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H. HW--30150

DE93 003441

GENERAL ELECTRIC  
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December 7, 1953

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of 5 pages. ~~Not 25~~

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9. JM Fouts - WE Foust
10. S Goldsmith
11. OH Greager - WK Woods
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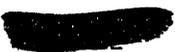
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HW 30150

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COMPANY



HW 30150

December 7, 1953

PT-105-519-E, SUPPLEMENT A, RAISING PERMISSIBLE  
OUTLET WATER TEMPERATURES OF SELECTED TUBES AT C PILE

OBJECTIVE

The objective of this supplement is to evaluate a method of eliminating localized corrosion attack of the slug can at the temperatures authorized by the original test(1).

BASIS AND JUSTIFICATION

The nine tubes placed in C Pile under the original production test have operated satisfactorily for six months at average and maximum outlet water temperatures of 99 and 109 C, respectively. Corrosion rates of slugs charged into these tubes were found to be tolerable; however, there have been variations in the data greater than can be ascribed to experimental error. Visual observations of the slugs charged under the original test have shown that slugs from some tubes showed areas of localized or "ledge type" corrosion attack, particularly in the vicinity of the ribs. At a given surface temperature, slugs having the greatest weight loss, were found to exhibit the most severe ledge type attack. This type of attack appears to be associated with scratches on the slug surface caused by the charging operation.

It has been shown that breaks in the autoclave film on the slug can result in accelerated corrosion of the can at the break in the film(2). It has also been found that during charging the slugs are rotated through a small angle with each push(3). Slugs were observed during charging to rotate as much as 80 to 90 degrees resulting in rib scratches on one-third to one-half of the lateral surface of the slug.

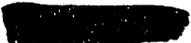
Maintaining the integrity of the autoclave coat should eliminate the primary cause of ledge type corrosion. A glue coating has been developed that will protect the autoclave coat on the slug while the slug is being charged into the tube(4). This glue coating is water soluble and is completely removed from the slug within 40 minutes exposure to cold flowing water. Only the lateral surfaces of the slug need be covered with the glue coating to give the protection desired.

The value of an undamaged autoclave coat lies in the greater assurance of uniform corrosion. Uniform corrosion attack permits operation at more severe conditions without slug failure than does localized corrosion attack; consequently, for a given flow rate, higher exit water temperatures could be permitted resulting in higher tube powers.

- (1) Goldsmith, S., "PT-105-519-E, Raising Permissible Outlet Water Temperatures of Selected Tubes at C Pile", HW-28076, May 25, 1953.
- (2) de Halas, D. R., "Effects of Autoclave Film on Corrosion", HW-27199, March 6, 1953.
- (3) Lewis, M., "Technical Activities Report, Pile Coolant Effects, January 1953", HW-26902, February 10, 1953.
- (4) Cook, J. P., Letter to S. Goldsmith "Glue Coated Slugs", December 1, 1953.

Classification Cancelled (Change 10)

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By Authority of CG-PR-2

DS Lewis 6-11-92

PM Erick 10-20-92

JH Tullis 10-21-92

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## SCHEDULE

Start: This test is to start on the first shutdown after or coincident with the approval of the test authorization.

Duration: This test will continue until the desired data are obtained--approximately nine months.

Area: 100-C.

## COSTS

Cost Code: xxx-5270-253.14.

Plant Utilities and Maintenance: No additional manhours other than specified in the original test.

Shutdown Time: No additional time other than specified in the original test.

Elevator Time: Same as above.

## DESCRIPTIVE DETAILS

Four tubes operating under this production test will be charged with regular production run four inch slugs that have been classified according to the integrity of the autoclave film. Classification, weight, and dimensional measurements will be made of only those slugs to be charged into the downstream half of the tubes, i.e., the first 32 slugs charged into each tube. The upstream half of the tubes will be charged with regular four inch metal. Of the 32 slugs to be charged into the downstream half of the tube, half will be coated with a water soluble glue and half will be left uncoated. The coated and uncoated slugs will be charged into the tube alternately.

The glue used to coat the slug contains a dextrine base, sodium silicate, and an inert filler material. The glue will be applied only to the lateral surfaces of the slug by means of a spray gun. Laboratory tests have shown the glue coating to be completely removed from the slug surface by a stream of cold water within 40 minutes; consequently, the coating should be completely removed from the slug before pile start-up. Tests have also shown that the glue coating does not flake or break off in large pieces but dissolves uniformly in water.

The nine tubes placed in C Pile under the original test will not be replaced with C type tubes until the completion of this test; however, two tubes are to be removed for inspection approximately nine months from start of the original test. These tubes are to be replaced with C type tubes.

The weighed, measured, classified, and coated slugs used in this test will be supplied by Technical. All slugs will meet canning specifications and pass canning inspections.

SPECIAL INSTRUCTIONS

The special instructions given in the original test will apply to this test.

SPECIAL EQUIPMENT

No special equipment will be required for this test.

SPECIAL ADJUSTMENTS

Appropriate changes to accommodate the shift from orifices to venturis and the necessary panellit gauge adjustments will be made by the Reactor Section.

DATA REQUIRED

The data specified in the original test will be required for this test.

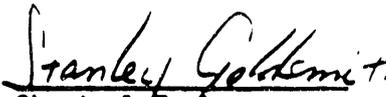
RESPONSIBILITY

Reactor Section

The Reactor Section will be responsible for all scheduling, charge and discharge operations, the operational safety and production continuity of the pile, and for the collection of data on the tubes operating under this production test. Requested operational data will be forwarded to the Technical Section.

Technical Section

M. Lewis and S. Goldsmith, Pile Coolant Studies Sub-Unit, will be responsible for the technical aspects of pile irradiation, analysis of all data, and issuance of the final report. J. M. Fouts, Fuel Examination Sub-Unit, will be responsible for examinations and measurements of the slugs used in this test.

  
Chemical Engineer  
Technical Section  
ENGINEERING DEPARTMENT

S Goldsmith:mc

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APPROVALS

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Date of issue December 16, 1953

S Goldsmith:mc

**END**

**DATE  
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