July 6, 1960

Marion Powell
3760 Building, 300 Area

HWIRs 1037, 1057, 1072, 1091, 1101, 1118, 1123, and 1155

There is no longer an objection from the patent standpoint to removal of any "Official Use Only" marking and public release of the following reports:

(1) HW-62431, "The Preparation of Uranium Dioxide from a Molten Salt Solution of Uranyl Chloride" by W. L. Lyon and E. E. Voiland.

(2) HW-62000, "Plutonium Recycle Program Annual Report, Fiscal Year 1959" by the Staff of Hanford Laboratories.

ORIGINAL SIGNED BY
ROBERT KEITH SHARP

Robert Keith Sharp
Patent Attorney
3760 Building, 300 Area

RKS:p

cc: HWIR Files (8)
LB

January 29, 1960

Mr. George H. Lee, Chief
Chicago Patent Group
U. S. Atomic Energy Commission
P. O. Box 59
Lemont, Illinois

Dear Mr. Lee:

HWIR-1037 - AEC CASE S-18,959
HWIR-1057 - AEC CASE S-19,530
HWIR-1072 - AEC CASE S-19,577
HWIR-1091 - AEC CASE S-20,647
HWIR-1112 - AEC CASE S-20,486
HWIR-1123 - AEC CASE S-21,311

We have a request for approval of publication of the attached Unclassified Document BW-62000, entitled "Plutonium Recycle Program Annual Report Fiscal Year 1959", to release for distribution.

We would appreciate receiving your approval of publication of the enclosed report as soon as possible.

Very truly yours,

Contract Engineer

WC Peeples

Enc.

cc: Mr. Roland Anderson w/ Enc.

MR. WEBB: We would also appreciate receiving your approval as soon as possible. Our folders HWIR-1057, 1091 and 1123 are enclosed and should be returned to us when you have finished your review. WCP

84—7000—002

HANFORD LABORATORIES OPERATION
GENERAL ELECTRIC
RICHLAND, WASHINGTON

January 27, 1960

W. C. Poe
703 Bldg.
700 Area

HW-62000
Plutonium Recycle Program Annual Report - FY 1959
by J. M. Atwood & W. A. Snyder (Unclassified)

The subject matter in the above document discloses patent information as follows:

HWIR - 1057
HWIR - 1037
HWIR - 1091
HWIR - 1123
HWIR - 1112
HWIR - 1072

Please notify us when there is no objection from a patent standpoint to release of the subject document.

As Mr. Snyder has mentioned to you, we are anxious to release this document as soon as possible.

M F Puckett

Supervisor
DOCUMENT DISTRIBUTION & FILES

MF Puckett/vbl

November 5, 1959

Mr. Roland A. Anderson
Assistant General Counsel for Patents
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Anderson:

In your various letters you stated that your office is not interested in filing an application on the reports of invention listed below.

This is to advise you that the General Electric Company does not deem it advisable to file an application on these cases.

HWIR-734 - AEC CASE S-14,911
HWIR-799 - AEC CASE S-15,474
HWIR-859 - AEC CASE S-16,149
HWIR-905 - AEC CASE S-16,761
HWIR-926 - AEC CASE S-17,314
HWIR-928 - AEC CASE S-17,316
HWIR-935 - AEC CASE S-17,325
HWIR-960 - AEC CASE S-17,377
HWIR-994 - AEC CASE S-17,956
HWIR-1047 - AEC CASE S-19,503
HWIR-1058 - AEC CASE S-19,532
HWIR-1072 - AEC CASE S-19,577
HWIR-1074 - AEC CASE S-19,591
HWIR-1094 - AEC CASE S-20,449
HWIR-1096 - AEC CASE S-20,454
HWIR-1106 - AEC CASE S-20,478
HWIR-1114 - AEC CASE S-20,488
HWIR-1115 - AEC CASE S-20,489
HWIR-1129 - AEC CASE S-21,325

Very truly yours,

W C Poe

Contract Engineer

WC Poe:es

cc: Mr. George H. Lee
bcc: Records Center
File
LB

October 23, 1959

Richard S. Rosenfels
234-5 Building
200-W Area

HWIR-1072 - AEC CASE S-19,577

This letter refers to the above-identified report of an invention which you made to this office on February 4, 1959, entitled "Non-Cracking Setter Plates For Firing Calcium Fluoride Crucibles".

The Atomic Energy Commission has determined that it is not advisable for the Government to proceed with the preparation of a patent application on this case, in view of the fact that the method is lacking in novelty.

As the result of careful consideration of your invention by a representative of your department, representatives of other HAPO departments, and the Patent Counsel of the Aircraft Nuclear Propulsion Department, it has been determined that it is not advisable for General Electric Company to proceed with the preparation of a patent application at this time.

Your invention report is being placed in our inactive files and, if at any time in the future it appears desirable, the case may be reopened. If you have any question concerning the action taken on your invention report, please feel free to contact either your department representative or W. C. Poe, Contract Engineer.

Specialist, Contracts

Douglas S. Cameron:es

cc: Richard S. Rosenfel's personnel folder
HH Hopkins
LM Meeker
File
DSC - LB
WCP - LB

GENERAL ELECTRIC

ATOMIC PRODUCTS DIVISION
1 [redacted]
Cincinnati 15, Ohio

October 14, 1959

Mr. W. C. Poe
Contract Engineer
Hanford Atomic Products Operation
RICHLAND

Subject: HWIR-1047 HWIR-1106
HWIR-1058 HWIR-1114
HWIR-1072 HWIR-1115
HWIR-1074 HWIR-1129
HWIR-1094

Dear Mr. Poe:

Reference is made to your letter of September 25, 1959, with which you enclosed the above-identified invention report folders. I agree with the conclusions on September 25, 1959, of the HAPO Patent Panel that the attached folders should be inactivated.

Very truly yours,

Paul R. Webb, II

PAUL R. WEBB, II
Department Patent Counsel

PRW,II:dyh

Enclosures

W.M. Harty
L.M. Meeker
C.A. Rohrmann
H.F. Zuhr

September 25, 1959

## INVENTION REPORTS REVIEWED

The Action taken by the HAPO Patent Panel on September 25, 1959, on the following invention reports is as follows:

| HWIR NO. | INVENTOR | TITLE | DEPT. | ACTION |
|---|---|---|---|---|
| 868 | William E. Cawley | Method for pre-stressing a shaft - to increase the torque-load carring capacity of a given size shaft. | HLO | Refer to Motor and Turbine Departments. |
| 891 | James Dunn | High capacity - Low head axial flow hermetically sealed pump. | HLO | Refer to Motor and Turbine Departments. |
| 981 | William E. Cawley | Method for obtaining maximum bulk outlet temperature from a pressure tube power reactor. | HLO | Refer to APED. |
| 1012 | Harold T. Hahn | The stabilization of liquid metal slurries. | HLO | Refer to APED. |
| 1047 | Thomas B. Correy | A method for improving the arc starting of the metal inert gas shielded welding arc and a tool for shaping the electrode. | FPD | No G. E. patent interest. |
| 1058 | John L. Swanson | Process for the determination of oxygen to uranium ratio in uranium oxide powders. | HLO | No G. E. patent interest. |
| 1065 | Ezra Hollister | A reactor maintenance tool which will simultaneously pull out and cut into small pieces a spent long section of tubing from a reactor to provide containment of contamination and powered for remote operation. | IPD | Reconsider in one month |
| 1072 | Richard S. Rosenfels | Non-cracking setter plates for firing calcium fluoride crucibles. | CPD | No G. E. patent interest. |
| 1074 | Carl M. Unruh | Finger Ring Dosimeter (a device for the measurement of the quantity of radiation dose received by the hand on which the ring is worn.) | HLO | No G. E. patent interest. |
| 1076 | Martin O. Rankin | Portable dose-rate integrator. | HLO | Refer to Instrument Department. |
| 1092 | Roy W. Wirta | The use of interstitially hardened titanium for sliding contact service. | HLO | Refer to Metallurgical Products Department. |

W.M. Harty, et al

September 25, 1959

| HWIR NO. | INVENTOR | TITLE | DEPT. | ACTION |
|---|---|---|---|---|
| 1094 | Edward M. Duke, Jr. | The use of ferric salts to prevent the formation of precipitates in solutions containing dissolved uranium and molybdenum. | HLO | No G. E. patent interest. |
| 1101 | Ward L. Lyon | A pyrochemical separations process applicable to thorium oxide reactor fuels. | HLO | Refer to APED. |
| 1103 | Donald W. Shannon | A new solution for pickling zirconium and zircaloy. | HLO | Refer to Metallurgical Products Department. |
| 1106 | Ward H. Swift | The use of helium as a replacement atmosphere in the handling of heat generating powders. | CPD | No G. E. patent interest. |
| 1114 | John J. Shefcik,Jr. | Removal of chloride from uranyl nitrate solutions by nitrogen tetroxide addition. | HLO | No G. E. patent interest. |
| 1115 | John J. Shefcik,Jr. | Stainless Steel in Dilute Aqua Regia. | HLO | No G. E. patent interest. |
| 1117 | Roy E. Tomlinson<br>Ward H. Swift | Containment vessel and heat transfer mechanism for shipment of radioactive materials. | CPD | Refer to APED |
| 1129 | Earl C. Watts | The remote control of metallographs used in metallography of radioactive metals and alloys. | HLO | No G. E. patent interest. |

W. C. Poe

Contract Engineer

WC Poe:es

cc: PR Webb
File
LB

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

IN REPLY REFER TO:
GCP:RAA

August 12, 1959

Mr. W. C. Poe, Contract Engineer
Contract Unit, Manufacturing Dept.
General Electric Company
Richland, Washington

Subject: AEC CASE S-19,577 - HWIR-1072

Dear Mr. Poe:

There was transmitted to this office with Mr. Lee's memorandum of February 19, 1959, the above HWIR disclosure. This office has determined that it is not advisable for the Government to proceed with the preparation of a patent application on this case in view of the fact that the method is lacking in novelty.

In view of this determination, the docket has been inactivated.

Very truly yours,

Roland A. Anderson
Assistant General Counsel
for Patents

cc: George H. Lee

UNITED STATES
ATOMIC ENERGY COMMISSION
CHICAGO OPERATIONS OFFICE
P. O. Box 59
LEMONT, ILLINOIS

IN REPLY REFER TO:

February 13, 1959

Mr. W. C. Poe, Contract Engineer
Relations & Utilities Operation
General Electric Company
Richland, Washington

Subject: HWIR-1070 AEC-S-19,575
HWIR-1071 AEC-S-19,576
HWIR-1072 AEC-S-19,577

Dear Mr. Poe:

We are in receipt of your letter and Invention Reports in triplicate relative to HWIR-1070, 1071, and 1072 and we have assigned AEC-S-19,575, S-19,576, and S-19,577 thereto.

We will notify Mr. Anderson's office in Washington of these cases by sending him two copies each of your letters and Invention Reports together with our recommendations at a later date.

Very truly yours,

George H. Lee, Chief
Chicago Patent Group

54-3000-101 (6-58)

**DON'T SAY IT --- *Write It!***

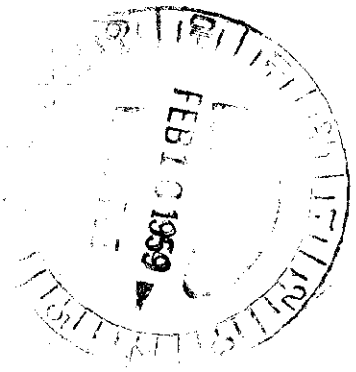
DATE February 9, 1959

TO W. C. Poe

FROM L. M. Meeker

HWIR-1072 - NON-CRACKING SETTER PLATES FOR FIRING CALCIUM FLUORIDE CRUCIBLES

I have reviewed HWIR-1072, and do not recommend domestic and/or foreign filing by the Commission. It appears that this report describes only a modification to existing processes and other methods, as mentioned in the report, may be as satisfactory.




LMM:lbp

February 5, 1959

Mr. George H. Lee, Chief
Chicago Patent Group
U. S. Atomic Energy Commission
P. O. Box 59
Lemont, Illinois

Dear Mr. Lee:

Enclosed are three copies of the following Hanford Reports of Invention:

U. S. Case HWIR-1070, (Unclassified HW-56634 & HW-56635)

U. S. Case HWIR-1071, (Unclassified HW-56777)

U. S. Case HWIR-1072, which is in response to your request under Work Sheet JWF-303 - Hanford Document HAN-70117.

Very truly yours,

Contract Engineer

MC Peetgs

Encs.

cc: NOO - AEC
Attn: Process Eng. & Mfg. Div.

bcc: Records Center
File
LB

E-2411- DS (3-52) A.E.C. - G.E. - RICHLAND, WASH.

ATOMIC PRODUCTS DIVISION
GENERAL ELECTRIC COMPANY
RICHLAND, WASHINGTON

# REPORT OF INVENTION

A.E.C. CASE NO. S-19,577
G. E. CASE NO. HWIR-1072

TO:

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

Non-Cracking Setter Plates For Firing Calcium Fluoride Crucibles.

II: THE NAME, TITLE OR POSITION, WORKS LOCATION, AND PERMANENT ADDRESS OF THE INVENTOR(S) IS:

Dr. Richard S. Rosenfels, Engineer
234-5 Building, 200-West Area, Chemical Processing Department,
Hanford Atomic Products Operation

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.):

Notebook HWN-1638, Page 51.

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

1/28/59

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

H. H. Hopkins, Jr.
L. J. Adams

| SIGNED (SUPERVISOR) | DATE | DEPARTMENT |
|---|---|---|
| Horace H Hopkins Jr | 2/4/59 | Hanford Atomic Products Operation<br>Chemical Processing Department |

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

# INVENTION DESCRIPTION

## NON-CRACKING SETTER PLATES FOR FIRING CALCIUM FLUORIDE CRUCIBLES

### Background

Slip cast refractory crucibles are conventionally fired (sintered) resting inverted on setter plates customarily made of the same material as the crucible. The plate undergoes the same shrinkage as the crucible during the heating cycle, and this keeps the crucible circular in cross-section and uniform in diameter vertically. Refractory oxides and clays are typical examples of materials handled in this way.

### Development

Development of satisfactory procedures for slip casting calcium fluoride crucibles was accomplished during the period January, 1957, to September, 1958, in the Ceramic Shop at the Hanford Atomic Products Operation.

The conventional method of using calcium fluoride setter plates for firing the crucibles proved unsatisfactory. Due to the poor thermal shock resistance of calcium fluoride, the plates nearly always cracked, and a crucible resting on a cracked plate was usually out of round.

### Invention

The invention involves a method of avoiding distortion of the crucibles by using a non-cracking refractory material for the setter plates. Any one of a number of oxide or other refractories such as zirconia, alumina, or magnesia might be satisfactory. The only one tried was magnesia.

Magnesia plates, made by the method of Stoddard and Allison*, yielded crucibles which were much less out of round than those made with calcium fluoride plates. However, the crucibles made with magnesia plates did have a slight flare on the open end. This is due to the lower shrinkage of magnesia (3 - 4 percent) compared to the 12 percent shrinkage of calcium fluoride. The flared part can be readily eliminated by making the crucible 20 percent longer than desired, and sawing off the flared end.

A non-cracking refractory plate material with a greater shrinkage than magnesia would probably give even better results; e.g., less flare.

### Use

Calcium fluoride crucibles are routinely fired on magnesia setter plates in the Ceramic Shop, HAPO.

(*) "Casting Of Magnesium Oxide In Aqueous Slips", S. D. Stoddard and A. G. Allison, American Ceramic Society Bulletin 37 (9): 409-413, 1958.

SIGNED Richard J. Rosenfels (Inventor) DATE: 2/4/59

READ AND UNDERSTOOD BY ME:

SIGNED Horace H Hopkins Jr. (Witness) DATE: 2/4/59

January 19, 1959

H. H. Hopkins
234-5 Building
200 West Area

WORK SHEET JWF-303
HANFORD DOCUMENT HAN-70117

Your letter of December 30, 1958 indicated that a submit would be prepared on the use of green setter plates when firing calcium fluoride crucibles.

We will appreciate receiving this submit at an early date. Please refer to the above-mentioned work sheet when making this submit.

Contract Engineer

WC Poe:gs

cc: File
LB
T

January 5, 1959

Mr. George H. Lee, Chief
Chicago Patent Group
U. S. Atomic Energy Commission
P. O. Box 59
Lemont, Illinois

Dear Mr. Lee:

WORK SHEET JWF-303
HANFORD DOCUMENT HAN-70117

We have not received a submit on the above-mentioned Work Sheet, but for your information we are enclosing a report from our Research and Engineering Operation relative to this matter.

The submit will be forwarded to you as soon as it is prepared.

Very truly yours,

Contract Engineer

WC Poe:gs

Enc.

bcc: File
LB
T

CHEMICAL PROCESSING DEPARTMENT
GENERAL ELECTRIC
RICHLAND, WASHINGTON

December 30, 1958

W. C. Poe, Contract Engineer
Relations and Utilities Operation
703 BUILDING, 700 AREA

WORK SHEET JWF-303
HANFORD DOCUMENT HAN-70117

This note refers to Mr. George H. Lee's letter to you dated 10/15/58.

We have always felt that slip casting is a ceramic fabrication process of long standing; and there is nothing inventive in the combination of steps described in HAN-70117.

One item representing a possible invention is the use of green setter plates when firing calcium fluoride crucibles. An invention report will be filed on this item. The reason for using green magnesia setter plates, and the beneficial results therefrom, are described on Page 6 of HAN-70117.

Mr. Lee asked for the composition of Daxad 23. All we know is what the manufacturer, Dewey and Almy Chemical Company, discloses. They state, in part, "Wherever your process or product requires a stable dispersion in water of finely-divided, insoluble particles, Daxad dispersing agents can speed up chemical reactions or increase the efficiency of ingredients. Daxads are composed of polymerized organic salts of sulfonic acid of both aklyl-aryl and aryl-alkyl types". Daxad 23 is described as "sodium salts of polymerized substituted benzoid alkyl sulfonic acids". Since we have used Daxad 23 to form a dispersion of finely-divided calcium fluoride in water, it would seem that we have followed the manufacturer's recommendations.

HHHopkins, Jr

Manager
234-5 Development
RESEARCH AND ENGINEERING OPERATION

HH Hopkins, Jr.:RSR:e

RS Rosenfels, 234-5 Bldg.
File

**UNITED STATES**
**ATOMIC ENERGY COMMISSION**
**CHICAGO OPERATIONS OFFICE**
**P. O. Box 59**
**LEMONT, ILLINOIS**

IN REPLY REFER TO:

December 23, 1958

Mr. W. C. Poe, Contract Engineer
Relations & Utilities Operation
Hanford Atomic Products Operation
General Electric Company
Richland, Washington

Subject: WORK SHEET JWF-303; HANFORD DOCUMENT HAN-70117

Dear Mr. Poe:

Your letter of October 22, 1958, relative to this work sheet stated that we could expect to hear from you shortly concerning the contents of the work sheet. We would appreciate hearing from you as to the current status of the concept.

Very truly yours,

George H. Lee

George H. Lee, Chief
Chicago Patent Group

UNITED STATES
ATOMIC ENERGY COMMISSION
CHICAGO OPERATIONS OFFICE
P. O. Box 59
LEMONT, ILLINOIS

December 23, 1958

Mr. W. C. Poe, Contract Engineer
Relations & Utilities Operation
Hanford Atomic Products Operation
General Electric Company
Richland, Washington

Subject: WORK SHEET JWF-303; HANFORD DOCUMENT HAN-70117

Dear Mr. Poe:

Your letter of October 22, 1958, relative to this work sheet stated that we could expect to hear from you shortly concerning the contents of the work sheet. We would appreciate hearing from you as to the current status of the concept.

Very truly yours,

George H. Lee, Chief
Chicago Patent Group

December 23, 1958

H. H. Hopkins
234-5 Building
200 West Area

WORK SHEET JWF-303
HANFORD DOCUMENT HAN-70117

We would appreciate your comments on our request of October 23, 1958 relative to the above Work Sheet. If a submit was made on this, we have been unable to identify it.

In replying, please refer to the above Work Sheet.

Specialist, Contracts

Douglas S. Cameron:gs

cc: File
LB
T

October 23, 1958

H. H. Hopkins
234-5 Building
200 West Area

WORK SHEET JWF-303
HANFORD DOCUMENT HAN-70117

Confirming our telephone conversation of today, we are enclosing copy of letter dated October 15, 1958 received from Mr. George H. Lee, Chicago Patent Office, AEC.

We would appreciate receiving a reply or an invention report as soon as possible for forwarding to the AEC.

In replying, please refer to the above-mentioned subject.

Contract Engineer

WC Poe:gs

Enc.

cc: File
LB
T

October 22, 1958

Mr. George H. Lee, Chief
Chicago Patent Group
U. S. Atomic Energy Commission
P. O. Box 59
Lemont, Illinois

Dear Mr. Lee:

WORK SHEET JWF-303
HANFORD DOCUMENT HAN-70117

We have now learned that the above-mentioned document was written by an employee of General Electric and not of AEC. We are, therefore, obtaining an answer to your letter of October 15, and you will hear from us further in the very near future.

We are also forwarding herewith information received from Mr. C. L. Robinson, Classification Officer, AEC-HOO.

Very truly yours,

Contract Engineer

WC Poe:gs

Enc.

bcc: File
LB

October 21, 1958

Mr. George H. Lee, Chief
Chicago Patent Group
U. S. Atomic Energy Commission
P. O. Box 59
Lemont, Illinois

Dear Mr. Lee:

WORK SHEET JWF-303
HANFORD DOCUMENT HAN-70117

This is to advise you that we have referred your letter of October 15, 1958 to the Hanford Operations Office of the U. S. Atomic Energy Commission as the above-mentioned document was written by one of their employees.

Very truly yours,

Contract Engineer

WC Poe:gs

bcc: File
LB

**UNITED STATES**
**ATOMIC ENERGY COMMISSION**
**CHICAGO OPERATIONS OFFICE**
**P. O. Box 59**
**LEMONT, ILLINOIS**

IN REPLY REFER TO:

October 15, 1958

Mr. W. C. Poe, Contract Engineer
Relations & Utilities Operation
Hanford Atomic Products Operation
General Electric Company
Richland, Washington

Subject : WORK SHEET JWF-303; HANFORD DOCUMENT HAN-70117

Dear Mr. Poe:

The above document has been forwarded to us for review by the Washington office. As you know this document has been released for publication.

We believe there might be invention in the combination of steps shown in this Hanford document. We also believe that this might have reasonable prospects for use. Unless there is sufficient prior art to make this process noninventive, we would appreciate a formal submit from you on this process. We would also like to have your estimate of the probable amount of usefulness of such crucibles. Finally, if conveniently available, we would like to have a little more information as to the exact composition of "Doxad 23".

Very truly yours,

George H. Lee

George H. Lee, Chief
Chicago Patent Group

E-2411- DS (3-52) A.E.C. - G.E. - RICHLAND, WAS.

ATOMIC PRODUCTS DIVISION
GENERAL ELECTRIC COMPANY
RICHLAND, WASHINGTON

# REPORT OF INVENTION

A.E.C. CASE NO.

G. E. CASE NO. HWIR-1072

TO:

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

Non-Cracking Setter Plates For Firing Calcium Fluoride Crucibles

II: THE NAME, TITLE OR POSITION, WORKS LOCATION, AND PERMANENT ADDRESS OF THE INVENTOR(S) IS:

Dr Richard S. Rosenfels, Engineer
234-5 Building, 200-West Area, Chemical Processing Department,
Hanford Atomic Products Operation

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.):

Notebook HW-1638, Page 51.

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

1/28/59

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

H. H. Hopkins, Jr.
L. J. Adams

| SIGNED (SUPERVISOR) | DATE | DEPARTMENT |
|---|---|---|
| Horace H Hopkins Jr | 2/4/59 | Hanford Atomic Products Operation<br>Chemical Processing Department |

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

INVENTION DESCRIPTION

# NON-CRACKING SETTER PLATES FOR FIRING CALCIUM FLUORIDE CRUCIBLES

## Background

Slip cast refractory crucibles are conventionally fired (sintered) resting inverted on setter plates customarily made of the same material as the crucible. The plate undergoes the same shrinkage as the crucible during the heating cycle, and this keeps the crucible circular in cross-section and uniform in diameter vertically. Refractory oxides and clays are typical examples of materials handled in this way.

## Development

Development of satisfactory procedures for slip casting calcium fluoride crucibles was accomplished during the period January, 1957, to September, 1958, in the Ceramic Shop at the Hanford Atomic Products Operation.

The conventional method of using calcium fluoride setter plates for firing the crucibles proved unsatisfactory. Due to the poor thermal shock resistance of calcium fluoride, the plates nearly always cracked, and a crucible resting on a cracked plate was usually out of round.

## Invention

The invention involves a method of avoiding distortion of the crucibles by using a non-cracking refractory material for the setter plates. Any one of a number of oxide or other refractories such as zirconia, alumina, or magnesia might be satisfactory. The only one tried was magnesia.

Magnesia plates, made by the method of Stoddard and Allison(*), yielded crucibles which were much less out of round than those made with calcium fluoride plates. However, the crucibles made with magnesia plates did have a slight flare on the open end. This is due to the lower shrinkage of magnesia (3 - 4 percent) compared to the 12 percent shrinkage of calcium fluoride. The flared part can be readily eliminated by making the crucible 20 percent longer than desired, and sawing off the flared end.

A non-cracking refractory plate material with a greater shrinkage than magnesia would probably give even better results; e.g., less flare.

## Use

Calcium fluoride crucibles are routinely fired on magnesia setter plates in the Ceramic Shop, HAPO.

(*) "Casting Of Magnesium Oxide In Aqueous Slips", S. D. Stoddard and A. G. Allison, American Ceramic Society Bulletin 37 (9): 409-413, 1958.

SIGNED Richard F. Rosenfels (Inventor) DATE: 2/4/59

READ AND UNDERSTOOD BY ME:

SIGNED Horace H Hopkins Jr. (Witness) DATE: 2/4/59