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Director of
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Soviet Civil Defense

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Key Findings

Civil defense in the Soviet Union is an ongoing nationwide program under military control. The Soviets' strategic writings integrate civil defense into their military strategy. It is part of a general scheme of the likely origins, course, and consequences of nuclear war. The Soviets' experience in World War II and their traditional emphasis on homeland defense reinforce their interest in civil defense. By developing an active and extensive civil defense, in conjunction with their other defensive and offensive strategic programs, they hope to convince potential enemies that they cannot win a war with the USSR. If war should occur, the Soviets seek through civil defense along with other means to assure survival of the homeland and to leave the USSR in a stronger postwar position than its adversaries. Civil defense is meant to contribute to the maintenance of a functioning logistic base for continuing military operations, to help limit human and material losses, and to help enable the Soviets to speed recovery from the effects of nuclear war.

The Soviet civil defense program is not a crash effort, but its pace increased beginning in the late 1960s. Civil defense activities are directed by a nationwide civil defense organization consisting of over 100,000 full-time personnel located at all levels of the Soviet government and economic structure. While improvements have been made in virtually all facets of the program, it has been marked by wide variations in implementation from area to area and year to year. Bureaucratic difficulties and apathy on the part of a large segment of the population have retarded implementation in the past, though in wartime such problems would probably diminish. A sustained effort has been made to provide blast shelters for the leadership and essential personnel. Programs to protect industry by geographic dispersal have not been implemented to a significant extent, however, and there is little evidence of hardening of economic installations.

The Soviets regard the specific objectives of their civil defense program to be:

— An ability to protect people—the leadership first, the essential work force second, and the remainder of the population third.

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— An ability to protect the sources of economic productivity, to assure the continuity of economic activity in wartime, and to permit the restoration of production following a nuclear attack.

— An ability to sustain the surviving population in the period immediately following a nuclear attack, and to prepare for longer term postattack recovery.

We have assessed the state of Soviet civil defense preparations with respect to these objectives.

Protection of People:

— ***Leadership:*** The Soviets probably have sufficient blast-shelter space in hardened command posts for virtually all the leadership elements at all levels (about 110,000 people). Some of these shelters are harder than those available to the general population. All fixed leadership shelters which have been identified are vulnerable to direct attack, but we assume that alternative arrangements are available to protect at least the top leadership.

— ***Essential Work Force:*** Shelters at key economic installations could accommodate about 12 to 24 percent of the total work force. However, Soviet plans do not call for sheltering the entire work force. In a crisis, nonessential and off-duty workers would be evacuated. Only those required to maintain essential production would remain behind to be sheltered. If one-half the total work force is dispersed, from 24 to 48 percent of the remainder could be sheltered.

— ***Population:*** A minimum of 10 to 20 percent of the total population in urban areas (including essential workers) could be accommodated at present in blast-resistant shelters. By 1985, the percentage of the urban population that could be sheltered would rise to 15 to 30 percent, assuming no change in the present rate of shelter construction. Despite the scope and pace of shelter construction, the absolute number of city dwellers not afforded such protection by 1985 will increase because of the expected population growth in urban areas.

The critical decision to be made by the Soviet leaders in terms of sparing the population would be whether or not to evacuate cities. Only by evacuating the bulk of the urban population could they hope to achieve a marked reduction in the number of urban casualties. An evacuation of urban areas could probably be accomplished in two or three days, with as much as a week required for full evacuation of the largest cities. These times could be extended by shortages in transportation, other bottlenecks, or adverse weather conditions.

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Protection of the Economy: Soviet measures to protect the economy could not prevent massive industrial damage. The Soviet program for dispersal of industry appears to be offset by a contrary tendency for investments in new facilities to be inside or near previously existing installations. The Soviet measures for protecting the work force, critical equipment, and supplies and for limiting damage from secondary effects could contribute to maintaining and restoring production after an attack. We expect some improvements in the level of protection for the economy, but any radical change in its vulnerability to nuclear attack is unlikely.

Postattack Recovery: The operating elements of the civil defense program as well as a substantial number of the civilian population (a number we cannot estimate with confidence) have received training in rescue and recovery operations such as administering first aid, clearing rubble, decontaminating, and providing emergency repair and restoration of power. With at least several weeks to build up reserves and distribute supplies of food and fuel, the Soviets could probably provide adequate supplies to sustain the relocated and surviving urban population in the period immediately following a nuclear attack. Nevertheless, the coordination of requirements with available supplies and transportation is a complex problem for Soviet planners even in peacetime, let alone following a large-scale nuclear attack. We have not evaluated the potential for continuity of the Soviet government or the USSR's long-term ability to recover from the effects of a nuclear attack.

Costs: While total civil defense costs are unknown, cost estimates have been made of three major elements of the Soviet program: pay for full-time civil defense personnel, operation of specialized civil defense military units, and shelter construction. The cost of these elements in 1976 amounted to about 400 million rubles, less than 1 percent of the estimated Soviet defense budget. If these three elements of the Soviet program were to be duplicated in the United States, they would have cost about $2 billion in 1976, with about three-fourths of this representing manpower costs. (These estimates should be considered rough approximations. They are affected by uncertainties both in the quantitative data on civil defense programs and in estimates of prices.)

Effects of Civil Defense: In analyzing the effects of civil defense on levels of damage and casualties the Soviets might sustain, we simulated a hypothetical attack against high-value military and economic targets. The Soviet population as such was not deliberately targeted. For the purposes of this simulation we assumed a single retaliatory attack immediately following a Soviet first strike. Our analysis in effect tends to present a "worst case" for retaliation. For example, various times were assumed to be available to the Soviets to make civil defense preparations, ranging from a few hours to a week or more, while in each case opposing forces were assumed not to have

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progressed beyond day-to-day alert. In reality, Soviet efforts to maximize civil defense preparations could lead a potential opponent to place its forces at increased levels of readiness.

The effectiveness of civil defense in reducing casualties in the USSR and in coping with the postattack period would depend primarily on the time available to make final preparations before an attack. (The analysis considered only those casualties that occurred during the first month following an attack and resulted from prompt nuclear effects and early fallout.) Using the results of the hypothetical attack under the assumptions referred to above, we estimate that:

— Under worst conditions for the USSR, with only a few hours or less to make final preparations, Soviet casualties would be well over 100 million but a large percentage of the leadership elements would probably survive.

— The critical time for preparation appears to be about two or three days, because only by evacuating could the Soviets hope to avert massive losses. With a few days for final preparations, casualties could be reduced by more than 50 percent; most of this reduction would be due to evacuation, the remainder to shelters.

— Under the most favorable conditions for the USSR, including a week or more to complete urban evacuation and then to protect the evacuated population, Soviet civil defenses could reduce casualties to the low tens of millions.

— While many of the essential personnel sheltered at economic facilities would probably survive an attack, the Soviets could not prevent massive damage to their economy and the destruction of many of their most valued material accomplishments.

The casualty levels noted above could be increased if, for example, the attack came while an evacuation was in progress, if the size of the attack were larger, if the attack were stretched out over a longer period, if it were directed against the population as such, or if the evacuation were less expeditious than planned or impeded by adverse weather or transportation deficiencies. In assessing the protection afforded by their civil defenses the Soviets would take account of these uncertainties.

The Soviets almost certainly believe their present civil defenses would improve their ability to conduct military operations and would enhance the USSR's chances for survival following a nuclear exchange. They cannot have confidence, however, in the degree of protection their civil defenses would afford them, given the many uncertainties attendant to a nuclear exchange. We do not believe that the Soviets' present civil defenses would embolden them deliberately to expose the USSR to a higher risk of nuclear attack.

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Present evidence does not suggest that in the foreseeable future there will be any significant change in the Soviet leaders' judgment that civil defense contributes to war-fighting and war-survival capabilities, nor that their uncertainties about its actual effectiveness would be lessened. Thus, we have no reason to believe that the Soviet leaders' perception of the contribution of civil defense to their capabilities for strategic nuclear conflict will change significantly.

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DISCUSSION

1. Civil defense in the Soviet Union is an ongoing nationwide program under military control. The Soviets' strategic writings integrate civil defense into their military strategy. It is part of a general scheme of the likely origins, course, and consequences of nuclear war. The Soviets' experiences in World War II and their traditional emphasis on homeland defense reinforce their interest in civil defense. By developing an active and extensive civil defense program, in conjunction with their other defensive and offensive strategic programs, they hope to convince any potential enemy that it cannot win a war with the USSR. The Soviets seek, through civil defense along with other means, to assure the survival of the USSR if a war does occur and to come out of it in a stronger postwar position than their adversaries. Civil defense is meant to contribute to the maintenance of a functioning logistic base of operations by regular armed forces to win the war, to help limit human and material losses, and to help enable the USSR to speed recovery from the consequences of war.

2. This study focuses on the USSR's civil defense objectives and the progress the Soviets are making toward achieving them. It assesses some of the effects of Soviet civil defense preparations in reducing casualties and damage from a large-scale nuclear attack. Because we do not know much about the consequences of a large-scale attack on the functioning of a modern, industrialized society, the study deals with that relatively brief period following a strike during which the most obvious effects of a nuclear exchange would be apparent. It does not assess the Soviets' post-nuclear-attack capabilities to conduct military operations or their longer term prospects for political cohesion and reconstitution of the economy.

3. We have attempted to describe the Soviet program in a way that would allow for an assessment of the confidence that the Soviet leaders place in the program—the degree to which their civil defense makes them feel more able to withstand the consequences of a strategic nuclear exchange. A principal effort has been to analyze what the effect of an attack on the Soviet Union would be—to assess the degree of protection provided for the leadership, for the economy, and for the population.

Objectives, Priorities, and Pace

4. The Soviets regard the specific objectives of their civil defense program to be:

— An ability to protect people—the leadership first, the essential work force second, and the remainder of the population third.

— An ability to protect the sources of economic productivity, to assure the continuity of economic activity in wartime, and to permit the restoration of production following a nuclear attack.

— An ability to sustain the surviving population in the period immediately following a nuclear attack and to prepare for longer term postattack recovery. (See the tabulation below.)

5. In terms of actual priorities, the Soviet program appears to hew closely to what its organizers have declared their intentions to be. The first priority is to protect people. In support of this part of the program, the Soviets have built blast shelters, established relocation sites, and developed evacuation plans. The

Objectives and Priorities of Soviet Civil Defense

Program Objectives	Priority Tasks
Protection of Human Resources	Sheltering and relocation of the leadership Sheltering and dispersal of essential workers Sheltering and evacuation of the urban population Stockpiling food and medical supplies
Continuity of Economic Activity in Wartime	Integration of civil defense and economic mobilization plans Rapid shutdown of industrial facilities Permanent and hasty hardening of installations and equipment Crisis relocation of economic enterprises Stockpiling reserves of materials Geographic dispersal of industry
"Liquidation of Consequences of Enemy Attack"	Preparation of military and civil defense formations Training in rescue and recovery Preparations for distribution of food and essential supplies

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second priority is to maintain the continuity of economic activity in wartime. Much of the action on this part of the program appears to have been directed toward providing protection for the work force. The third priority, "liquidation of the consequences of an enemy attack," involves the training of a substantial number of the civilian population in postattack operations such as administering first aid, clearing rubble, decontaminating, and providing emergency repair and restoration of power.

6. The pace of the Soviet civil defense program is affected on the one hand by commitments of the leadership to realize progress in peacetime preparations, and on the other by the reluctance of some ministries, industrial managers, and local officials to dedicate scarce resources to what they regard as a secondary requirement and by apathy toward civil defense among a large segment of the public. While it is not a crash effort, the pace of the program increased in the late 1960s. Civil defense preparations are continuing, but the extent of implementation of civil defense measures varies from area to area.

Organization

7. A publicly recognized, highly structured, military-controlled civil defense organization exists at all levels of the Soviet government and economy, with the head of every organization designated "chief of civil defense." The national organization is led by General of the Army A. T. Altunin, a Deputy Minister of Defense. Full-time civil defense staffs exist at each echelon of the Soviet administrative structure: national, republic, oblast, city, and rayon, as well as at all significant economic institutions and enterprises.

8. The operating elements of the Soviet civil defense program—those that would carry out postattack recovery—consist of a large number of military civil defense units, communications elements, and civilian civil defense formations. We estimate the number of full-time civil defense personnel to be more than 100,000. Counting all civilian units and formations according to guidelines issued by General Altunin in 1975, the total number of people in the program would be upwards of 16 million—a number that includes many perfunctory participants.

9. The peacetime effectiveness of the civil defense organization suffers at times from the reluctance of industrial officials to spare labor and other resources for civil defense and from misunderstandings between civil defense officers and Soviet civilians. In wartime, increased centralization of authority would probably reduce many of the bureaucratic inefficiencies inherent in this large organization. But the fact that the organization exists, despite its problems, and the fact that progress is being made toward fulfillment of the objectives of the civil defense program give Soviet civil defense leaders some confidence in their ability to function as required. On the whole, the Soviets' view of their civil defense organizational structure probably is a favorable one—overall, better than it was before the military assumed control of it in the early 1970s.

10. The Soviet leaders' emphasis on civil defense also offers the potential to foster favorable popular attitudes toward the Soviet system, to demonstrate leadership concern for the people, and to lend credibility to calls for vigilance against potential enemies. Nearly every Soviet citizen receives civil defense instruction either in school or through training courses, lectures, and exercises at places of work. Public attitudes about surviving a nuclear war remain skeptical, however, and there is evidence that many people do not take the program seriously. Nevertheless, the Soviet people would respond to directions from civil defense authorities.

Protection of People

11. ***Leadership.*** When we speak of measures for the protection of the leadership, we refer not only to the top national leadership but also to some 5,000 party and government officials at the national and republic level; 63,000 party and government leaders at kray, oblast, city, and urban rayon level; 2,000 managers of key installations; and about 40,000 members of civil defense staffs—about 110,000 people in all.

12. Throughout the Soviet Union there is a pattern of shelter construction for this leadership. It consists of hardened underground shelters near places of work and relocation sites outside the cities. Hardened command posts have been constructed near Moscow and at other sites. Some of these shelters are harder than those available to the general population. The pattern of local shelter and relocation sites extends from government ministries to party headquarters and oblast and city governments and includes sites for major industrial enterprises as well. While we do not know much about exact amounts, it is probable that these shelters generally have some stockpiles of food, medicine, protective equipment, communications, and other supplies for their prospective occupants.

13. The Soviets probably have sufficient command post shelter space for virtually all the leadership elements as defined in this paper (that is, about 110,000 people). This estimate takes into account

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space required for supplies, communications, and work area. All fixed leadership shelters which have been identified would be vulnerable to direct attack, but we assume that alternative arrangements are available to protect at least the top leadership.

14. ***Essential Personnel.*** Soviet plans for protection of essential personnel include sheltering at their places of work and rotation of off-shift personnel outside of likely target areas. The Soviets could probably shelter about 12 to 24 percent of the total work force at key industrial installations. This assumes shelter occupancy factors of 1 square meter or 0.5 square meter per person—factors that are mentioned in Soviet civil defense manuals. The actual percentage of on-duty workers that could be sheltered during a crisis would be considerably higher. Only those required to maintain essential production would remain behind to be sheltered. If one-half the total work force is dispersed, from 24 to 48 percent of the remainder could be sheltered.

15. ***Population.*** Soviet plans call for moving people to in-place blast shelters as well as for the evacuation of population from urban target areas. Assessments of the effectiveness of this part of the Soviet program are highly dependent on the scenario chosen, but tentative evaluations are possible. Nationwide the Soviets have probably constructed more than 15,000 blast-resistant shelters (including those at economic facilities) that can protect 10 million to 20 million people, depending on whether the shelter occupancy factor is 1 or 0.5 square meter per person. This is roughly 10 to 20 percent of the total population in cities of more than 100,000 people. We are confident that more extensive analysis would result in an upward, not downward, adjustment of this figure, but we are unable to say by how much.

16. Some additional protection would be available to the Soviet population in the form of subway tunnels and stations. The Moscow subway, for example, has 92 underground stations and more than 150 kilometers of tunnels. We estimate that between 240,000 and 480,000 persons could be sheltered in the station areas and four times that number in the track tunnels, for a total of 17 to 34 percent of the population of the city. This total is in addition to the number that could be sheltered in the previously discussed shelters. The five other operating subway systems in the USSR could provide an additional increase in the total sheltered population. However, we have not included subways in our estimate of total shelter capacity because the subways could be intended for evacuation and because of our uncertainty about the existence of life-support systems in the subways.

17. We estimate that 75 to 90 percent of the people in urban shelters would be adequately protected from the blast and other prompt effects of a nuclear attack that was intended to maximize damage to industrial and military targets. On the other hand, evacuation of the bulk of the urban population would be necessary in order to achieve a marked reduction in the total number of urban casualties.

18. Soviet writings state that the order to evacuate cities would be given during the "special period"—a period of high tension and increased risk of war. This order would be disseminated to the public via the mass media. Individual installations would use available means to notify personnel of the time and place for staging their evacuation. Factories, offices, schools, or bus and train stations would serve as embarkation points. According to Soviet planners, the population would have only a few hours to prepare for an evacuation following the order to do so. On their arrival at assembly points, people would board buses or trains, or would begin walking toward their previously assigned relocation areas. Those persons destined for remote areas would be evacuated first to intermediate points, where they would rest and be fed by local authorities. There is no evidence that evacuation exercises in large cities involving the actual movement of people have been practiced. There is evidence of small-scale evacuations and numerous exercises primarily involving civil defense staffs.

19. Theoretical studies indicate a range of times necessary to accomplish evacuation, depending primarily on the availability of transportation. For evacuation employing motorized transport—buses, trucks, trains, and cars—one to four days would be required for the last group of evacuees to reach their relocation area. If the evacuation were carried out on foot, a week or more would be required to evacuate the larger cities. Using some combination of motorized and foot transport would reduce the required time to less than a week. Unusually severe weather could slow the pace of evacuation and affect a local decision to evacuate. On an average, two or three days would probably be required to evacuate the major portion of the Soviet urban population.

20. Soviet planning recognizes that the evacuated portion of the population must be provided fallout protection. Plans and some materials exist for upgrading existing structures and constructing hasty shelters in rural and exurban areas. However, as a practical matter, the bulk of the evacuated population would initially have about the level of protection afforded by upgraded basements and interior rooms of standard Soviet rural structures. Under ideal circumstances,

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with a week or so to evacuate urban areas and to modify existing structures and construct hasty shelters, the evacuated population could be afforded high levels of protection.

Protection of the Economy

21. Plans for protecting the Soviet economy include a number of complementary measures, not all of which are to be taken at any individual site but which could apply selectively depending on a site's importance to a wartime economy. These measures include:

— Sheltering personnel at installations in the event of attack.

— Dispersal of a portion of the work force during a period of crisis.

— Emergency relocation of certain installations.

— Geographic dispersal of new installations.

— Hardening of physical structures.

— Hasty hardening measures when an attack is imminent, such as sandbagging of equipment and mounding of earth around structures.

— Rapid shutdown of equipment.

22. In their programs to protect the economy, the Soviets have given first priority to protection of personnel at economic facilities. Their plans for protecting the work force are related directly to the importance of the place of work both in terms of its output and its contribution to postattack recovery. Some industries and other enterprises will continue to function on a two-shift basis, with one shift dispersed outside of urban areas and the other protected in blast shelters at or near its installation. Some enterprises are considered nonessential and will stop operations, and others will be relocated in time of crisis.

23. The Soviet program for geographic dispersal of industry is, as far as we can tell, not being implemented to a significant extent:

— New plants have often been built adjacent to major existing plants.

— Existing plants and complexes have been expanded in place.

— No effort has been made to expand the distance between buildings or to locate additions in such a way as to minimize fire and other hazards in the event of a nuclear attack.

— Previously open spaces at fuel storage sites have been filled in with new storage tanks and processing units.

The value of overall productive capacity has been increased proportionately more in previously located sites than in new areas, raising even more the vulnerability of industry to attack.

24. Little evidence exists that would suggest a comprehensive program for hardening economic installations. Published Soviet civil defense guidelines acknowledge the high cost of such measures and explicitly state that they are to be carried out only when economically feasible. The Soviets appear to have given greater emphasis to rapid shutdown of equipment. The emphasis in this scheme seems to be on protecting vital equipment and installations from secondary damage triggered by prompt effects of a nuclear attack, such as ignition of combustibles, and on facilitating longer term recovery of installations after an attack.

25. Overall, the measures the Soviets have taken to protect their economy would not prevent massive damage from an attack designed to destroy Soviet economic facilities. At best, Soviet leaders and civil defense planners are probably confident that, through rapid shutdown and emergency repairs by the surviving work force, limited production at slightly or moderately damaged sites could be restored soon after an attack. We have not assessed the Soviets' long-term ability to reconstruct their economy.

Postattack Recovery

26. The Soviets characterize recovery activities in the postattack period as measures for the "liquidation of the consequences of an enemy attack." We are uncertain how effective Soviet civil defense would be in such postattack operations as rescue and recovery, sustaining the surviving population, and maintaining government control. There is evidence, however, of Soviet preparations for the postattack period.

27. Soviet plans require that rural civil defense staffs and formations prepare for protection of livestock and growing areas from fallout, with emphasis on safeguarding the current harvest. In the USSR, food storage and food processing are activities performed outside urban areas of greater than 50,000 population. In addition to the normal peacetime levels of food supplies stored above ground, there are buried or semiburied food storage facilities outside urban areas. Also, food storage in the USSR varies seasonally. We are uncertain how long the surviving population could be sustained on the undamaged food stores after an attack.

28. Supplies of petroleum products and coal in the USSR would last for perhaps a month at prestrike

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consumption levels. Reduction of these supplies by nuclear attack and the disruption of local distribution could be offset by energy conservation measures, alternate fuel sources, and a decrease in industrial demand. Sufficient stocks of fuel would therefore probably be available in the near-term postattack period to sustain the needs of the surviving population.

29. In the immediate postattack period, treatment of trauma (wounds and broken bones) and burns would create the greatest burden on those who possess specialized medical skills. Treatment for radiation sickness and relatively minor injuries could be provided by those who have received civil defense first-aid training. Nevertheless, Soviet civil defense medical preparations would be unable to cope with the levels of casualties which large-scale nuclear attack would inflict on the civilian population.

30. The Soviets' capacity to continue production in the postattack period depends not only on how much of the critical production equipment and essential work force survive, but also on the on-hand inventories of raw and processed materials. Attacks against industry in general would reduce the overall level of supplies on hand, but it is likely that supplies would be available at undamaged industrial facilities to allow production to continue for several weeks following an attack. The adequacy of strategic reserves for continuing production over a longer period, however, would depend on the survivability and restoration of transportation and electric power systems.

31. The distribution of essential supplies in a postattack period would be a difficult problem for the Soviets. They have made some effort to ensure survival of the transportation system through such measures as preparations to disperse equipment and to establish stockpiles of rolling stock. They have also organized civil defense services and formations in transportation enterprises and have constructed blast shelters at critical points in the road and rail transportation systems. Nevertheless, the coordination of requirements with available supplies and transportation is a complex problem for Soviet planners even in peacetime, let alone following a large-scale nuclear attack on the USSR.

32. The operating elements of the civil defense program as well as a substantial number of the civilian population (a number we cannot estimate with confidence) have received training in rescue and recovery operations such as administering first aid, clearing rubble, decontaminating, and providing emergency repair and restoration of power. With at least several weeks to build up reserves and distribute food and fuel, the Soviets could probably provide adequate supplies to sustain the relocated and surviving urban population in the period immediately following a nuclear attack. We have not evaluated the potential for continuity of the Soviet government or the Soviets' long-term ability to recover from the effects of a nuclear attack.

Costs

33. We are unable to estimate the total annual costs of Soviet civil defense, but we have made a tentative estimate of the costs of three elements of the program: full-time civil defense personnel, operation of military civil defense units, and blast shelter construction. These three elements cost 400 million rubles in 1976. This ruble figure, which indicates the burden of these three elements on the Soviet economy, represents less than 1 percent of our estimate of Soviet defense spending. If incurred in the United States, the costs of these three elements would have been about $2 billion in 1976. While this dollar figure conveys the magnitude of the program in familiar terms, it does not reflect the economic burden to the Soviets. The higher dollar estimate results primarily from the greater costs of manpower in the United States than in the USSR. Manpower represents about 70 percent of the total dollar costs—that is, about $1.4 billion of the $2 billion—but only about 40 percent of the ruble costs. (These estimates should be considered rough approximations. They are affected by uncertainties both in the quantitative data on civil defense programs and in estimates of prices.)

Overall Effectiveness

34. We have analyzed the effects of civil defense on the levels of damage and casualties the Soviets might sustain from a nuclear exchange. We have deliberately chosen to analyze important and sensitive variables—economic damage and casualties—that can be evaluated quantitatively, and have made arbitrary assumptions to deal with the inevitable uncertainties regarding preparations for and conduct of an actual nuclear exchange. This type of analysis involved trading on the realism of the war scenario adopted to gain detail in calculating the consequences—the more detailed our analysis for purposes of calculations, the less likely the calculations would apply to another scenario.

35. For purpose of these calculations we have assumed, for example, that various times ranging from a few hours to a week or more would be available to the Soviets to make civil defense preparations, while in each case opposition forces were assumed to be on no more than day-to-day alert. In reality, Soviet efforts to

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maximize civil defense preparations could lead a potential opponent to place its forces at increased levels of readiness. We have also assumed that a retaliatory strike would not deliberately target the Soviet population but would attack high-value military and economic targets. This approach tends to establish a lower limit for the level of casualties such an attack would inflict on the Soviet Union. In effect, it tends to present a "worst case" for retaliation, especially if Soviet population casualties are a major criterion.

36. ***Protection of People.*** The extent of losses to the leadership would be less sensitive to final preparation time than would be the level of casualties among essential personnel and the remaining population. Casualties among the latter would depend primarily on the time the Soviets had to prepare for an attack and whether or not they chose to evacuate their urban population. The findings of our analysis, based on the results of the hypothetical retaliatory attack under the assumptions given above, were as follows:

— With several hours to make final preparations, a large percentage of leaders and communications facilities would probably survive.

— A large percentage of the essential work force in shelters would survive an attack designed to maximize damage to economic facilities.

— With a minimal period to make final preparations (a few hours or less), Soviet casualties from prompt nuclear effects and fallout would be well over 100 million. More than half the casualties would be fatalities.

— With a moderate period of preparation (two to three days) during which the Soviet civil defense authorities implemented plans for evacuation of urban areas, the level of casualties and fatalities could be reduced by more than 50 percent. Most of this reduction would be due to evacuation, the remainder to shelters.

— Extended preparation (a week or more) could further reduce the level of Soviet casualties and fatalities. With time to complete urban evacuation and to protect the evacuated population, casualties from prompt nuclear effects and fallout could be reduced to the low tens of millions, about half of which would be fatalities.

37. The findings of our analysis serve to point out the important fact that, in the preparations for an attack, the critical decision to be made by the Soviet leaders in terms of sparing the population would be whether or not to evacuate cities. The cost of not evacuating could be in the neighborhood of 100 million casualties. There are, of course, many combinations of preparation times and assumptions about hypothetical retaliatory attacks which would increase the calculated levels of casualties over those shown above—for example, a larger attack directed at more targets (perhaps as a consequence of the opposing forces' having been placed on increased levels of readiness), an attack directed against the population, one which was carried out over an extended period, or an attack which came while the Soviets were in the process of evacuating their cities.

38. ***Protection of the Economy.*** Those measures we have described for protection of the economy could not prevent massive damage. Even with a week or so of preparations, there would be little reduction in the amount of prompt damage to facilities inflicted by blast. The Soviet measures for protecting the work force, critical equipment, and supplies and for limiting damage from secondary effects could contribute to maintaining and restoring production after an attack. As noted above, however, we have not analyzed the Soviets' long-term potential for economic recovery.

39. ***Postattack Recovery.*** We are unable to make a confident assessment of how effective Soviet civil defense would be in rescue and recovery operations following an attack. Our tentative estimate is that, given a week or more to make preparations, the Soviets could accumulate stocks of essential supplies adequate to sustain the surviving population in the period immediately following a nuclear attack, but the distribution of these supplies would be a critical problem. Under worst conditions with only a few hours to prepare, the chances would be poor that the Soviets could effectively support the surviving population with supplies and services.

40. The Soviets almost certainly believe their present civil defenses will improve their ability to conduct military operations and will enhance the USSR's chances for survival following a nuclear exchange. They cannot have confidence, however, in the degree of protection their civil defense would afford them, given the many uncertainties attendant to a nuclear exchange. We do not believe that the Soviets' present civil defenses would embolden them deliberately to expose the USSR to a higher risk of nuclear attack.

Future Trends

41. Programs for protection of the leadership are solidly established and well advanced. We are confident that this aspect of the program will continue to receive attention, with better protection for leaders

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at all levels. The continued growth in the numbers of leadership facilities will increase the prospects of survival for a large number of Soviet leaders.

42. The Soviets will probably continue their emphasis on construction of blast shelters in urban areas. If this results in a pace of construction matching that since 1968, they would, by 1985, increase the minimum percentage of population sheltered in urban areas to an estimated 15 to 30 percent. This increase takes into account the projected growth in urban population.

43. Over the next 10 years, the percentage of population which can be sheltered will increase, but the absolute number of people that would have to be evacuated will also increase because of growth in the urban population. To avoid an increase in the number of people to be evacuated, the rate of shelter construction would have to be higher than the rate currently indicated. Thus, the Soviet leaders' critical problem of deciding whether to evacuate, and when to do so, will not change substantially over this period. They may, however, be able to achieve some reduction in the time required to evacuate by increasing the available transportation.

44. Prospects for improvement in measures to protect the economy against attack are mixed. The increase in the number of blast shelters at economic facilities will probably enable the Soviets to shelter a larger proportion of the work force. But the continuing concentration of economic investment in previously existing plant sites, together with an absence of construction-hardening techniques, suggests that a future retaliatory attack would be about as destructive as at present. The protective measures the Soviets are likely to undertake during the next 10 years would probably not significantly reduce damage from a large-scale attack designed to maximize destruction of economic targets.

45. Present evidence does not suggest that in the foreseeable future there will be any significant change in the Soviet leaders' judgment that civil defense contributes to war-fighting and war-survival capabilities, nor that their uncertainties about its actual effectiveness would be lessened. Thus, we have no reason to believe that the Soviet leaders' perception of the contribution of civil defense to their capabilities for strategic nuclear conflict will change significantly.

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— Published in the USSR during the period 1968-77.

— Intrinsic value of each document's contents.

— Coverage of representative subjects within the broad field of civil defense.

Not all of the documents included in this bibliography have been translated into English. Significant sources in the Russian language are included so that those readers interested in conducting in-depth research on Soviet disaster preparedness have an appropriate, initial, open source of data. The books are arranged by date of publication, beginning with the oldest:

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