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Central Files

Dr. M. H. Raffiee
Combustion Engineering, Inc.
911 West Main Street
Chattanooga, Tennessee

Dear Joe:

Under separate cover I have returned to you your sample E-6284. The micro-probe examination of this sample has been completed. The area which you designated No. 3 was the one chosen for examination and a backscatter electron picture of this region is shown in Figure 1. The sample had to be remounted to fit the probe holder and therefore repolishing was necessary. The results obtained from this sample are as follows:

1. Qualitative analysis was made in the white region next to the edge; 12 from the edge (which was the gray area in the etched photograph; and 2,400 from the edge, which was in the "good" area). No difference in qualitative analysis was found. However, this does not eliminate the possibility of there being oxides or nitrides present in the white or gray area since we are unable, at the present time, to analyze for oxygen and nitrogen. We will have this capability in about two weeks.

2. Semi-quantitative analysis was done for Mn, Si, Cr, Ni, Cb, and S by scanning from the edge from area No. 3 inward 600 .

The Si was highly concentrated on the edge (in the white area). This is shown by Figure 2 which is an x-ray photograph taken at a magnification of 400X. From the x-ray trace there seemed to be 50 per cent more Si on the edge than in the interior.

Cr appeared to be more concentrated in the gray area adjacent to the white area. This is indicated also by the x-ray photograph shown in Figure 3. From the x-ray trace the difference in concentration was about 15 per cent.

The Mn also seemed to be highly concentrated in the gray region of area 3 as indicated by Figure 4. There also appeared to be some small regions in the white area which was highly concentrated in Mn. The difference here was about 20%.

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There was no variance in the concentrations of Ni or S. A x-ray photograph of Ni is given in Figure 5. The Cb appeared to be distributed as particles throughout the matrix.

We are now in the process of examining the sample which contained the five specimens. We have completed the analysis of the one designated BJ and have found marked differences in the concentration of Ni, Cr, Fe, Mn, and Cb. We should finish your work by the end of next week and will give you definite answers at that time.

If you have any questions please do not hesitate to contact me or James Johnson.

Sincerely yours,

Edgar A. Starke, Jr.
Assistant Professor

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GEORGIA INSTITUTE OF TECHNOLOGY

ENGINEERING EXPERIMENT STATION

ATLANTA, GEORGIA 30332

August 4, 1969

Mr. M. H. Rafiee
Combustion Engineering, Inc.
911 W. Main Street
Chattanooga, Tennessee

Re: Project A-232-275

Dear Joe:

As per Ed Starke's letter of July 2, we have looked at the precipitates in the sample of yours that remains with us. We were not able to detect nitrogen in these precipitates. This could be a matrix effect, the steel absorbing all the x-rays from the nitrogen, if any were produced. If you want us to do anything more on this sample, please let us know.

I believe that this completes all of your work that we have on hand. We are still in a position to perform microprobe work on the sample you were to copper plate, or new work if you have such.

Yours truly,

James W. Johnson
Research Physicist

JWJ:brj

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