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PROVISIONAL SPECIFICATIONS FOR PROTOTYPICAL
LITHIUM-ALUMINUM TARGET ELEMENT 05T

By

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FUELS ENGINEERING OPERATION
PRODUCTION FUELS SECTION
IRRADIATION PROCESSING DEPARTMENT

September 2, 1963

GENERAL ELECTRIC COMPANY
HANFORD ATOMIC PRODUCTS OPERATION
Richland, Washington

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PROVISIONAL SPECIFICATIONS FOR PROTOTYPICAL
LITHIUM-ALUMINUM TARGET ELEMENT 05T

INTRODUCTION

The 04T lithium-aluminum target elements that were irradiated at Hanford during the early part of 1963 indicated that a longer element would be more desirable from the standpoint of tritium production. The Production Fuels Section was requested in late August, 1963, to manufacture a test load of "0" size elements that would be five inches in length. This document presents the manufacturing information that is necessary to make a finished target element five inches in length that will approximate the "0" size geometry with the existing supply of AlSi type aluminum components.

COMPONENTS

Fuel model 03E spires (Code Y-2) will be modified as shown in Addendum I, Code A-2 (straight side AlSi well) 03N cans will be modified as shown in Addendum II, and the lithium-aluminum core will be machined as shown in Addendum III.

Any dimension not found in Addendum I or II will be found on one of the following H-3 drawings.

H-3-17951 Revision 2	Stepped Base Aluminum Can Model 03N
H-3-16940 Revision 3	Aluminum well-type cap Model 03E

ASSEMBLY

The 05T target elements will be assembled as described in PWR 98 (1962) with the following exceptions:

1. The lithium-aluminum core shall be machined from rod stock containing 3.1 ± 0.35 per cent lithium enriched to a nominal 44.3 a/o isotope six.
2. Core imperfections:

Surface defects on the machined core shall be limited to the following:

- A. 0.010" depth
- B. Isolated pits or voids 0.125" wide, 0.250" long, and 0.050" deep.
- C. Surface inclusions 0.125" by 0.250" in area.

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3. Concentricity:

The concentricity of the can-spire-core assembly is of no consequence, therefore, if all of the components will assemble with reasonable ease, the finished assembly will be acceptable.

4. Hydrogen Content:

The hydrogen content of the finished target element must not exceed ten ml per core.

5. Component Cleaning:

The aluminum components shall be cleaned according to Quality Control Standard C 206.0.

6. All of the lithium-aluminum cores will be mandrelled with a 0.4135" Go and a 0.4205" No-Go gauge.

7. Sizing:

All elements will be sized with a 0.321" internal nylon plug. The external sizing will be performed using a series of nylon rings 1.442", 1.436", and 1.430" in diameter.

8. Facing:

The faced target element length shall be 5.000" $\pm$ 0.050".

9. Lot Number:

The lot number for this group of target elements shall be NA-001-A.

10. Canned Element Dimensions:

A. Diameters:

- a. Inside 0.317" $\pm$ 0.004"
- b. Outside 1.434" $\pm$ 0.004"

B. Length (excluding welds) 5.000" $\pm$ 0.050"

C. Base and Cap Thickness:

- a. 0.250" maximum
- b. 0.080" minimum

D. Non-Seat: 0.010" maximum

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- E. Can and/or Spire to Core Gap: 0.0001"
- F. Wall Thickness:
- a. Can 0.037"
 - b. Spire 0.050"
- G. Surface Mars:
- a. Ends 0.035"
 - b. Other 0.004"
- H. All elements shall pass a 1.447" plate gauge and a 0.302" steel mandrel.

WELDING

The end closures will be made with D.C. current as specified in PWR 97 (1962) with the exception that the current shall be 145 amps.

The finished cap and base welds will pass a 0.307" and 1.442" plug and ring gauge respectively.

ANALYTICAL DATA

- A. Two finished elements will be sent to the Hanford Test Reactor for reactivity testing, and the results will be reported to the Process Control clerks.
- B. Two elements from each heat that is used to manufacture the cores will be sent to the Analytical Labs for hydrogen analysis.

Engineer,
Process Control Engineering
Fuels Engineering Operation
Production Fuels Section-IPD

JJ Wick, Jr.:jan

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ADDENDUM I

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ADDENDUM II

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