

Mound Laboratory - Miamisburg, Ohio

TR-78

July 13, 1961

MOUND LABORATORY-MONSANTO  
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Trip to Savannah River Plant on  
June 12 - 13, 1961

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Dr. John F. Eichelberger - Research Director

Introduction

Since a "Tritium Gas Collection and Processing System" is being planned at Mound Laboratory, a trip was made to SRP by G. L. Deniston, Engineering Division and D. R. Spangler, Research Division to discuss their experience in the recovery of tritium from a gas stream. The discussion was held principally with J. Eckenrode, R. Weeks and J. Koonce of H-232 area at SRP.

The design of their "Stripper and CA Bed System" was explained to us in detail. Their system is designed to recover tritium from the upstream side of a vacuum system. Thus, the whole system operates at reduced pressure and efficiency. Prints of their equipment will be sent us upon our written request. Following the discussion, the equipment was viewed in Building H-232.

The possibility of burying our tritium-contaminated waste, gas and water that is not profitable to recover was discussed with J. Conaway. Although he could foresee no trouble in disposing of much of our waste, he suggested that the arrangements be made between our two AEC offices.

Stripper System

This system converts tritium gas to water vapor. Before the gas enters the stripper bed, it is necessary to remove the oil vapor from the vacuum pumps. This would poison the bed. This oil is removed by a "Kao-Wool" filter. The bed contains Hopcalite, a mixture of copper oxide and manganese oxide, and is maintained at 700°C. Their bed is 24" long and 6" in diameter with an average flow of about 10 liters STP of gas per minute. They believe that in their system the stripper is better than 90 per cent efficient. No regeneration of this bed is necessary if the gas stream contains some oxygen.

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CA Bed

This part of the system removes the tritiated water vapor from the stream. Since most of the tritium is in form of water at this point in the system, the effluent contains very little tritium. Their system operates, by necessity, at about 50 millimeters Hg<sup>0</sup> pressure. At this pressure, the effluent contains 40 parts per million water vapor. At higher pressures, which Mound's system will use, they believe we could approach several parts per million water vapor. The flow is about 10 liters per minute.

SRP beds measure 31 inches long and 4 inches in diameter and contain 4000 grams of Linde Molecular Sieve, 5A. Two are used in series. These beds are regenerated at 600°C and the resulting water vapor reduced with hot magnesium to hydrogen isotopes.

Safety

There is concern over a possible explosion in a system that contains hydrogen. SRP limits their input to a 2.5 percentage of hydrogen isotopes. Once the percentage rose to this amount without an explosion, but still they believe the danger exists. With our system, SRP suggests that we continuously monitor the input gas to assure that no explosion mixture exists.

All of their beds have a "calorized" interior. This process coats the stainless steel with aluminum and reduces by a factor of 100 the hydrogen diffusing through the walls at higher temperature.

Donald R. Spangler  
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Research Division

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