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DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
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NAME Jerry E Keyes	2 CLASSIFICATION CHANGED TO _____
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NAME Ted Davis	(5) CLASSIFICATION CANCELED
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Series A

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RECENT DEVELOPMENTS IN POWDER METALLURGY

This document is
PUBLICLY RELEASABLE
Jerry E Keyes
Authorizing Official
Date 3-5-98

by

B. R. Hayward

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By Authority Of DOC
By [redacted] Date 10-25-71

During a recent visit to NAA by S. B. Roboff, of Sylvania Electric Products, the important developments in powder metallurgy fuels and reactor materials were discussed. This memo contains brief notes from this meeting.

I. NEW URANIUM PRESSING TECHNIQUES

Sylvania is developing the use of plastic dies and hydrostatic pressing. This could sharply reduce die costs and make other configurations more feasible (e.g., cheaper hollow slugs). Some flat plates have been made by this method. One major problem is fluid for high temperature pressing (600° C). Du Pont is assisting in this fluid problem.

Samples of flat plates made by powder metallurgy were demonstrated with a few specimens on hand for testing. Large test samples (3" x 14" x 5/16") Al-Ni clad appeared excellent. A series of these plates will be tested in MTR as soon as their fabrication is complete.

II. NEW URANIUM PROCESSING TECHNIQUES

It has been found through pilot plant production that screening of the uranium hydride is not required (thus lowers equipment cost).

Sylvania is currently hydriding derby uranium metal instead of ingot material. The derby is the metal button (100 lb.) product of the reduction of UF_4 by Mg. A purer and cheaper slug product is produced.

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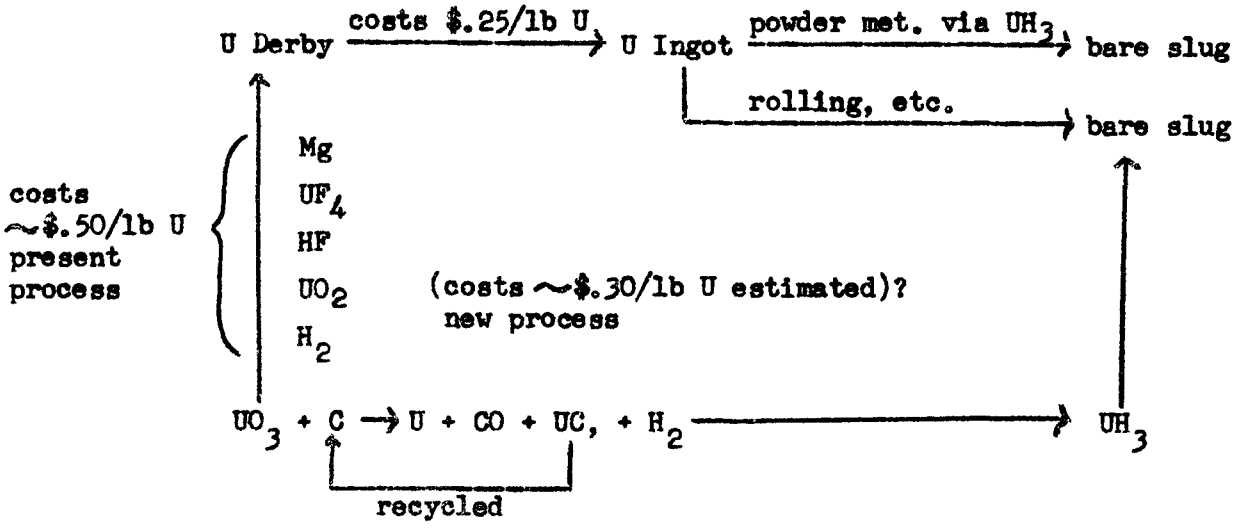
The most important achievement is the potential reduction in cost of the powder compacted bare slug. The following sketch indicates the improved method.



Based on an output of 9000 Hanford slugs per day, the following cost values are noted: (Labor only)

Present Process	Powder Metallurgy	Present Melting & Rolling
UO_3 to U derby	at .50/lb U = $2.00/slug	$2.00/slug
U derby to U ingot	at .25/lb U = 1.00/slug	1.00/slug
U ingot to bare slug	.85/slug	1.50/slug
TOTAL	$3.85/slug	$4.50/slug

Savings per slug by hydriding uranium derby material = (1.50 - .85) + 1.00 = $1.65 per slug

New Process

UO_3 to U derby } U derby to U ingot	eliminated-replaced by $.30/lb U = $1.20/slug*	$2.00/slug 1.00/slug
U ingot to bare slug	.85/slug	1.50/slug
TOTAL	$2.15/slug	$4.50/slug

*It is not certain whether this value is per pound or per slug. At $.30 per slug the total cost per slug [redacted]15.

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Sylvania estimated this plant could be built for five megabucks which would mean a plant write-off of six months. The complete detailed report has been ordered by Dr. Starr. Private cost estimates were within 10% of the SEP estimate. If true, these figures indicate a very large decrease in fuel costs.

III. MISCELLANEOUS NOTES

1. A new method of beryllium production is being evaluated with a large potential decrease in Be costs.

2. SEP may make some sample Th-U alloys for NAA. Free!

3. The last charge of powder compacted slugs have been taken out of Hanford. Results were good. Five thousand are on order.

4. Some Hanford 8" slugs have been made by side pressing.

5. Sylvania expects to put some powder compacted slugs in MTR for long term irradiation (possibly to destruction).

Distribution:

Abbott	Crittenden	Hallett	Olson	Siegel
Bowman	Eggen	Howe	Parkins	Starr
Chalker	Fahrner	Hayward	Pearlman	Syrovy
Cockrell	Faris	Martin, A.	Reed	Weisner