August 9, 1989

MEMO TO: Distribution

FROM: R. C. Davis RCD

SUBJECT: DLA Beryllium Oxide HAZMAT Program

Enclosed are the last two letters in the four-part series addressing issues raised by the DLA HAZMAT program. Additional copies of all four letters can be obtained from Jerry Nice at the Cleveland Saint Clair Avenue Office.

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BRUSHWELLMAN
ENGINEERED MATERIALS

Brush Wellman Inc.
Corporate Headquarters
1200 Hanna Building
1422 Euclid Avenue
Cleveland, Ohio 44115
(216) 443-1000

July 19, 1989

Dear Beryllia Ceramic User:

Do you need to find a substitute for beryllium oxide (beryllia) ceramics? Definitely not! Beryllia's unique properties, coupled with over forty years of safe handling experience, make it the material of choice in your electronic applications. The facts are:

- **Beryllia is an excellent engineering material.**
- **Beryllia is safe.**

To assure that you continue to receive the full commercial benefits of this unsurpassed material, allow me to review with you the safe handling of beryllia ceramics. You are probably aware that all scientific and medical literature supports the safety of finished beryllia products. Yet there is some confusion because of basic misunderstandings about safety in the production of beryllia.

Touching or handling beryllia is absolutely safe. Even accidental ingestion of beryllia is not harmful. The only potential safety concern associated with beryllia is the inhalation of significant amounts of respirable beryllium oxide; dust particles with a size below about 10 microns.

The beryllia products you receive from Brush Wellman are completely safe when used in electronic components because, as high-fired ceramics, there is virtually no possibility for beryllia particles to become airborne under normal conditions of use. In this respect, the beryllium oxide in beryllia ceramic is like the silica in glass or the aluminum oxide in alumina ceramics. In glass or ceramic form, these materials may be handled readily. During grinding, machining or similar manufacturing operations, precautions must be taken to minimize airborne dust emissions. However, experience has shown that control is simply and inexpensively achieved by following proven industrial hygiene procedures similar to those recommended for aluminum nitride, boron nitride, and other ceramic materials.

Even though finished beryllia products are completely safe, we believe it is important to reiterate the precautions we at Brush Wellman observe when handling beryllium-containing powders during our own manufacturing operations. We strictly observe the OSHA occupational exposure standard for beryllium in air. This standard, which has been effective in protecting our employees since 1950, and was reaffirmed by OSHA in January 1989, limits beryllium exposures to:

- **2 micrograms per cubic meter of air as a time-weighted average over an 8-hour day, and**

- **25 micrograms per cubic meter of air for one daily peak exposure of short duration.**

The fact that no beryllium disease cases have been reported where the standard has been met provides immutable testimony to its effectiveness. Exposures above this standard have been associated with a lung condition called "berylliosis", also known as "chronic beryllium disease", or "CBD". CBD is an allergic-type condition which can reduce the exchange of oxygen between the lungs and the bloodstream. Not all people can contract CBD, in fact most people, perhaps as much as 98-99 percent, do not react to beryllium exposure at any level.

Remember, the only potential safety risk associated with beryllia is inhalation of high concentrations of fine airborne particulate, a condition which you and other beryllia users do not routinely encounter in your use of finished beryllia components.

At Brush Wellman, the world's primary producer of beryllia ceramics, tons of beryllium compounds are handled every month. Most of these are in the powdered form, the form requiring the greatest degree of care. Our fifty years of experience stands as proof of the safe manufacturing and use of beryllia products.

We urge you to continue using this unique material in your applications.

In the interest of improving communications about our beryllium-containing products, I welcome any comments, questions or suggestions you may have. Please feel free to call if you wish to discuss this matter.

Sincerely,

Thomas N. Markham, M.D.
Corporate Medical Director

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BRUSHWELLMAN
ENGINEERED MATERIALS

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(216) 443-1000

August 2, 1989

Dear Beryllia Ceramic User:

Our society faces grave problems with regard to waste disposal. As a current or prospective manufacturer, designer or user of electronic components, you will be glad to know that beryllium oxide ("beryllia") ceramics do not present a waste disposal problem. There are fundamental legal, scientific and practical reasons why this is true, as I shall briefly explain.

Legal

Beryllia is not a hazardous waste under federal law. The Code of Federal Regulations (CFR) identifies and defines the substances considered to be hazardous wastes when discarded. (See Title 40 CFR, Subpart 261 for a complete listing.) Beryllia is not identified on this list, and for good reason. Beryllia does not present a waste disposal hazard.

Scientific

Beryllia is a ceramic -- an inert, insoluble substance. Ceramics are akin to many of the oldest geological formations on earth. Because of their stability and impermeability, ceramic-like rocks have existed in the earth for millennia. They have withstood the stresses and strains of pressure, temperature and contact with other substances, including water. Because of these vital qualities, scientists have proposed ceramics to be one of the forms, along with glass, that could offer safe, long-term storage of truly hazardous wastes such as high level wastes from nuclear power plants.

Ceramics, including beryllia ceramics, are thus the direct opposite of hazardous waste materials. They have never to our knowledge created waste site hazards.

Practical

Beryllia is typically recycled. Thus, not only is beryllia not a hazardous waste material, it is rarely a waste product at all. Because of the high cost of producing beryllia ceramics, Brush Wellman repurchases clean, unmetallized scrap from our customers for direct re-use as a raw material in beryllium copper alloys.

We also accept metallized beryllia parts for similar recycling following the removal of any metallization. At Brush Wellman, we are continuously looking for additional ways to recycle beryllia scrap produced by you, our customers, and we will be pleased to help you in any way we can.

Beryllia products are used safely everyday by a wide range of industries with no negative effects on workers or the environment. As with many industrial materials, there are safety precautions which must be observed during some manufacturing steps. However, experience has shown that such operations can be readily maintained in a safe, environmentally sound manner.

Because of our concern for accurate information about our products and because we value you as a customer, we are periodically sending you these informational letters. If you ever have questions about beryllia, applications or safety, we invite you to contact your nearest Brush Wellman representative.

Sincerely,

Richard C. Davis

Richard C. Davis
Manager, Environmental Affairs

RCD:lh

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