DECLASSIFIED

(CLASSIFICATION)

DOCUMENT NO.

HW-74717

Revised

SERIES AND COPY NO.

10

DATE

January 16, 1963

GENERAL ELECTRIC

HANFORD ATOMIC PRODUCTS OPERATION - RICHLAND, WASHINGTON

☒

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

TITLE

CRITICAL MASS CONTROL SPECIFICATION
7.35 WEIGHT PERCENT Pu-Al ALLOY
FUEL ELEMENT STORAGE
GAS CYLINDER STORAGE AREA, 234-5 BUILDING

☐

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 TRANSMISSION OR REVELATION OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

AUTHOR

R. J. SLOAT

ISSUING FILE

THIS DOCUMENT MUST NOT BE LEFT UNATTENDED WHERE AN UNAUTHORIZED PERSON MAY HAVE ACCESS TO IT. WHEN IN USE, IT MUST BE STORED IN AN APPROVED LOCKED CONTAINER WITHIN AN APPROVED GUARD AREA. WHILE IT IS YOUR RESPONSIBILITY AND UNTIL YOU OBTAIN A SIGNED RECEIPT FROM CLASSIFIED FILES, IT IS YOUR RESPONSIBILITY TO KEEP IT AND ITS CONTENTS WITHIN THE LIMITS OF THE PROJECT AND FROM AN UNAUTHORIZED PERSON. ITS TRANSMITTAL TO, AND STORAGE IN YOUR PLACE OF RESIDENCE IS PROHIBITED. IT IS NOT TO BE REPRODUCED. IF ADDITIONAL COPIES ARE REQUIRED, OBTAIN THEM FROM THE RELATED ISSUING FILE. PERSONS READING THIS DOCUMENT ARE REQUESTED TO SIGN IN THE SPACE PROVIDED BELOW.

ROUTE TO:

PAYROLL NO.

LOCATION

FILES ROUTE
DATE

SIGNATURE AND DATE

300 Files

THIS DOCUMENT HAS BEEN SCANNED
AND IS STORED ON THE OPTICAL DISK DRIVE

DECLASSIFIED

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

DECLASSIFIED

Distribution:

1. J. J. Courtney
2. D. T. Crawley
3. C. B. Foster
4. W. S. Frank
5. W. J. Gartin
6. M. K. Harmon
7. L. M. Knights
8. R. J. Sloat
9. R. L. Stevenson
10. 300 Files

~~This document contains restricted information as defined in the Atomic Energy Act of 1954. Its transmittal or the disclosure of its contents in any manner to any unauthorized person is prohibited.~~

This document consists of 8 pages.
No. 10 of 10 copies.

CRITICAL MASS CONTROL SPECIFICATION

7.35 WEIGHT PERCENT Pu-Al ALLOY FUEL ELEMENT STORAGE

GAS CYLINDER STORAGE AREA, 234-5 BUILDING

By:

R. J. SLOAT

PLUTONIUM PROCESS ENGINEERING
RESEARCH AND ENGINEERING OPERATION
CHEMICAL PROCESSING DEPARTMENT

Classification Cancelled and Changed To

DECLASSIFIED

By Authority of RM Sloat

RLO-CG-44, 3-14-94

By J E Savely 3-28-94

Verified By DK Hanson, 3-30-94

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

JANUARY 16, 1963

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DECLASSIFIED

MASTER

DECLASSIFIED

CRITICAL MASS CONTROL SPECIFICATION

7.35 WEIGHT PERCENT Pu-Al ALLOY FUEL ELEMENT STORAGE

GAS CYLINDER STORAGE AREA, 234-5 BUILDING

Plutonium-aluminum fuel elements, which were fabricated at Hanford Atomic Products Operation for a special Atomic Energy Commission program, but were rejected for failure to meet specifications, were returned to Hanford for recovery. These elements, although contaminated during acceptance checking, have not been used in the proposed reactor tests. This special material will be stored until recovery is completed.

I. LIMITS

A. Storage Limit - Gas Cylinder Storage Area, 234-5 Building

Maximum plutonium in compartment #5: 30.8 kgs (28 birdcages)

B. Limit of Plutonium Concentration in Fuel Element

Maximum: 7.6 wt. %

C. Container Limits

1. Maximum number of birdcages: 28 (physical limit of storage compartment)

2. Maximum amount of plutonium per birdcage: 1.1 kgs (12 rods)

D. Spacing Limits

1. None within storage compartment #5.
2. No other plutonium may be stored within 12 feet of this storage compartment.

E. Other Plutonium Storage Limits

1. No other plutonium will be allowed to pass within 12 feet of this storage array.
2. Fuel elements must not be removed from a birdcage without prior nuclear safety review.

F. Moderation Limits

1. No solutions are to be stored in this compartment or the two adjoining compartments.

DECLASSIFIED

- I. F. 2. No other hydrogenous materials may be stored in this or the two adjoining compartments.

II. BASIS

A. Gas Cylinder Storage Area

The gas cylinder storage shed is an open frame, compartmented, wooden building, 72 feet long by 11 feet deep, on a concrete platform 33 inches above grade and 73 feet long by 16 feet. The shed is located within the 234-5 exclusion area southeast of the main building (see figure 1 and figure 4).

B. "Birdcages" (Shipping Tubes)

The shipping tube is a $61\frac{1}{2}$ -inch length of 4-inch steel pipe in a $16\frac{1}{2}$ " x $16\frac{1}{2}$ " x $65\frac{1}{2}$ " angle iron frame for spacing requirements (see figure 3).

C. Fuel Elements

The fuels are Pu-Al alloy rods clad in aluminum (Pu 7.06 - 7.58% by weight). The overall element dimensions are 0.95-inch diameter and 60 inches long (see figure 2).

D. Conditions Excluded

Crushing of birdcages.

E. Estimated Critical Mass

The minimum critical number of rods in cylindrical grouping is 60 (4.98 kgs Pu).

III. REFERENCES

- A. TID-7016, Rev. 1, "Nuclear Safety Guide, 1961".
B. DP-710, "Nuclear Safety Measurements of Uranium-Aluminum Alloys and of a Plutonium-Aluminum Alloy in H₂O", F. E. Kinard, June, 1962.

NOTE: This document supersedes HW-74717, same title, dated November 2, 1962.

IV. APPROVALS

Issued by R. J. Sloat
Manager, Plutonium Process Engineering

Date 1-10-1963

DECLASSIFIED

IV. APPROVALS (Continued)

Reviewed by R. L. Stevenson Date 1-14-63
Senior Engineer, Advance Technical Planning

Approved by V. S. Frank Date 1/15/63
Manager, Research and Engineering Operation

Accepted by W. J. Lantieri Date 1-21-63
Manager, Weapons Manufacturing Operation

FIGURE 1
PLOT PLAN

SCALE 1" = 40'-0"

from H-2-29601

8-27-62 *see*

COEXTRUDED FUEL ROD (0.94"D x 5")

from HW-63151

FIGURE 2

8-27-62 *WJL*

$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{16}$ L TYP. 4 PLACES
1010-1020 STL.

$2 \times 2 \times \frac{3}{16}$ L
TYP. BOTH ENDS

FIGURE 3
FUEL SHIPPING TUBE

from SK-3-9053

NOTE! COMPARTMENTS ARE NOT ACTUALLY NUMBERED BUT ARE HERE FOR EASIER IDENTIFICATION IN THE SPECIFICATION.

#11 O ₂	#10 A	#9 C ₂ H ₂ HEXONE H ₂	#8 He	#7 DEV. LAB. MATH. HCL CL ₂ Phosgene	#6 CO ₂	#5 PO-AL FUEL ELEMENTS	#4 N ₂	#3 HF	#2 HF	#1 MT CYLINDERS
LOADING DOCK										
RAMP										RAMP

FIGURE 4

PLAN GAS CYLINDER STORAGE SHED

234-5 EXCLUSION AREA

SCALE 1/4" = 2'-0"
1-17-63 JRC