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JAN 17 1975

Martin B. Biles, Director
Division of Operational Safety, HQ .

DISPOSAL OF SCRAP COPPER, CYCLOTRON DISMANTLING PROJECT, NUCLEAR RESEARCH CENTER, CARNEGIE-MELLON UNIVERSITY (CMU)

Enclosed for your information is a copy of the October 28, 1974, letter from T. Morris (CMU) to J. Krupa (CH) with pages 1-4 and 8-16 of its attachment (the October 23, 1974, F. Bomba to T. Morris, memorandum; pages 5-7 are economically omitted as they were not relevant to the subject of this letter) regarding disposal of 4 to 6 tons of copper.

The enclosure contains a summary of data obtained from the analysis of copper samples from items to be discarded as part of the dismantling activities. The counting system employed was a Princeton Gamma-Tech Inc. Ge(Li) counting system. Samples were counted for periods of 8 to 12 hours and the resulting data compared to the background levels of the system for the principal gamma peak(s) of the isotopes Mn-54 and Co-60 (principal activation products that might remain in the copper after the five year shutdown period). Background levels of the counting system expressed in isotopic equivalents are

1. Mn-54 (835 KeV gamma): 0.55×10^{-12} Curies
2. Co-60 (1173 KeV gamma): 0.037×10^{-12} Curies
   (1332 KeV gamma): 0.019×10^{-12} Curies

based upon a background determined from a 24-hour counting period.

The following is a summary of the information in the enclosure by items sampled:

1. Buss bars from sections of bending magnet coils

   All sample results except for one were within the background range. The exception showed a maximum of 0.12×10^{-12} Ci/gm for Mn-54. This is considered a probable statistical fluctuation in background due to the facts that (a) the other sample results were not different from background and (b) in buss bar samples from other areas of the cyclotron which were exposed to similar but higher radiation fluxes Mn-54 was not seen when Co-60 was present at levels 10^5 times background.

2. Berkley "C" bending magnet

   Sample results were not different from background.

3. Beam Tube

   Sample results were in the background range with one exception in which the 1332 KeV gamma peak of Co-60 showed slightly elevated levels. However, the results obtained for the 1173 KeV gamma peak of Co-60 were not consistent as would be expected if Co-60 were actually present. No other samples showed elevated count rates. It is concluded that this was probably a counting system anomaly and not due to the presence of Co-60.

4. Coils and cooling tubes from the bending magnet

   Sample results were not different from background with the exceptions of those for coil 1 and coil 7.

   a. Coil 1

      It appears that Co-60 may be present to a maximum level of 0.18×10^{-12} Ci/gram based upon the samples from the outside of the coil. It should be noted that the samples from the inside of the same coil showed essentially background Co-60 count rates. It would be expected that the inside sample count rate would be equivalent to or larger than those for the outside of the coil.

b. Coil 7

One of four samples showed slightly elevated count rates at the Co-60 energy levels (the equivalent of approximately 0.05 x 10^{-12} μCi/gram). The other sample results were not different than background. Samples for the previous coil sampled (Coil 6) did not show positive results for Co-60 as would be expected as it was closer to the radiation source.

Based upon our evaluation of the sample data we concur with the CMU recommendation that the copper be released as commercial scrap.

If you have any comments please advise us by February 1, 1975, so that we may initiate disposal action.

Robert H. Bauer
Manager

SD:BJD

Enclosure:
Letter, Morris to Krupa, dtd. 10/28/74,
w/ pages 1-4 and 8-16 of its attachment

cc: Director, R, HQ, w/encl.
T. Morris, CMU, w/o encl.