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MOJRD...  
Central File No 53-10-26

October 13, 1953

Mr. E. J. Walko, Section Supt.  
Building 91,  
Rocky Flats Plant  
The Dow Chemical Company  
P. O. Box 2131  
Denver, Colorado

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Dear Mr. Walko:

As was indicated in our letter to Mr. F. H. Langell on September 14, we are sending you an account of our experiences and some current counting methods associated with the T-29 geometry.

We operate the T-29 type geometry on position 5 which delivers around 640 volts. The electronic equipment is the 503 amplifier and 503-A preamplifier along with a 750-A scaler. This equipment along with the Ra-Be standards was purchased from the Los Alamos Laboratories. We have added automatic timers and external registers.

We have experienced very little trouble with the T-29 geometry. One of these units that had foreign matter in the water compartment developed an internal pressure, apparently by gassing, and through expansion caused considerable damage to the container and electrical parts. To avoid a recurrence, we have equipped all T-29 tubs with overflows.

The electronic equipment has caused some trouble. It requires several days for new equipment or equipment that has been out of service to become stable. We leave power on the electronic equipment 24 hours a day but turn the T-29 on and off before and after counting. The slowing down of the counting rate is one of the difficulties frequently experienced. We maintain a counting rate of 2100 to 2400 counts per minute for our standard sources. If the units are operating properly the counting rates will drop very slowly over a period of several weeks. Rapid falling off of the counting rate is an indication of trouble in the electronic units. There is usually good agreement between standard source counts and at least three consecutive three minute counts are run. Over four percent variations in the counting rate of a series of standard counts is an indication of electronic trouble.

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E. J. Walko - October 13, 1953

Some times as many as forty samples per machine are counted during a day so we have developed the following method of counting. A 1000 second background count is taken each morning. The background count is followed by several three minute standard source counts. Generally the three counts that are closest to the average of the several counts are used to establish the standard count. These are compared to the previous days counts to determine if there has been a change in the counting rate. By counting the standard source several times and averaging the three middle counts we find that we have standard counts that average about the same each day. We also reduce the random effect of the counting in this manner. The standard counts, both within a series and between averages, should agree within three percent. If the counting rate has changed over three percent we run several more standard counts to be sure that the counting rate is not changing further. After determining by the standard counts that the counter is operating properly, samples are run until lunch time when another series of three standard counts is taken. The same procedure is followed in the afternoon.

The samples are run in the following manner. Cells and Pots are given two five-minute counts and the counts averaged. Agreement between counts must be within three percent. Toms are run initially for two one-minute counts and the final counts are two one and one-half minute counts. The agreement between counts in both instances must be within six percent. By taking two short counts in place of one long count we reduce both the operator errors and the effect of the random nature of the counting. The two sets of morning standard counts are used with the samples run in the morning and the afternoon standards with the afternoon samples. It has been found that our background remains sufficiently constant during the working day so that only the one background count is taken and it is used for both morning and afternoon counting.

Attached is a graph of the averages of the standard counts that have been used on one counter for approximately one month. The counts have been converted to counts per minute so that they may be more readily compared with your graph. The drop in counting rate near the right end of the graph was an indication of possible trouble. The electronics service man was consulted and if a further drop had appeared on September 16 the counter would have been turned over to him for checking and servicing.

We would be interested in learning more about your neutron counting methods. Do you use a Ra-Be source and what is its value?



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How many days counting are covered by your graph of source counts/minute vs items? Are the counts plotted on the graph all the counts taken or are they selected or averaged? Are the first and second group of counts both compared to the same source? What period elapsed between the first and second group of counts?

Yours very truly,



P. J. Lowry  
Chief of Control Section

HFD:mg

- Copy 1 - E. J. Walko w/enc.
- 2 - F. H. Langell w/o enc.
- 3 - J. J. Burbage w/o enc.
- 4 - J. H. Roberson w/o enc.
- 5 - E. C. McCarthy w/enc.
- 6 - Central Files w/o enc.

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