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SUBJECT OR TITLE
A METHOD OF HANDLING IRRADIATED URANIUM IN THE "FLUORINE VOLATILITY PROCESS"
TO **J. V. Underwood**
FROM **G. B. Barton**
GE-AEC BUSINESS RECORD

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GENERAL ELECTRIC

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Per DOC
By DL Adair 3/17/73

SPECIAL RE-REVIEW
FINAL DETERMINATION
DECLASSIFICATION CONFIRMED

BY AE Barker DATE 30-82

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1st REVIEW-DATE: 5/17/73
AUTHORITY AOC ADC ADD
NAME: DL ADAIR
ORG: AEC
2nd REVIEW-DATE: 10/8/98
NAME: JB Briggs
ORG: PRNL-ADD

APPROVED FOR
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GE-AEC BUSINESS RECORD
RETURN TO:
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GENERAL ELECTRIC COMPANY
 RICHMOND, WASHINGTON

1-7. JW Underwood

8. FW Hopkins

9. AE Hopkins

10. GE Barton

11. TW

12. 300

A. E. C. CASE NO.

13. Yellow

G. E. CASE NO.

REPORT OF INVENTION

This Document contains

2 Pages No. of

Copies, Series

TO: J. W. Underwood - 703 Building - 700 Area

HW 12-441

I: ATTACHED HERETO IS A DESCRIPTION OF WHAT MAY BE AN INVENTION IN:

The handling of irradiated uranium in the fluoride volatility process to permit collection of the plutonium and fission product fluorides in a relatively small volume container.

GE-AEC BUSINESS RECORD**II: THE NAME, TITLE OR POSITION, WORKS LOCATION, AND PERMANENT ADDRESS OF THE INVENTOR(S) IS:**

Gerald B. Barton, Problem Leader
 Hanford Atomic Products Operation
 1319 Kimball
 Richland, Washington

III: EVIDENCE AS TO WHEN AND WHERE THE INVENTION WAS MADE CAN BE FOUND IN THE FOLLOWING LISTED WRITTEN OR PICTORIAL MATERIAL (NOTEBOOK, FILE REPORTS OR DRAWINGS, ETC.):

HW-5125-F

Secret Notebook, page 21, invention disclosed orally April 20, 1953.

IV: THE APPROXIMATE DATE OF THE FIRST ENTRY IN SAID WRITTEN OR PICTORIAL MATERIAL DESCRIBING OR SHOWING SAID INVENTION IS:

April 28, 1953

V: PERSONS WHO COULD TESTIFY AS TO WHEN AND WHERE THE INVENTION WAS MADE INCLUDE THE FOLLOWING:

H. H. Hopkins, Jr.
 E. E. Veiland

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SIGNED (SUPERVISOR)

H H Hopkins Jr.

DATE

3/28/53

DEPARTMENT

Eng.

NOTE: SUGGESTIONS FOR PREPARING THE INVENTION DESCRIPTION ARE CONTAINED ON THE REVERSE SIDE OF THIS FORM.

DECLASSIFIED**SECURITY INFORMATION**

A METHOD OF HANDLING IRRADIATED URANIUM
IN THE "FLUORIDE VOLATILITY PROCESS"

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This invention relates to a method of handling the irradiated uranium to be used in the "fluoride volatility process" for separating uranium and plutonium and fission products, in such a manner that the plutonium and fission product fluorides are collected in a small volume convenient for further processing.

The uranium metal is exposed to the action of gaseous hydrogen, at a suitable temperature (approx. 250°C.), which results in the formation of uranium hydride - a finely divided powder. This powder is converted back to the metal by heating in a vacuum system designed to collect and eliminate the gaseous fission products and volatile fission product compounds. The powdered uranium is then fed continuously into a reaction chamber designed to convert the uranium to the volatile hexafluoride by the action of fluorine or a fluorine interhalogen compound, and permit the plutonium and non-volatile fission product fluorides to be collected in a small volume container as a residue. The heat of reaction could be removed by circulating an excess of the reactant - interhalogen or fluorine in a carrier gas - through a heat exchanger. By controlling the rate of feed of the uranium the rate of heat liberation could be controlled. The container with the plutonium and fission product fluorides could be made removable or the residue could be dissolved directly from it to permit recovery and purification of the plutonium. Adequate provision for cooling to remove the heat of radioactive decay from this residue would be necessary.

Gerald B. Barton 5/13/53
Inventor Date

Horace H. Hopkins, Jr. 5-13-53
Witness Date

E. E. Varland 5/13/53
Witness Date

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