U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

APR - 5 2000

Ref. No. 99-0230

Mr. Peter W. Egan
Director of Regulatory Affairs
CleanHarbors Environmental Services, Inc.
1501 Washington Street
Braintree, MA 02185

Dear Mr. Egan:

This responds to your letter of August 13, 1999, concerning requirements for shipping a hazardous waste mixture under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). Specifically, you ask about shipment of a waste corrosive liquid that emits a very low level of hydrocyanic acid (HCN).

You describe the waste material, called Alodine, as a mixture composed of 99% water, 0.5% chromic acid, 0.5% potassium ferricyanide, and less than 0.1% nitric acid. You have determined that waste Alodine is properly classed and described as RQ Waste Corrosive Liquid, Acidic, Inorganic, n.o.s. (Chromic Acid), 8, UN 3264, PG II. You state that the mixture does not meet the definition of a Division 6.1 (poisonous) material. However, over time, Alodine emits very small mounts of HCN, which can accumulate in the headspace of the 55 gallon drums or bulk packagings in which it is transported. You ask if there is an upper limit on the amount of HCN that may accumulate in the headspace of a non-bulk or bulk packaging above which the shipment of waste Alodine would be prohibited under the HMR.

Under § 173.22 of the HMR, it is the shipper's responsibility to determine the appropriate class for a hazardous material. Such determinations are not required to be verified by this office. However, based on the information you have provided, it does not appear that the HCN emitted by waste Alodine will

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accumulate in amounts sufficient to present a safety hazard during transportation. Thus, waste Alodine may be offered for transportation as a Class 8 material pursuant to the HMR.

I hope this information is helpful. If you have further questions, please do not hesitate to contact this office.

Sincerely,

Thomas G. Allan

Thomas G. Allan
Senior Transportation Regulations Specialist
Office of Hazardous Materials Standards

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§ 173.21(e)
99-0230

Certified Mail - Return Receipt Requested (Z 318 705 979)

August 13, 1999

Mr. Edward M. Mazzullo, Director
Office of Hazardous Materials Standards, DHM-10
Research and Special Programs Administration
U.S. Department of Transportation
400 7th Street, SW
Washington, DC 20590-0001

Re: Request for Regulatory Clarification

Dear Mr. Mazzullo:

Clean Harbors Environmental Services, Inc. (CHESI) is a national provider of hazardous materials and hazardous waste transportation. This is to request that the United States Department of Transportation (USDOT) provide a regulatory interpretation/ clarification regarding shipment of an acidic waste stream which contains low levels of cyanides, and which emits a very low level of hydrocyanic acid (HCN).

CHESI discussed this question with Mr. George Cushmac of your staff on June 22, 1999. Mr. Cushmac asked that CHESI submit its request to the USDOT in writing.

CHESI believes that, during shipment, the material described below does not generate vapors in a quantity sufficient to produce a dangerous atmosphere, does not pose a threat to safety, and is therefore acceptable for transportation under USDOT regulations. CHESI believes that shipment of the hazardous material described below is not prohibited pursuant to 49 CFR 173.21(e), 49 CFR 173.24(e)(4)(ii) or 49 CFR 177.848(c); CHESI's rationale is presented below.

CHESI requests that the USDOT review this rationale, and notify CHESI as to whether or not the USDOT agrees that the material may be offered for transportation pursuant to 49 CFR Subchapter C.

Background

CHESI provides waste transportation services to several customers who are involved in materials fabrication, and who utilize chemicals which contain acids and cyanides which have been intentionally mixed together. One such chemical is called Alodine (trademarked), and is used to prepare the surface of certain metals to accept various coatings. A solution of Alodine used for this purpose is typically comprised of 99% water, 0.5% chromic acid, and 0.5% potassium ferricyanide (a complex cyanide); the solution may also contain a small amount of nitric acid (~0.1%).

The Alodine solution is typically stored in 2500 gallon open top tanks or vats inside the manufacturing workplace. Fabricated pieces of metal may be immersed in the vats as part of a surface coating process. These vats are located in an open work area, and facility personnel work in the immediate area of the vats. There are no special air purifying or ventilation systems in place to evacuate or remove the HCN which slowly evolves from the Alodine. CHESI's customers who use this material have performed air monitoring to ensure the safety of their employees. The air monitoring has shown that the reaction rate of the potassium ferricyanide and the chromic acid is slow enough that there is not an HCN exposure risk to personnel working in the immediate area of the vats.

Eventually the Alodine loses its efficacy and consequently meets the definition of a hazardous waste pursuant to the Resource Conservation and Recovery Act. It must then be transferred offsite to a properly licensed disposal facility. Prior to shipment offsite, a proper USDOT shipping description is determined, and the proper packaging is then selected. Utilizing the criteria for selecting a proper shipping name pursuant to 49 CFR 172.101(12), the proper shipping description for the material is RQ Waste Corrosive Liquid, Acidic, Inorganic, n.o.s. (Chromic Acid), 8, UN3264, PGII. Although the material contains potassium ferricyanide, the solution does not meet the defining criteria for division 6.1 in §173.132.

Prior to shipment offsite, the material may be stored in the packaging for up to 90 days. In some cases, HCN slowly evolves from the liquid and accumulates in the headspace of the packaging (e.g., 55 gallon drum). Monitoring of the headspace in several drums has indicated HCN concentrations of 12 parts per million (ppm) HCN. In some cases it is possible that the concentration may reach higher levels.

Rationale

CHESI believes that this type of acidic cyanide solution with a low emission rate would not release hydrocyanic acid in a concentration that would present a threat to health or safety during transportation. CHESI believes that this material may be safely offered for transport in 55 gallon drums with an HCN concentration in the headspace ranging up to 250 ppm. The rationale for using 250 ppm as a maximum follows.

Assuming that a 55 gallon drum is 90% full of the Alodine solution, approximately 5.5 gallons of void space is present in the head of the drum. CHESI has conservatively assumed that the void space is one (1) cubic foot (7.48 gallons).

Assuming that there is a release of the entire one cubic foot of air from the drum (e.g., through the bung cap), which contains HCN at a concentration of 250 ppm, the diluted concentration in 25 cubic feet of air space surrounding the top of the drum would equal 10 ppm. Twenty five (25) cubic feet would consist of the air space located within two (2) feet above the drum, and within a two (2) foot radius around the drum.

The United States Occupational Health and Safety Administration (OSHA) has established a permissible exposure limit (PEL) of 10 ppm for HCN. The PEL represents the concentration at which an individual can be exposed for eight (8) hours without any adverse effects.

CHESI believes that, in the event of a release of air from the headspace of a drum of Alodine during transportation, dilution of the HCN concentration due to dispersion in the area immediately around the top and sides of the drum would be sufficient to remove any threat of dangerous vapors to any individuals in the area, since the concentration of HCN would decrease below the OSHA PEL within two feet of the drum. Furthermore, in the event of a release of solution from the packaging, generation of additional HCN from the solution would be so slow that it would not pose an immediate danger to individuals in the area.

Waste Alodine solution may also be offered for transortation by CHESI's customers in bulk packaging (e.g., 5000 gallon transport vehicle). In this case, CHESI believes that a concentration of 10 ppm HCN (OSHA PEL) in the headspace of the bulk packaging is acceptable.

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Request for Guidance

CHESI requests that the USDOT provide CHESI responses to the following questions.

1. Is shipment of the above described Alodine solution in a 55 gallon (or smaller) non-bulk container in which the concentration of HCN in the headspace of the packaging is equal to or less than 250 ppm prohibited pursuant to 49 CFR 173.21(e), 49 CFR 173.24(e)(4)(ii) or 49 CFR 177.848(c)?

2. Is shipment of an Alodine solution in a bulk packaging in which the concentration of HCN in the headspace of the packaging is equal to or less than 10 ppm prohibited pursuant to 49 CFR 173.21(e), 49 CFR 173.24(e)(4)(ii) or 49 CFR 177.848(c)? If so, what concentration of HCN in the headspace of the bulk packaging would be acceptable?

3. Would shipment of an Alodine solution in a bulk packaging in which the concentration of HCN in the headspace is greater than 10 ppm be acceptable? If so, what is the maximum concentration that would be allowed in the headspace of a bulk packaging?

Please direct your response to my attention at the address on the letterhead. Please don't hesitate to contact me at 781-849-1800 extension 1278 if you have an questions or require additional information.

Sincerely,

Peter W. Egan
Director of Regulatory Affairs

cc: George Cushmac, USDOT