5.0 ANTIMONY-BERYLLIUM (Sb-Be) PELLETS

5.1 THERMAL/PHYSICAL PROPERTIES

5.1.1 DENSITY

A minimum room temperature geometric density of [ ] is required (a,c)
to meet Materials Specification requirements. Since the Sb-Be pellets
are [ ], the 100 percent
theoretical density is [ ] based on densities of 6.68 g/cm^3 and (a,c)
1.85 g/cm^3 respectively for Sb and Be[1]. (a,c)

5.1.2 MELTING POINT

The melting point of the Sb-Be mechanical mixture is expected to be
630.5°C (1167°F)[1], the lowest (Sb) melting point of the two consti-
tuents. Westinghouse measurements of the melting point for a Sb-Be
pellet recorded melting points of [ ] upon heating. It (b,c)
seems probable impurities within the Sb caused the slight lowering of
the melting point from the established value.

For design purposes, a minimum melting point of [ ] should (b,c)
be used for Sb-Be pellets.

5.1.3 THERMAL EXPANSION

Westinghouse obtained thermal expansion data on two pellets of different
densities [ ]. No significant difference in (b,c)
expansion results was observed although the lower density pellets gave
higher expansion coefficient results. Data is presented in Figure
5.1-1 for temperatures up to 850°F and is represented by the following
equation used in design:

[ ] (b,c)

10.2 CHEMICAL PROPERTIES

10.2.1 CHEMICAL COMPOSITION

The chemical requirements for the individual B_4C and Al_2O_3 powders are those given in Section 8.2.1 and ASTM F7 respectively. The nominal chemical requirements on the pellets are limited to restricting impurities as follows:

Element	Maximum Weight Percent
[	]+ (a,c)

10.2.2 CHEMICAL COMPATIBILITY

Al_2O_3-B_4C: H_2O

Section 8.2.2 established that irradiated B_4C readily corrodes in coolant water. Since the Al_2O_3-B_4C pellet [ ],+ the B_4C particles in the Al_2O_3 matrix would have intimate contact with coolant water should it enter the rodlet, and the boron would likely be readily leached from the pellets. (a,c)

*Typographical Error