JUN 10 1994

Docket No. 040-08984

MEMORANDUM FOR: Robert C. Pierson, Chief
Licensing Branch
Division of Fuel Cycle Safety and Safeguards

FROM: Susan F. Shankman, Deputy Director
Division of Radiation Safety and Safeguards, RI

SUBJECT: LICENSE APPLICATION FOR MAGNESIUM ELEKTRON, INC.; RESULTS OF SAMPLES COLLECTED APRIL 7, 1994

On April 7, 1994, representatives from Region I attended a meeting between NMSS and Magnesium Elektron, Inc. (MEI) to discuss the results of the site characterization submitted by MEI and to verify the location of process components. Also present at the meeting were representatives from the local municipality, Kingwood Township. At the conclusion of the meeting and the site tour, Region I took 10 samples from at the facility. The analyses included in the attached summary were completed during the first week of June. MEI took duplicate samples, but has not yet completed their analysis.

We agreed to analyze the samples and provide the results to NMSS for your use in reviewing MEI's license application. The results have been communicated to your staff. The enclosed summary discusses the background of the facility as it appears applicable to these samples, the locations where the samples were taken, sample preparation and analytical techniques and the results. Also enclosed are draft letters to send the summary to MEI and the State of New Jersey. The State of New Jersey has consistently expressed interest in this site.

We are concerned that this facility requires the controls imposed by an NRC license. As discussed below, the incoming zircon powder appears to be source material, at least part of the time; water discharged from the facility in large quantities either exceeds the release limit in Part 20 or is a significant fraction of the limit; and, the waste material meets the definition of source material, again, at least part of the time. Also, the waste, at all times, is in excess of the Option 1 criteria in the Branch Technical Position on Disposal or Onsite Storage of Residual Thorium or Uranium from Past Operations.

Based on the results of our sample analyses, there appear to be three items that have an impact on the MEI license application which is currently being reviewed by NMSS:

1. The percentage of source material in the zircon powder in use at MEI was found to be about 0.08 percent by weight. Prior analyses of the zircon powder in 1989 by

IE 07

NRC and MEI found the concentration of source material between 0.04 to 0.05%. Natural variation in the source material content of naturally occurring ore is well known, even for ore from the same source, as different parts of the ore deposit are worked. For example, at a recent inspection of another Region I licensee, the concentration of uranium in the alluvial deposit used by this licensee (pyrochlore ore) had doubled in two years.

2. Material (sludge) taken from the two ponds (1E and 1W) that receive waste product during different stages of the process was found to dry out under natural conditions. The samples collected by Region I from Pond 1W and 1E do not appear to exhibit the hygroscopic properties stated in the report from the licensee's contractor entitled, "Identification of Radiological Constituents in Waste Sludge" dated January 13, 1994. Without the presence of the water to reduce the concentrations, the weight percents of source material in the "dry" material from Pond 1E and 1W were found to be 0.37% and 0.046%, respectively. Even considering that the contents of these ponds are eventually mixed together in Pond 6 upper or lower, which is the current practice, it is likely that the source material in air-dried sludge would be greater than 0.05 percent by weight. This is consistent with the results of split samples from Pond 6 at MEI that were dried and analyzed by Oak Ridge Institute for Science and Education (ORISE). The results of the split samples were described in a January 28, 1994 letter to Charles Gaskin.

3. Ponds 1E and 1W are utilized by MEI to separate water (supernatant) from the waste sludge. The supernatant is then discharged into a separate holding basin (Pond 8). Prior to 1989, this water was discharged into a local stream. Since 1989 MEI trucks this water from their facility to a nearby sewerage treatment system for disposal. According to MEI, approximately 757,000 liters (200,000 gallons) of water is transported offsite daily. The gross alpha and gross beta concentrations in this water were both found to be in excess of 2,000 picocuries per liter. Based on the analyses by Region I, the radioactivity in the water was primarily in a dissolved state and not attached to suspended material. While Region I did not do specific isotope identification, isotopic analyses of water decanted from a sample in Pond 1E by ORISE indicated that the radioactivity was due to the presence of U-238 and U-234. The gross alpha or beta concentrations measured in the water sample are approximately 7 times the effluent concentrations in Table 2, Column 2 of Appendix B to 10 CFR 20 for both U-238 and U-234. The applicable effluent concentration is 300 pCi/l for U-238 and U-234. Sewer discharge limits are ten times higher.

Based on the results of the samples taken of MEI's current operation, Region I continues to believe that this facility requires an NRC license. In addition to the fact that the concentration of source material in the zircon powder likely meets the definition of source material in 10 CFR 40.4, the waste sludge in Pond 1E, when air dried, also meets the definition of source material.

MEI representatives stated at the April 7, 1994 meeting that if it is decided that a license is not required, they will dispose of the Pond 6 contents (approximately 20,000 m^3 of waste material) in a county landfill. Once the material is placed in the landfill, we believe that the waste will dry out to concentrations in excess of 0.05% source material by weight.

We are also concerned that the effluent discharges into the local sewer system via trucks appear to be in excess of Table 2 limits in Appendix B of 10 CFR 20 (Limits for Release to the Environment). If one considers the effluent is being disposed by release to the sanitary sewer, even though the sewer does not serve the licensee's property, the allowable concentration is a factor 10 higher, but the discharge is a significant fraction of the limit.

If you have any questions concerning our analysis, please contact J. Kinneman at (610) 337-5252 or Duncan White at (610) 337-5042.

Original Signed By:

Susan F. Shankman, Deputy Director
Division of Radiation Safety
and Safeguards

Enclosures:
1. Region I Summary of Sample Analyses for Magnesium Elektron
2. Draft Letter to MEI
3. Draft Letter to NJDEPE

cc: (w/enclosures)
J. Austin, NMSS
J. Glenn, NMSS
C. Gaskin, NMSS
J. Greeves, NMSS
E. Ten Eyck, NMSS

bcc:
Region I Docket Room (w/concurrences)
J. Joyner, RI
J. Kinneman, RI
D. White, RI
J. Austin, NMSS
T. Johnson, NMSS
D. Fauver, NMSS
C. Hehl RI

RI:DRSS	RI:DRSS	RI:DRSS	RI:DRSS
White	Kinneman	Joyner	Shankman
06/9/94	06/9/94	06/10/94	06/10/94

IE 07

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I
SUMMARY OF SAMPLE ANALYSES FOR MAGNESIUM ELEKTRON

Docket No. 040-08984

Applicant: Magnesium Elektron, Inc.
500 Point Breeze Road
Flemington, New Jersey 08822-9111

A. Background

Magnesium Elektron Inc. (MEI) processes zircon powder to manufacture a number of chemical products containing zirconium. The zirconium chemical products manufactured by MEI are sold to other manufacturers which incorporate the zirconium in a wide variety of industrial and consumer products. The facility is located in Kingwood Township, approximately 6 miles west of Flemington, New Jersey. The feed material used at the facility is zircon sand mined in South Africa, which contains naturally occurring uranium and thorium. Prior to processing at MEI, the zircon sand is milled into a powder or "flour" at the applicant's facility in Aspers, Pennsylvania. The applicant reports that the resulting powder has an average particle size of 10 microns.

At the Flemington plant, the zircon powder is first fused at high temperatures with soda ash and then treated with various acids to separate the zirconium from other materials present in the raw material, including the uranium and thorium. Liquid waste is removed from the process at two points and discharged into separate concrete-lined holding ponds. Pond 1W receives waste that is generated early in the process and reportedly contains mostly silica. The second effluent is neutralized in the pipe leading from the manufacturing facility and is discharged to Pond 1E. This effluent contains not only silica, but the other metals present in the zircon powder feed, including uranium and thorium. The effluents are a liquid-solid slurry when they reach the ponds. The solids settle in the ponds resulting in a light colored sludge and a clear liquid supernatant. The supernatant from both ponds is allowed to flow over a weir and accumulates in Pond 8.

After additional settling time, water from Pond 8 is shipped offsite by tanker truck to a substation operated by the Trenton Municipal Utility Authority (MUA) where it is treated in their sewerage treatment plant. When Pond 1E or 1W reaches capacity the sludge is pumped to either upper or lower Pond 6. Ponds 6 upper and lower contain material that has been accumulating (approximately 20,000 m^3) since the start of operations in 1952. Although sludge containing uranium and thorium has not been removed from the site, the applicant stated that approximately 50,000 yd^3 of silica was shipped off-site in 1990 as capping material for a landfill in Burlington County, New Jersey.

As the result of an inspection on January 18, 1989, Region I issued a Notice of Violation (NOV) to MEI for possession of dry and wet sludge with concentrations of source material in excess of 0.05% by weight without a specific license. The bases for the NOV were sludge

samples collected by the inspector which had source material concentration up to 0.37% by weight. MEI's response to the NOV was to file an application dated August 27, 1989 for an NRC license.

To determine the concentration of uranium and thorium in the waste sludge the applicant's consultant (IT Corporation) implemented the "Work Plan for Identification of Radiological Constituents in Waste Sludge" dated July 20, 1993. Samples were collected by the consultant in October 1993 from the upper and lower portions of Pond 6 and Pond 1E to determine the average concentration of source material. The NRC split 12 samples with the applicant to independently analyze the waste sludge. IT Corporation submitted the results of the sampling in "Identification of Radiological Constituents in Waste Sludge" a report dated January 13, 1994. Oak Ridge Institute for Science and Education (ORISE) analyzed the split samples for the NRC and confirmed the accuracy of the applicant's measurements regarding the concentration of uranium and thorium in the sludge. The concentration of source material in the sludge was calculated in the applicant's reports on the wet basis in accordance with guidance provided to the applicant in a March 5, 1993 letter from NRC.

On April 7, 1994, a meeting was held at MEI to discuss site characterization results and to verify sample points. The meeting was attended by NRC representatives from NMSS and Region I, representatives from Kingwood Township and the applicant's management and staff. After the meeting and a tour of the processing facility, Region I staff collected samples from various locations in the facility. The purpose of these samples was to independently confirm the concentration of source material at various points in the current process.

B. Sample Collection

On April 7, 1994 Region I collected 10 samples at the MEI facility. All samples were collected in 500 milliliter (ml) plastic containers. The following is a summary of the samples collected.

1. One sample was taken from a container of zircon powder prior to processing. This sample was a fine, dry powder.

2. Five sludge samples were collected at various points in Pond 1E. These samples were designated as 1A through 1E. Each sample was collected as a grab sample from a bucket dragged through the sludge by submerging the 500 ml sample container in the bucket and attempting to maximize the amount of sludge in the sample container. A similar sample was taken from each bucket by MEI. The amount of sludge collected in each container varied based on the sample location in the Pond.

3. Three sludge samples were collected at various points in Pond 1W. These samples were designated as 2A, 2B and 2C. The samples were collected in the same manner as those in Pond 1E.

4. A sample was taken of the water that is pumped from Pond 8 into the tanker trucks for off-site disposal. This sample was taken at a sampling port located on top of the filling station for the trucks.

C. Sample Analyses

Gamma spectrometry was performed on an intrinsic germanium detector coupled to a Nuclear Data computer-based multichannel analyzer system in the Region I Laboratory.

Individual radionuclide results were determined based on the following:

1. Uranium 238 (U-238) is based on the 1,001 keV photon peak for Protactinium 234m (Pa-234m).

2. Radium 226 (Ra-226) is based on the 186 keV photon peak (corrected for U-235 interference).

3. Lead 214 (Pb-214) is based on the 352 keV photon peak.

4. Bismuth 214 (Bi-214) is based on the 609 keV photon peak.

5. Thorium-232 (Th-232) is based on the 911 keV photon peak from Actinium-228 (Ac-228).

6. Thorium 228 (Th-228) is based on the 238 keV photon peak from Lead 212 (Pb-212).

Gamma spectroscopy results are reported with an uncertainty of one standard deviation based on counting statistics alone.

Gross alpha and beta activities were determined on a Tennelec Model LB5100 gas flow proportional counter. Results are reported with an uncertainty of one standard deviation based on counting statistics alone.

D. Analytical Procedures

The analytical procedures used to evaluate each sample are summarized below:

1. The zircon flour was analyzed by gamma spectroscopy without additional preparation. No additional analyses were performed on this sample. The sample was counted for 3,000 seconds in a 250 milliliter (ml) Marinelli beaker.

2. The samples from Ponds 1E and 1W were evaluated separately, but in an identical manner. Initially, each individual sample was analyzed by gamma spectroscopy in the original sample container. With the exception of shaking the bottles to thoroughly

mix the contents in order to minimize geometry effects, no other preparation was performed. The count time for this initial analysis was 3,000 seconds.

For the second analysis, each sample was allowed to settle so that two distinct layers appeared, a clear supernatant and a light colored sludge. The supernatant was removed from each sample by suction and was combined into separate containers representing Pond 1E and Pond 1W. The process was repeated until it appeared that the maximum amount of supernatant had been removed from each sample. A 500 ml aliquot of the supernatant from the Pond 1E samples and a 250 ml aliquot of the supernatant from the Pond 1W samples was then passed through a particulate filter with a pore size of 0.45 microns. The filters were counted for 10 minutes on the Tennelec gas flow proportional counter for gross alpha and gross beta activities and the results expressed in activity per volume of the supernatant. The filtered water was analyzed by gamma spectroscopy without additional preparation. The count time was 3,000 seconds. One ml of the sample was then evaporated to dryness and analyzed for gross alpha and gross beta activities. The count time for this sample was 6,000 seconds.

For the third analysis, the sludge remaining after the supernatant was removed was combined in separate aluminum pans, one for the samples from Pond 1E and another for Pond 1W, and was allowed to dry in a standard laboratory hood. The pans were weighed daily to track the weight loss due to evaporation. After the sludge appeared dry, the remaining material was placed in a 250 ml Marinelli beaker and analyzed by gamma spectroscopy. The count time for these samples was 3,000 seconds for the sample representing Pond 1E and 10,000 seconds for the sample representing Pond 1W.

3. The water sample from Pond 8 was initially analyzed by gamma spectroscopy without additional preparation. The count time for this sample was 3,000 seconds. One ml of the sample was then evaporated to dryness and analyzed for gross alpha and gross beta activities. The count time for this sample was 6,000 seconds.

E. Results

1. Zircon Powder

The gamma spectroscopy results for the zircon powder are presented in Table 1. The results indicate that the radionuclides in the uranium series (U-238, Ra-226, Pb-214, and Bi-214) were not in equilibrium. The concentration of U-238 was approximately twice the concentration of Ra-226 and its progeny. The thorium series radionuclides (Th-232 and Th-228) appear to be in equilibrium.

The weight per cent of uranium and thorium present in the sample is based on the concentrations of U-238 and Th-232 and is 0.063% and 0.017%, respectively. The total source material present in the zircon powder is 0.08% by weight.

2. Pond Samples

Pond 1E

The results for Pond 1E samples can be found in Table 2. The radionuclide concentrations measured in the individual samples from Pond 1E were similar to each other with the exception of sample 1B. The observed ratios of the radionuclides in the uranium or thorium series are different from the ratios observed in the zircon powder. These differences are probably due to the effects of chemical processing on the various radionuclides present and the insufficient time permitted to allow for the ingrowth of radon and thoron progeny.

The composite sludge from Pond 1E was allowed to dry at room temperature, reaching approximately constant weight in ten days (lost less than 10% of net weight on last day). The resulting material was light brown in color and slightly damp; however, portions of the composite sample did appear completely dry. The five samples yielded about 830 grams of wet sludge which dried to about 200 grams of material, for an approximate moisture content of 75 percent. The weight per cents of uranium and thorium present in the air dried sludge were 0.31% and 0.06%, respectively; the total source material present was 0.37%.

Gamma spectroscopy on the filtered supernatant did not identify the presence of uranium or thorium series nuclides in excess of the system's Lower Level of Detection (LLD). Gross alpha and beta results were 2,500 $\pm$ 400 pCi/l and 1,950 $\pm$ 400 pCi/l, respectively. Analysis of the filter indicates that most of the activity present is dissolved.

Pond 1W

The results for Pond 1W samples can be found in Table 3. The radionuclide concentrations in Pond 1W were lower than Pond 1E. The large uncertainty for U-238 and Ra-226 and the lack of data for other radionuclides prevented the comparison of radionuclides in the individual containers in a wet condition.

The composite sludge from Pond 1W was allowed to dry at room temperature, until it yielded a fine, white, dry appearing powder after six days. The three samples yielded about 500 grams of wet sludge which dried to about 185 grams of "dry" material, for an approximate moisture content of about 63 percent. The concentrations of U-238 and Ra-226 were similar, but the concentrations of the Ra-226 progeny were less, probably due to insufficient time for the progeny to reach secular equilibrium with

Ra-226. The Th-232 concentration was twice that measured for Th-228. This is probably the result of Rn-220 and its progeny (including Pb-212) not reaching secular equilibrium. The weight per cents of uranium and thorium present in the air dried sludge were 0.033% and 0.013%, respectively; the total source material present was 0.046%.

Gamma spectroscopy on the filtered supernatant did identify the presence of uranium but not thorium series nuclides in excess of the system's LLD. The concentration of uranium reported is associated with a large counting error. Gross alpha and beta results were 3[illegible] ± 200 pCi/l and 500 ± 300 pCi/l, respectively. Analysis of the filter indicates that most of the activity present is dissolved.

3. Pond 8 Water Sample

The results for the Pond 8 Water sample can be found in Table 4. Gamma spectroscopy identified the presence of Ra-226 and its progeny. The concentration of Ra-226 was 2,600 ± 900 pCi/l. The gross alpha and gross beta concentrations were 2,200 ± 300 pCi/l and 2,200 ± 300 pCi/l, respectively.

TABLE 1
ANALYSIS OF ZIRCON POWDER
MAGNESIUM ELEKTRON, INC.

Radionuclide	Result (pCi/g)	Result (weight %)
U-238	210 ± 20	0.063
Ra-226	78 ± 15	
Pb-214	106.1 ± 0.6	
Bi-214	96.7 ± 0.6	
Th-232	18.4 ± 0.7	0.017
Th-228	16.3 ± 0.2	
Total		0.080

The reported uncertainty is one standard deviation based on counting statistics only.

Weight per cent results are for total uranium and total thorium even though they are listed by individual isotope.

TABLE 2
POND 1E SAMPLES
MAGNESIUM ELEKTRON, INC.

A. Individual Samples

	Sample Number				
Radionuclide	1A	1B	1C	1D	1E
U-238	170 ± 30	150 ± 40	110 ± 20	130 ± 30	140 ± 20
Ra-226	40 ± 20	150 ± 20	30 ± 20	30 ± 20	40 ± 20
Pb-214	46.2 ± 0.7	78.4 ± 0.9	35.6 ± 0.6	41.0 ± 0.6	37.9 ± 0.6
Bi-214	43.6 ± 0.7	73.2 ± 0.9	31.8 ± 0.6	36.3 ± 0.6	33.5 ± 0.6
Th-232	< 0.4	26.5 ± 1.1	6.0 ± 0.7	5.6 ± 0.6	5.7 ± 0.6
Th-228	16.1 ± 0.3	9.2 ± 0.3	9.8 ± 0.3	10.6 ± 0.3	12.4 ± 0.3

Results are in pCi/milliliter. The reported uncertainty is one standard deviation based on counting statistics only.

B. Composite Sludge Sample (air dried)

Radionuclide	Result (pCi/g)	Result (weight %)
U-238:	1,020 ± 40	0.31
Ra-226:	190 ± 30	
Pb-214:	21.0 ± 0.6	
Bi-214:	10.4 ± 0.4	
Th-232:	63.3 ± 1.2	0.06
Th-228:	95.2 ± 0.6	
Total		0.37

The reported uncertainty is one standard deviation based on counting statistics only.

Weight per cent results are for total uranium and total thorium even though they are listed by individual isotope.

TABLE 2 (CONT)
POND 1E SAMPLES
MAGNESIUM ELEKTRON, INC.

C. Suspended Solids in Supernatant Water (Filter)

Analysis	Result (pCi/l)
Gross alpha	494 ± 14
Gross beta	687 ± 15

D. Filtered Supernatant (Water)

Analysis	Result (pCi/l)
Gross alpha	2,400 ± 400
Gross beta	1,900 ± 300

TABLE 3
POND 1W SAMPLES
MAGNESIUM ELEKTRON, INC.

A. Individual Samples

	Sample Number		
Radionuclide	2A	2B	2C
U-238	90 ± 30	10.1 ± 6.8	< 20
Ra-226	27 ± 13	2 ± 7	10 ± 10
Pb-214	24.2 ± 0.5	4.7 ± 0.3	16.8 ± 0.4
Bi-214	28.0 ± 0.5	4.7 ± 0.2	14.4 ± 0.4
Th-232	4.4 ± 0.6	< 0.4	< 0.4
Th-228	3.2 ± 0.2	1.20 ± 0.12	2.0 ± 0.7

Results are in pCi/milliliter. The reported uncertainty is one standard deviation based on counting statistics only.

B. Composite Sludge Sample

Radionuclide	Result (pCi/g)	Result (weight %)
U-238	109 ± 10	0.033
Ra-226	96 ± 6	
Pb-214	8.84 ± 0.15	
Bi-214	7.54 ± 0.16	
Th-232	14.0 ± 0.3	0.013
Th-228	7.34 ± 0.12	
Total		0.046

Results are for air dried material. The reported uncertainty is one standard deviation based on counting statistics only.

Weight per cent results are for total uranium and total thorium even though they are listed by individual isotope.

TABLE 3 (CONT)
POND 1W SAMPLES
MAGNESIUM ELEKTRON, INC.

C. Suspended Solids in Supernatant Water (Filter)

Analysis	Result (pCi/l)
Gross alpha	54 ± 7
Gross beta	145 ± 11

D. Filtered Supernatant (Water)

Analysis	Result (pCi/l)
Gross alpha	300 ± 200
Gross beta	500 ± 300

TABLE 4
POND 8 WATER SAMPLE
MAGNESIUM ELEKTRON, INC.

Analysis	Result (pCi/l)
Gamma Spectroscopy	
Ra-226	2,600 ± 900
Pb-214	500 ± 120
Bi-214	620 ± 120
Ac-228	< 336
Gross alpha	2,200 ± 300
Gross beta	2,200 ± 300

DRAFT

Docket No. 040-08984

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

Dear Dr. Jaeger:

SUBJECT: Sample Results

On April 7, 1994 D. White and J. Kinneman from our Region I office took 10 samples from four different stages of your current process to measure the concentration of uranium and thorium (source material). Samples were taken from Ponds 1E and 1W, zircon powder, and effluent shipped off-site. The enclosed summary of sample analyses discusses the location of the samples, sample preparation, analytical techniques and results.

The enclosed report is being used in the review of your application for a license and has been provided to the New Jersey Department of Environmental Protection and Energy. Please contact John Kinneman at (610) 337-5252 or Duncan White at (610) 337-5042 in Region I if you have questions regarding these analyses.

Your cooperation with us is appreciated.

Sincerely,

Enclosure: Summary of Sample Analyses for Magnesium Elektron

bcc (w/enclosure):
Region I Docket Room (w/concurrences)
J. Austin, NMSS
J. Glenn, NMSS
C. Gaskin, NMSS
S. Shankman, RI
J. Kinneman, RI
D. White, RI

DRAFT

Docket No. 040-08984

New Jersey Department of Environmental
Protection and Energy
Radiation Protection Programs
ATTN: Robert Stern, Ph.D., Chief
Bureau of Environmental Radiation
CN 415
Trenton, New Jersey 08625-0415

Dear Dr. Stern:

SUBJECT: Magnesium Elektron; Sample Results

On April 7, 1994 representatives from Region I took 10 samples from four different stages of Magnesium Elektron, Inc.'s (MEI) current process to extract various zirconium chemical products from zircon powder. The purposes of the samples were to measure the concentration of uranium and thorium (source material) present and determine the effect that natural drying conditions would have on the waste material or sludge from Ponds 1E and 1W. Samples were taken from Ponds 1E and 1W, zircon powder, and the liquid effluent shipped off-site. The enclosed summary of sample analyses discusses the location of the samples, sample preparation, analytical techniques and results.

The enclosed report is being used by the NRC project manager for MEI's application for an NRC license. Please contact John Kinneman at (610) 337-5252 or Duncan White at (610) 337-5042 in Region I if you have questions regarding these analyses.

We appreciate your continued interest in this matter.

Sincerely,

Enclosure:
Summary of Sample Analyses for Magnesium Elektron

cc w/o enclosure:
Magnesium Elektron, Inc.
ATTN: Richard F. Jaeger, Ph.D.
Technical Manager
500 Point Breeze Road
Flemington, New Jersey 08822

bcc w/o enclosure:
Region I Docket Room (w/concurrences)
J. Austin, NMSS
J. Glenn, NMSS
C. Gaskin, NMSS
J. Kinneman, RI
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