

Future of the Nuclear Deterrent, 12 December 1978  
18 page paper from the Chief Scientific Advisor

Annex A: Unacceptable Damage

Original classification Top Secret UK Eyes A

Generalised destruction

“4. The choice of large cities as targets would pose a generalised threat against those elements of governmental, military and industrial capabilities which were located in the main urban areas and not specially protected against nuclear attack, as well as threatening more general damage to the infrastructure of Soviet society and widespread civilian deaths and casualties. In addition to their importance as population and governmental/industrial centres, certain cities may also have a symbolic importance. Both Russian tradition and preservationist practice suggests that special value, beyond that of material assets, is attached to certain places and that Moscow and Leningrad are particularly important in this sense. For city targets, we need to consider the scale of damage to be threatened against each city and the number of cities which need to be so damaged in order to reach an unacceptable level.”

“5. In the targeting of our existing nuclear capabilities against Soviet cities under present war plans, the damage criterion used is based not on destroying the whole city or killing a specified number of people but instead on creating sufficient damage to bring about the breakdown of the city as a functioning community. Our present plans assume that, to achieve this, 40% of the target area should suffer severe structural damage (SSD) – that is, its unhardened buildings should be so damaged that they could not be used for their intended purpose without essentially complete reconstruction. An attack at this level would ensure that in about a further 15% of the area buildings would be so damaged that they needed major repairs; and in only about 15% of the total area would buildings escape any damage at all. Casualties cannot be precisely estimated since they would depend upon a number of factors including the type of nuclear explosion used, the distribution of the population within the city at the time of attack, and the nature of the precautions taken. Assuming that the warheads were detonated in the air at the optimum height to maximise blast damage, against a target with a uniformly distributed, unwarned population occupying buildings with load-bearing walls, at least 40% of those in the city at the time of the attack would be likely to be killed outright, a further 15% might be so seriously injured that they needed to be treated in hospital, and another 15% suffer light injury.”

“6. We believe that the deterrent effect of the threat we are posing would be weakened should the Soviet Union ever be confident that the consequences of a nuclear attack for the population itself (although not for the buildings in which they lived) could be significantly mitigated. Increasing the area of each target subjected to SSD would not provide an adequate counter to civil defence since the additional threat would be primarily of further blast damage against which shelters do provide protection. The civil defence programme would not, however, provide adequate protection against the

risk arising if warheads were to be ground rather than air-burst. An attack of sufficient weight to cause SSD over 40% of Leningrad using air-bursts would inflict similar damage over only half this area if the warheads were ground-burst. But, in near-still-air conditions, ground-bursts would subject 55-60% of the city to a radiation dose sufficient to cause rapid debilitation followed by death for most people in the area, and to contaminate food, water, air and both damaged and undamaged buildings. Residual radiation would remain a hazard for many years to come. If there was a wind, the fall-out could be carried beyond city limits to extend the hazard to people locally dispersed. A civil defence programme on present lines would be an inadequate counter to a threat of this sort."

"9. There is no simple way of calculating an appropriate damage criterion against each target since the effects of nuclear explosions cannot be precisely predicted and we are, in any case, concerned for deterrence with Soviet perceptions of the threat. Some assumptions have to be made, however, in order to calculate warhead requirements to implement alternative options. For this purpose, we believe the existing criterion of 40% SSD assuming air-burst warheads is appropriate, but that a somewhat lower figure could be acceptable if this standard proved very difficult to meet. We believe that, provided we left open the possibility that the warheads might be detonated as ground-bursts (which would involve no change in our present policy of not commenting on such matters) and retained flexibility in the targeting of our nuclear weapons, the Soviet Union could not be confident that civil defence measures would significantly reduce the deterrent threat posed against each target"

"10. There remains for consideration the question of the scale of the total damage which needs to be threatened in order to deter. We need to consider the perception by the Soviet leadership of the acceptability of such damage and its consequences for the numbers killed, injured, and rendered homeless, as well as for their subsequent ability to pursue their objectives both domestically and internationally. Russian history suggests that their leaders threshold of horror at widespread loss of human life may be higher than ours: but an ability to absorb previous losses incurred over a period of years may not be a good guide to the acceptability of a catastrophic loss of population in a single attack. Looked at in terms of their ability subsequently to govern as they would wish, we do not believe they would be indifferent to the problems likely to be posed by the need to divert scarce resources to domestic reconstruction and by the risk of public disaffection if catastrophic damage had been created as a result of an aggressive Soviet foreign policy. These considerations support our conclusion in paragraph 12 of the report that any one of the options identified would constitute an unacceptable level of damage."