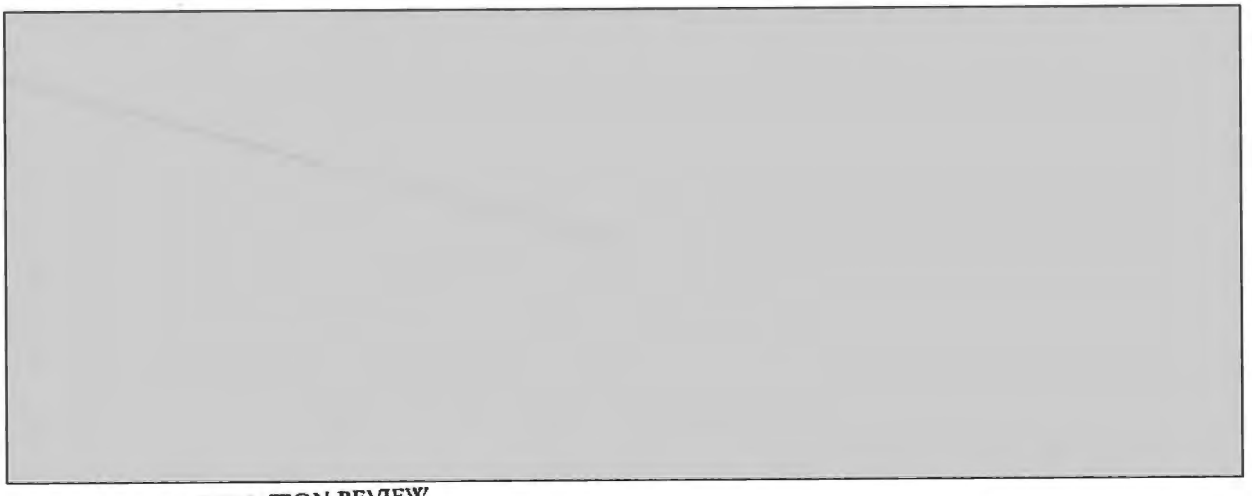
LAND BASED INTERCONTINENTAL BALLISTIC MISSILES

1. The Soviets began ICBM development in the early 1950s and deployed their first operational systems, the SS-6, SS-7, and SS-8, in the early 1960s. Since then they have fielded additional generations of newer and more capable ICBMs, culminating in the MIRVed and highly accurate systems now being deployed. Table 1 provides a historical overview of Soviet ICBM deployment; TableA-1 an estimate of current and future Soviet ICBM deployment levels and Table A-6 characteristics of operational Soviet ICBMs.

2. The capability of any missile system against hard targets depends primarily on its yield and accuracy. The older SS-7 and SS-8 systems (which have all been deactivated) had a CEP of about 1.0 nm with yields of 2.0 to 5.0 MT which does not provide a hard target capability. The Soviets achieved their first hard target capability with deployment of the SS-9 in 1966. Initially, there were varying estimates of accuracy and yield of the SS-9 MOD 1 and MOD 2. The effects of these two variables--accuracy and yield--on the SS-9's hard target capabilities are shown in TABLE 2. It summarizes, in percentage terms, the likelihood of disabling a Minuteman silo or LCC by rendering it incapable of launching a missile. The Table is based on the susceptibility of Minuteman launch facilities solely to air blast and ground shock with doors closed. It does not consider the SS-9 force size or reliability.

3. Figure I compares the hard target capabilities of the various Soviet ICBMs in the operational force prior to 1975. It depicts the single shot probability of disabling a Minuteman silo with doors closed, by means of air blast and ground shock. Despite some uncertainty in estimates of accuracy and yield, which results in a range of probability values (the midpoint of which is used for each of the missile systems), the figure clearly shows that, prior to 1975, the SS-9 MOD 1 and MOD 2 were the only Soviet ICBMs with the combination of accuracy and yield which could be effective in attacking hard targets.

(b)(1)



5. This capability, however, is dependent upon the successful employment of the two-on-one targeting technique to increase the probability of damage. Use of this technique could be relatively easy if the nuclear effects of the first RV were allowed to dissipate before the second is employed. But this could take an hour or so, more than enough time for the side attacked to launch its surviving missiles. Thus, for the attack to be effective, the two RVs would have to be closely spaced in time. Such spacing would increase the risk that the second RV would be disabled or thrown off course by the effects of the first detonation. Analysis of the phenomenology indicates that a "window" would occur about 5 to 60 seconds after the first detonation during which a second RV could reliably reach a target.

(b)(1)

[redacted]

6. With the relatively large yields of Soviet ICBM MIRVs, the requirement to compound damage by using two RVs against a single hard target would lessen considerably when the CEP of the RVs approaches (b)(1) [redacted] At that point, reliability would become a more significant factor in hard-target capability. If in-line targeting were used the damage expectancy could be no better than the nonreprogrammable reliability of the missile system. Cross targeting could overcome this limitation, but, in fact, the contribution of the second RV would be primarily to ensure the arrival of at least one reliable weapon; it would not add much to the likelihood of damage otherwise. Thus, when the Soviets are able to deploy ICBMs with (b)(1) [redacted] —we estimate this is likely in the mid-to-late 1980s—they will not have to rely on the intricacies of a two-on-one attack in which both RVs must detonate. Two-on-one attacks would still be attractive, but their purpose would be to assure the arrival of at least one reliable weapon.

TABLE 2

PROBABILITY OF DISABLING A SINGLE
MINUTEMAN SILO OR LCC
SS 9 MOD 1 AND MOD 2

CEP (nm)	0.4	0.5	0.6	0.7
Yield				
(b)(1)				

Figure 1

Hard Target Capabilities of Soviet Ballistic Missiles
Probability of Disabling Minuteman Silos

(b)(1)

This figure depicts the relative effectiveness of Soviet ballistic missiles against hard targets. Probabilities are calculated in percentage terms on the basis of a single sho[redacted]. The values shown represent the midpoint of the range derived for each missile type. Probabilities are calculated on the basis of surface bursts and according to US targeting practice using the "vulnerability number" 36P5 as a designator of Minuteman silo hardness. The probabilities are for a single incoming missile against a single Minuteman silo; no account is taken of force reliability.

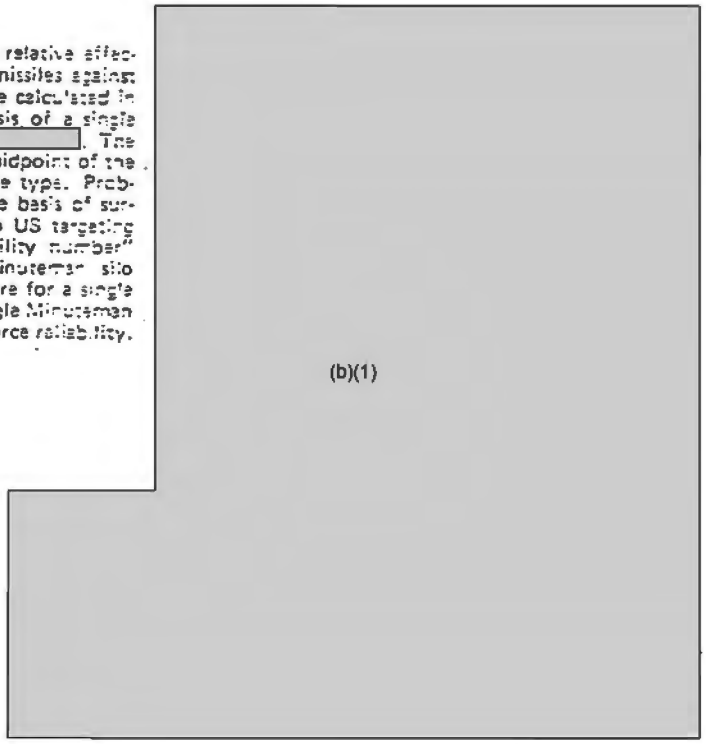


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Table 1

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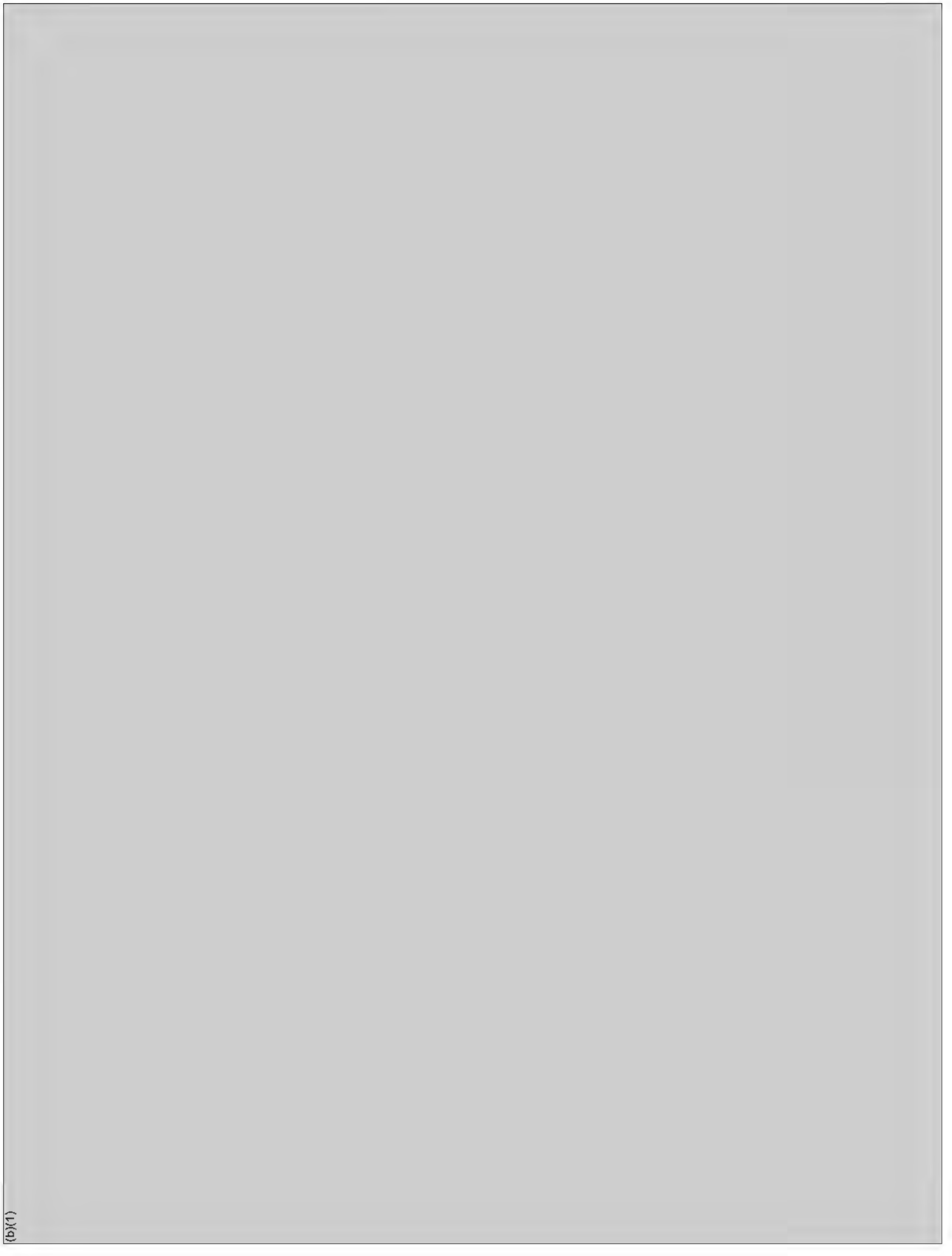
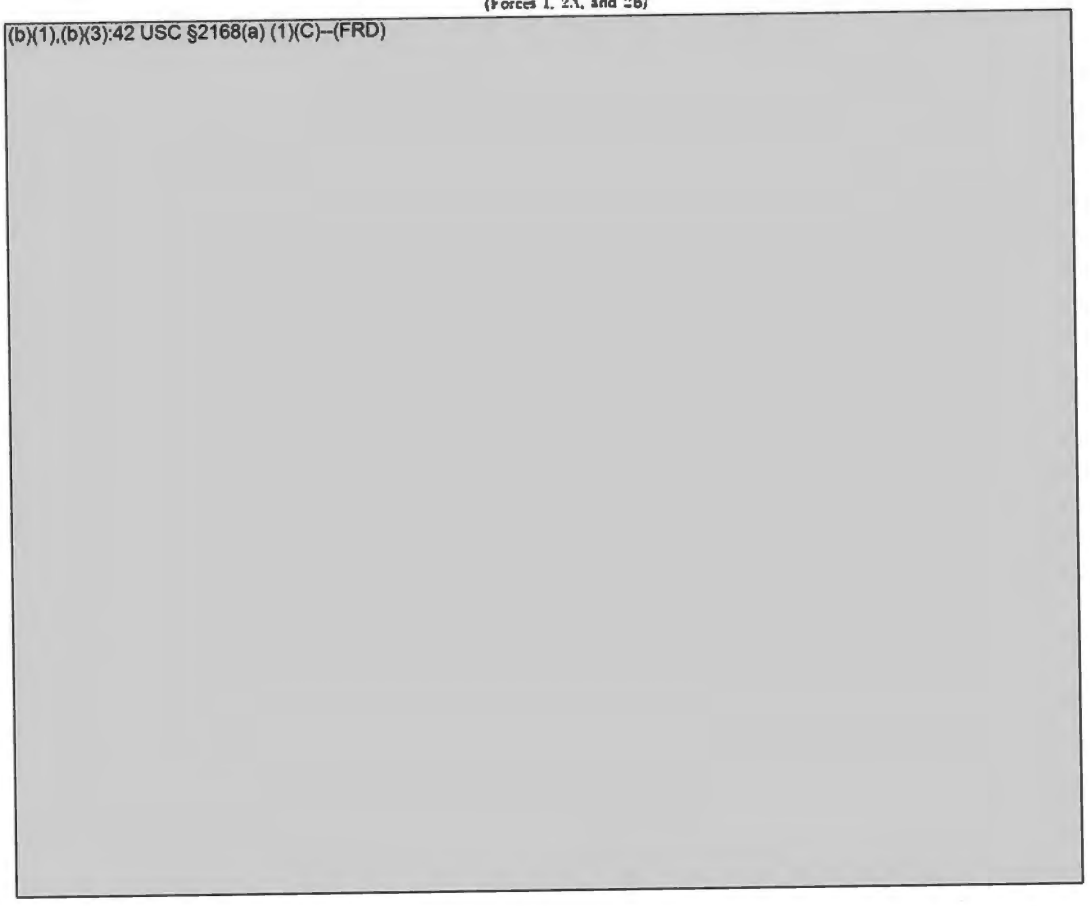
HISTORY OF SOVIET ICBM OPERATIONAL LAUNCHERS AT DEPLOYED COMPLEXES *

(b)(1)

This chart is DIA's best estimate today of force levels and growth through the years. It does not necessarily correspond to previously published figures given at those dates. Additionally, the numbers do not include launchers at missile test centers or training launchers at deployed complexes.


(b)(1)

Estimated Characteristics of Soviet Ballistic Missiles
Moderate SAL and Moderate No-SAL Forces [a]
(Forces 1, 2A, and 2B)



[a] The various agencies have developed slightly different performance figures on some systems as a result of differing interpretations of the evidence or the use of different analytical models. These differences are shown only when they are significant in themselves or when they have a major impact on our assessments of trends or strategic capability.

[b] The CEP (circular error probable) shown is the accuracy value chosen for purposes of the illustrative force projections. The values shown for CEPs of intercontinental ballistic missiles (ICBMs) are operational accuracies for mature systems which would occur three to five years after IOC. These estimates take into account systematic and other operational errors which are often encountered in the early years following initial deployment and which are usually overcome within a few years. We have no hard intelligence evidence of the magnitude of these operational degradations or of the time required to overcome them. Using engineering judgments reflecting US experience, however, we estimate that operational accuracies at system IOC (initial operational capability) are 10 to 15 percent poorer than the potential accuracy. This degradation is assumed to be reduced to 5 to 10 percent after three to five years.

[c] The amount of oralloy estimated to be available for weapons represents a significant constraint on Soviet weapon deployments and has been considered in making the four illustrative force projections. Some of the illustrative MIRVed warhead yields are lower than we would otherwise have chosen. The Soviets could choose to maximize the yield in any single system, or spread the amount of nuclear material among all systems and not maximize the yield of any one warhead.

[d] The throw weight shown represents the estimated total weight, as applicable, of reentry vehicles (RVs), decoys, dispensing mechanisms, and of the postboost vehicle (or bus), including its fuel, used to carry multiple independently targetable reentry vehicles (MIRVs).

[e] These are multiple reentry vehicles (MRVs) and, unlike MIRVs, are not independently targetable. The individual RVs of MRV payloads are counted separately in this table for purposes of expressing the estimated megaton yield per RV of the SS-11 Mod 3 and the SS-N-6 Mod 3. In the tables (A-1 through A-3) of force projections, however, the MRV payloads of these systems are counted as one RV and, of course, are not considered in calculating the totals of MIRVed delivery vehicles.

[f] The first number is for the Moderate SAL force; the second for the Moderate No-SAL forces.