Hw-19326

**Cover Sheet for a Hanford
Historical Document
Released for Public Availability**

Released 1994

**Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830**

**Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute**

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P. F. GAST

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Very truly yours,

MASTER

Incidentally, you are probably aware that the Pu cross sections used by L. Marshall included a calculated resonance addition to the purely thermal capture and fission. I cannot vouch for the accuracy of that correction.

These gains are much larger than any calculations we have seen or have attempted to make ourselves. We have no explanation to offer. Due to their determination by metal discharge, graphite gains cannot enter the picture.

I delayed answering your letter of August 22 in the hope that we could include some late data from new pile operation. Unfortunately most of this data will require extensive analysis before a gain versus exposure curve emerges. We can, however, report, in addition to the standard 95 lb at 200 MW/ton, a reasonably well established point at 400 MW/ton and 300 lb. We also have a single observation at a 600 MW/ton discharge which indicates that gains for this material are in the neighborhood of 500 lb. All of these points are determined from reactivity changes when batches of irradiated metal are discharged and replaced by fresh metal. These batches usually amount to less than 10% of the pile (reactivity statistical weights) and other reactivity changes often occur at shutdowns which interfere with high precision. The exposure figures quoted are the average for a column with cosine distribution and not to average ratio of 1.45 because of reflector effects.

LONG TERM REACTIVITY GAINS

COPY 1 OF 1, SERIAL 100

Dear Sam:

Chicago 80, Illinois

P. O. Box 2401

Argonne National Laboratory

Dr. Samuel Untermyer

Verified By J.H. Wooten 5-17-94

By RM Clark 5-16-94

RM ITD 3-9-92

By Authority of CG-PR-2

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54-19325

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