To: C. E. Bettis
From: Stanley Cantor
Subject: Estimated Viscosities of BeF$_2$-Containing Salts Suggested as MSBR Coolants

Recently R. E. Thoma (MSR 67-76, memo of September 21, 1967) has proposed three BeF$_2$-containing salt mixtures as possible MSBR coolants. Estimates of the viscosities of two of these salts are given in the table below; the third mixture (57-43 mole % NaF-BeF$_2$) was not considered because it possessed the highest liquidus temperature and highest viscosities.

<table>
<thead>
<tr>
<th>Mixture (mole %)</th>
<th>Viscosity Equation</th>
<th>Viscosity (Cp) at 700°F</th>
<th>Viscosity (Cp) at 988°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>LiF 31.5 NaF 31  BeF$_2$ 37.5</td>
<td>$\eta(Cp) = 0.0745 e^{4540/T(°K)}$</td>
<td>86.6</td>
<td>21.1</td>
</tr>
<tr>
<td>LiF 5 NaF 53  BeF$_2$ 42</td>
<td>$\eta(Cp) = 0.0465 e^{5090/T(°K)}$</td>
<td>133</td>
<td>26.2</td>
</tr>
</tbody>
</table>

Cp $\equiv$ centipoise

The viscosity-temperature equations given in the table were derived empirically from two sources:

(a) data obtained at ORNL on the LiF-BeF$_2$ system (MSRP Semiann. Progr. Rept. Feb. 28, 1965, ORNL-3812, p. 145),

(b) data obtained at Mound Laboratory on the NaF-BeF$_2$ system (Blanke et al, MLM-1079, Sept. 1958).

The viscosities predicted from these two equations are probably accurate to within $\pm$ 25%.

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CC: Distribution
Distribution

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