AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

1 of 1

DECLASSIFIED

EW-79808

DATE 12-5-63

GENERAL ELECTRIC

☒ THIS DOCUMENT CONTAINS RESTRICTED DATA AS
DEFINED BY THE ATOMIC ENERGY ACT OF 1954
ITS TRANSMITTAL OR THE DISCLOSURE OF ITS
CONTENTS IN ANY MANNER TO AN UNAUTHORIZED
PERSON IS PROHIBITED

PRODUCTION TEST IF-638-1, OPERATING OF KER-1,
-2, -3, and -4 SIMULATING N REACTOR CONDITIONS

☐ OTHER OFFICIAL CLASSIFIED INFORMATION
THIS MATERIAL CONTAINS INFORMATION AFFECTING
THE NATIONAL DEFENSE OF THE UNITED STATES
WITHIN THE MEANING OF THE ESPIONAGE LAWS,
TITLE 18, U. S. C., SECS. 793 AND 794, THE TRANS-
MISSION OR REVELATION OF WHICH IN ANY MANNER
TO AN UNAUTHORIZED PERSON IS PROHIBITED BY
LAW.

R. Neidner

ISSUING FILE

[illegible][illegible]

(CLASSIFICATION)

DECLASSIFIED

DECLASSIFIED

HW-79808

1. AEC-RLOO, Attn: RL Plum
2. AEC-RLOO, Attn: RL Plum
3. AEC-RLOO, Attn: PM Midkiff
4. AEC-RLOO, Attn: CN Zangar
5. FW Albaugh
6. DG Albertson
7. TW Ambrose
8. ER Astley
9. JA Ayres
10. LV Barker
11. RS Bell
12. CE Bowers
13. RW Bown
14. GN Brown
15. RO Carlson
16. RG Clough
17. DL Condotta
18. WA Crossman
19. TW Evans
20. VF Fitzpatrick
21. JW Goffard
22. AB Greninger
23. AE Guay
24. AK Hardin
25. PC Jermañ
26. WK Kratzer
27. GA Last
28. MC Leverett
29. CG Lewis
30. M. Lewis

31. JE Minor
32. R. Neidner
33. RH Nelson
34. CA Priode
35. T. Prudich
36. WH Radtke
37. RW Reid
38. OC Schroeder
39. CH Shaw
40. HG Spencer
41. RE Trumble
42. FW Van Wormer
43. OJ Wick
44. MJ Wise
45. 300 Files
46. Record Copy

Classification Cancelled and Changed To

DECLASSIFIED

By Authority of DB LewisCG-PR-2, 4-4-94By DK Hanson, 4-16-94Verified By Jesse M. Gley
4-18-94

This document classified by

C. G. Lewis

This document consists of 6 pages,

HANFORD ATOMIC PRODUCTS OPERATION RICHLAND, WASHINGTON

NOTICE

This report was prepared for use within General Electric Company in the course of work under Atomic Energy Commission Contract AT(45-1) - 1350, and any views or opinions expressed in the report are those of the author only. This report is subject to revision upon collection of additional data.

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

DECLASSIFIED

used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

87B

PRODUCTION TEST IP-638-D, OPERATION OF KER-1, -2, -3, and -4
SIMULATING N REACTOR CONDITIONS

Objective

The objective of this production test is to irradiate N Reactor prototype and candidate fuel components and alternate products at simulated N-Reactor pressure and temperature conditions in KER Loops 1, 2, 3, and 4.

Summary

Selective KER tube loadings will be irradiated at outlet pressures that will simulate N-Reactor coolant pressures. Simulated N-Reactor coolant and component temperatures already have been attained during the present series of N-Reactor fuel development and proof-testing programs since the KER loops were assigned to this function. These simulated temperature conditions will continue to be attained. There will be no change in loop operating philosophy and all operation will be in accordance with the Process Standards governing the KER Loops⁽¹⁾, except for the following changes:

a. New minimum process tube exit pressure - low trip

KER-1 and -2	-	1225 psig
KER-3 and -4	-	1180 psig

b. New maximum temperature - high trip

KER-1 and -2	-	285 C
KER-3 and -4	-	290 C

c. New maximum operating temperature - alarm

KER-1 and -2	-	275 C
KER-3 and -4	-	275 C

Basis and Justification

During recent operation of the KER loops, conditions and tests have been performed that simulated or exceeded the anticipated conditions for most NPR parameters. The data from these irradiations have been invaluable in characterizing the candidate materials and fuel elements developed for potential N-Reactor use. With the aid of these data, final fuel element design and fabrication has been established for use during the N-Reactor startup and subsequent ascension to full power. These recent KER test conditions have been performed with the tube outlet pressures at a nominal 1600 psig, N-Reactor pressure will be approximately 1335 psig. The effect of this added 265 psi on the operational characteristics of in-reactor components is believed to be insignificant but confirmation data of this hypothesis is incomplete. Analysis has shown that all the principal predicted N-Reactor

(1) HW-46000 - Process Standards - K

DECLASSIFIED

conditions can be approximated in the KER loops when operating at approximately 1300 psig outlet header pressure.

Test Details

Fuel Elements, Target Material, Sleeves, Spacers and Dummies

The fuel elements, target material, and hardware to be irradiated under the provisions of this test will be only the type already having prior approval at normal KER-loop operating conditions. Specifically, they include the NIEL, NAEI, KSE5 and crud probe fuel pieces and the lithium-aluminum target material that are authorized by the documents in the attached bibliography.

Loading

Detailed tube loadings of the authorized material covered by this production test will be given in a document approved by the managers of Testing, Process and Reactor Development, and Process Technology Subsections prior to operation at the N-Reactor pressure condition.

Irradiation Facility

The fuel elements, crud probes and target material to be covered in this production test will be irradiated in either KER-1, -2, -3, or -4 as specified in the respective approval document for a particular irradiation.

Operating Conditions

All operation will be in accordance with the Process Standards applicable to KER-1, -2, -3, and -4 except as noted above. These temperature limit exceptions were established by applying the same sub-cooling values that are specified for normal 1600 psig operation. The low pressure trips are approximately 100 psi below the anticipated lower normal operating pressures that will simulate N-Reactor conditions.

Coolant flow and pH control will be in accordance with the respective approval documents for a particular irradiation. The high outlet temperature trip, maximum operating outlet temperature, desired operating outlet temperature and boiling point suppression trip will be given for each loading in a document approved by the managers of the Testing, Process and Reactor Development and Process Technology Subsections prior to operation at the N-Reactor pressure conditions.

Power and Temperature Limits

The operating conditions will be chosen so that surface boiling will not occur on the fuel pieces during normal operation, sub-cooled burnout will not occur at the limiting trip conditions, and the maximum uranium temperature will not exceed 600 C unless specifically authorized by prior approval for a particular irradiation.

DECLASSIFIED

Exposure

The maximum exposure will conform to that already authorized by the respective previous approval documentation.

Special Procedures

All special procedures will be the same as previously specified by the respective approval documentation for each irradiation.

Hazards

The hazards for operating under the conditions of this production test are the same as those discussed for each particular irradiation having previous approval. The stress on the in-reactor process tube and the pressurizer stored energy will be less for the N-Reactor pressure condition than at the normal 1600 psig condition.

Responsibilities

Irradiation Processing Department - Research and Engineering Section

Testing Subsection has the over-all technical responsibility of operation according to the criterion specified in this production test.

Coolant Testing is responsible for:

1. Operation of the KER Loops.
2. Taking basic data.
3. Reactor safety and production continuity as they are affected by loop operation.
4. Abiding by all special responsibilities as set forth in the respective previous approval documentation for each irradiation.

 R. Neidner, Senior Engineer
 Testing

R. Neidner:bmr

DECLASSIFIED

APPROVED BIBLIOGRAPHY

Kratzer, WK, HW-75280, PT-IP-536-A, Irradiation of N-Reactor Inner Fuel Tubes In KER Loops 1 and 2, 10-16-62

HW-75298 - Supplement A (of HW-75280)

HW-75383 - Supplement B (of HW-75280)

HW-75773 - Supplement C (of HW-75280)

HW-79619 - Supplement D (of HW-75280)

Neidner, R. HW-78552, PT-IP-601-D, Evaluation of Crud Forming Characteristics of KER Loop Coolant Containing NH_4OH for pH Control, 8-6-63

Kratzer, WK HW-72269, PT-IP-477-A, Irradiation of N Reactor Fuel Elements in KER Loops 3 and 4, 1-9-62

HW-75772, Supplement B (of HW-72269)

Kratzer, WK HW-75456, PT-IP-544-A, Irradiation of 1.6 Percent Enriched Thick and Walled Single Tube Elements in KER-1 and -2, 12-12-62
MJ Wise

HW-79796, Supplement A (of HW-75456)

Neidner, R. HW-77579, PT-IP-584-D, Irradiation of Target Assemblies in the KER Loops, 5-8-63

HW-79775, Supplement A (of HW-77579)

DECLASSIFIED

Approvals

C. G. Lewis

CG Lewis, Manager
Testing

TW Van Worman for

TW Ambrose, Manager
Process and Reactor Development

H-B. Spence Acting

RW Reid, Manager
Process Technology

O. H. Greager

OH Greager, Manager
Research and Engineering

G. Rogers

GJ Rogers, Acting Manager
Applied Reactor Engineering

R. G. Clough, Jr. for

RG Clough, Jr., Manager
KE Processing

RS Bell

^{Acting}
RS Bell, Manager
KE-KW Reactor Operation

OC Schroeder

OC Schroeder, Manager
Manufacturing

Date Of Issue: 1-15-64

DECLASSIFIED

DATE

FILMED

8 / 31 / 94

END