TO: Distribution  
FROM: Dunlap Scott  
SUBJECT: Niobium and Ruthenium in the MSRE Offgas Particle Trap

The particle trap, which was replaced during the shutdown starting July 17, 1966, contained $^{95}$Nb and $^{103}$Ru in surprising amount. These fission products normally are not considered to be gases and do not have gaseous precursors to explain their presence so far from the pump bowl. The transit time from the pump bowl to the particle trap is in excess of 30 minutes. The information given below are the relative disintegration rates of these two fission product and of $^{140}$Ba and $^{137}$Cs taken from a γ-ray energy scan taken on a single sample from the particle trap. A summary of the results of the examination of the particle trap will appear in the February 1967 MSR Progress Report, but this information was not included.

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Disintegration Rate</th>
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</thead>
<tbody>
<tr>
<td>$^{140}$Ba</td>
<td>2.7x10^5 dpm</td>
</tr>
<tr>
<td>$^{95}$Nb</td>
<td>1.25x10^6 dpm</td>
</tr>
<tr>
<td>$^{103}$Ru</td>
<td>4.1x10^6 dpm</td>
</tr>
<tr>
<td>$^{137}$Cs</td>
<td>8.8x10^6 dpm</td>
</tr>
</tbody>
</table>

When counted on 1330 11/10/66:

Corrected to reactor shutdown 7/17/66:

- Comments:
  1. The sample was removed from the steel mesh at the entrance to the particle trap. The weight of the sample is unknown, however, the counting data was taken on a single sample in a fixed geometry such that the relative counting rates should be within ±10%. (The sample size was governed by the acceptable level for the counter.)
  
  2. Other information obtained from similar samples indicate that there was essentially no fuel salt at the particle trap. (The mass spectrographic analysis results indicated that the fission products Ba and Sr concentrations were over 100 times the concentration of the fuel salt constituents Be and Zr.)
  
  3. This sample was taken from a region which had been elevated to temperatures above 1200°F by the decay heat of the fission products deposited there during reactor operation.

The second particle trap which was removed in January 1967 is being saved for examination as time permits. At the present the purpose for the examination is to determine if the cause of the pressure drop is the same.
as for the first trap previously examined. If there is sufficient interest in particular information, which may be gotten from the trap, a limited program could be established. I would be glad to discuss the trap at almost any time but would appreciate receiving any suggestions by May 15, 1967.

DS: jb

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