub> pigment using chromium-bearing ores by the chloride process.

[FR Doc. 80-33869 Filed 10-29-80; 8:45 am]  
BILLING CODE 6560-30-M

## 40 CFR Part 265

[SW FRL 1623-7]

Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

AGENCY: Environmental Protection Agency (EPA).

**ACTION:** Revisions to final rule and interim final rule.

**SUMMARY:** The Resource Conservation and Recovery Act (RCRA) hazardous waste regulations, as promulgated May 19, 1980, in §§ 265.112(a) and 265.142(a) require owners or operators of all hazardous waste facilities to have closure plans, as well as cost estimates based on these plans, on the effective date of the regulations. At the same time, owners or operators of hazardous waste disposal facilities are also required in §§ 265.118(a) and 265.144(a) to have post-closure plans and associated cost estimates.

The Agency is amending these regulations to allow the owners or operators of all hazardous waste facilities to have up to six months after the effective date of these regulations to prepare a written closure plan, post-closure plan (if applicable), and cost estimates for closure and post-closure (if applicable).

The Agency is extending the period for preparing closure and post-closure plans for disposal facilities because planning for closure and post-closure at these facilities is an extremely important activity. Because these plans are so important, the Agency believes that it should provide owners or operators more time to prepare them so that they will be well thought out.

**EFFECTIVE DATE:** November 19, 1980.

**FOR FURTHER INFORMATION CONTACT:** Lawrence G. Buc, Office of Solid Waste (WH-565), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, (202) 755-9190.

**SUPPLEMENTARY INFORMATION:**

**I. Authority**

This amendment is issued under the authority of Sections 1006, 2002(a), and 3004 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (RCRA), as amended, 42 U.S.C. 6905, 6912(a), and 6924.

**II. Background**

The RCRA hazardous waste regulations, as promulgated May 19, 1980, 45 FR 33064 *et seq.* in Sections 265.112(a) and 265.142(a) require owners or operators of all hazardous waste facilities to have closure plans, as well as cost estimates based on these plans, on the effective date of the regulations (November 19, 1980). At the same time, owners or operators of hazardous waste disposal facilities are also required in §§ 265.118(a) and 265.144(a) to have post-closure plans and associated cost estimates. The amendments to the

regulations EPA is promulgating today modify these requirements.

The amended regulations allow the owner or operator of a hazardous waste facility up to May 19, 1981 (six months after the effective date of these regulations) to prepare a written closure plan, post-closure plan for a disposal facility, and cost estimates for closure and post-closure for a disposal facility. An owner or operator of a facility who decides to close his facility within this six-month period must nevertheless submit a closure plan and post-closure plan for a disposal facility at least 180 days before the date he expects to begin closure as required in 40 CFR Part 265, Subpart G, §§ 265.112(c) and 265.118(c).

The Agency is extending the period for preparing closure and post-closure plans for disposal facilities because planning for closure and post-closure at these facilities is an extremely important activity. Because these plans are so important, the Agency believes that it should provide owners or operators more time to prepare them so that they will be well thought out.

As a necessary consequence of extending the time for preparing closure and post-closure plans for facilities, EPA is extending the time for preparing closure and post-closure cost estimates for facilities. Cost estimates must be based on the closure and post-closure plans, so they cannot be prepared until the plans have been prepared.

The Office of Management and Budget recently approved EPA's Part 264 and 265 reporting requirements under the Federal Reports Act on the condition that EPA extend until May 19, 1981, the deadline by which disposal facilities (landfills, land treatment facilities, and surface impoundments which intend to close as landfills) must prepare closure and post-closure monitoring and maintenance plans. The Agency is convinced that owners or operators of all facilities, given an additional six months, will be able to prepare better plans and more accurate cost estimates. For this reason, and to avoid confusion as to when these plans are required, EPA is granting the time extension to all facilities.

Dated: October 27, 1980.

Douglas M. Costle,  
*Administrator.*

For the reasons described above, Title 40 of the Code of Federal Regulations is amended as follows:

**§ 265.112 [Amended]**

1. In § 265.112(a), in the first sentence, replace the phrase "On the effective date of these regulations" with the phrase: "On May 19, 1981."

**§ 265.118 [Amended]**

2. In § 265.118(a), in the first sentence, replace the phrase "On the effective date of these regulations" with the phrase: "On May 19, 1981."

**§ 265.142 [Amended]**

3. In § 265.142(a), in the first sentence, replace the phrase "On the effective date of these regulations" with the phrase: "On May 19, 1981."

**§ 265.144 [Amended]**

4. In § 265.144(a), in the first sentence, replace the phrase "On the effective date of these regulations" with the phrase: "On May 19, 1981."

[FR Doc. 80-33870 Filed 10-29-80; 8:45 am]  
BILLING CODE 6560-30-M

**40 CFR Part 261**

[WH-FRL 1648-4]

**Hazardous Waste Management System: Identification and Listing of Hazardous Waste**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Technical amendment; final rule.

**SUMMARY:** In its regulations on the identification and listing of hazardous waste, the Environmental Protection Agency (EPA) is amending the section "Analytical Procedures for Analyzing Extract Contaminants" in Appendix II of Part 261. This amendment merely clarifies confusing references to two sets of analytical methods, each of which delineates the same methods insofar as the applicability of the subject section of Appendix II. Therefore, this amendment does not change the substance of Appendix II.

**EFFECTIVE DATE:** This action is effective immediately.

**FOR FURTHER INFORMATION CONTACT:** David Friedman, Office of Solid Waste (WH-565), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, (202) 755-9187.

**SUPPLEMENTARY INFORMATION:** The section on "Analytical Procedures for Analyzing Extract Contaminants" in Appendix II of Part 261 promulgated on May 19, 1980 (45 FR at 33126) referenced certain water and wastewater analytical methods and implied that these methods should be used in analyzing EP Toxicity Procedure extracts. That section also referenced "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" and implied that these methods should be used to analyze these same extracts. Those