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A COMPARISON OF MONTHLY SLUG RUPTURES AT C-PILE

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2. E. G. Waters/J. L. Jacob

June 20, 1956

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1. COMPARISON OF MONTHLY SLUG RUPTURES AT C-PILE

The data you submitted consisted of the numbers of slugs that ruptured per month at C-pile in addition to the total numbers of slugs discharged^{*} each month. All data pertained to regular production metal. Table I summarizes these data.

Table I

<u>Month</u>	<u>No. of Ruptures</u>	<u>Total No. Discharged</u>
January 1955	4	18584
February 1955	2	33334
March 1955	10	22569
April 1955	4	14555
May 1955	3	22625
June 1955	0	19762
July 1955	4	25834
August 1955	6	33075
September 1955	4	23308
October 1955	2 3	13253
November 1955	2	24095
December 1955	2 2	25487
January 1956	2 0	6161
February 1956	1	18829

As you requested, a number of comparisons were made. Since July and August had a tendency toward higher rupture rates at the other piles, a comparison of the July and August rates with the other months was made at C-pile, both including and excluding March data. A second comparison consisted in determining whether or not the monthly slug failure rates differed from month to month. Thirdly, data were grouped in two month periods and compared. Finally, a comparison was made between

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* based on shipping records

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June 20, 1956

data corresponding to January through June, 1955, and August, 1955, through February, 1956. This comparison was made because of a change in canning process made during July, 1955, which some felt may have affected rupture rates. The results of these comparisons are summarized below.

(A) July and August, 1955. Versus Other Months

For July and August, 10 ruptures were observed, whereas 34 ruptures were observed in the other months. Based on the proportions of slugs discharged in each group, we would expect 8.6 ruptures in July and August, and 35.4 in the others. This discrepancy is far from statistically significant. If March data were excluded as being atypical, we have 10 ruptures in July and August and 24 in the remaining months. Based on the proportions of slugs discharged in each group, we would expect 7.2 ruptures in July and August, and 26.8 ruptures in the other months. Since an observed discrepancy as large as this would occur by chance alone about 35% of the time, we conclude that this is not a significant difference.

(B) Month by Month Comparison

In the month by month comparison, no overall significant difference was found. The differences as given in Table I could occur by chance alone about 10% of the time. If March were again excluded, the remaining months become very comparable, such that we expect agreement this close over 50% of the time.

(C) Two Months Comparison

If data for two months periods of time are combined, the preponderance of ruptures in April, when added to those in March, combine to result in a significant difference between these two months and the others. Fourteen ruptures were observed in these two months. Based on the proportions of slugs discharged, we expect only 5.4 ruptures, a highly significant difference ($< 1\%$ level). If these two months are eliminated, the agreement between the remaining data is again quite good, since we would expect agreement of this sort by chance alone about 45% of the time.

(D) January to June, 1955. Versus August, 1955. to February, 1956

Using this division in the data results in an observed 23 ruptures in the first group, and 17 in the latter. Again based on the proportions of slugs discharged at each time, we would expect by chance 19.6 ruptures in the first group and 20.4 in the second.

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Such a difference is expected to occur by chance alone about 30% of the time, and hence, no significant difference is found. If March data were again eliminated, the observed numbers of ruptures are 13 and 17 respectively. By chance we expect 12.9 and 17.1 respectively, which obviously means no difference.

On the basis of the above, the only statement of significance that can be made refers to the peak around March, 1955. No other deviation from the normal behavior of the pile is observed on the basis of the submitted data.

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