PLAINTIFF'S EXHIBIT

GE-94

GENERAL ELECTRIC COMPANY

APPARATUS SALES DIVISION

ROCKY MOUNTAIN DISTRICT

650 SEVENTEENTH STREET, DENVER 1, COLORADO . . . . . TELEPHONE KE 4-7171

March 24, 1958

Subject: Arapahoe No. 4 Unit
100,000 KW Turbine No. 101604
Valmont No. 3 Unit
25,000 KW Turbine No. 32395
Valmont No. 4 Unit
25,000 KW Turbine No. 34688

Mr. A. A. Woodward
Superintendent of Steam Production
Public Service Company of Colorado
38th and Holly
Denver, Colorado

Dear Woodie:

Confirming our conversation of March 2, our turbine design engineers have removed additional machines from the recommendation that the fields be prewarmed before bringing up to operating speed. The release of additional units has been brought on by the knowledge of the causes of failures of fields that have occurred. Industry now knows the importance of the transition temperature to the brittle or ductile characteristics of the steel and to possible presence of thin silica layers within the forging. For this reason it is not necessary now to prewarm the Cherokee No. 1 unit if the field is at 75°F or above. Of course, Arapahoe No. 1 and No. 3 and Zuni No. 1 have not had the prewarming requirement.

We are now in a position where we can determine if the subject turbine-generator sets could be taken off of the field prewarming requirement by the use of sonic testing and by trepanning.

Elaborating, if thin silica inclusions were present in your present rotor, the flexing of the rotor would now have opened these areas up so that they would be readily detected on sonic testing. By means of trepanning into the field poles or core drilling, we can obtain a sample to check the actual transition temperature of the metal in the field forging.

These tests could indicate any one of the following three recommended steps:

1. To remove this particular field from the list of those fields for which we recommend prewarming before bringing to speed.

2. We would recommend that the field be kept on the prewarming procedure.

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3. If sonic indications have increased very appreciably and it is not possible to bore them out or trepan them out, we might recommend no further use of this field. (I might add that in this field re-examining program that we have found but one field in the third category.)

We are now in a position with technicians to make sonic tests and do trepanning operations in the field in your plant. The present rates are as follows:

Sonic Test Equipment	-	$30 per day plus transportation expense to and from job site. (Usual time for checking field - one day.)
Factory Sonic Technician	-	$12 per hour straight time rate, $18 per hour time and one-half rate, $24 per hour double time rate, plus travel and living expenses. (Usual time required - one day at job plus one day each way for transportation.)
Trepanning Equipment	-	$100 per week or any fraction thereof plus transportation. (Usual time - 5 to 6 days.)
Trepanning Expert	-	District technician is available out of our San Francisco office and his rate would be $12 per hour straight time plus travel and living expenses. (Usual time required - 6 to 7 days.)

In spite of the above comments, I would like to recommend preheating the fields, especially on larger diameter fields, for the benefits derived from protecting the insulation from so much abrasive action when the unit is at speed due to coil expansion.

If you should desire more copies of the paper I left with you - Why Do Generator Rotors Burst?, GER-1462, please let me know and I will obtain them for you.

Very truly yours,

C. H. McCabe
Manager - Installation & Service Engineering - Turbines

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CHMc:jm

cc: Mr. W. S. Pullen - Denver
Mr. M. I. Cleveland - Schenectady