



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

January 12, 1993

Docket No. 40-8984

Magnesium Elektron, Inc.
ATTN: Dr. Richard F. Jaeger
Technical Manager
500 Point Breeze Road
Flemington, New Jersey 08822

Gentlemen:

This letter responds to yours dated November 6, 1992. In general, we accept your responses to our comments. However, a few of our concerns still remain outstanding.

To avoid licensing by the Nuclear Regulatory Commission, Magnesium Elektron, Inc. (MEI) should adequately demonstrate that it does not possess, at any stage of the processes conducted at its facility, and during storage, greater than unimportant and small quantities of source material as defined in 10 CFR 40.13 and 10 CFR 40.22, respectively.

Based on your estimated surface areas and average sludge depths for Ponds 1E, 1W, 6 Upper and 6 Lower, the total volume of sludge in these ponds is about 450, 450, 2,500, and 4,000 cubic meters (10,000, 10,000, 250,000 and 450,000 cubic feet), respectively. For such large quantities, a decision on licensing cannot be based on average concentrations of uranium and thorium for an entire pond. But rather, the possessed inventory of source material, i.e., the quantity of sludge containing uranium and thorium with concentrations greater than 0.05 percent by weight, shall determine the need for a license. Therefore, your characterization plan should include provisions to calculate this inventory.

In 1989, fourteen sludge samples were retrieved from a section of Pond 2 and analyzed for uranium-238 and thorium-232 by MEI and NRC. The results (dated July 26, 1989) indicated a significant variance in concentration by location. You stated that the standard deviation for samples analyzed by the NRC was ± 645 ppm. According to this value, sludge in Pond 2 cannot be assumed to contain a uniform distribution of uranium and thorium. You have stated that in transferring sludge from the now closed Pond 2 to Ponds 6 Upper and Lower, substantial mixing ultimately resulted in uniform uranium and thorium concentrations in the sludge. In the absence of measured data, the NRC is not prepared to accept this assumption.

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Dr. Richard F. Jaeger

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Your procedure to determine vertical variations in source material concentrations in the core samples by detecting direct radiation, may be inadequate. Limited sludge sampling of 1989 indicated that the concentration of uranium in the sludge is generally higher than that of thorium. Unlike the thorium chain, the uranium chain does not emit readily detectable gamma radiation. Also considering interference from background radiation and the dimensions of the core sample source, obtaining and analyzing representative vertical samples for 1-meter segments would be an appropriate method to determine vertical variations of source material concentrations in the sludge.

I hope this letter clarifies remaining NRC concerns. If you need further clarifications, you may reach me at (301) 504-2669. Please inform the NRC of your plans within two weeks of receiving this letter.

Sincerely,

/S/

Yawar H. Faraz, Project Manager
Advanced Fuel and Special
Facilities Section
Fuel Cycle Safety Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

cc: David Lewis, Esq.

J. Lipoti, NJDEQ

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