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SUBJECT OR TITLE

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

TO J. W. Underwood

FROM G. B. Burton

Hw IR-441

GE-AEC BUSINESS RE

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Per DOE

By DL Adain 5/17/73

SPECIAL RE-REVIEW FINAL DETERMINATION DECLASSIFICATION CONFIRMED

BY AE Barker DATE 10-30-82

BY DATE

RECEIVED

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1st REVIEW-DATE: 5/17/73
AUTHORITY AOC (ADC) ADD
NAME: DL ADAIN
ORG: AEC
2nd REVIEW-DATE: 10/8/98
NAME: JD Bruggeman
ORG: PNNL-ADD

APPROVED FOR PUBLIC RELEASE
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GENERAL ELECTRIC COMPANY
HANFORD WORKS
RICHLAND, WASHINGTON

1-7. JW Underwood
8. FW Albaugh
9. AE Bolleter for HH Hopkins
10. GB Barton
11. TBO
12. 300
13. Veiland

REPORT OF INVENTION

A.E.C. CASE NO.

G. E. CASE NO.

This Document contains 2 Pages No. ... of ... Copies, Series ...

HW-R-441

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

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-T
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. H. Veiland

RESTRICTED DATA

This document contains restricted data as defined in the Atomic Energy Act of 1946. Its transmittal or the disclosure of its contents in any manner to an unauthorized person is prohibited.

SIGNED (SUPERVISOR)	DATE	DEPARTMENT
H H Hopkins Jr.	5/28/53	Eng.

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

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SECURITY INFORMATION

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

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.

Donald B Barton 5/13/53
Inventor Date

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

E E Vanland 5/13/53
Witness Date