Westinghouse

MASTER

REFERENCE

FROM Test Planning and Analysis
TII-267
DATE September 21, 1962
SUBJECT Request for Hot Cell
Services

ASTRONUCLEAR LABORATORY

TO: Mr. D. Galin-WTR

cc: Mr. N. Bifano-WANL
Mr. J. Coombe-WANL
Mr. N. Gordon-APD Technical Services Lab
Mr. M. Manjoine-WANL

As per our conversation on September 19, 1962, approval is requested to ship twelve (12) capsules to the APD hot cell facility for receipt, storage and post-irradiation examination.

The capsules, which will be shipped from GETR, should arrive at WTR during the last week in October. The G. E. cask illustrated on the attached sketch is to be utilized as a shipping container. It should be unloaded immediately upon receipt and returned promptly to G. E. The combined activity of all twelve capsules will not exceed 100 curies.

The attached appendix delineates the nature and scope of the post-irradiation examinations required. It is requested that you prepare a cost estimate for the services required to complete the program.

H. W. Calley

/mm

Attachment

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REV. 0
NO.

FIG. 1

SK-RML-A1022

SHIPPING CASK OUTLINE

CONT. ON SHEET

SH. NO.

IP 17 MADE 100%

REVISIONS

PRINTS TO

MADE BY J.B. HATHAWAY 7-31-57

APPROVALS
UR

A P E D
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DEPT.
LOCATION

SK-RML-A1022

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SH. NO.

APPENDIX

BEARING COMPONENTS TEST CAPSULES

POST-IRRADIATION REQUIREMENTS

I. DESCRIPTION OF CAPSULES

A typical capsule is illustrated in the attached sketch. Each capsule contains up to three (3) specimens of the same type of material. Table I lists the composition of the various specimens.

TABLE I
SPECIMEN COMPOSITION

CAPSULE DESIGNATION	NO. OF SPECIMENS PER CAPSULE	COMPOSITION OF SPECIMENS (BY VOLUME)
A-1, A-2	3	3:1 WSe ₂ - 60 Cu 60% Cu 30% Teflon 10% WSe ₂
A-3, A-4	1	2:1 WSe ₂ - 70 Ag 70% Ag 20% Teflon 10% WSe ₂
A-5, A-6	1	3:1 MoSe ₂ - 70 Ag 70% Ag 22.5% Teflon 7.5% MoSe ₂
B-1, B-2	3	2:1 WSe ₂ - 40 Bronze 40% Bronze (90% Cu, 10% Sn) 40% Poly-imide 20% WSe ₂
B-3, B-4	3	2:1 MoSe ₂ - 40 Bronze 40% Bronze (90% Cu, 10% Sn) 40% Poly-imide 20% MoSe ₂
B-5, B-6	3	2:1 WSe ₂ - 60 Bronze 60% Bronze (90% Cu, 10% Sn) 26.7% Poly-imide 13.3% WSe ₂

The attached photographs depict a typical capsule during various stages of assembly. Six of the assembled capsules were evacuated to a pressure of approximately 1×10^{-6} mm of Hg, and the remaining six were filled with hydrogen at 14.7 psia.

II. POST-IRRADIATION EXAMINATION

The following post-irradiation tests are to be performed on every specimen.

A. Capsule pressure and gas constituent determination

The even numbered capsules in both series are evacuated, and the odd numbered ones are hydrogen filled. A capsule pressure and gas constituent determination is required for each capsule. Outgassing of the specimens during irradiation in the evacuated capsules could conceivably result in a net positive pressure in these capsules.

B. Decapsulation

The attached sketch illustrates the position of the specimens with respect to the capsule. In capsules containing a single specimen, the specimen occupies the center position. Specimens were wrapped in copper foil and press fitted into the capsules. They may be removed by cutting the capsule at both ends. Additional cuts may be made, if required, provided the integrity of the specimens is maintained.

C. Specimen weights

A weight determination of every specimen is required. Specimen weights are important and therefore should be determined immediately after decapsulation and without processing such as cleaning.

D. Visual examination and photographs

Visual and stereo examination by Test Planning and Analysis personnel is requested in order to observe general effects. Photographs may be required to record any anomalies observed.

E. Specimen dimensions

A complete dimensional survey of specimen diameter and length is required. A sketch showing the desired locations of dimensional checks will be forwarded at a later date.

F. Hardness tests

Four hardness impressions per specimen are required utilizing Rockwell scales H and L. The exact location of the impressions desired will be forwarded at a later date.

G. Polishing and macrographs

Specimens were hand polished and macrophotographs taken prior to irradiation. A comparison of the pre and post-irradiation structure of the specimens is required. If visual observation in Step D indicates a lack of clarity in the surface of the specimens, additional polishing may be required to produce acceptable 12X macro-structure photographs for the comparison.

H. Additional testing

Any additional tests, such as friction tests, deemed necessary will be performed by WANL personnel. Equipment and instrumentation required to perform these tests will also be supplied by WANL. However, these tests could involve the use of one or more hot cells. The exact scope of these additional tests is not clearly defined at present, but it is felt that they can be negotiated as the need for them becomes apparent.

The testing sequence suggested above is flexible and may be altered as required provided that the data requirements are not altered.

Upon successful completion of the testing program, the capsules and specimens may be disposed of as radioactive waste.

III. PROGRAM SCHEDULE

Post-irradiation testing may be performed on a schedule compatible with the existing work load for the APD hot cell facility; however, all testing should be completed by January 1, 1963.

It is suggested that WANL be informed of the tentative schedule prior to commencement of testing to insure that WANL observers are available at that time.

MATERIAL CAPSULE, ALUMINUM 1100-O
 TUBING AL-1100-O .3125 OD
 .050 WALL THICKNESS
 COPPER FOIL - .010 THICKNESS
 WELDING: HELI-ARC

ASTRONUCLEAR
 OFX-11-1
 BEARING COMPONENT
 TEST CAPSULE

8/31/62 HEK