
**Cover Sheet for a Hanford
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**Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute**



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By Authority of B.F. O'Malley
1-18-73
By J.E. Sauly 11-14-94
Reviewed by Gerri Arnally
11-17-94

- 81 A. B. ~~Franklin~~ - R. W. Hauff - 700 711a
- 82 G. H. ~~Franklin~~ - R. W. Hauff - 700 711a
- 83 J. B. Work - T. Erdlich
- 84 W. H. Barty - D. W. ~~Hauff~~
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- 86 Yellow Copy

July 1, 1948

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234-5 PROJECT

PROBLEM ASSIGNMENT 8-1
EQUIPMENT FOR DEVELOPMENT AND EVALUATION OF
ALTERNATE PROCESSES FOR PLUTONIUM METAL PRODUCTION

OBJECTIVE

It is intended as the objective of this Problem Assignment to assemble equipment to determine the physical and chemical characteristics of the compounds manufactured in the current 234-5 process for button production such that these characteristics can be compared to the characteristics of compounds produced in alternate processes. With this equipment the feasibility of substituting an alternate process for the current process can be determined. Also, the equipment will be used to determine the most suitable physical and chemical conditions for the operation of the current and alternate processes.

BASIS AND PRESENT STATE

The 234-5 Process functions as a process for the production of plutonium metal. The process consists of three phases, purification, dry-chemistry and reduction. In the purification phase the plutonium is received as a mixture of the various valence state nitrates which is reduced to plutonium III nitrate with hydriodic acid. A plutonium III oxalate is precipitated. The precipitate is separated from the supernatant and is then transferred to the dry-chemistry phase. In the dry-chemistry phase the plutonium oxalate is converted to the oxide and then to the tetrafluoride. The tetrafluoride is reacted with calcium in the reduction phase to form the plutonium metal. The detailed procedure for the process is contained in Specification Letter 234-2, Process for Button Production, from J. B. Work to D. D. Strick, dated October 6, 1947, document EW-7703.

Although the above process has functioned adequately at Los Alamos for the production of plutonium metal its use at Hanford presents the opportunity for several potential modifications that will allow several hazardous steps to be eliminated from the continuity of the Isolation-Purification Process; a modification of the Waste Disposal and Recovery Processes; and the simplification of equipment design and fabrication. As indicated in the Objective, it is the intention of the Development Group to provide facilities for experimental studies as to develop information as to whether these potential modifications can be successfully instituted into the process.

PROGRAM

Since Hanford does not have hoods and facilities for experimentation on a scale such that information useful for process modifications can be developed, the necessary facilities will be provided by modifying the available hoods in rooms

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30, 41, and 42 of the Isolation Building. The modification, conversion of the open "K" type hood to a dry-box type hood, will provide an environment in which the potential health hazard may be controlled. Equipment necessary to the performing and control of the intended experiments will be developed, prepared and installed in the hoods. The experiments can then be performed that will develop the information necessary to obtaining the proposed Objective.

FACILITIES REQUIRED

The facilities and equipment have been mentioned above and pertain to the requirements necessary for experimentation on an eight gram scale.

ESTIMATED COMPLETION DATE

Work on this Problem Assignment will start immediately and should require four ~~months~~ months to complete, dependent upon receiving requisitioned supplies and equipment and on the priority obtained for the fabrication of certain pieces of equipment in the EOGW Area shops.

D. H. Haugick
D. H. Haugick

APPROVED:

J. B. Work *7/7/48*
J. B. Work Date

BMH/m

(Faint handwritten notes and stamps)

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