UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 9, 1999

Mr. David R. Smith
Radiation Safety Officer
Shieldalloy Metallurgical Corporation
P.O. Box 768
Newfield, New Jersey 08344

SUBJECT: TRANSFER OF BAGHOUSE DUST UNDER 10 CFR 40.13(A) AND 40.51(b)(3) (TAC NO. L30926)

Dear Mr. Smith:

The U.S. Nuclear Regulatory Commissioin (NRC) staff has reviewed your request by letter dated June 24, 1996, to transfer baghouse dust containing less than 0.05 weight percent source material to an exempt person, in accordance with 10 CFR 40.51(b)(3) and 40.13(a). The staff also reviewed your report entitled, "Technical Basis for the Use of Baghouse Dust as an Additive in Concrete Production."

Based on the information you submitted, the NRC performed independent dose calculations to determine the potential doses to individual members of the public as a result of these transfers. The staff has determined, based on the results of these assessments, that the total effective dose equivalent to an individual member of the public or worker from the transfer of the material to a cement manufacturer is not expected to exceed 100 mrem/yr as specified in 10 CFR 20.1301(a), under routine conditions. Based on this determination, the NRC staff has no objection to you transferring this material.

If you have any questions about this letter or the assessments that were performed, please call Heather Astwood of my staff, on (301) 415-5819.

Sincerely,

Carl J Paperiello

Carl J. Paperiello, Director
Office of Nuclear Material Safety
and Safeguards

Docket 40-7102
License SMB-743

IEM
Integrated Environmental Management, Inc.

9040 Executive Park Drive, Suite 205
Knoxville, TN 37923
Phone: (615) 531-9140
Fax: (615) 531-9130

1680 East Gude Drive, Suite 305
Rockville, MD 20850
Phone: (301) 762-0502
Fax: (301) 762-0638

September 11, 1995

Mr. C. Scott Eves
Shieldalloy Metallurgical Corporation
West Boulevard
Post Office Box 768
Newfield, New Jersey 08344

Re: Radiological Constituents in Samples Collected from the Lime Pile

Dear Mr. Eves:

On July 31, 1995, Mr. Alan Duff of **IEM**'s Knoxville, Tennessee office collected 15 samples of material from the "lime pile", located in the storage yard of SMC's Newfield facility. The lime pile was assumed to contain, primarily, baghouse dust. However, it is my understanding that it may also contain mis-located pieces of slag and possibly other items.

The samples were collected, using a JVC Soil Probe, from the top one foot (approximate) of the stockpile at 15 separate locations.[1] Each sample was then placed into a large zip-lock baggie and homogenized. Approximately 20 grams of each sample were shipped to General Activation Analysis, Inc., where they were to be analyzed for total uranium and total thorium by neutron activation analysis. However, the GAA reactor was unavailable for this sampling campaign. Therefore, the aliquots were transferred to the University of Missouri. Enclosed is the University of Missouri final report. The remainder of each sample was packaged, labeled and delivered to you for subsequent metallurgical testing.

The results of the analyses demonstrate that the materials in the lime pile at Newfield contain only low concentrations of naturally-occurring radioactive materials, and that the variation in uranium and thorium concentration throughout the 15 samples is minimal. The following is a summary of results:

Sample No	U - ppm	Th - ppm	Percent (by Weight)
BHD-001	17.10	144.00	0.01
BHD-002	3.10	10.00	0.00
BHD-003	63.50	397.00	0.04
BHD-004	58.30	368.00	0.04
BHD-005	15.10	38.00	0.00
BHD-006	63.80	450.00	0.05
BHD-007	59.60	427.00	0.04

[1] Although the soil probe had a depth capability of 15 feet, it was unable to penetrate the lime pile past the first 12 inches.

Sample No	U - ppm	Th - ppm	Percent (by Weight)
BHD-008	43.80	326.00	0.03
BHD-009	46.30	341.00	0.03
BHD-010	54.00	373.00	0.04
BHD-011	58.60	202.00	0.02
BHD-012	59.40	197.00	0.02
BHD-013	26.80	200.00	0.02
BHD-014	28.00	261.00	0.03
BHD-015	29.60	182.00	0.02
Average	41.80	261.07	0.03
SD	19.48	131.74	0.01

From these results, it appears that the lime pile contains only "unimportant quantities" of source material, and that it is a potentially-good candidate for off-site sale. However, I recommend that TCLP be performed on at least a few of the remaining samples before any final decisions are made.

If I can answer any questions or provide you with additional information, please call me at (301) 762-0502. As always, it is a pleasure assisting you in such interesting studies. I am looking forward to speaking with you again soon.

Sincerely,

Carol D. Berger

Carol D. Berger, C.H.P.

Enc.
File 94005

UNIVERSITY OF MISSOURI-COLUMBIA

Research Reactor Center

Research Park
Columbia, Missouri 65211
Telephone (314) 882-4211
FAX [314] 882=3443

August 28, 1995

Carol D. Berger, C.H.P.
Integrated Environmental Management, Inc.
1680 East Gude Drive, Suite 305
Rockville, MD 20850

RE: Project No. 94005.07/94003.01

Dear Ms. Berger:

I have completed the neutron activation analysis of the bag house dust and zircon flour samples received in our laboratory on August 9, 1995. As per your instructions the FINAL report is attached. It has been our pleasure to be of service to you on this project and I look forward to working with you in the future.

Sincerely,

J. Steven Morris, PhD
Coordinator, Nuclear Analysis Program, and
Adjunct Professor of Chemistry

The Determination of Uranium and Thorium in Bag House Dust and Zircon Flour Samples
RE: Project No. 94005.07/94003.01
August 28, 1995

Procedure:

Samples were weighed, as received, into 1.5 mL high-density polyethylene (HDPE) vials. QC samples and uranium and thorium standards were quantitatively transferred to the same type vials. Samples, QA samples and standards are placed in boron nitride (BN) capsules for pneumatic tube irradiation using the standard HDPE rabbit. This configuration was irradiated in the high-flux pneumatic tube position at the University of Missouri Research Reactor (MURR). The neutron flux densities in this position, for thermal, epithermal and fast neutrons, are approximately 8×10^{13}, 2.5×10^{12} and 8×10^{12} $n \cdot cm^{-2} \cdot sec^{-1}$, respectively. Inside the BN capsule the thermal flux is reduced by a factor of approximately 1000 and the epithermal and fast flux densities are relatively unchanged.

The samples, quality control samples and standards, prepared in duplicate, were irradiated for 10 seconds, decayed for 5 to 15 minutes and real-time counted for 5 minutes. In some instances the samples and standards were re-counted for 2 to 14 hours after several day's decay to obtain a better sensitivity for the determination of thorium.

The spectrometer consists of a 20% HPGe detector (EG&G ORTEC, Oak Ridge, TN), an ORTEC 459 power supply, a Tennelec 244 spectroscopy amplifier (Tennelec, Inc., Oak Ridge, TN), a Canberra/Nuclear Data 599 loss-free counting module and a Nuclear Data 581 ADC (Canberra Nuclear Industries, Itasca, IL). Data acquisition is done via a Canberra/ND Acquisition Interface Module using a Microvax 3100 Model 38 Workstation (Digital Equipment Company, Maynard, MA) and Canberra/ND applications software.

For uranium, the U-238(n,γ)U-239 capture reaction was used. The thermal neutron capture cross section and resonance integral are 2.75 and 284 barns, respectively. The 74.66 KeV gamma-ray from the decay of U-239 ($t_{1/2}$ = 23.47 minutes) was used for analysis. Concentrations were determined via standard comparison.

For thorium, the Th-232(n,γ)Th-233 capture reaction iwasused. The thermal neutron capture cross section and resonance integral are 7.26 and 83.7 barns, respectively. For those samples with Th > 100 ppm, the concentration was determined by measurement of the 459.31 KeV gamma-ray from the decay of Th-233 ($t_{1/2}$ = 22.3 minutes); where Th < 100 ppm, the concentration was determined by measurement of the 312.01 KeV gamma-ray from the decay of Pa-233 ($t_{1/2}$ = 27.0 days) which is produced by the beta decay of Th-233. In those cases where Pa-233 was measured, samples were allowed to decay approximately 5 days and were counted for 2 to 14 hours depending on concentration. Concentrations were determined via standard comparison.

The quality control sample (NBS SRM 1633a) was obtained from the National Institute of Standards and Technology (NIST) and is certified to contain 10.2 ± 0.2 and 24.7 ± 0.3 ppm uranium and thorium, respectively.

The uranium and thorium standards were prepared from Spex Plasma Standards (Spex Industries, Inc., Edison, NJ) to contain 10.11 and 101.1 micrograms of uranium and thorium, respectively.

Results:

A total of 15 samples of bag house dust (labeled BHD-001 through BHD-015), two zircon flours (labeled ZF-1 and ZF-2) and NBS SRM 1633a Fly Ash were prepared and analyzed in duplicate. The results, in micrograms U and Th per gram sample (ppm) are given in the table below

sample ID	U conc (ppm)	Th conc (ppm)
BHD-001	17.1 ± 0.3	144 ± 34
BHD-002	3.1 ± 0.6	10 ± 6
BHD-003	63.5 ± 3.0	397 ± 10
BHD-004	58.3 ± 1.8	368 ± 7
BHD-005	15.1 ± 3.7	38 ± 10
BHD-006	63.8 ± 1.6	450 ± 11
BHD-007	59.6 ± 2.5	427 ± 22
BHD-008	43.8 ± 2.0	326 ± 34
BHD-009	46.3 ± 2.9	341 ± 6
BHD-010	54.0 ± 1.7	373 ± 2
BHD-011	58.6 ± 8.8	202 ± 26
BHD-012	59.4 ± 3.8	197 ± 22
BHD-013	26.8 ± 0.1	200 ± 9
BHD-014	28.0 ± 2.1	261 ± 53
BHD-015	29.6 ± 1.5	182 ± 11
ZF-1	273 ± 6	155 ± 32
ZF-2	271 ± 10	126 ± 33
NBS SRM 1633a Fly Ash	this analysis 10.2 ± 0.1 cert. value 10.2 ± 0.1	this analysis 23.8 ± 1.8 cert. value 24.7 ± 0.3