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By J. E. Savely 615-93

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BY JW Jordan DATE 5-5-81

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Richland, Washington
June 26, 1950

P-10 STACK MONITORING

On June 14, 1950, an aluminum Kanne Chamber on the 108-B vacuum discharge line was placed in operation. The older steel chamber, operating on Beckman No. 81-409H and recording Brown point #4, gave a rather steady reading of 2.6×10^{-10} amperes just previous to cutting in the new chamber. After equilibrium reading was reached in the aluminum chamber, the reading was 1.7×10^{-10} amperes. This indicates that, at the particular time, 65% of the steel chamber current indication was due to radioactive stack gases, and the remainder to chamber contamination, leakage, or other extraneous causes. It was not possible to double check or cross check this result since no facility for flushing either ion chamber is available.

At present, there are four gas monitoring stations for exhaust air from

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(1) can opening room, (2) hood room, (3) exhaust duct, and (4) vacuum pump discharge. The vacuum pump discharge line is now monitored by either an aluminum or a steel chamber under identical flow conditions. The chambers on the first three discharge lines are said to have given reasonably satisfactory service. The present criterion for satisfactory operation seems to be return to a "low" background after a production run. The vacuum pump discharge line chamber has a very poor reputation for two reasons - (1) an apparent hysteresis effect which shows as a high reading after a "slug" of gas has passed through it, and (2) failure to return to a low background current. Cause of the hysteresis effect has not yet been established, but is probably the distribution of tritium in the vacuum pump discharge gas. The rate of gas flow through the Kanne chamber concerned here is approximately ten cubic feet per minute (by calculation).

In order to determine steps necessary to eliminate chamber contamination, the existence of chamber contamination must first be definitely established by measuring chamber background with an uncontaminated air filling at intervals during routine use. Facilities for flowing clean air through the chamber during background measurement are required if this work is to be done. With addition of such facilities, it will be practicable to evaluate chamber contamination as well as the "hysteresis" effect. This latter can be done by switching from one chamber to another during the period of suspected spurious high ionization current.

Monitor chamber currents are now recorded on a multiple point recorder whose cycle time is approximately 4 minutes. This long wait is annoying in making either experimental or routine measurements. It might also make impor-

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tant transient phenomena almost completely. It is therefore recommended that, if space considerations permit, continuous recorders be installed on each of the existing stack monitoring chambers. A recorder of the Esterline-Angus or General Electric milliammeter type would be applicable. This is already planned for the expanded facilities, and would be extremely valuable with existing facilities for the experimental work necessary.

In summary, the writer feels that the following steps should be taken to facilitate the necessary stack gas measurements:

1. Provide clean air flushing facilities for both Kanne chambers on the vacuum pump discharge line.
2. Replace existing recorder with continuous recording facilities for each point.

R. J. B. [Signature]

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