



U.S. Department
of Transportation

**Research and
Special Programs
Administration**

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

NOV 7 2000

Mr. Dana Greeley
National Oceanic and Atmospheric Administration .
OAR Laboratories
Pacific Marine Environmental Laboratory (P/PMEL)
NOAA Building Number 3
7600 Sand Point Way NE
Seattle, WA 98115

Ref. No. 00-0249

Dear Mr. Greeley:

This is in response to your August 29, 2000 letter, in which you ask if our February 14, 1997, letter regarding an exception for shipments of water samples is still valid and if any quantity limitations exist.

This exception from the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) concerns the shipment of water samples containing limited quantities of various Class 8, corrosive materials. The materials noted in the exception are as follows:

Hydrochloric acid (HCl), in water solutions at concentrations of 0.04% by weight or less;

Mercury chloride (HgCl₂), in water solutions at concentrations of 0.004% by weight or less;

Nitric acid (HNO₃), in water solutions at concentrations of 0.15% by weight or less;

Sulfuric acid (H₂SO₄), in water solutions at concentrations of 0.35% by weight or less;

Sodium hydroxide (NaOH), in water solutions at concentrations of 0.080% by weight or less; and

Phosphoric acid (H₃PO₄), in water solutions at concentrations yielding a pH range between 4 and 2.

This exception is still valid. The above listed materials in water solutions in the concentrations identified are not subject to the HMR and therefore there is no quantity limitation.

I hope this satisfies your request.

Sincerely,

A handwritten signature in cursive script, appearing to read 'J. A. Gale', written in dark ink.

John A. Gale
Transportation Regulations Specialist
Office of Hazardous Materials Standards



**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
OAR Laboratories**

Pacific Marine Environmental Laboratory
NOAA Building Number 3
7600 Sand Point Way NE
Seattle, WA 98115

August 29, 2000

BAH
\$ 173.136
Class 8
Definitions
00-0249

Mr. Edward T. Mazzullo
Director of Office of HM Standards,
USDOT/RSPA/DHM-10
400 Seventh Street SW
Washington, DC 20590-0001

Dear Mr. Mazzullo:

I would like to begin a project that would require the shipment of seawater samples that contain very small quantities of Mercuric Chloride (HgCl_2). I have become aware of an exception (copies are attached) concerning the shipment of water samples containing limited quantities of corrosive materials, which leads to these questions:

- 1) Are these exceptions still valid?
- 2) Are there any limitations imposed (i.e. quantities) on these exceptions?
- 3) Do these exceptions apply to the situation explained below?
- 4) If your answer is yes to the above, would you please inform me whether you believe our samples, as explained below, are exempt from the Hazardous Materials Regulations?

We would like to ship seawater by land and air, nationally and internationally to our laboratory in Seattle. Individual seawater samples would be contained within 500-ml glass bottles¹. Twenty of these bottles would then be put into a shipping container².

The specifics are as follows:

We would collect 500-ml (0.5 L) samples of seawater from various depths and locations throughout the world's oceans. We would then add 200- μl (0.0002 L) of a saturated solution of Mercuric Chloride (HgCl_2) to each 500-ml sample. Taking into account the solubility of HgCl_2 , there would be 0.0138 g HgCl_2 (0.0102 g Hg^4) in each 500-ml sample³. This can also be stated as 0.00276% HgCl_2 . Removing the chloride from this figure further reduces that percentage to 0.00204% mercury⁴. The shipping container² containing 20 sample bottles would hold 10 liters of seawater and would contain a total of 203.9 milligrams mercury, 0.04% of the Reportable Quantity for mercury (453,592 milligrams or 1 pound).

Sincerely,

Dana Greeley
PMEL Environmental Compliance Officer



¹ The bottle is manufactured by Corning Glass, made of borosilicate glass with a limited coefficient of expansion = 32×10^{-7} . The bottle has a ground glass stopper greased with Type M Apeizon, and secured with plastic closure to provide an air-tight seal.

² The shipping containers are manufactured by ORBIS and called Flipak FP261-DQ. The material is made of HDPE with the following properties:

| | | |
|-----------------------------|--------------|--------------------------|
| Melt Density | ASTM D1238E | 8 gr/10 minute |
| Density | ASTM D4883 | 0.956 gr/cm ³ |
| Flexural Modulus | ASTM D790 | 120,000 psi |
| Tensile Stress @ Break | ASTM D638 | 2290 psi |
| Tensile Elongation @ Break | ASTM D640 | 50% |
| Instrumented Impact @-40°C: | Max Force | 728 lbf |
| | Yield Energy | 14 ft/lb. |
| | Total Energy | 25 ft/lb. |
| | Ductility | 43% |

The sample bottles¹ are stored inside the shipping container in layered Styrofoam. The container dimensions are 24"x20"x12"; the lids are double hinged and secured with plastic closures. Holes are cut in the Styrofoam, and each container holds 20 bottles.

³ The solubility of HgCl₂ is 6.9 grams per 100 grams water. Therefore, the amount of HgCl₂ in 200 microliters of a saturated solution is 0.0138 grams.

⁴ The molecular weights of Mercuric Chloride (HgCl₂) = 271.4954 and Mercury (Hg) = 200.59; thus Hg is 73.88% of the total weight of HgCl₂.