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

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MAY 18 2007

MEMORANDUM

SUBJECT: Regulatory Status of Wastewater Treatment Sludges from Aluminum and Copper Finishing at Aavid Thermalloy, LLC, Laconia, New Hampshire

FROM: Robert W. Dellinger, Director (Mail Code 5304P)
Hazardous Waste Identification Division
Office of Solid Waste

TO: Ernest Waterman, Acting Chief (Mail Code CHW)
Chemicals Management Branch
Office of Ecosystem Protection
Region I

I am writing in regard to the regulatory status of a wastewater treatment sludge generated at the Aavid Thermalloy, LLC facility in Laconia, New Hampshire. Recently, the State of New Hampshire Department of Environmental Services (NHDES) requested assistance, through your office, in determining whether this sludge should be classified as a listed hazardous waste.

Based on the information you forwarded to us, as well as the January 17, 2007 letter from Pierce Atwood, LLP to John Duclos, NHDES, the Aavid Thermalloy facility operates metal finishing lines on aluminum parts that include various cleaning, etching, anodizing, chromating, dyeing, sealing, rinsing, and coating processes. In addition, the facility operates three finishing processes for copper parts: cleaning, brightening/polishing and chromate conversion coating. These multiple processes generate numerous wastewater streams. The facility segregates all of these finishing wastewaters into two separate wastewater treatment systems. The "Chromium Pretreatment System," or CrPS, treats certain aluminum and copper finishing wastewater streams, generating a sludge that is managed as a listed waste – F019 (wastewater treatment sludges from the chemical conversion coating of aluminum).[1] The remainder of the aluminum and copper wastewater streams are treated at the "Central Wastewater Pretreatment System," or CPS, and the treatment sludges are managed as non-hazardous waste. This CPS treatment sludge is the particular waste in question. You have asked whether the CPS treatment sludge may be F006 listed waste.[2] In addition, there is a question of whether the CPS treatment sludge should

[1] F019 is defined as "Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process."

[2] F006 is defined as "Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated

be also classified as F019. As explained below, we conclude that the CPS treatment sludge is captured by the F006 listing definition, and does not meet the F019 listing description. Also, the CrPS treatment sludge has been properly classified as F019 waste. However, if the wastewaters treated in the CrPS include wastewater from the chemical etching of copper, the commingled CrPS treatment sludge would need to be classified as F006 as well.

Background

The CrPS "chromium containing sludge" is generated from the treatment of the spent process solutions, seal rinses and chromating wastewaters resulting from aluminum and copper finishing operations that contain significant levels of chromium and nickel. Per the wastewater flow diagram that was provided, the CrPS treats commingled wastewaters from the following finishing processes: "Black Seal & Rinses," "Green Seal & Rinses," "Chromate & Rinses," "Flightbar Clean/Rinse," "Dye," "Seal," "Microseal (Avagard)," and "Duracoat & Rinses." Of these processes, "Duracoat & Rinses" (Step 21) is specific for copper finishing, based on the facility's list of "Chemicals Used in the Anodize Areas" updated November 19, 1999. The CrPS also treats wastewaters from "Wet-Vacs (Cr spills)" and "High Cr Samples." The CrPS "chromium containing sludge" has been classified as hazardous and is managed as a listed waste (i.e., F019).

The CPS "aluminum hydroxide sludge" is generated from the treatment of the following finishing and other wastewaters and has been handled as a non-hazardous waste. Per the wastewater flow diagram that was provided, the CPS treats commingled wastewaters from the following aluminum and copper finishing processes: "Soap & Rinses," "Etch & Rinses," "Anodize & Rinses," "Laser S & Rinses," "Black Dye & Rinses," "Green Dye & Rinses," and a certain "Dye & Seal Rinses" process.[3] Of these processes, "Laser S & Rinses" (Step 15) is specific for copper finishing, based on the facility's list of "Chemicals Used in the Anodize Areas" updated November 19, 1999. The CPS also treats various other wastewaters from "Leak Test Water," "Lab Bench," "Wet-Vacs (non-Cr spills)," "Aqueous Washers," "Vibratory Tumblers," and so on.

The CPS "Aluminum Hydroxide Sludge"

First, it appears that the CPS treatment of the commingled wastewaters from the facility's copper finishing operations in the Anodize Manual Line, including specifically the "Soap & Rinses" (Step 11) and "Laser S" (Step 15) processes,[4] would generate an F006 sludge because copper etching/bright dipping is within the scope of the F006 listing. According to Pierce

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basis) on carbon steel; (4) aluminum or zinc-aluminum 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."

[3] However, according to Wendy Bonner, NHDES, an inspection by the New Hampshire staff on October 10, 2006 revealed that the "Laser S" bath and all dye baths were treated in the CrPS while the rinses from "Laser S" and dyeing were treated in the CPS at the time.

[4] Per New Hampshire staff's description during a conference call on February 1, 2007, the facility's copper finishing operations include only Step 11 (Soap & Rinses), Step 15 (Laser S & Rinses), and Step 21 (Duracoat & Rinses) among various process steps shown in the Anodize Manual Line Wastewater Flow diagram dated 2/23/99. Since 1999, the facility has replaced Duracoat used in Step 21 with another chemical, ALDOKOTE, for copper chromating.

Atwood's January 17, 2007 letter to John Duclos of NHDES, the facility claims that its "Laser S" process is just brightening or polishing, not chemical etching and as such, the generated wastewater treatment sludge should not be classified as F006 waste. Nevertheless, the list of "Chemicals Used in the Anodize Areas" reflects that the facility's "Laser S" copper bright dip solution (containing hydrogen peroxide and sulfuric acid) is used to "descale/bright dip." Since descaling by an acidic solution removes metal from the surface, it is essentially chemical etching. Further, bright dipping per se is a chemical etching process, as clarified in the Agency's January 27, 1987 letter from Matthew A. Straus to Mr. Tom Sauer of General Electric Company.[5] Bright dipping is also defined in the Development Document for Effluent Limitations Guidelines and Standards for the Metal Finishing Point Source Category (EPA 440/1-83/091, June, 1983), on page III-25,[6] as a specialized form of etching that is used to remove oxide and tarnish from ferrous and nonferrous materials. Based on this definition, the facility's brightening or deoxidizing operation in "Laser S" is, in fact, a chemical etching process that meets the F006 listing description. In addition, since the "Soap & Rinses" cleaning process in Step 11 appears to be associated with the "Laser S" operation, it is also a process associated with the F006 listing description.[7] Therefore, the CPS treatment sludge is captured by the F006 listing definition under the listing.

Second, relative to whether the CPS treatment sludge should be also classified as F019, we believe it should not be considered F019 because it does not contain wastewater treatment sludges from the chemical conversion coating of aluminum. At issue is the facility's aluminum dyeing operation. As shown in the facility's June 17, 1988 Operation and Maintenance Manual for the Central Pretreatment System and the Chromium Pretreatment System provided by the State, the facility applies black dye and certain colored dyes to porous, anodized aluminum pieces, and these dyeing steps are followed by nickel sealing. The rinsewaters generated from the black dye and green dye processes are treated jointly with other wastewaters in the CPS (while the spent dye solutions, spent nickel sealer solution, and chromating solution and rinsewater are directed to the CrPS for treatment).

Based on the Material Safety Data Sheets provided, the associated colored dyes contain chromium and chromium (III) complexes in addition to other organic ingredients. Moreover, the facility indicated in the 1988 Operation and Maintenance Manual that with the exception of blue dye, the colored dyes contain "low concentrations of hexavalent chromium." Note that the listing background document for both F006 and F019 briefly states "coloring is defined here as a chemical process in which the metal surface is converted into an oxide or other insoluble metal compound," which is unlike coloring with colored dyes. Furthermore, the F006/F019 Listing Background Document discusses in response to public comments that wastes resulting from

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[5] See RCRA Online Document 11214, available at http://yosemite.epa.gov/osw/rcra.nsf/ea6e50dc6214725285256bf00063269d/fc57db8204169cc48525670f006bd674!OpenDocument.

[6] A relevant discussion can be found in an Agency letter from Alexis Strass, Director, Water Division, to James J. Dragna of Bingham McCutchen LLP, dated June 4, 2004. See http://epa.gov/region09/water/pretreatment/files/air_products_2004-06-04_metal_finishing_stds.pdf.

[7] The December 2, 1986 Interpretative Rule (51 FR 43350) stated "the F006 listing included only common and precious metals electroplating, anodizing, chemical etching and milling, and cleaning and stripping when associated with these processes."

coloring of unsealed anodized aluminum by immersion in dyes prior to sealing were not listed.[8] Accordingly, the facility's dyeing operation does not appear to be the chemical coloring or the chromating process described in the listing background document and, therefore, would not be captured by the F019 listing definition.[9]

Third, a list of "Chemicals Used in the Anodize Areas" dated November 19, 1999 (submitted by Aavid Thermalloy to NHDES on September 14, 2004) indicates that the facility uses sulfuric acid to anodize aluminum parts in "Anodize & Rinses" steps. We note that this sulfuric acid anodizing of aluminum operation is exempt from the F006 listing description.[10]

The CrPS "Chromium Containing Sludge"

Concerning the CrPS treatment sludge, we agree that it has been properly classified as F019 waste given that the wastewaters from the chemical conversion coating of aluminum parts are treated in the CrPS. However, if the "Laser S" (i.e., a copper chemical etching process associated with the F006 definition, as aforementioned) bath is drained to the CrPS (as the New Hampshire staff found out during the October 10, 2006 inspection), then the resulting CrPS sludge would need to be classified as F006 as well. On the other hand, there seems to be some confusion about the applicability of the F006 listing to the treatment sludges from the chromate conversion coating of copper. Based on the January 17, 2007 Pierce Atwood letter, the third element of Aavid Thermalloy's copper finishing line, "Duracoat & Rinses" in Step 21, is conversion coating in an ALDOKOTE dip, followed by rinsing, and the wastewater from this conversion coating step is directed to the CrPS. Please note that such chromate conversion coating of copper is not within the scope of the F006 listing as per the Agency's December 2, 1986 Interpretative Rule (51 FR 43350).[11]

Moreover, the facility should evaluate its wastes to determine whether the CPS and CrPS sludges exhibit any of the hazardous waste characteristics (§261.21 - §261.24).

If you have further questions concerning this matter, please contact Chichang Chen of my staff at (703) 308-0441.

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[8] The F006/F019 Listing Background Document responded to public comments on pages 137 – 138 that "unsealed anodic coatings on aluminum are colored by immersion in a solution of organic or inorganic dyes. After rinsing, the sealing of the dye is accomplished by immersion in a hot solution of nickel or cobalt acetate . . . However, the available information indicates that both chromium and nickel are used infrequently as sealants in this process . . . Therefore, the Agency will only use the characteristics . . . to determine whether these wastes are hazardous at this time." The background document further indicates "If after further study, however, the Agency finds that both sodium dichromate and nickel acetate are commonly used . . . the Agency will consider bringing these sludges back into the hazardous waste system by listing."

[9] The F006/F019 listing background document describes that "Chemical conversion coating processes apply a coating to the previously deposited metal . . . This manufacturing operation includes chromating, phosphating, metal coloring, and immersion platings."

[10] F006 listing excludes certain processes such as sulfuric acid anodizing of aluminum, chemical etching and milling of aluminum, and so forth. See 40 CFR 261.31.

[11] The 12/02/86 F006 Interpretative Rule (51 FR 43350) stated "the F006 listing included only common and precious metals electroplating, anodizing, chemical etching and milling, and cleaning and stripping when associated with these processes" and that "the following processes are not included under the F006 listing: chemical conversion coating . . ."

cc: James Michael, HWID, OSW
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Department of Environmental Services
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