

M 5-32-3

November 30, 1953

Mr. J. H. Harlow, Chief Mechanical Engineer
Philadelphia Electric Company
900 Sansom Street
Philadelphia, Pennsylvania

My Dear Mr. Harlow:

Enclosed please find three copies of Report Number 71, entitled "Examination of Sample 14R from the Richmond Station for Graphitization 39,253 Hours After Solution Treatment", covering the examination of a boat sample from the Richmond Station, which has been solution-treated.

As in the examination which was made of another boat sample, taken after eight thousand odd hours of service, it shows no evidence of graphitization. This finding is pleasing to me, personally, as well as I know it must be a source of gratification to you.

Very sincerely yours,

A. E. White

AEW:ef
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ENGINEERING RESEARCH INSTITUTE
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICH.

REPORT
ON
EXAMINATION FOR GRAPHITIZATION
OF WELD-PROBER SAMPLES 1SK, 2SK, AND 3SK FROM
THE STEAM LINES TO NUMBER 1 TURBINE
AT THE SOUTHWARK STATION
OF THE PHILADELPHIA ELECTRIC COMPANY



By

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Project 1532-7
Report 73

July 11, 1955

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EXAMINATION FOR GRAPHITIZATION OF WELD-PROBER SAMPLES
1SK, 2SK, AND 3SK FROM THE STEAM LINES TO NUMBER 1 TURBINE AT THE
SOUTHWARK STATION OF THE PHILADELPHIA ELECTRIC COMPANY

Weld-prober samples from three welds from the steam lines between Number 1 turbine and boilers Number 11 and 12 at the Southwark Station of the Philadelphia Electric Company were examined for the presence of graphite. These samples were removed on April 21, 1955 when the service times were 58,792 to 61,509 hours. The pipes and casting were 1/2 Cr - 1/2 Mo steel. Two of the welds were pipe-to-pipe and one was between pipe and a cast non-return valve.

FINDINGS

No graphite was found in the three samples submitted. This is in accordance with the expectation that the 1/2 Cr - 1/2 Mo steel would prove resistant to graphitization.

DESCRIPTION OF SAMPLES

The location of the three weld-prober samples submitted are shown in Figure 1 together with the pertinent data as to service life and types of steel involved. This figure shows that the samples were taken from the following three locations:

- 1SK: Between the pipe and the non-return valve in the 16-inch line from Number 12 boiler.
- 2SK: From a pipe-to-pipe weld in the 16-inch line from Number 12 boiler.

3SK: A pipe-to-pipe weld in the 24-inch line between the turbine and boilers Number 11 and 12.

Samples 1SK and 2SK represent welds which had been in service 58,792 hours and 3Sk a weld which had been in service 61,509 hours.

RESULTS AND DISCUSSION

All three samples were examined under the microscope for graphite. No evidence of graphite was observed in any part of the samples. Plates 1 through 3 show typical photomicrographs of the heat affected zones of the welds. The photomicrographs show the heat-affected zones in the base metal when graphite usually forms if it occurs during service.

The absence of graphite was to be expected. The 0.5-percent Cr in this steel should have developed high resistance to graphitization. The service experience so far in this station appears to verify the resistance to graphitization of the 1/2 Cr - 1/2 Mo steel.

GENERAL NOTES

Stamp Sample Number on Upstream end of Sample. All Samples Removed From Horizontal Runs to Be Removed From Top of Pipe if Possible.

MATERIAL:

24"OD x 1-5/16" A-204-44, Grade A, Plus 1/2% Chromium 16" Sched. 100, A-206-44T Symbol P-1, Plus 1/2% Chromium, NRV-ASTM: A-217-42T Grade WC1 Plus .4% to .6% Chrome

REFERENCE DRAWINGS

A-108192 Plan of Steam Main Piping
A-108193 Elevations and Details

Sample Number	Date Removed	Service Hours
1-SK	4-21-55	58,792
2-SK	4-21-55	58,792
3-SK	4-21-55	61,509

BOAT SAMPLE RECORD

Steam Mains Between Turbine Number 1 and Boilers Number 11-12.

SOUTH WARK STATION

PHILADELPHIA ELECTRIC COMPANY

Date Revised No Scale
By R. B. Haig
March 16, 1955

SKETCH NO. 5

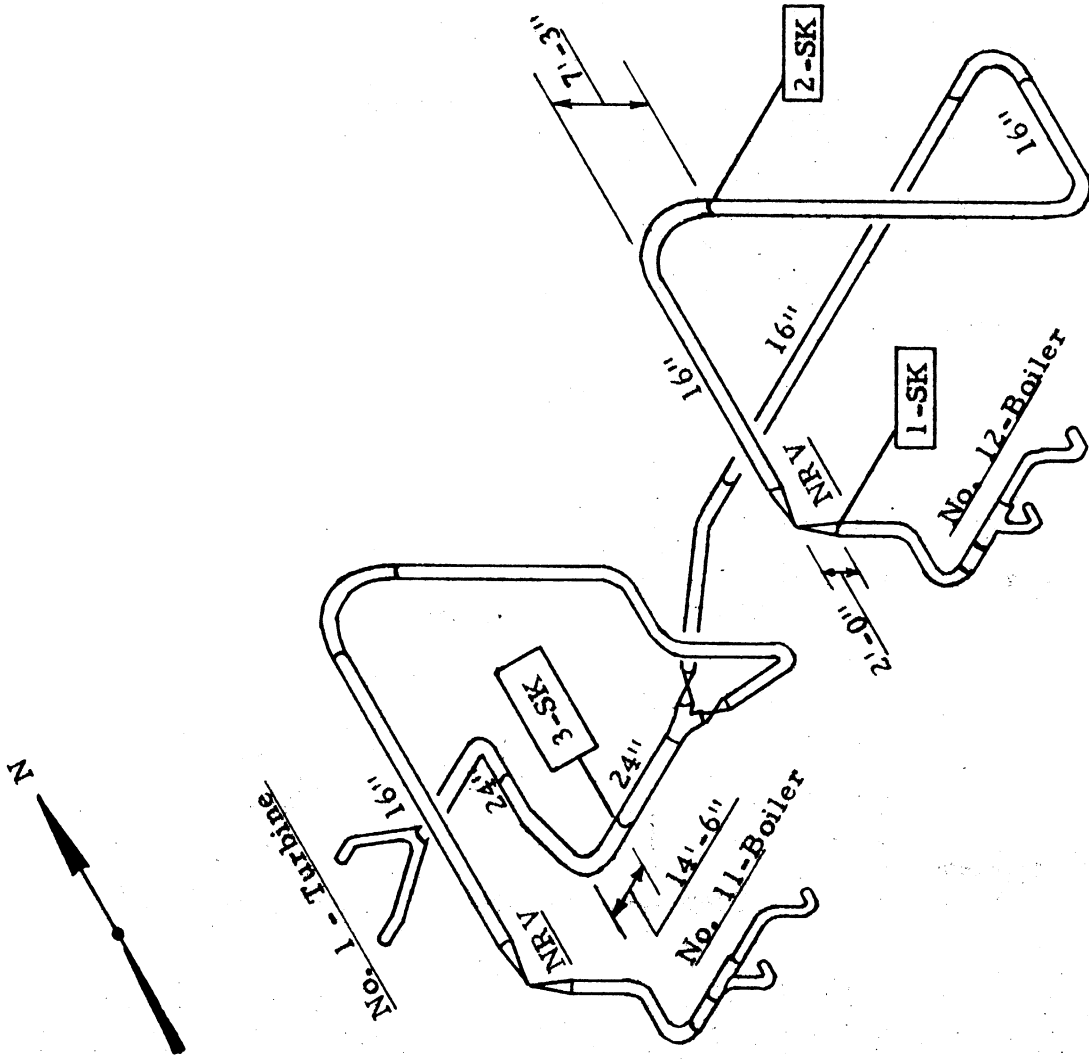


Figure 1. -Sketch Submitted Showing Location of Weld-Prober Samples.

For Plates, see File Copy

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