

696157

WSRC-MS-94-0490X

## **Tritium Stripping in a Nitrogen Glovebox Using Palladium/Zeolite and SAES St 198 (U)**

by

J. E. Klien

Westinghouse Savannah River Company

Savannah River Site

Aiken, South Carolina 29808

J. R. Werner

Westinghouse Savannah River Company

SC USA

A document prepared for FIFTH TOPICAL MEETING ON TRITIUM TECHNOLOGY IN FISSION, FUSION AND ISOTOPIC APPLICATIONS at Belgirate, Lake Maggiore from 05/28/95 - 06/03/95.

DOE Contract No. DE-AC09-89SR18035

This paper was prepared in connection with work done under the above contract number with the U. S. Department of Energy. By acceptance of this paper, the publisher and/or recipient acknowledges the U. S. Government's right to retain a nonexclusive, royalty-free license in and to any copyright covering this paper, along with the right to reproduce and to authorize others to reproduce all or part of the copyrighted paper.

## TRITIUM STRIPPING IN A NITROGEN GLOVEBOX USING PALLADIUM/ZEOLITE AND SAES ST 198™

J. E. Klein and J. R. Wermer  
Westinghouse Savannah River Company  
773-A, Savannah River Site, Aiken, SC 29808, USA

Tritium stripper experiments which mock-up the use of a palladium deposited on zeolite (Pd/z) stripper bed and a SAES St 198™ stripper bed for a full-scale (10,500 liter) nitrogen glovebox have been completed. These tests were conducted in a 620 liter glovebox. The stripper system, located inside the glovebox, consisted of a single stripper bed where the glovebox atmosphere is drawn through the stripper by a blower. Experiments consisted of a release of a small quantity of protium/deuterium spiked with 0.2 to 10 curies tritium which were scaled to simulate tritium releases in the full-scale glovebox ranging from 0.03 to 30 g (0.005 to 5 moles). An ion chamber located within the glovebox and ion chambers on the inlet and outlet the stripper column were used to monitor the tritium removal performance of the stripper.

The Pd/z stripper system, operating at glovebox atmosphere turn-over times ranging from 75 to 148 minutes produced a reduction in tritium activity of two to three orders of magnitude after 15-20 hours. The Pd/z column was operated at ambient temperatures with nominal oxygen concentrations ranging from 0.4 to 1.1 percent. A persistent background tritium activity of nominally  $1 \times 10^4 \mu\text{Ci}/\text{m}^3$  limited glovebox decontamination factors to two to three orders of magnitude. Attempts to reduce the glovebox activity to lower levels by releasing water into the box, releasing additional deuterium, and installation of additional Pd/z and carbon beds were unsuccessful.

The SAES St 198™ stripper system, operating at turn-over times between 172 and 281 minutes produced a reduction in tritium activity of approximately two orders of magnitude within 24 hours. The SAES St 198™ column was operated at elevated temperatures with oxygen levels on the order of 10-160 ppm. The same persistent background tritium activity experienced during the Pd/z tests were also observed during these tests. The SAES St 198™ material was not only capable of stripping tritium from the glovebox atmosphere, but was also effective in maintaining the glovebox oxygen level near 10 ppm.

This document was prepared in connection with work done under Contract No. DE-AC09-89SR18035 with the U.S. Department of Energy.