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Box #65

FORWARDED MATERIALS DIVISION

31 JUL - Dec

F. M. Belmore, Director, Production Division

November 26, 1952

V. L. Parsegian, Director, Research Division

ULTRASONIC INGOT TESTS

SYMBOL: RD:RH:sh

ATTENTION: George Bate

MATERIALS 3 Mr.
✓ X
EQUIPMENT (E.M.) 4 Mr.

This is to request that you authorize shipment of the following uranium samples to Mr. Donald C. Erdman, Electro Circuits, Inc., 401 East Green Street, Pasadena 1, California, for the purpose of ultrasonic tests:

- 1. Two uranium ingot sections, 8" long and 5" in diameter.
- 2. Four slabs cut from ingots, measuring 5" x 5" x 1" each.

The purpose of the tests which are to take place on December 8, 9 and 10th is to determine the usefulness of ultrasonics in the detection of pipe in ingots.

Exploratory tests with the Sperry Reflectoscope have indicated that conventional ultrasonic instruments are incapable of penetrating the ingot. This is because the wave length of sound in uranium at conventional test frequencies is on the order of the grain size in ingots. The resultant scattering attenuates the beam so strongly that virtually no energy can traverse the ingot.

In view of the urgent need for a non-destructive test for pipe in ingots and the expense involved in betatron radiography (which now appears to hold the most promise), we have reconsidered the question of using ultrasonics. The possibilities still do not appear optimistic, however it is probable that penetration may be increased by use of (1) lower frequency (about 250,000) to increase the wave length to grain size ratio, (2) increased signal power, (3) a mercury coupling bath, and (4) more elaborate electronics for increased resolution.

The Erdman equipment was developed recently at Electro Circuits and embodies these four expedients, which are not available in other equipment. Although there is at present substantial uncertainty about the successful use of ultrasonics for ingot tests even with the Erdman instruments, much would be gained in the way of test speed,

OFFICE ▶	R. D. RH	R. D.			NOVEMBER 28 1952
SURNAME ▶	Hochschild	Parsegian			
DATE ▶	11/26/52				

P. M. Baltimore

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November 26, 1952

simplicity and economy if ultrasonics did prove successful.
Mr. R. Hochschild and I expect to attend the tests on December
8, 9 and 10th.

CC: Reading File (2)
R. D. File