U.S. Department
of Transportation
**Pipeline and
Hazardous Materials Safety
Administration**

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

APR 26 2005

Ms. Jolynn Parchen
Safety and Benefits Manager
Human Resources
The Field Museum
1400 S. Lake Sore Drive
Chicago, Illinois 70605-2496

Ref. No. 04-0285

Dear Ms. Parchen:

This responds to your letter dated December 17, 2004 regarding the Hazardous Materials Regulations (HMR; 49 CFR parts 171-180 as they apply to the shipment of museum artifacts preserved with arsenic dust. Specifically, you ask if shipments of artifacts treated with arsenical dust are not subject to the HMR. You provided information, as follows:

> From the 1890s into the1940s, natural history museums, like the Field Museum, used arsenical dust as a pesticide to help preserve certain artifacts in their collections. Generally, these artifacts are made of organic materials such as hides, feathers, fur or wood. The residue of this arsenical dust remains on the surface of treated artifacts.
>
> The Merckoquant® Arsenic Test is used to determine whether or not the artifact has been contaminated with arsenic. Using the Merckoquant® Arsenic Test, the museum determined that the most contaminated artifacts tested at less than 0.003 grams per liter arsenical dust from 1 cm^2 area swab. This is equivalent of 0.014 grams per square foot of arsenical dust on the entire artifact surface. For example, the largest contaminated object tested to date is a New Guinea mask of maximum dimensions 20' x 4'x4', having a surface area of 320 square feet. A total of 4.9 grams arsenical dust would be present on the surface area of the mask if the whole surface were equally contaminated.
>
> The Field Museum receives numerous requests each year from other institutions to loan artifacts to them for research and public exhibition. For preservation reasons, artifacts that move in transportation are packed in multiple layers of impact, shock, and vibration absorbing materials. The custom-made crates are made of 5/8" plywood and 1" by 4" wood battens that are lined with at least 2" thick planks of medium to high density closed cell polyester foam. Each artifact is in its own custom-made internal compartment that is made with lower density polyester foam and lined with Tyvek™ polyethylene sheet.

040285

172.101
173.132

Under the HMR, tests to determine if a material meets the definition for a Division 6.1 (poisonous) material are found at § 173.132, which specifies oral, dermal or inhalation toxicity criteria. If a material does not meet the criteria for a Division 6.1 (poisonous) material or any other hazard class, it is not subject to the requirements of the HMR.

Although a residue of the arsenical dust remains on the surface of the artifacts, it is our opinion that the packaging you utilize for shipment of the artifacts is sufficient to mitigate the minimal hazard that may be present during transportation. Therefore, shipments of artifacts with surface residues of arsenical dust that are packaged as described in your letter are not subject to regulation under the HMR.

I hope this satisfies your inquiry. If we can be of further assistance, please contact us.

Sincerely,

John A. Gale
Chief, Standards Development
Office of Hazardous Materials Standards

The Field Museum exploring the earth and its people

Engrum
§172.101
§173.132
Aplicability
04-0285

December 17, 2004

Mr. Edward T. Mazzullo
Director, Office of Hazardous Materials Standards
U.S. DOT/RSPA (DHM-10)
400 7th Street S.W.
Washington, D.C. 20590-0001

Re: Letter of Interpretation

Dear Mr. Mazzullo,

We are writing to obtain a letter of interpretation concerning the shipment of museum artifacts preserved with arsenic dust. We hope that by providing you with technical information and the results of our arsenic testing, you could determine if we would need to meet the hazardous materials shipping requirements of HMR 49 CFR.

From the 1890s into the 1940s, natural history museums, like the Field Museum, used arsenical dust as a pesticide to help preserve certain artifacts in their collections. Generally, these artifacts are made of organic materials such as hides, feathers, fur or wood. The residue of this arsenical dust remains on the surface of treated artifacts. We use the Merckoquant® Arsenic Test to determine whether or not an artifact in our collection has been contaminated with arsenic.

Using the Merckoquant® Arsenic Test, we were able to determine that the most contaminated artifacts tested at less than 0.003 grams per liter arsenical dust from 1 cm^2 area swab. This is the equivalent of 0.014 grams per square foot of arsenical dust on the entire artifact surface. As an example, the largest contaminated object tested to date is a New Guinea mask of maximum dimensions 20'x 4'x4', thus a surface area of 352 square feet. This would be a total of 4.9 grams arsenical dust, if the whole surface were equally contaminated.

In November 2001, we contracted with an environmental hazard consulting firm, The Raterman Group, to determine if our staff members were being exposed to elevated levels of arsenic dust while handling our collections. The Raterman Group performed personal air exposure tests on a group of our collections staff. During this sampling period, exposure-monitoring pumps were placed on individual collection staff while they performed their routine work activities. This included cataloging and moving artifacts,

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vacuuming shelves and taking inventory of the collections. These work activities were organized to represent an above average load of work for one day.

These monitoring tests determined that the seven-hour (seven hours represent a full Museum work day) time-weighted average exposures for these staff members were well below OSHA's action level and the permissible exposure limits allowed for staff during a workday. Through this sampling, we know that staff handling or moving artifacts in our collections are not exposed to elevated levels of airborne arsenic dust.

The Field Museum receives numerous requests each year from other institutions to loan artifacts from our collection for the purposes of research and public exhibition. For preservation reasons, artifacts that travel are packed in multiple layers of impact, shock and vibration absorbing materials. These constitute custom made crates made of 5/8" plywood and 1" by 4" wood battens that are lined with at least 2" thick planks of medium to high density closed cell polyester foam. Each artifact is nested in its own custom made internal compartment that is made with lower density polyester foam and lined with Tyvek™ polyethylene sheet. In short each artifact that is shipped by the Field Museum is packed in multiple layers of protective materials.

Based on our test results and current shipping procedures, are we subject to the requirements of HMR 49 CFR 173.132(d), if we need to ship artifacts from our collection that have been treated with arsenic dust? If you need further information to make a determination, please feel free to contact me at (312) 665-7278.

Thank you very much for your time and I look forward to your response.

Jolynn Parchen
Safety and Benefits Manager
Human Resources