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Letter to Z. P. Zaveniagin, 'Regarding the Choice of Devices for Strategic Use'

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Summary:

Report describing the relative merits of the RDS-27 and the SD nuclear weapon designs for use on the R-7 "Semyorka" ICBM.

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To Comrade A.P Zaveniagin,

It is necessary at this time to determine the type of main compression device that will be chosen for strategic use.

Calculations made throughout 1954-5 showed that within the [parameters of the] overall dimensions of the RDS-6 system, and at the expense of (…) kg U235, it is possible to make the following products: One SD type device with a yield of 1.8 million tons, with a zone of destruction of 12.2 kilometers in diameter (the area of the zone of destruction would be 117km2).

. Two SD type device, with a yield of 1 million ton each, with a zone of destruction of 10 kilometers in diameter (the total area of the zone will be 156km2).

. Five RDS-27 device with a yield of 0.35 million tons each, with a zone of destruction 7 kilometers in diameter (total area=190 km2).

If one takes into account the cost of the carrier (the R-7 rocket), and of lithium deuteride six, then the cost of one SD device with a yield of 1.8 million tons would equal the cost of 4 RDS-27 devices. Thus the ratios between the zones of destruction of the two devices will not be 190:117, but 152:117.

In our opinion, the RDS-27 is the optimal normal compression strategic device. This system gives us the greatest area of destruction, will provide great flexibility, and the opportunity to destroy a maximal number of targets. It also increases the likelihood of hitting the target in case of the downing of the delivery vehicle, or in case of a significant [unclear] under fire.

An important practical implication of our view is the necessity of the deployment of long-range rockets and aircraft, in accordance with the production of the U235 as outlined in our calculations.

A. Alexsandrov

Iu. Khariton

A. Sakharov

Ia. Zel'dovich

21 April 1955