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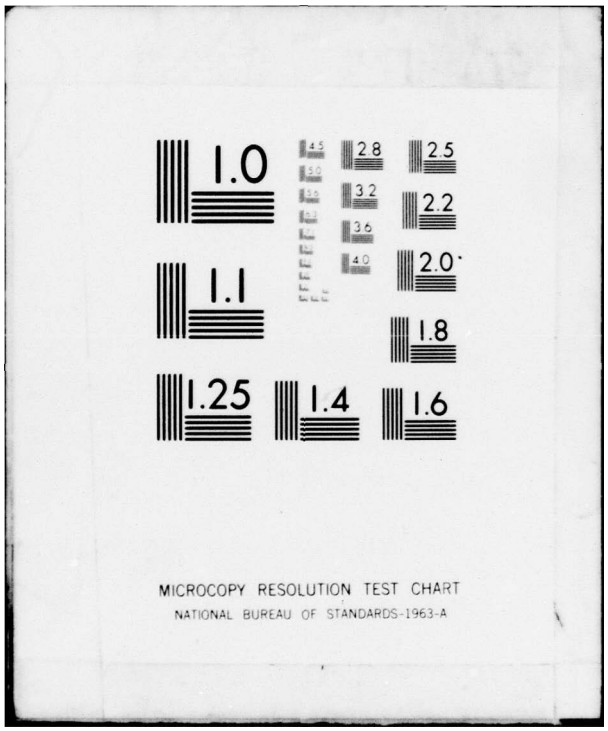
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IMPACT OF ENHANCED MOBILIZATION POTENTIAL ON CIVIL PREPAREDNESS PLANNING

FINAL REPORT
SPC 453

June 1979

by
Leonard Sullivan, Jr.
W. Scott Payne

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report explores the possibility of conflicting U.S. resource and management demands resulting from a major industrial mobilization effort coupled with a major civil defense augmentation effort during a period of extreme tension between the superpowers. The impact is assessed for the period preceding, during, and in the aftermath of a general war. This uncommon scenario is predicated on an estimate of relative U.S. and Soviet mobilization potentials that suggests that such a competitive pre-war mobilization might be in the best Soviet interests. This estimate is developed in a separate appendix entitled "Estimating U.S. and Soviet Latent Prewar Industrial Mobilization Potentials."

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CONTENTS

I. EXECUTIVE SUMMARY

This exploratory study was conducted by the Center for National Security Research of System Planning Corporation (SPC) for the Economic Research Division of the Defense Civil Preparedness Agency (DCPA). It was funded as a pilot effort to demonstrate the relationship between basic national planning assumptions and the research planning for specific DCPA/ Federal Emergency Management Agency (FEMA) programs. In particular, it postulates a long period of deteriorating relations between the superpowers, and investigates the possible contest for resources between a national industrial mobilization effort and an enhanced civil defense program. By design, this scenario is intended to represent the opposite extreme from the majority of current DCPA contingency planning, and to illustrate potential problem areas arising from an eventuality significantly different than that popularly accepted as the more likely.

The initial phases of the study were devoted to the preparation of estimates of the relative mobilization capabilities of the Soviet Union and the United States. Surprisingly little information was found to be available on the full latent industrial mobilization capability of either nation. This investigation concludes that the Soviet mobilization capability has increased substantially over the past decades, while American capabilities have been allowed to decline ever since the advent of nuclear warfare. The ultimate industrial production capacity of the U.S. still exceeds that of the U.S.S.R. However, it now appears that, during a two or three year competitive mobilization period (called by some "mobilization warfare"), the Soviets might be able to succeed in shifting the perceived balance of conventional power substantially in their own favor. To avoid this, the U.S. might be forced into an industrial mobilization effort at least as large as that undertaken for World War II. The study concludes

that such an effort is still practical although little, if any, thought is being given to it.

At the same time, it is apparent that the Soviets have undertaken a very substantial peacetime civil defense program, no doubt the result of many years of nuclear inferiority, but still continuing despite their far more favorable current nuclear posture. It would appear plausible, then, that the United States might find itself in a crisis where a major crash civil defense effort appeared warranted at the same time as, or shortly after, a major defense industrial mobilization had been initiated. The latter phase of this study attempted to look at some of the areas in which the planning for the two efforts might be inconsistent. Such areas include the basic assumptions concerning national posture for civil defense, the competing demands for civil sector conversion to the "war effort," and several aspects of resource allocation and control, as well as emergency legislation and continuity of government itself. Contrary to "conventional wisdom," several areas were identified where total national capabilities might be strained--some by industrial mobilization and some by enhanced civil defense efforts. These findings appear contrary to popular feelings that civil defense demands would never rank with industrial mobilization requirements--and that neither would fully tax the vast American civil economy.

The conclusions of this modest study may not be sufficiently rigorous to justify specific changes in either mobilization or civil defense programs and plans, but they do demonstrate that the range of uncertainties in how "World War III" might evolve is very large, and that the full spectrum of plausible scenarios should be explored before judging the adequacy of emergency preparedness research and planning. A comprehensive framework in which DCPA/FEMA research and planning should be conducted would be helpful in this respect. Such work might well lead to the development of basic national policy options that could have quite different impacts on the nation's ability to respond across that spectrum. It could also serve to provide a set of alternative scenarios against which the sensitivity of current programs can be tested.

II. STUDY FOCUS

The purpose of this study, conducted by System Planning Corporation (SPC) for the Defense Civil Preparedness Agency (DCPA), is to examine U.S. mobilization potential and the impact of mobilization on civil preparedness planning. More specifically, the DCPA General Statement of Work indicated the effort should provide "...preliminary estimates of the level of U.S. civil sector mobilization capability that would be required to offset the maximum projected level of Soviet mobilization potential. The preliminary analysis will concentrate on identifying those segments of the civil sector which might be most conducive to a large-scale mobilization effort sufficient to deter Soviet aggression at any warfare level." In addition, the work statement noted that the study should determine the implications of such a mobilization effort on U.S. civil preparedness planning.

The objective of most civil defense planning is to limit damage to life and property from nuclear attacks on the United States and to begin the process of post-attack--and thus post-war--national recovery. Basically, SPC has raised the issue as to whether this definition of civil preparedness is appropriate or sufficient. We question whether civil defense can be conceived, planned, and organized as a distinct and separate endeavor independent of other national considerations that may loom large at the same time, involving competition for the same resources, and demanding conflicting government management systems and objectives.

We must introduce this effort, then, by trying to focus on the immense range of uncertainty involved in planning any activities around the highly unlikely and highly distasteful prospects of a nuclear "World War III." SPC does not pretend it can predict the course of World War III, its origins, its procedure, or its outcome. To the contrary, we wish to emphasize just the opposite: that the war could start under a variety of very different

"scenarios"; that the nuclear phase might, under certain conditions, be neither the final phase nor the decisive phase; and that the post-nuclear phase is not necessarily synonymous with the post-war phase. We are, in fact, disturbed by simplistic views of World War III that can lead to seriously inadequate planning at the national level. In essence, we are trying to think through the "unthinkable" aspects of World War III--as we suspect the Soviets do--and to encourage others to do likewise.

This work has been conducted by SPC's Center for National Security Research (CNSR) as a small pilot study to approach civil emergency preparedness planning from its broader aspects, and to encourage further and more detailed work in related areas--primarily by others more qualified in the details. In that respect, it is intended to raise more questions than it answers, and to stimulate creative thinking rather than to reinforce conventional wisdom.

The basic issue involves whether we can improve our planning for the unknown. We have singled out one specific aspects of the problem as a means of demonstrating the need for a more creative framework within which to carry on additional research for DCPA/FEMA. We believe the entire process of thinking through and planning for the actual conduct of a "World War III" has been dangerously neglected within the federal government. We believe there is more than enough for everyone to think about, and we would consider this effort successful if it stimulated more cooperative thought in any of several government sectors.

Our fundamental premise is simply that planning for the unknown must attempt--insofar as possible--to consider the entire range of plausible eventualities, and to design plans, organizations, and management structures that can cope with the full range of possible contingencies. Such plans, in all likelihood, will be somewhat "off-optimum" for any single eventuality. We believe this is the price for dealing with the unknown. Surely, such plans should be less "off-optimum" than those drawn up for an eventuality that does not happen, and is replaced by one that was totally unforeseen. Rather than "peak-up" the system for a single scenario, we would like to "peak-down" the system to assure its applicability across the broad range of uncertainty.

We start, then, by visualizing broadly differing World War IIIs. We would like to try to envision the two limiting cases within which almost the entire gamut of practical alternatives would fall. The major variables appear to be time--the span from the beginning of the perceived crisis to the attainment of a stable rate of recovery in the war's aftermath--and intensity of preparation, warfighting (nuclear and non-nuclear), and recovery. At one end of the spectrum is the sudden "bolt from the blue," which starts with some rapidly developing crisis and shortly thereafter culminates in a full exchange of nuclear weapons between the superpowers, followed immediately by the difficult task of national recovery. At the other end of the spectrum--the end we believe has been neglected--one can conceive of a long, drawn out period of crisis; breeding a limited war that slowly grows into a major confrontation between the superpowers; leading to a series of limited nuclear exchanges over a period of weeks or months (as each side tries to deplete the will of the other to persist); followed by a continuing residual conventional war--possibly for control of the seas, or elimination of either side's nuclear reserves; finally followed by a negotiated settlement in which neither side can claim an unconditional surrender. The end of the nuclear exchanges by no means assures the end of hostilities.

These two extremes are illustrated by Figure 1 on the following page. We do not believe that either extreme is likely. We do believe that most of the plausible alternatives lie within these limits. Furthermore, by opening up and expanding the spectrum vs. time, we believe we have identified the four major phases of any likely conflict between the superpowers:

- Pre-attack phase
- Trans-attack phase
- Post-attack phase
- Post-war phase.

Any of the first three phases could last from a few hours to many months. In some scenarios, some phases may be essentially missing. In any event, we believe that distinct policies and preparations should be made for each of these phases that are flexible in their application. Major federal programs should be "tested" against the four phases, and attempts should be made to assure that appropriate research is carried out across this entire

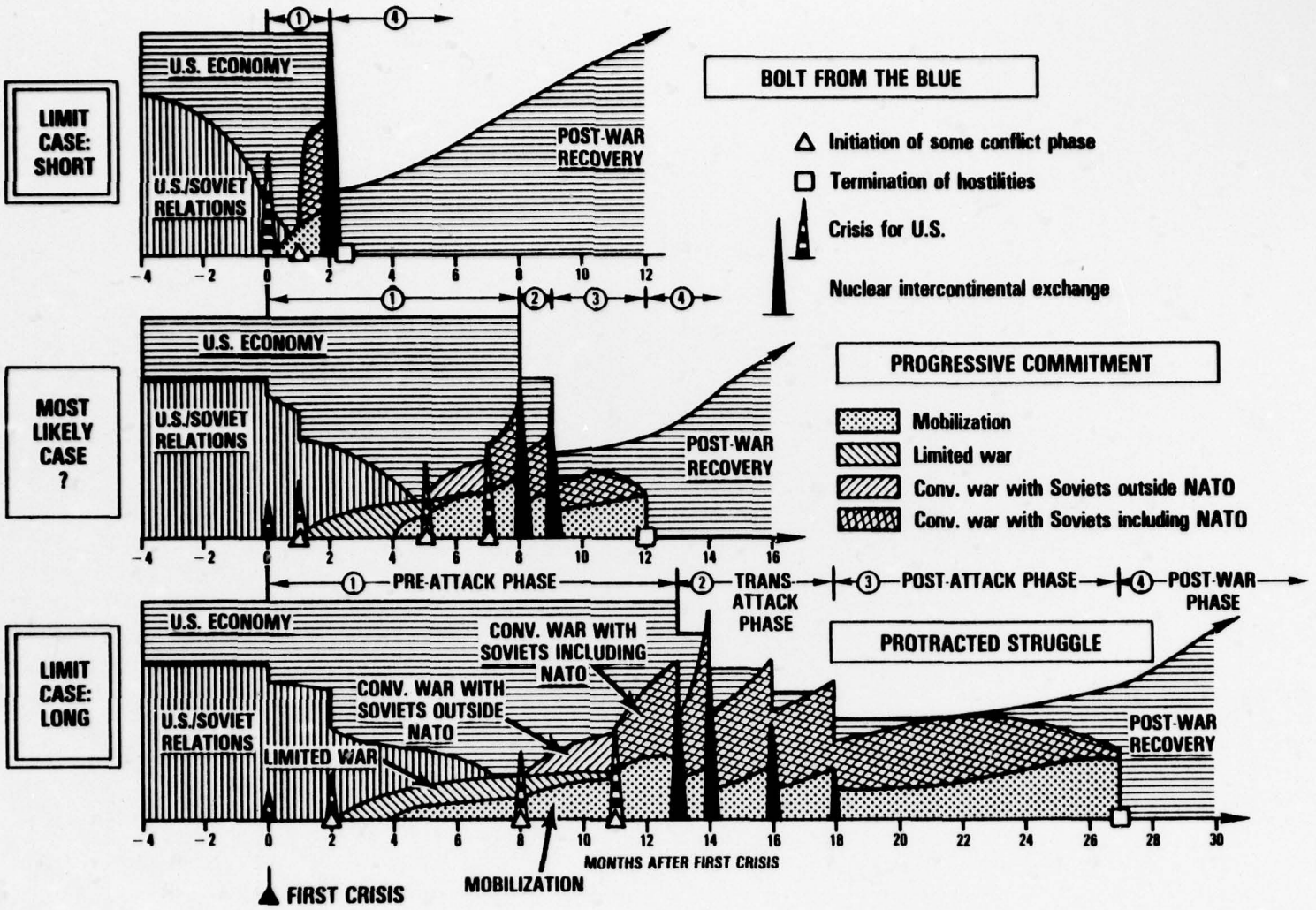


FIGURE 1. THREE PLAUSIBLE SCENARIOS FOR WORLD WAR III

spectrum. Figure 2 is a schematic chart illustrating these facets of the problem as a matrix.

Defense industrial mobilization is but one of many aspects of the overall problem that deserves consideration. One reason for its selection for this pilot study is that it could figure strongly in each of the four phases, and because it could also overlap many other areas of equivalent import. As a single case in point, consider the extensive American construction industry: how might it best be used during World War III? Is it "drafted" and sent off to fight the war? Is it redirected toward a major defense industrial expansion program (as in World War II)? Or is it reoriented toward an extraordinary crash program to build shelters and/or harden civil industry in preparation for post-attack recovery? Or can it do all three? The issue is not so much the need for a specific answer to these questions, but whether each eventuality has been considered--and whether the military, the industry, and DCPA/FEMA each are planning to use the same capabilities at the same time. In short, there appears to be a need for some sort of national planning guidance that is consistent across the various interested government agencies. We will attempt to demonstrate this in Phase III of this report, using defense industrial mobilization as an example.

First, however, we will attempt to lay the groundwork for our illustration by looking at the relative mobilization capabilities of the two superpowers. The results of this investigation are intended to lend credence to the assertion that a competitive mobilization is at least a plausible scenario option to consider. This brief study has actually changed the preconceived notions of the investigators in that the findings tend to make mobilization look like a more advantageous option to the Soviets than we had previously supposed. This examination is summarized in Chapter III and elaborated in the Appendix.

The results of Phase I of the study suggest that, under certain conditions, the U.S. might choose--or be forced--to undertake a very substantial defense industrial mobilization. However, the very notion of attempting to raise defense production by a factor of 10 or 20 over a short period of a year or two has not been seriously considered since the early

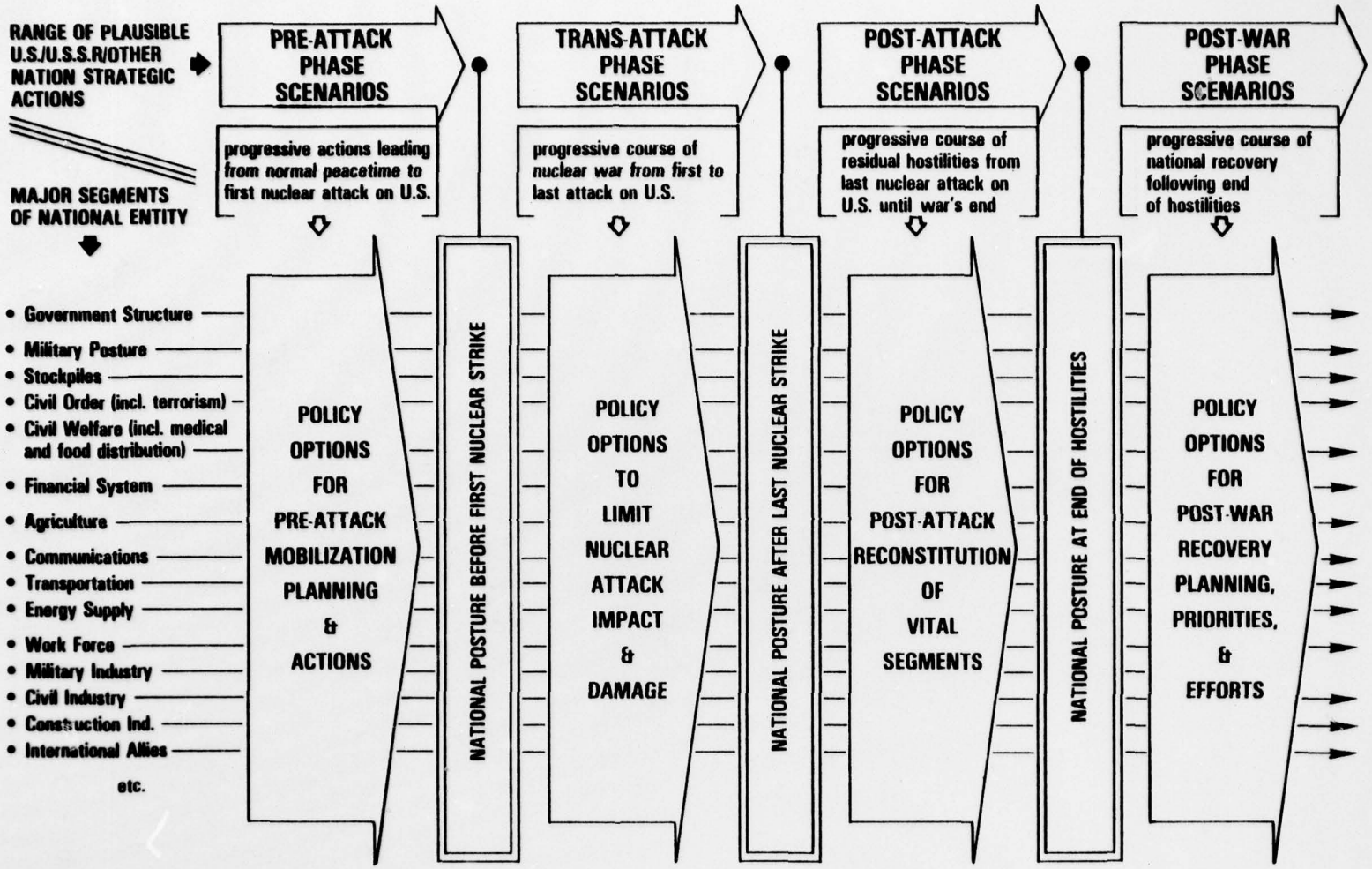


FIGURE 2. CONCEPTUAL FRAMEWORK FOR COORDINATED LONG-RANGE FEMA RESEARCH AND ANALYSIS PROGRAM

days of World War II, when President Roosevelt decreed that we would produce 50,000 aircraft in a year; and we did. The concept seems so foreign today that it was necessary to spend some time gathering the views of experienced defense industrial producers. The results of Phase II of this work--based primarily on informal, privileged conversations with senior industry representatives--are reported in Chapter IV. In essence, the latent capability to "put out" if necessary is still part of the American scene--but pretty much buried by 30 years of neglect and inhibiting peacetime bureaucratic silt. Chapter V then turns to a more detailed qualitative discussion of the possible impact of industrial mobilization on civil defense preparedness--and vice versa.

III. PHASE I: ESTIMATING U.S. AND SOVIET LATENT PREWAR INDUSTRIAL MOBILIZATION POTENTIALS

The introductory chapter of this report tries to emphasize the obvious: that no one really knows how World War III--if there ever is one--will unfold. As a corollary, we cannot predict with certainty what might be demanded or required from a national industrial mobilization effort or from a national civil defense effort. Our planning, therefore, should be as broad and flexible as possible.

At the one extreme, the major issue for civil defense might be to limit the damage to life and property caused by the nuclear exchange and the immediate problems of post-war national recovery. There might be little, if any, opportunity during the pre-attack phase to energize a large military industrial mobilization effort. At the other extreme, extensive pre-attack civil defense measures might be possible, coupled with a large-scale national mobilization effort. Damage from the nuclear attacks might be less, but the major post-attack emphasis might be on regenerating a defense-related industrial mobilization to continue to prosecute the war. In this case, the rate of post-war national recovery might be constrained for months or even years. Clearly, both civil defense and emergency mobilization efforts would have to be intertwined in this latter case.

The purpose of this study is to investigate the impact of mobilization on civil preparedness planning, because under some war-fighting scenarios at least, the two might have to be carried out simultaneously. Phase I of the study effort, therefore, concentrates on estimating the relative mobilization potentials of the two superpowers. Implicit in such an investigation are such questions as who would benefit more from such a prewar competitive mobilization, and how hard would the U.S. have to work at it. In short, the results indicate that such a mobilization effort might in fact benefit the Soviets more than the U.S. in the short run, by shifting the balance of

weapon inventories more in their favor. If this is so, then it represents yet another step short of war through which the Soviets might attempt to intimidate the West or deter Western military defense against Soviet aggression. To offset such a shift in the military balance away from the West, the U.S. might, in fact, be forced to undertake a very substantial mobilization effort of its own. This might involve a very dramatic shift from a peacetime to a wartime economy well before any high-level military conflict breaks out between the superpowers themselves. Moreover, such a mobilization effort might have to be continued through and after a series of nuclear exchanges in direct competition with other civil defense actions.

It was first necessary to select a simple, inexpensive means to make judgments--certainly not detailed analyses--concerning the relative mobilization capabilities of the two superpowers. The approach adopted by SPC for this initial investigation has been to compare the available industrial labor pools on the two sides, making a set of plausible assumptions about the utilization of that manpower during a crisis mobilization period. There are many aspects of the "real world" that must be neglected in such an analysis. We have not explored detailed bottlenecks that might develop for each side. We have not introduced raw material shortages. We have not considered the side effects on either country's economic structure. We have simply tried to look at the latent mobilization potential in terms of available manpower--and available capacity for them to utilize. To this end, we have utilized some very knowledgeable consultants on both the Soviet and the U.S. industrial potential. Through three SPC workshops, we have developed a set of general parameters that contribute to the outcome and indicate some interesting and fundamental differences between the two industrial economies.

The details of the comparative analysis are contained in a separate appendix to this report. It will suffice here to summarize the important parameters to indicate both the approach and the results. From the outset, it is worth noting that we placed a higher priority on using comparative data to obtain comparative results. We have avoided exploring the U.S. side in great detail because the equivalent vast array of statistics is not available for the Soviets. Consequently, we have reasonable confidence in the relative numbers but less confidence in the absolute numbers.

To begin with, the distribution of the workforce in the two countries is very different. By chance, both sides use 22 percent of their labor force in manufacturing, but more Russians work than Americans (131 million vs. 87 million), and their population is substantially larger. Whereas the largest segment of U.S. workers are in the service industries, the Soviets use substantially more workers in their agriculture and utilities sectors. Moreover, a far greater fraction of the Soviet workforce is women. In fact, there are more Soviet women than men in the overall workforce.

In addition to having a larger manufacturing workforce, the Soviets devote a much larger fraction of it to defense industry production during peacetime. While this implies that they have less room for expansion during a mobilization effort, it also means that they start with substantially higher production rates and inventories, even though their productivity per worker is substantially less than our own. Taking all of these factors together, we estimate that their peacetime military industrial output is somewhere between two and three times our own--which appears to be supported by knowledge of inventories and production rates.

Both sides are normally operating on a peacetime industrial base, although many observers feel--with some justification--that the Soviet economy is always partially geared up for war. In fact, we estimate that the Soviets utilize less of their total factory capacity during peacetime than we do. Students of the Soviet economy agree that the unused capacity is set aside for mobilization purposes. In any event, we clearly have more continuous processes that run around the clock (even for electronics components) and more expensive production machines that only pay their way when operated on multiple shifts during peacetime. This, in turn, gives the U.S. less capability to increase output under mobilization conditions. We estimate that the Soviet society would be willing to work longer hours than the U.S. during a crisis, and also that they would be willing to sacrifice more of their civil industrial consumption. To some extent, this compensates for the fact that they have a smaller residual labor pool from which to draw additional workers, as well as the fact that more of their current industrial workers would be called up to military duty during any crisis period.

We estimate that Soviet factories would have to spend more downtime to keep their production machinery running. We also believe that any new unskilled Soviet workforce augmentation would be relatively less productive than their American counterparts. Nonetheless, the Soviets can more than offset these shortcomings by virtue of what appears to be excellent planning for industrial mobilization. Some portion of their defense plants is normally devoted to peacetime production, and some portion of their civil production plants is devoted to military production. This makes possible a very rapid initial build-up of military output, even though the ultimate output may only be a fraction of what can be accomplished in the U.S. economy.

The net result of all of these variables, plus some lesser ones, is that we estimate that the Soviets could increase their military industrial output by a factor of six within a few weeks of sounding the mobilization alarm. This would be done by adding overtime, increasing the workforce slightly, and by converting all dual-output facilities to planned military production. On an equivalent basis, we estimate that the U.S. could only increase its military production output by a factor of three--which appears consistent with current defense "surge" plans. Over the longer range, both sides could convert more of their total manufacturing production to defense needs. After a period of some months or even a year or so, we believe the Soviets would reach their maximum latent mobilization potential--short of building new factories (which generally takes them a relatively long time). We estimate that this would level off at about eight times their normal peacetime production. After a longer period of time, we believe that the U.S. industrial base could transition through a much more demanding conversion process and ultimately produce more than 25 times as much defense durables and nondurables as during peacetime.

In short, at the beginning of a surge, we estimate that the U.S. can only increase its defense output half as much as the Soviets can, although ultimately, we could expect to level off with an output over three times larger than the Soviets. This is summarized by Figure 3. The complete results of the workshops are presented in the separate appendix.

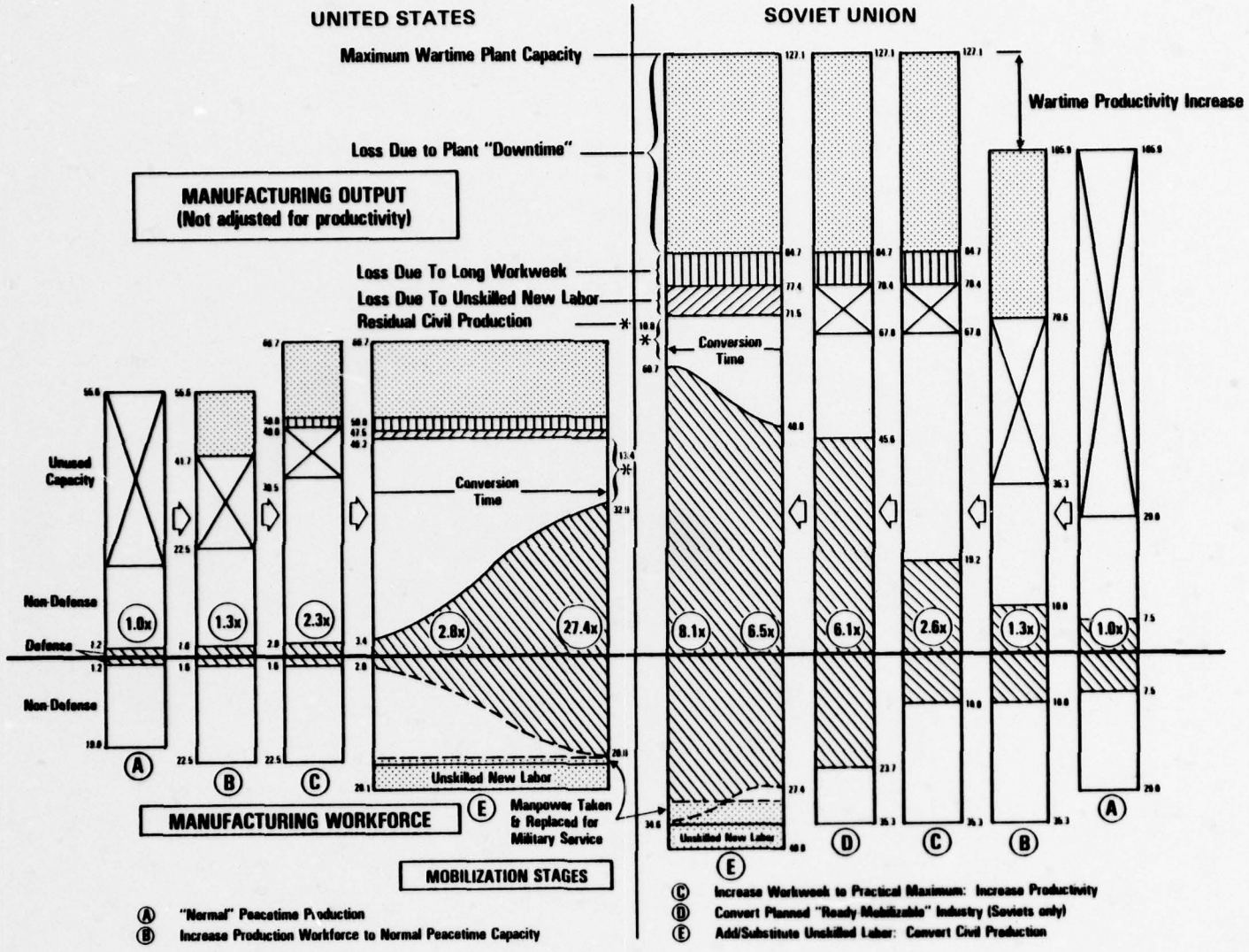


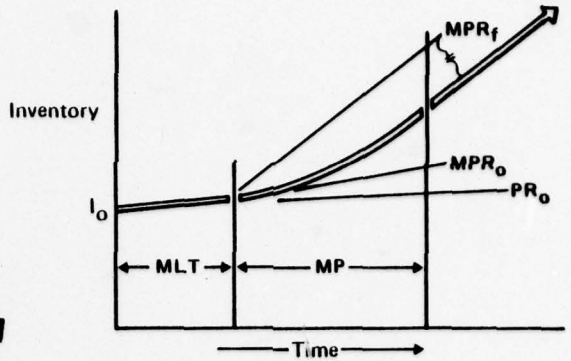
FIGURE 3. PLAUSIBLE STAGES OF PRE-WAR INDUSTRIAL MOBILIZATION

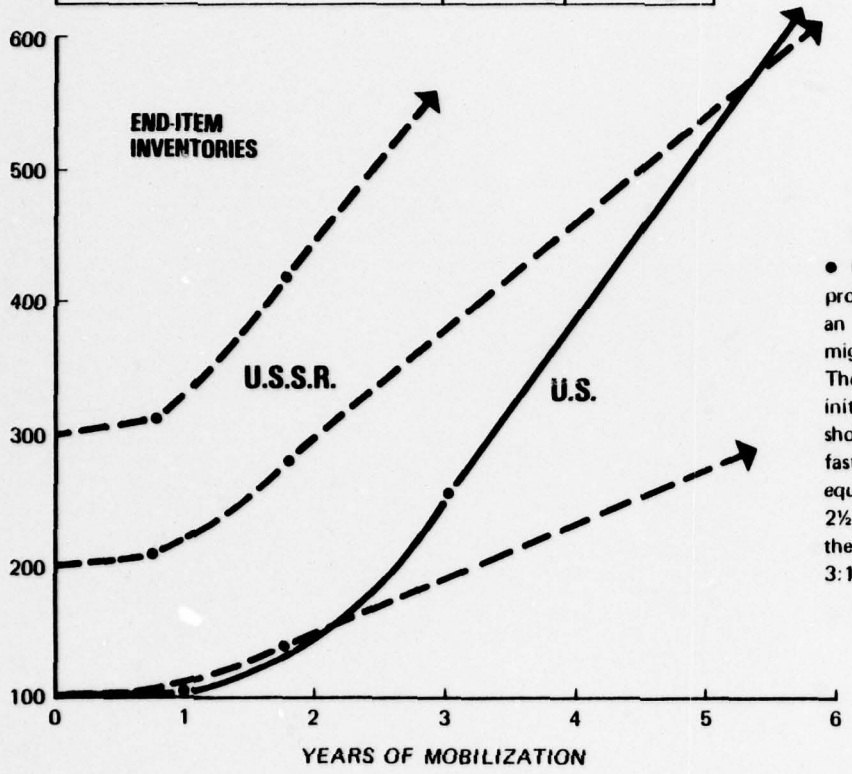
In a competitive race to amplify fielded weapon inventories, however, the production rate increases must be factored onto peacetime "initial conditions." Since the Soviets are starting with inventories and production rates substantially higher than our own, a favorable shift in the total weapon inventory balance can only be accomplished by very large production increases on the U.S. side. We have explored this effect in a "non-dimensional" manner, again avoiding the specifics of any one type of system. Using the numbers developed above, plus some reasonable assumptions about relative production lead times and conversion times, it can be shown that the U.S. will have very substantial difficulties in catching up--or even keeping up, for that matter. If the Soviets start with an inventory and production advantage of three-to-one during peacetime, it is highly unlikely that the U.S. would ever "catch up." If the Soviets start with a two-to-one advantage in inventories and production rates, it could take over five years before a maximum U.S. mobilization effort could draw even with the Soviets' in total inventories. In fact, even if the Soviets and the U.S. start out with equal inventories, the Soviets will build up faster, and it will be more than two years before American inventories catch up again. This is illustrated in Figure 4.

Clearly, the U.S. has been placing more of its emphasis on the development of service industries, while buying many of its manufactured goods abroad. The Soviets, on the other hand, have been building up their manufacturing capability and devoting a substantial fraction of it to defense production, while also planning for the conversion of much of the rest of their total manufacturing base to defense use if needed.

The fundamental message from this comparison has substantial strategic implications. It means, in essence, that the Soviets can--if they choose to--produce a rather rapid change in the balance of weapon inventories to their own favor, as a direct result of their centrally controlled civil economy. This has substantial strategic value in changing the perceived balance of power and could act as a serious deterrent to Western military resistance to openly planned Soviet aggression. It provides them with another opportunity to use their military-industrial complex, short of war, to contribute to the "peaceful" accomplishment of their expansionist tendencies.

	MOBILIZATION FACTOR	U.S.	U.S.S.R.
I_o	Initial Inventory	100	100/200/300
UL	Useful Equipment Life	20 yr	20 yr
PR_o	Initial Production Rate	5 yr	5/10/15/yr
MLT	Manufacturing Lead Time	12 mos	9 mos
MP	Mobilization Build-up Time	24 mos	12 mos
MPR_o	Initial Mob. Prod. Rate	$2.8xPR_o$	$6.5xPR_o$
MPR_f	Final Mob. Prod. Rate	$27.4xPR_o$	$8.1xPR_o$





- Using the maximum workforce mobilization rates projected on the previous page, this chart presents an illustrative example of how opposing inventories might build up as a mobilization period progresses. The U.S. starts with an inventory index of 100, and initial Soviet inventories of 100, 200, and 300 are shown. The Soviet inventory build-up will progress faster than the U.S. even if initial inventories are equal, although the U.S. will take the lead after 2½ years. If the Soviets start with a 2:1 advantage, the U.S. will require 5½ years to "catch up;" at a 3:1 ratio, the U.S. would never match Soviet inventories.

FIGURE 4. ILLUSTRATIVE INVENTORY BUILD-UPS DURING PRE-WAR MOBILIZATION

It is not the purpose of this report to divine Soviet intentions or to predict Western reactions. Nonetheless, the U.S. can ill afford to be in a position where it cannot respond by competing in kind. The U.S. might, in fact, have to try to offset a Soviet mobilization threat with a mobilization effort of its own. Such a mobilization effort need not, of course, attempt to match the Soviets tank-for-tank or aircraft-for-aircraft. Nonetheless, the U.S. cannot afford to overlook the possible need to gear up for a very substantial industrial effort during a period of crisis.

Clearly, the United States does not have any existing plans for an industrial mobilization effort of the magnitude indicated by this study to be necessary. Most defense equipment is not really designed with mobilization in mind. Although there are some plans and consideration given to increasing defense production by a factor of three to five, the notion of moving rapidly towards an output 20 to 25 times our peacetime rates has not really been explored. It appears quite likely that such a full-scale effort would have to be quite different than an equivalent Soviet effort. The Soviets would most probably strive to increase production of the same materiel they were producing at the time, primarily in the facilities currently either partly or wholly devoted to defense work. This approach is made easier by the somewhat lower sophistication of Soviet military equipment. The U.S., on the other hand, would have to depend far more heavily on the utilization of commercial-grade facilities, components, and perhaps even designs. The U.S. would therefore, in all likelihood, have to move toward lower sophistication in its war mobilization equipment.

There appears to be little question that a massive U.S. mobilization effort would require substantial innovation so that the full strength of the civil sector could be brought into play. This would involve the relaxation of peculiarly stringent government specifications, a rapid substitution of many critical parts and subassemblies for more readily produced alternatives, and possibly even the production of totally different designs. This sort of effort would be enormously enhanced by suitable prior planning, development, and testing. For instance, if the forged titanium "bathtub" around the A-10 cockpit is the bottleneck part in raising production levels of that attack

aircraft, then some simpler and more producible alternative--even if it is less effective and somewhat heavier--should be designed and tested as part of mobilization planning. At the present time, there are no funds available for such developments, nor is there any practical mechanism for highlighting either the need or the benefits that might be gained.

There is, of course, no intent here to suggest that a U.S. mobilization effort need duplicate an equivalent Soviet effort item for item. Because they decide to produce five times as many tanks does not mean that we need to do the same. Rather, we might decide instead to build twenty-five times as many anti-tank weapons with the intent of neutralizing any perceived shifts in the balance of power. Nonetheless, it is by no means clear that the anti-tank weapons mass-produced under these circumstances should be as complex, expensive, or difficult to use as current American designs. Quite possibly, a different design (with which the Soviets are not already familiar) specifically tailored for rapid production--and easy training--by commercial industry would be more appropriate. At present, no such standby developments are visualized or funded. No efforts have been made to highlight those areas in which U.S. production capabilities excel. There is little, if any, feedback between defense developers and those in Commerce and the Federal Preparedness Agency (FPA) who understand our national production capabilities. This may again demonstrate the current absence of national interest in a truly substantial mobilization capability or in an organization with the means and authority to conduct the necessary planning and development.

Another inherent advantage of the United States is its vast array of existing commercial products that might, under extreme pressures of crisis needs, be converted to military applications. A broad variety of civil inventory products from trucks and ships to CB radios and commercial satellites could, if necessary, perform expedient military functions. While such assets may appear off-optimum to the peacetime cost-effectiveness mentality, they do represent a vast national resource which could be redirected toward an all-out war effort. Again, however, it is fully acknowledged that there are currently no plans or mechanisms whereby these resources could be mobilized--with the exception of some air and sea transport units which are

intended to be mobilized to support national strategic mobility requirements. In all likelihood, this approach could be extended to a broad variety of other equipments, if there were strong interest in preserving a national mobilization capability. It appears that the Soviet civil industrial capabilities have developed with such potential conversion in mind, and certainly their centralized, military-oriented, government apparatus has encouraged such an approach. It is equally clear that the free-enterprise approach of the Western Alliance hinders equivalent planning.

Conjuring up a major national mobilization capability is well beyond the scope or intent of this study. Visualizing how it might be done, however, is useful in exploring the total demands that might someday be placed on our economy during a period of crisis. One of our country's greatest latent assets may be its ability to improvise and to mount a major creative effort when the situation demands it. We need only look back to the extraordinary accomplishments of the Berlin airlift to find an example of a totally unexpected international crisis that resulted in the mobilization of civil assets to perform a completely unanticipated but highly successful response to a foreign challenge. The issue at hand is simply whether or not our current research and planning considers the possibility of performing such operations in the future.

Phase I of this study has tried to demonstrate that a major mobilization effort might someday be required by the United States. It has also indicated that the latent capability for a massive effort does exist, even though there appears to be little if any planning for it. Phase II of this investigation now looks at the current judgments of a sample of the American defense industry to undertake such a mobilization effort.

IV. PHASE II: CONFIRMATION OF DEFENSE INDUSTRY MOBILIZATION CAPABILITY AND NEEDS

Phase I of this study was devoted to assessing in a gross manner the relative capabilities of the two superpowers to undertake a competitive industrial mobilization prior to the outbreak of hostilities. The results of this economic analysis indicate that the United States might have great difficulty in trying to catch up to the Soviets in sheer numbers of fielded weapons, even though the latent production potential of the U.S. is substantial. The difficulties stem mainly from the fact that Soviet peacetime inventories are generally significantly higher than those of the U.S., and the Soviet peacetime production rates to support those inventories are also significantly larger than those in the U.S. In order to gear up for a maximum effort, the U.S. would have to dip deeply into the manufacturing capacity of the civil sector, curtailing civil consumption of non-essential durables and non-durables.

One purpose of Phase II was to gain insights from a representative segment of the U.S. defense industry concerning its capabilities to augment military production through vastly greater contributions from the civil manufacturing sector. Informal discussions were held with senior representatives of several different defense industries. Because their remarks were candid and do not represent official corporate or Defense Department positions, promises of anonymity were given. However, almost all the interviewees had some familiarity with the U.S. mobilization efforts undertaken during World War II. Although the sample was necessarily limited, the responses are considered representative of the armored vehicle, airframe, aircraft propulsion, missile, and electronics (sensors) industries. All respondents are currently producing major components or end-items for latest generation military inventories.

The following general conclusions were drawn from these conversations:

- Virtually none of the people contacted had ever before been asked to consider increasing their current production capabilities by factors of more than two or three. The idea of increasing output by factors of ten to twenty-five in a one or two year period was invariably greeted with initial shock. This was followed by a growing enthusiasm that if someone <u>really</u> wanted to do it they might well be able to. All felt that prior planning would be essential but not terribly expensive.

- Those current manufacturers who have conducted developments under some form of "Design-to-Cost" limitations were more hopeful that their designs were suitable for mass production. Pressures to use less expensive manufacturing techniques, less complex parts, and less exotic materials, all tend to produce designs for which a broader production base in the civil sector exists. Considerations of possible foreign co-production exerted similar pressures to simplify techniques, subassemblies, etc.

- Military products that are not technologically unique and that employ manufacturing techniques also used in the civil sector, are clearly capable of more rapid industrial mobilization. As a case in point, new safety regulations are often credited with destroying this country's capabilities to make very large castings. As a result, the Department of Defense found it extremely costly and time consuming to increase even peacetime production of M-60 tanks since suitable facilities no longer existed in the civil sector. In reality, however, it can be more effectively argued that the heavy casting industry dwindled away because there was no use for it in the civil sector. If civil demand had been high, then new capacity with acceptable occupational safety and health standards would have evolved. From a mobilization standpoint, then, there is a clear premium on restricting military technology to that which also has application in the civil sector.

- Almost all military products are capable of being produced in a more austere version that eliminates some of the "frills" and extreme specifications. Even items that have been designed to a production cost limit still contain some elements that appear to their manufacturers to provide marginal additional capabilities. One example provided was a titanium leading-edge insert in an otherwise relatively simple steel missile wing and control surface. This insert is only necessary under a very unlikely combination of launch conditions, which the manufacturer believes would seldom if ever be encountered in real life operations. Elimination of such frills vastly simplifies production and broadens the base of potential fabricators. Others mention the restrictive nature of many stringent military specifications which seriously restrict both output and commonality with civil sector parts. Relief of such specification requirements would be an important element of any serious mobilization effort.

- Peacetime competition among subcontractors and vendors greatly improves prime contractor ability to expand his sources of supply, as well as his knowledge of alternate available sources. Such competition is generally maintained by those defense contractors who are subject to price competition for yearly production orders. Producers who recognize their unique status in defense procurement and who are employing proprietary production techniques--often peculiar to their own product--are the ones who appear least capable of expanding their production base. Turbine engines for aircraft present the most serious example of this uncovered during this limited investigation. Very high temperature parts such as electron-welded combustor cans, and vacuum-cast turbine buckets, and very highly stressed compressor disc and blade forgings appear to have no counterparts except in the civil transport engine field. This could force a trade-off between combat aircraft and military transport augmentation, introducing an Achilles Heel in the mobilization of military aircraft which appears unparalleled in other defense products. Even such specialized items as infrared detector elements appear to have parallels in non-essential civil production which assure the ability to rapidly multiply output--within a few months.

- Almost all industries queried agreed that there would probably be a need to perform some parts substitutions. Aircraft manufacturers mention special forgings most frequently. Almost invariably, however, they acknowledge that these forgings could be replaced by more producible machined parts at some slight cost in weight and overall dimensions. Such substitutions would, in many cases, require "re-certification" of the structural adequacy of the airframe. In general, the development and testing of such alternate structural components did not seem to represent an overwhelming problem--although clearly such substitutions should be explored as part of mobilization planning. Tank manufacturers mentioned potential problems in vastly increased production of both transmissions and the new turbine propulsion systems. In general, however, they felt that alternate transmissions, albeit somewhat heavier, could be mass-produced by the civil sector currently involved in the production of heavy construction equipment. Converting the XM-1 tank back to diesel power was considered a major, but not insurmountable, change if necessary.

- There also appears to be general consensus that many military equipments would be far easier to mass-produce with some minor reductions in system performance as a result of either some relaxation of tolerances (as in turbine engines) or some increases in weight of certain critical parts. This, of course, raises basic issues concerning the relative importance of quality versus quantity in war-fighting. It seems generally apparent that the Soviets have opted for quantity, while the U.S. has preferred quality--at least for peacetime deterrence purposes. Since the purpose of mobilization would be to increase quantities, it appears that some sacrifices in quality would be acceptable.

- High levels of technological sophistication do not, per se, imply extraordinary difficulties in defense mobilization potential. The outstanding example of this appears to be in the electronics industry, which today is primarily driven by commercial demand. Although quality control for military systems is substantially higher than that demanded by the civil sector, the basic manufacturing techniques are apparently very similar. The electronics industry apparently has reached a stage where most of its components can be mass produced on general purpose machinery. Even missile test equipment--an essential aspect of missile production--is now programmed through general purpose computers that are widely available in the civil sector. In fact, aside from the need to train additional inspectors to provide for necessary quality control, tne electronics industry apparently feels that it would readily absorb a vast mobilization demand from its civil sector. This is particularly significant in view of the important technological "edge" provided by U.S. electronics capabilities. It also suggests that U.S. industry may be better able to produce counter-weapons such as antitank or antiaircraft devices, than it is to produce the tanks or aircraft themselves.

- The cost of performing additional mobilization planning, including the identification of alternative sources from the civil sector and the development of substitute components, is relatively small. Most respondents talked in terms of a few million dollars over a year or two to prepare them quite well for a greatly improved mobilization potential. Actual testing and certification of substitute parts and components, of course, could run into tens of millions. As a "rule of thumb," however, it would appear that such planning could be done for a cost roughly equivalent to ten to twenty end-items over one to two years. In other words, a trade-off of ten to twenty MX-1s or F-16s or PATRIOT missiles would provide the funding required to develop and protect a substantially larger mobilization capability for those same weapon systems.

In short, there appears to be no inherent reason to assume that the U.S. is incapable of undertaking a very dramatic defense industrial mobilization. The present absence of planning for such an eventuality could be overcome within a year or two, and at relatively modest cost. Current trends toward controlling defense weapon costs actually enhance national mobilization capabilities, and high technology and component sophistication are a problem only if they are proprietary to the manufacturer and unique to the defense sector. In some instances, the very high technology contributes positively to mass producibility--but apparently only in those cases where the drive toward such sophistication has been motivated by the civil sector. America

does not appear to have lost its latent potential to again become the "Arsenal of Democracy"--only its interest in (and planning for) such a role.

The second purpose of Phase II was to gain some feel for the types of weapons and equipment that would be demanded in a massive U.S. mobilization effort, and the segments of the U.S. civil sector that would be most useful in contributing to that effort. There would appear to be at least three criteria for such increased military production:

- Items that are known to be in short supply in current inventories, and that would be required even in a limited mobilization effort.
- Items that would be clearly perceived by both our allies and our adversaries as offsetting to Soviet attempts to shift the balance of weapons to their own aggressive advantage.
- Items through which the U.S. can demonstrate its own substantial mobilization potential, as well as its will and determination to retain or improve the balance in its own favor.

Items in the first category would primarily involve wartime consumables, such as ammunition and ordnance, and various other expendables such as sonobuoys and various electronic countermeasures items. Most of these items represent the "sustainability" of U.S. forces in combat. Many of them have been neglected in recent years as the focus has been centered on modernization of primary weapon systems. In these areas, there are plans for increased production, and "warm base" and "standby" facilities exist for rapid mobilization. Many qualified observers, however, believe that existing plans for increased production of consumables are inadequate on at least two different counts: (1) planning does not assume that there is to be a substantial increase in overall American force levels--as would result from a substantial World War II-like mobilization phase of a year or more; and (2) relatively little thought seems to have been given to the need to be able to provide equivalent consumables for use by our allies--whose war reserve stocks appear, in many cases, to be substantially less than our own. While there may be good and sufficient reasons during peacetime to emphasize weapons over ammunition, and U.S. force needs over allied force needs, it is quite likely that such priorities would have to change during a serious and threatening mobilization period. It seems quite likely that current mobilization

planning substantially underestimates the full scope of increased consumables production that could be required.

Items in the second category are in many respects more judgmental since one must deal with the perceptions that influence the Soviet ability to intimidate our allies. Clearly, a Soviet mobilization effort designed to threaten and intimidate the West must emphasize offensive weapons. Moves primarily devoted to enhancing the impregnability of the Soviet Union homeland would not be so interpreted. A Soviet mobilization effort of the type and purpose envisioned in this study would logically lean towards increasing inventories of potentially offensive weapons and forces that are seen to improve Soviet abilities to overwhelm--and occupy--Western territory. One would naturally expect this to include ground force augmentation, as well as the supporting forces which would accompany such a Soviet offensive. Although much Soviet peacetime emphasis is placed on defensive systems, such as interceptors and surface-to-air missile systems, their recent modernization efforts have clearly focused more on offensive capabilities such as tanks, artillery, attack aircraft, and missiles. It is also in many of these areas (except aircraft) where current Soviet inventories and production rates significantly exceed those of the U.S. (see appendix).

It has already been mentioned in several places that a responsive U.S. mobilization effort need not parallel that of the Soviets, since our purpose is surely to deter aggression rather than undertake it. On this basis, many will argue that the rapid production of countervailing systems such as antitank and antiaircraft systems may provide the desired deterrent. Such logic, however, is not infallible, since we must deal with the perceptions of the Soviets--and their threatened neighbors. It is clear that the Soviets would be quite willing to absorb very substantial losses in the achievement of their objectives. Defensive weapons alone may not be able to prevent the accomplishment of those objectives. The ability to perform unequivocal counteroffensives must be retained if the West's objectives are (a) to restore lost territory, and (b) to "punish" the aggressor for his offensive operations. The Soviets must perceive this, and so must our allies who are threatened. U.S. mobilization efforts, then, must not only be able to destroy the enemy's added offensive potential, but must preserve our ability

to undertake a decisive counteroffensive. To some extent, then, the perceived balance in offensive weapons must also be maintained--if not improved. This appears to require that the U.S. be prepared to do its best to increase its own production of major offensive systems such as aircraft and armored vehicles.

U.S. remoteness from the anticipated scene of the actual military action is also a cause for substantial uncertainty among our allies. Hence, we must not only be able to produce more materiel, but we must be able to deliver it to the potential theater of operations. This in turn will require maintaining or improving allied perceptions of our ability to airlift and sealift reinforcements--preferably before the outbreak of hostilities. This will require the mobilization of strategic lift assets, as well as the naval and air forces required to ensure their safe transit. This creates an additional demand on U.S. mobilization capabilities, which the Soviets do not need to match.

Items in the third category must meet two objectives. First, they must represent areas in which U.S. technological and production capabilities clearly exceed those of the Soviet Union. In general, it appears that these will be things for which there are some rough equivalents in our much broader civil sector (such as vehicles or home appliances). Second, of course, they must also embody characteristics that, by either their sheer numbers or their technological innovation, also represent substantial threats to the success of Soviet aggressive operations. These might be anything from very simple antitank weapons, which could be provided in large quantities to arm entire affected populations, to disposable electronic jammers which could be scattered over the countryside to impede the effectiveness of Soviet operations, or to voluminous decoys to destroy the effectiveness of Soviet firepower or intelligence operations. These items might also involve relatively high levels of technological sophistication, available only to the West, which could surprise and confound enemy forces. A small magnetic sensor-triggered, noise-homing antitank mine might be a purely hypothetical example of such a disruptive system that might be created by American ingenuity and produced by our home appliance industry in very large quantities in a very short time.

Given the extraordinary--and somewhat unexpected--Soviet mobilization capability, then, it appears clear that there would be very few if any areas in which an equivalent U.S. mobilization capability would not be desired. There appear to be some areas where the combination of current Soviet inventories, production rates, and mobilization capability will essentially make it impossible for the U.S. to keep the perceived balance of power from shifting towards the Soviets (e.g., tanks, armored personnel carriers, or artillery). Nonetheless, the perceived values of these systems in preventing intimidation will require that we undertake a competitive production effort in kind. In other areas, such as aircraft production, the U.S. need not start with such a deficit, and there is greater hope of being able to outproduce the Soviets over a period of time (if we can overcome present apparent bottlenecks). These may tend to offset predicted Soviet advantages. At the same time, we should think in terms of exploiting inherent American advantages in the production of electronics and other sophisticated devices, to vastly increase inventories of counter-systems for use not only by qualified military personnel, but by less adept civilians and military reservists.

In addition, the U.S. will have a unique requirement to be able to ship such equipments to the threatened areas. This will require mobilization of our transportation capabilities--and the defenses required to protect them. In such areas, we may well have to depend on the conversion of existing civil assets, quite possibly armed in some hurried fashion, to provide for their own defenses. Again, the advantages of American quick-reaction with ad hoc solutions may provide a sorely needed element in the overall equation. Such capabilities could be significantly enhanced by proper planning.

In an effort of the magnitude envisioned, it is difficult to visualize any part of the U.S. manufacturing industry that could not usefully be involved--completely. American efforts would certainly have to go very far beyond the current limits of the defense industry. In fact, it is difficult to visualize any segment of manufacturing, from chemicals and furniture to plastics and toys, which could not become gainfully occupied in a mobilization effort. Relative to the entire GNP-producing capacity of the U.S., however, our manufacturing sector is a rather small fraction. It is difficult

to imagine an equivalent pre-occupation of other segments of our economy, such as services or construction, in the defense industrial mobilization effort. These other segments are probably available for other aspects of the overall national effort--including, for instance, military conscription or expanded civil defense efforts.

V. PHASE III: IMPACT OF INDUSTRIAL MOBILIZATION ON CIVIL DEFENSE PREPAREDNESS

Phase I of this study has investigated the relative mobilization potentials of the U.S. and the Soviet Union and concluded that a competitive mobilization phase prior to a war might be used by the Soviets to tilt the perceived balance of military power in their own direction. It has also shown that, to offset the intimidating qualities of a Soviet mobilization, the U.S. is latently capable of undertaking a substantial and counterbalancing mobilization effort of its own. Phase II of this study briefly explored the views of defense industry officials concerning their capabilities to accomplish such a mobilization if "the chips were down." They conclude that they could, although it would require substantial departure from current procurement/production procedures, and involve extensive penetration of the manufacturing base of the civil sector. Phase II also considered the types of equipment to be produced in greater quantity and the civil sector segments best suited to helping. It is concluded that most equipments would be needed in much larger quantity and that the entire civil manufacturing sector could become involved.

In this final phase, we will attempt to demonstrate that a pre-attack mobilization phase could have a significant impact on civil defense planning--and vice versa. Moreover, it will show that, if mobilization planning and civil defense planning are not well coordinated, there will be many opportunities for conflict between the two that would require resolution and reconciliation.

The hypotheses contained in this phase were discussed in some depth at an SPC workshop attended by various knowledgeable members of the emergency preparedness community from DCPA, FPA, Commerce, JCS, ICAF and other involved agencies. It becomes evident that there is no common visualization of the extent of the effort that might be required during either an industrial

mobilization or a civil defense mobilization phase. Many of the points of discussion reflected the common belief that the industrial mobilization would not really tax our manufacturing sector, and that the civil defense demands would be modest at best, regardless of the warning time generated by a gradually worsening crisis. There were the customary concerns that any stepped up American preparedness actions might be interpreted by our adversaries as "sword-rattling" and a general skepticism that the United States would risk "destabilizing" the crisis by taking advantage of available preparation time. Naturally, the actual American response in such a time of crisis will depend on our leadership at the time, and their perceptions of how best to simultaneously deter hostilities and avoid intimidation. It is not the purpose of this paper to try to definitively project U.S. and Soviet reactions during a crisis.

Nonetheless, it is one purpose of this paper to investigate the impact of a very substantial mobilization effort on other emergency planning. It can be assumed for the purposes of this study, then, that American leadership has decided to undertake a "maximum-effort" mobilization program. Given a firm commitment to such a course, it would somehow appear illogical that we would fail to take whatever practical steps are available to improve our civil defense posture also. The two efforts would probably not be initiated simultaneously. In fact, both efforts would follow some series of carefully calculated steps up a preparedness escalation ladder as an integral part of the action-and-reaction demanded by a deepening crisis. In all probability, industrial mobilization would be started prior to enhanced civil defense measures. Nonetheless, the two efforts could readily become entwined in successively serious steps to demonstrate our resolve.

It has been of some interest to note that many members of the preparedness community envision a rather limited mobilization effort (way short of that postulated in this study). They also seem to feel that any additional civil defense efforts would place no more than trivial demands on any sector of the U.S. economy. Again, such a view is inconsistent with the assumptions of this particular study effort. For the purposes of this analysis, we postulate a mobilization effort at least as large, proportional to our economy, as the effort associated with the early stages of World War II. We also postulate

that the nation would decide for the first time that it is serious about civil defense, and undertake a very substantial effort to improve its defensive posture against strategic nuclear warfare. It appears almost inconceivable to these investigators that this great country, faced with the reality of impending superpower conflict, would hesitate to disturb its national status quo and do less than its utmost to assure its own survival.

Hence, the subsequent discussions should be reviewed from the standpoint of a massive national effort to prepare to fight an unlimited World War III, including the expectation of intercontinental nuclear exchanges with the Soviet Union somewhere during the course of the struggle for decisive victory. Consistent with earlier sections of this report, this would mean striving to increase our output of military equipment by more than a factor of twenty. It could also mean a civil defense program that might have as its objective hardened blast shelters for at least 50 million metropolitan area citizens, in addition to thorough preparations for relocation and fall-out shelters for another 75-100 million Americans. Such a civil defense program might be attempted over less than a year. The questions addressed here are not whether we <u>should</u> undertake such a dramatic effort, but whether we have sufficiently well thought-out plans so that we <u>could</u> progress towards that objective without chaos.

On this basis, then, we have singled out six specific areas where conflicting demands might well be generated by a large industrial mobilization effort and a vigorous civil defense effort somehow running in parellel. The six areas are as follows:

- Civil posture for damage limiting in nuclear war
- Civil sector conversion to mobilization/civil defense demands
- Resource allocations
- Emergency government organization
- Emergency legislation
- Continuity of government.

In each of these six areas, we have identified a set of pertinent issues and compared the demands of mobilization and civil defense. The point of this exercise is simply to search somewhat methodically for areas of conflicting and/or reinforcing planning requirements. We will not claim that the resulting tabulations are complete, precise, accurate, or even totally

correct, but will only suggest that this methodology is useful in exploring for potential problem areas that could be alleviated by suitable prior thought and planning. In particular, we are searching for unresolved issues that could usefully be surfaced and treated in terms of national policy options worthy of consideration at higher levels of the federal government.

It should be stated that, within the limited scope of this contract, we do not propose to offer solutions to some of the dilemmas raised. In fact, many of them represent policy alternatives that must be either decided by higher authority, or conversely, must be recognized to require standby mechanisms for their ad hoc resolution as the emergency unfolds. It remains the objective of this study to raise more questions than it answers--in the belief that identifying the questions is, per se, a significant step toward their orderly resolution after further appropriate study.

There was a general feeling at our workshop that the demands imposed by civil defense would, in general, be very small compared to those generated by a truly great mobilization effort. There was also a general feeling that the demands of the two efforts were, in the main, consistent with one another. Moreover, there was a feeling that neither effort, separately or together, would really tax the total depth of our national capabilities. We have attempted to qualitatively assess all three of these suppositions, at least superficially. Hence, for each issue in each of the six major areas, we have tried to determine whether the combined impact on that sector was small, large, or extreme, and whether the competing objectives were similar, different, or opposite. Finally, we have also attempted to judge which of the two competing efforts would have the larger impact and by what ratio. Needless to say, these are only estimates, developed on the basis of comments offered at the Phase III workshop at SPC.

Nevertheless, we cannot support any of the three feelings described above. Some impacts definitely appear major. Some objectives appear to be in clear opposition to one another, and there appear to be instances where the civil defense demands could be an order of magnitude greater than the industrial mobilization demands--and vice versa. These will be discussed in somewhat greater detail in the following paragraphs, which refer specifically to each of the six tables. Each summarizes our findings in one of the

areas previously identified. Each of these tables has benefited from the discussions held at the workshop. In no case, however, do any of the results presented here represent an approved position of any of the attendees of their agencies.

A. CIVIL POSTURE FOR DAMAGE LIMITING

The first potential area of concern deals with assumptions made about our national posture at the time of the civil defense alert. Clearly, there could be some significant differences in our own perceptions of potential U.S. targets for Soviet weapons if a large scale mobilization effort has already been generated. Some new military targets could arise that might place additional civilian populations in jeopardy. New industrial targets could become of greater significance to a strike against U.S. warfighting capability. Additionally, there may have been some significant migrations of defense workers to communities not now overwhelmingly defense-oriented. For instance, the population of Norfolk, Virginia, or Columbus, Ohio, might be substantially larger than at present. While these areas may already be on the Soviet "target list," the question arises as to whether these communities plan their own civil defense efforts around current rather than potential population size. In this particular area, the impact is not expected to be large, the objectives of both mobilization and civil defense would be considered similar, and the demands imposed by both efforts would be of the same magnitude (i.e., 1 to 1 or 2 to 1, as indicated on Figure 5).

On the other hand, the size of the "essential workforce" might be quite different, and questions may properly be raised as to whether that larger essential workforce should be protected and supported differently than those who can be assumed to hold non-essential occupations. The need to protect the population would remain similar, but the magnitude of those requiring special consideration might be larger by a factor of three (30 million as opposed to 10 million). This "relative demand" estimate is derived from prior sections wherein the size of the workforce involved in industrial mobilization is raised from about 1 million to 20 million or so. The 20 million is then added to existing estimates by the civil defense community of nominally 10 million "essential workers" in potential target areas.

FOR INDUSTRIAL MOBZN (IM) PLANS	Potential Impact	IM vs CD Objectives	Relative Demand: IM/CD	FOR CIVIL DEFENSE (CD) PLANS
POTENTIAL MILITARY TARGETS	SMALL	SIMILAR	1:1	
• Additional storage, training, and assembly bases for military units and materiel (1, 2, 3)*				• Normal peacetime military base structure (1, 2, 3)
POTENTIAL INDUSTRIAL TARGETS	SMALL	SIMILAR	2:1	
• Many additional industrial targets with direct defense contributions (1, 2)				• Normal peacetime industrial centers, with emphasis on peacetime defense industry (1, 2)
POTENTIAL POPULATION TARGETS	SMALL	SIMILAR	1:1	
• Some population redistribution towards converted wartime industry production centers (1, 2, 3)				• Normal peacetime population distribution (1)
ESSENTIAL WORKFORCE	LARGE	SIMILAR	3:1	
• Substantially increased workforce contributing to war effort and working longer hours (1, 2, 3)				• Minimal peacetime workforce in selected essential industries and services (1, 2, 3)
KEY INDUSTRIAL MACHINERY	SMALL	DIFFERENT	3:1	
• Continuous full operation to support wartime mobilization effort (1, 2, 3)				• Protect or stand-down essential machinery to assure more rapid post-war recovery (1, 2, 3, 4)
POPULATION SHELTERING	LARGE	DIFFERENT	1:2	
• On-site shelters and hardening to maintain full operation of key mobilization industries (1, 2)				• Evacuate to simpler shelters in lower threat areas for duration of nuclear threat (1, 2)
POPULATION EVACUATION TIME	LARGE	DIFFERENT	1:7	
• Minimize production stand-down time (1, 2, 3)				• Evacuate for duration of threat and sometime thereafter (1, 2, 3)
RESERVE & GUARD FORCE UTILIZATION	SMALL	DIFFERENT	1:1	
• Active duty or already overseas (1, 2)				• Help control evacuation, keep civil order (1, 2)
• Continuing post-attack military operations (3)				• Help in emergency rescue/recovery operations (2, 3)

* = PRIMARY INTEREST DURING (1) PRE-ATTACK; (2) TRANS-ATTACK; (3) POST-ATTACK; (4) POST-WAR PHASE

FIGURE 5. POTENTIAL AREA FOR CONCERN: CIVIL POSTURE FOR DAMAGE LIMITING

Different objectives may arise concerning the use of essential machinery. The mobilization effort may wish to maximize its use while the civil defense community may wish to hide and protect it because of its contribution to post-attack or post-war recovery. Steps required to preserve that machinery could easily be inconsistent with plans to maximize the output from that same machinery for mobilization purposes. Conflicting objectives may also arise concerning whether the essential workforce should be protected in hardened shelters near their expediently hardened factories, or whether they should be relocated outside of the expected target areas. Some feel the objectives are consistent and that workers can be left in place, unprotected until "the last minute" before an attack, and then relocated in safer places from which they can commute to their jobs. Others feel that good knowledge of "the last minute" will not be available, that the threat of attack--or continued attack--could persist for months, and that commuting long distances to work on a daily basis may not be feasible. There are further differences of opinion as to how long an evacuation might have to last. Some claim that it will be only a "few weeks" until the threat or the strikes have passed, after which essential workers can return to what is left of their industrial facilities. Others believe that the evacuation time might be months or years and that there would be little opportunity for the resumption of the mobilization effort.

These differing views raise the basic questions, then, of additional in-place hardening of facilities and workforce versus the cheaper expedient of massive relocation, and potentially semi-permanent industrial shut-downs.

In one final area, there appear to be differing views of the availability of guard and reserve forces to help with evacuation plans and the retention of civil order. Some planning appears to assume the availability of these well-disciplined forces. Others seem to recognize that the guard and reserve forces may have already gone off to war.

Typical Issues Arising from this Study

The following types of questions are raised by this preliminary analysis of the impact of mobilization on civil defense planning for damage limiting:

- Should DCPA/FEMA be planning around a peacetime U.S. target structure or a mobilized target structure, or both?
- Should DCPA/FEMA be planning on less evacuation and more in-place hardening and sheltering?

B. CIVIL SECTOR CONVERSION

The second potential area of concern deals with the planned usage of the various segments of the civil sector that might be called upon to support either a large-scale mobilization effort or a large-scale civil defense effort, or both, as summarized on Figure 6.

The first issue deals with the utilization of various manufacturing industries for the production of war materiel or special demands from the civil defense community. There are currently few, if any, plans to generate special production demands for enhanced civil defense, such as: generators; camping-type equipment for cooking, sanitation, and the like; exhaust fans for shelters; molds or tools for the construction of expedient shelters; special protective clothing; and so on. Nonetheless, it is certainly not inconceivable that such demands could arise. In this particular case, wartime mobilization requirements could readily place demands 30 times greater than civil defense needs. This is based on a 20 to 1 increase in defense procurement, compared to the production of $200 worth of special civil defense equipment for each of 100 million people. Such possible civil defense needs would appear to be readily absorbed within other defense production requirements. Nonetheless, in this particular scenario, we are talking about converting the vast majority of all American manufacturing capabilities--not just a small fraction. Some preplanning, then, appears justified, since much of the equipment possibly needed for civil defense would "look like" equivalent equipment for military purposes.

A second issue deals with potential demands on the construction industry. In this case, it is quite possible to visualize a very major shelter and hardening program for the population and industrial facilities that might swamp any demands by the military itself or the defense sector, possibly by a figure of 8 or 10 to 1. For instance, 50 million shelters at $100 each, and 75 million shelters at $1000 each (to protect essential workers and

FOR INDUSTRIAL MOBZN (IM) PLANS	Potential Impact	IM vs CD Objectives	Relative Demand: IM/CD	FOR CIVIL DEFENSE (CD) PLANS
MANUFACTURING INDUSTRIES	LARGE	SIMILAR	30:1	
• Very largely involved in conversion to and production of wartime materiel (1, 2, 3)*				• Could become involved in special requirements to "surge" to improve civil defense posture (1)
CONSTRUCTION INDUSTRIES	LARGE	DIFFERENT	1:8	
• Could become involved in construction of special wartime industrial facilities (1, 2, 3)				• Could become involved in major shelter and hardening "surge" program - - and rapid restoration of essential services following attack (1, 2, 3)
• Could be needed for crash military construction programs either at home or abroad				• Critical to rapid post-attack national recovery (3, 4)
TRANSPORTATION INDUSTRIES	EXTREME	DIFFERENT	10:1	
• Heavily involved in contributing to industrial and military mobilization and movements of military units (1, 2, 3)				• Needed to assist in supporting enhanced civil defense effort, distributing essential survival items, as well as aiding evacuation (1)
MEDICAL INDUSTRIES AND SERVICES	EXTREME	DIFFERENT	1:25	
• Heavily involved in supporting war effort and caring for wounded in action (1, 2, 3)				• Heavily involved in preparing to tend wounded in nuclear attack and preventing of subsequent spread of disease (1, 2, 3, 4)
SERVICE INDUSTRIES	SMALL	DIFFERENT	1:1	
• Major source of additional manpower for both essential industries and military service (1, 2, 3)				• Required to contribute to support of vastly expanded civil defense efforts (1, 2, 3)

* = PRIMARY INTEREST DURING (1) PRE-ATTACK; (2) TRANS-ATTACK; (3) POST-ATTACK; (4) POST-WAR PHASE

FIGURE 6. POTENTIAL AREA FOR CONCERN: CIVIL SECTOR CONVERSION

their plants) could cost $80 billion. The rapid construction of 1000 new defense plants at $10 million each equates to only $10 billion. Both of these efforts, if carried out simultaneously could tax the entire construction industry of the United States for many months.

The transportation industry could also be faced with substantially different requirements to support a mobilization effort and a civil defense effort at the same time. Here, it is estimated that the mobilization effort might place 10 times as large a demand on the trucking and railroad industries as the civil defense effort. This assumes that, during the mobilization process, five times the weight of total existing military equipment stocks would require movement (50M tons), while civil defense might require the movement of 100 pounds for each of 100M people. As in World War II, it is estimated that these demands would severely tax the entire transportation structure of the U.S., and place quite different objectives on available resources.

The medical industries and services could also be subject to very major and substantially different requirements. In this case, the civil defense casualty demands might easily exceed those of the military by a factor of 25 to 1. This assumes maximum military casualties of 200 to 500 thousand, compared to civilian casualties from nuclear strikes ranging from 4 to 15 million. Additionally, of course, the types of treatment and medicines for the two efforts would be substantially different. Relatively sudden casualties of this magnitude could severely stress the pharmaceutical industries, as well as overwhelming available medical staffs and facilities. Hard decisions concerning care for military vs. civilian casualties could result.

The largest single sector of the American workforce is engaged in our burgeoning service industries which employ over 50 million people. This would represent the largest pool of "non-essential" people that could be assigned special wartime functions, ranging from military service to civil defense "wardens." Potential demands from both the military and civil defense sectors are estimated to be somewhat equivalent--ranging from 1 to 5 million for each. In this case, the potential impact is relatively small, and the differing objectives should be easily met.

Typical Issues Arising from this Study

- Is DCPA/FEMA planning to use the same resources from the civil sector industries as will be required to support a mobilization effort?
- Are DCPA/FEMA needs spelled out as well as those of the defense sector?

C. RESOURCE ALLOCATION

In any major national effort there will be extensive demands on the country's available resources. The extent of these demands will, of course, depend on the scale of the effort envisioned. In this area, we have singled out seven different areas of potential interest to both a mobilization effort and a civil defense effort, as shown on Figure 7.

Normal defense demands on raw materials represent a very small fraction of the total demands. Even with an attempt to increase defense production by a factor of 20, it is unlikely that there would be a conflict between immediate civil defense demands and mobilization requirements, although the combined demands could be substantial relative to the total raw materials available. Special stockpile materials, amassed for such a mobilization effort would, of course, be consumed. There appears to be substantial question, in fact, as to whether current stockpile planning is consistent with a war effort as large as that envisioned here. While planning is supposedly based on satisfying the first three years of demand for a major conventional war, it is quite possible that this demand has been seriously underestimated--at least compared to the mobilization levels postulated herein.

Mobilization efforts would also place additional demands on domestic energy supplies, both in industrial usage, and in use by the military themselves. Current defense usage of American petroleum products is only about 2 percent of the total consumed in the United States. However, even if external supplies were diminished, it is unlikely that defense needs would become unmanageable. Any civil defense efforts would appear miniscule by comparison.

FOR INDUSTRIAL MOBZN (IM) PLANS	Potential Impact	IM vs CD Objectives	Relative Demand: IM/CD	FOR CIVIL DEFENSE (CD) PLANS
AVAILABLE NATIONAL RAW MATERIALS	LARGE	OPPOSITE	1:1	
• Support vastly increased defense production (aluminum, steel, plastics, etc.) (1, 2, 3)*				• Husband for post-war recovery (1, 4)
NATIONAL STOCKPILE MATERIALS	LARGE	OPPOSITE	1:1	
• Draw down to meet mobilization requirements (1, 2, 3)				• Build-up and protect to enhance national post-war recovery (1, 2, 3, 4)
AVAILABLE ENERGY SUPPLIES	SMALL	OPPOSITE	1:1	
• Additional demands for industrial and military mobilization efforts (1, 2, 3)				• Conserve for post-attack and national recovery demands (1, 2, 3, 4)
NATIONAL FOOD SUPPLIES AND PROCESSING	EXTREME	SIMILAR	1:2	
• Additional demands for military rations for combat consumption (1, 2, 3)				• Stockpile and distribute to emergency shelters, trans-attack, and post-attack consumption (1, 2, 3, 4)
IMPORT/EXPORT OF BASIC FOODSTUFFS	LARGE	OPPOSITE	1:1	
• Sudden requirements to export food to support allied needs abroad (1, 2, 3, 4)				• Need for food imports in post-attack period from neighboring countries not attacked (3, 4)
NATIONAL WATER SUPPLIES	SMALL	DIFFERENT	1:1	
• Possible additional requirements for vital industrial processes (1, 2, 3, 4)				• Crucial needs for expedient water supplies and movement in wake of nuclear attacks (2, 3, 4)
CLOTHING, BEDDING, SANITATION	LARGE	DIFFERENT	1:10	
• Increased demands for military forces and wartime casualties (1, 2, 3)				• Major demand for bad weather apparel/sleeping gear/sanitary needs of displaced population (1, 2, 3, 4)

* = PRIMARY INTEREST DURING (1) PRE-ATTACK; (2) TRANS-ATTACK; (3) POST-ATTACK; (4) POST-WAR PHASE

FIGURE 7. POTENTIAL AREA FOR CONCERN: RESOURCE ALLOCATION

In all three of these areas, however, there could be serious conflict between civil defense motivations to conserve resources for the post-war recovery period, while the mobilization effort would demand draw-downs of existing stockpiles. Most attendees at our workshop felt that there would be no contest between immediate needs vs. long-term needs--the immediate needs would always have overriding priority. It appears to some investigators, however, that this may be a serious oversimplification. The issues of national recovery vs. near-term war-fighting have never been tested in the real world. Military experience on the battlefield would suggest that there is a strong motivation not to commit one's last reserve unit, nor to consume one's last available ammunition. There are equally strong debates about the level of nuclear weapons that should be reserved from the primary exchanges. This appears to be an area which does deserve more thought.

Both mobilization and civil defense requirements could place very major demands on the U.S. food processing and agriculture industries in the last-minute preparation of storable rations for combat consumption. The issue of existing stockpiles for either military or civilian (civil defense) consumption has not been researched in this effort. Nonetheless, it is difficult to imagine that additional efforts would not be undertaken, almost regardless of current stockpiles. Additionally, this appears to be an area where civilian demands for a displaced population could readily exceed military needs--particularly if military stockpiles are currently more adequate. Of course, this is basically due to the vastly larger civilian population relative to any conceived military force levels.

On the other hand, there could be some diametrically opposed demands for the import and export of foodstuffs. It is quite likely that America would be called upon to export food to some of our less self-sufficient allies in times of war. Such demands could be sizable. By the same token, in the aftermath of a major nuclear exchange, the U.S. could also find itself with inadequate food supplies for some substantial period of time. This in turn might suggest a strong demand for the import of food from other countries not exposed to the nuclear exchanges. In this case, the import/export demands for foodstuffs could be diametrically opposed to one another.

Frankly, it is not known to what extent this issue has been investigated elsewhere.

Water supplies could, of course, become extremely short in the wake of nuclear attack. Many industrial processes also demand the extensive consumption of water. This could become a substantial conflicting issue at least in the post-attack stages of a nuclear confrontation.

Lastly, there could be some very different demands on supplies of clothing, bedding, sanitation supplies and the like. In this case, the demands for a large-scale civil defense program would probably far outweigh any justifiable military mobilization demands. Nonetheless, the issue may not be trivial if our armed forces are increased by several million people, while, at the same time, the "home front" is preparing for a massive relocation effort. Priorities in resource allocation might well be needed.

Typical Issues Arising from this Study

- Are current suggestions to protect resources for the post-war recovery effort consistent with mobilization plans to consume them faster prior to the onset of an attack?

D. EMERGENCY GOVERNMENT ORGANIZATION

There has been virtually no question about the need for special organizations to manage and control either a large mobilization effort or a large civil defense effort. Figure 8 illustrates just a few of the controls that may be required. It was the general consensus of the SPC workshop that the provisions of the National Security Act and the Defense Production Act were generally adequate to provide the necessary authority for the establishment of appropriate management structures and procedures for times of emergency. As a matter of fact, the extent of existing legislation is greatly admired by those who would have to work within it. In fact, the skeleton organizations for an Office of Industrial Priorities and an Office of Defense Resources are currently in place. Alternate headquarters are designated, and exercises are actually run--though not very frequently.

FOR INDUSTRIAL MOBZN (IM) PLANS	Potential Impact	IM vs CD Objectives	Relative Demand IM/CD	FOR CIVIL DEFENSE (CD) PLANS
PRODUCTION CONTROLS	LARGE	SIMILAR	1:1	
• Allocation of resources for industrial mobilization (1, 2, 3)*				• Allocation of resources for civil defense and post-war recovery (1, 2, 3, 4)
WAGE AND PRICE CONTROLS	LARGE	SIMILAR	1:1	
• Inflation control during major industrial mobilization effort (1, 2, 3)				• Essential to post-war national economic recovery (4)
EMERGENCY FINANCIAL CONTROLS	EXTREME	N.A.	N.A.	
• Not required				• Required in post-attack phase if normal financial institutions and pay systems disrupted by nuclear attacks (3, 4)
TRANSPORTATION CONTROLS	EXTREME	SIMILAR	10:1	
• Allocation of priorities during mobilization phase (1, 2, 3)				• Allocation of priorities for preparation and execution of civil defense programs (1, 2, 3, 4)
CONSTRUCTION CONTROLS	LARGE	SIMILAR	1:8	
• Allocation of priorities to support war effort (1, 2, 3)				• Allocation of priorities to conduct civil defense preparations and recovery (1, 2, 3, 4)
ENERGY USE CONTROLS	LARGE	SIMILAR	1:1	
• Allocation of priorities to support war effort (1, 2, 3)				• Enforcement of conservation, allocation of surviving supplies for post-attack recovery (1, 2, 3, 4)

* = PRIMARY INTEREST DURING (1) PRE-ATTACK; (2) TRANS-ATTACK; (3) POST-ATTACK; (4) POST-WAR PHASE

FIGURE 8. POTENTIAL AREA FOR CONCERN: EMERGENCY GOVERNMENT ORGANIZATION

In the main, it appears that the necessary legislation and organization for emergency government controls are in place and satisfactory. They would apparently closely parallel the successful operations of the War Production Board in World War II. Further, there is a pool of earmarked managers from industry who have agreed to serve their government in time of emergency. The National Defense Executive Reserve is in being and has an active membership of over 2500 suitable executive personnel--who hold meetings annually.

To the extent that production, transportation, energy, construction, and wage and price controls are undoubtedly going to be required, there appears to exist a mechanism for bringing a suitable organization into being on short notice. From many repeated comments at the meeting, there seems to be little question that they could provide the necessary controls for both a mobilization and a civil defense effort of substantial magnitude.

However, it does appear that those who plan for this organization are thinking in terms of a relatively modest mobilization effort, and do not appear concerned that a parallel civil defense effort might tax their--or the nation's--capabilities to respond. Clearly, however, they have not been thinking in terms of a truly all-out effort in either area. It also appears evident that they have been thinking very little about the total extent of possible civil defense demands. In truth, this may simply mean that the efforts visualized in this investigation exceed anything currently considered reasonable. This in turn may be because the participants have not envisioned as long a period of preparation as may actually be available, and possibly because they have not considered the Soviets capable of performing as great a mobilization effort as ourselves.

In only one area does civil defense appear to establish truly unique requirements. This involves the question of emergency financial controls, under the assumption that the normal financial systems of the country have been largely disabled during nuclear strikes on the United States. It was beyond the scope of this study to explore the uniqueness of this possibility, or the extent to which it might require changes in current emergency management planning.

Typical Issues Arising from this Study

- Are DCPA/FEMA emergency control requirements fully compatible with current emergency mobilization plans?
- Are there potentially serious DCPA/FEMA emergency requirements with which current emergency control organizations are not familiar?

E. EMERGENCY LEGISLATION

Possible requirements for emergency legislation are summarized on Figure 9. Existing legislation, as discussed in the previous section, essentially authorizes the generation of a management and control apparatus for the conduct of emergency mobilization and civil defense efforts. It does not, however, provide for the suspension or selective waiving of many restrictive laws that have been passed since the early 1950s, dealing predominantly with regulatory policy. It appears highly likely that many of the current statutes for protection of the environment, protection of the worker, protection of public lands, and the like, will prove inappropriate and highly inhibiting during a major national war effort. Moreover, even if the provisions of the legislation themselves are not counterproductive, the seemingly endless reporting requirements are certain to impede rapid (overnight) increases in national productivity and industrial output.

Moreover, the requirements of a really substantial civil defense program may introduce troublesome new problems concerning the use of existing facilities, parks, and other properties currently reserved for public/government usage. Considerations such as temporary water storage, temporary power generation, primitive sanitation facilities, emergency medical stations, even massive burial sites, may require quick and uncontested use of private or government properties. The extent to which planning has been carried out in these areas is frankly not known by our investigators.

Typical Issues Arising from this Study

- What kinds of changes are required in national laws and regulations to assure maximum effectiveness in both an industrial and civil defense mobilization effort?

FOR INDUSTRIAL MOBZN (IM) PLANS	Potential Impact	IM vs CD Objectives	Relative Demand: IM/CD	FOR CIVIL DEFENSE (CD) PLANS
EMERGENCY EXECUTIVE POWERS	EXTREME	SIMILAR	1:1	
• Enable emergency organizations to use powers for controls listed on previous chart (1, 2, 3)*				• Same
REGULATORY RELIEF	LARGE	SIMILAR	1:1	
• Provide relief from various stringent peacetime procurement regulations as well as environmental and OSHA regulations inappropriate during crisis (1, 2, 3)				• Same
LEGAL CHANGES	LARGE	SIMILAR	1:1	
• Assure maximum efficient utilization of national manpower and resources (1, 2, 3)				• Required to exercise rights of "eminent domain" to free up sites for shelters, temporary sanitary facilities, burial grounds, etc. (1, 2, 3, 4)

* = PRIMARY INTEREST DURING (1) PRE-ATTACK; (2) TRANS-ATTACK; (3) POST-ATTACK; (4) POST-WAR PHASE

FIGURE 9. POTENTIAL AREA FOR CONCERN: EMERGENCY LEGISLATION

F. CONTINUITY OF GOVERNMENT

The threat of intercontinental nuclear warfare introduces problems concerning the vulnerability of governmental functioning that never existed during World War II. The War Production Board, for instance, was able to operate with a centrally located staff in a Washington office building without fear of loss of leadership or communications. Continuity of government during World War III could be a very different matter, as indicated on Figure 10. This has been recognized. Current planning assumes the use of an alternate, hardened, (but no longer invulnerable) headquarters from which all central emergency governmental functions would be conducted. These requirements and facilities are essentially similar for a mobilization effort and a civil defense effort. Planning apparently exists for continuing central direction if possible, but also allows for regional leadership in the event that national governmental functioning is interrupted.

There are apparently some disagreements as to the extent to which intra-governmental communications have been assured. Some participants in our workshop seem to feel that communications will be adequate, while others more closely related to civil defense efforts displayed substantial concern. There was general agreement, however, that there was no inherent reason why the two emergency efforts should utilize separate communications systems. No reason was presented that would support an assumption that either effort's communication requirements would overwhelm the other. Whether or not the total planned pool of executive talent available to the government for emergency national service is large enough to accommodate substantial nuclear casualties was not addressed.

It is of some passing interest to note that, compared to the situation at the time of World War II, there are many more and much larger national business chains throughout the United States today which inherently have their own management hierarchies and operational procedures. Whether or not any of these could be brought to bear, as corporate entities, to support a substantial war effort has not been explored in any detail. Could national fast-food chains be given some role in emergency food distribution? Could national motel chains be given some emergency responsibilities for dispensing

FOR INDUSTRIAL MOBZN (IM) PLANS	Potential Impact	IM vs CD Objectives	Relative Demand: IM/CD	FOR CIVIL DEFENSE (CD) PLANS
LEADERSHIP ASSIGNMENTS	LARGE	SIMILAR	1:1	
• Federal and regional leaders and organizations will be required, many using people already assigned other tasks (1, 2, 3)*				• Same
LEADERSHIP AUGMENTATION	LARGE	SIMILAR	1:1	
• Additional skilled personnel will have to be drawn from NDER executive reserve pool to staff emergency organizations (1, 2, 3)				• Same
ALTERNATE OPERATIONS CENTERS	LARGE	SIMILAR	1:1	
• Alternate operations centers desired if industrial mobilization efforts are threatened by nuclear attack (1, 2, 3)				• Hardened operations centers mandatory to assure continuous operations during and after crisis periods (1, 2, 3, 4)
GOVERNMENT COMMUNICATIONS	LARGE	SIMILAR	1:1	
• Continuous redundant communications desired to provide fast-reaction control (1, 2, 3)				• Hardened redundant communications essential to control civil defense operations (2, 3)
PUBLIC COMMUNICATIONS	LARGE	SIMILAR	1:1	
• Some public communications desired to help work force relocation, information dissemination, etc. (1, 2, 3)				• Communication of vital emergency instructions and public guidance will be essential (1, 2, 3, 4) • "Feedback" will be essential for damage assessment, regional crisis management, relocation, etc. (2, 3, 4)
OPERATIONAL AND COMMAND EXERCISES	LARGE	SIMILAR	1:1	
• Regular exercise of emergency and mobilization scenarios are essential at federal and regional levels to provide training and uncover problems (1)				• Same

* = PRIMARY INTEREST DURING (1) PRE-ATTACK; (2) TRANS-ATTACK; (3) POST-ATTACK; (4) POST-WAR PHASE

FIGURE 10. POTENTIAL AREA FOR CONCERN: CONTINUITY OF GOVERNMENT

medical assistance? Could some national industrial distributor/sales operations be converted to provide assistance in administering some aspects of governmental functions? Clearly, such questions are beyond the scope and intent of this study. Nonetheless, they are notions that come to mind when one tries to explore the problems of sharing the burden of keeping our governmental functions--and emergency functions--operating during a period of potentially severe national catastrophe. In fact, some attempts to mobilize the extensive latent capabilities of our service industries might be worth exploring.

Typical Issues Arising from this Study

- Are communications likely to be a major achilles' heel in the retention of governmental continuity in the conduct of emergency operations throughout a severe national crisis?
- Should DCPA/FEMA planning include consideration of the mobilization of national service industries to assist in assuring continuity of certain governmental functions during a combined mobilization/civil defense effort?

VI. SIGNIFICANT FINDINGS AND CONCLUSIONS

It appears clear from this modest effort that there are many areas in which the demands of a substantial national mobilization effort and those of a major civil defense effort are similar and compatible. It is also clear that many of the emergency management and control requirements will be exercised through the same governmental mechanisms. Whether or not the two efforts will present conflicting demands for which ad hoc resolution will be required, or whether the parallel efforts could be made more productive by further planning, appears to depend rather crucially on the relative magnitude of the two programs and their timing. The seemingly prevalent conventional wisdom is that a normal mobilization effort will not tax civil industry and that the anticipated civil defense effort will be small even relative to that modest mobilization effort.

On the other hand, it is by no means clear that the levels of effort currently considered most likely would, in fact, be representative of actual demands imposed under the more extreme scenario postulated in this study. If a major all-out national mobilization becomes a new possibility based on emergency Soviet capabilities, it is well within the realm of reason to visualize a national "war effort" that goes significantly beyond current thinking. In this more extreme scenario, there are several areas of potential conflict between civil defense and mobilization requirements which bear further investigation. Competition for the use of our construction industry and our transportation industry could be substantial. There appear to be areas where mobilization will always overwhelm civil defense needs--such as in manufacturing and transportation. Yet there appear to be other areas where civil defense demands could overwhelm defense mobilization needs--such as medical and construction. Still, there appear to be other segments, such as our extensive service industries, which remain underutilized. Current

emergency control planning appears to be adequate, yet there may be other areas where additional standby legislation would be useful in eliminating needless conflict during crisis periods regarding national regulatory policies.

There do exist potential areas of seriously competing demands and broadly differing views on the scope of efforts required. This suggests the desirability of gaining acceptance for the need to develop a set of limit scenarios within which DCPA/FEMA research, analysis, and planning should be both conducted and tested. It is worth noting that every scenario need not be a "design scenario" on which either mobilization or civil defense planning and peacetime programming is conducted. To the contrary, some of the more extreme scenarios, such as the one dealt with herein, could perhaps be more appropriately labeled "test scenarios."

These latter postulations can serve a very useful purpose in testing the adequacy of planned programs and actions against less likely, but nonetheless plausible, occurrences. As explained at the beginning of this report, the adequacy of planning for inherently unpredictable contingencies must be gauged, at least in some measure, by its insensitivity to off-design demands. A national emergency plan that works perfectly on a largely ad hoc basis for modest mobilization and modest civil defense efforts, but which falls apart if truly heroic efforts are called for, would--in the views of these investigators--be less desirable than a national emergency plan that works "reasonably well" in either eventuality.

It must be recognized, of course, that the extent of the confusion and conflict that might arise during an actual dual mobilization phase could be greatly alleviated by prior peacetime planning, organization, oversight, and some additional stockpiling. Emphasis on these issues at the highest levels has clearly declined in recent years. There has been a lack of interest, coordination, funding management attention, and authority within the Executive Branch to coordinate its own activities, and a lack of focused oversight within the Congress. DCPA has done virtually no stockpiling of essential equipments and materials in recent years. FPA has had little or no direct funding and has been unable to influence the activities and developments of

other pertinent federal agencies without being able to back up their particular interests with dollars.

One can only hope that the new FEMA organization will be able to cure some of this neglect. But if it receives no budget of its own, if it receives no strong independent role in the review of other agency emergency preparedness budgets and activities, and if it is not supported by a suitable congressional oversight group, it is unlikely that the desirable plans and preparations can be made. If they are not made, then the burden on the development of ad hoc solutions while the crisis is in progress will be far greater. While "brinksmanship" appears to be a hallmark of free democractic societies, one can only hope that enough forethought is given so that American ingenuity and responsiveness can be properly harnessed when the need arises.

Both research and actual planning for contingency operations can be improved by mutual understanding on the full scope of the plausible contingencies. It appears at the present time that there is no such agreement on the total possible scope of the most important national contingency we might face--national survival. Further, there appears to be little agreement on the relative magnitudes of the demands imposed by mobilization and civil defense. Hence, it is difficult, if not impossible, to explore potentially conflicting areas. Advanced knowledge of such possible conflicting areas can only help improve contingency planning, even though the decisions on the resolution of such competing demands would probably have to await the arrival of the actual contingency. These considerations lead to the creation of two additional pertinent questions:

- What aspects of civil defense planning are consistent with mobilization planning, and what aspects should be highlighted as requiring ad hoc decisions as the emergency unfolds?
- What conflicting aspects of civil defense and mobilization planning could be resolved by the generation of updated national planning guidance policy alternatives and decisions?

With respect to the latter question, it is of some interest that there has been no formal update of national civil emergency planning guidance since 1966--although it is recognized that extensive staff work and interdepartmental coordination in these areas have been undertaken in the intervening

years (particularly in the 1975-76 period). It is difficult to believe that the events of the past 15 years would not produce some significant changes in the existing guidance, both with respect to the range of scenarios deserving consideration and the magnitude of the national efforts that might be required.

Although this study has focused only on the upper range of potential wartime emergency situations, it seems clear that such revised planning guidance should properly deal with the full spectrum of disasters, crises, and emergencies for which civil emergency preparedness and planning should be undertaken. This would include, for example, such hazards as large-scale natural disasters, peacetime nuclear incidents and certain terrorist activities, in addition to covering a broad range of wartime scenarios.

The creation of FEMA would appear to provide a unique opportunity for the development and publication of current, comprehensive guidance on which to base future civil emergency planning in the United States. It appears highly desirable for FEMA to give high priority to this task.

These are the kinds of questions and issues which arise as a result of trying to "think the unthinkable" concerning the actual process of preparing for, and ultimately fighting, some "World War III" in the post-1980 time frame. This study cannot attempt to answer these questions. It can only illustrate the potential value of continued efforts to study the problem in depth, across a broad spectrum of possible alternative situations, and to "test" the adequacy of current DCPA/FEMA research and planning across that range of plausible uncertainties.

VII. THE SPC WORKSHOPS

As discussed earlier in this report, the judgments made and conclusions reached are based as much on seasoned experience as on analysis. This experience was derived in large measure from the day-long discussions held at four separate SPC workshops between December of 1978 and the end of April 1979. Attendance at these workshops was varied according to the subject matter, in order to provide the desired wealth of experience.

Present at all four of the workshops were: the DCPA Project Monitor, Mr. George F. Divine, whose guidance and assistance have contributed greatly to this effort; the SPC Project Director, Dr. W. Scott Payne, with extensive background in both economics and defense matters; and Mr. Leonard Sullivan, Jr., SPC resident consultant and principal investigator on this study.

SPC participation was extended as required. Mr. Pat Gardner, SPC economist, and Dr. Mark Miller, SPC Sovietologist, attended portions of the first and second workshops (described later), Mr. Pat Gardner attended portions of the third workshop, and Drs. Roger Sullivan and Frank Adelman, SPC experts in civil defense matters and technical advisors to this project, attended the fourth workshop.

SPC further augmented its own capabilities through the use of special consultants with extensive applicable experience. Two well-known experts on Soviet economics are responsible for major contributions to the first two workshops; they are Dr. Holland Hunter, Chairman of the Department of Economics at Haverford College, and Professor Vladimir G. Treml, Professor of Economics at Duke University. It is their judgment and experience that underlies the development of the Soviet mobilization potential. To augment our understanding of various historic and organizational aspects of national emergency preparedness, SPC engaged Mr. Haakon Lindjord, former Assistant Director of the Office of Emergency Preparedness. He contributed greatly

to the final phase of this study effort, and has provided a critical review of the final report.

In addition to these paid consultants, the experience of several other senior experts was gained through their voluntary attendance at the latter two workshops. The purpose of the third workshop was to estimate U.S. latent mobilization potential by the same techniques as those developed for estimating the Soviet latent mobilization potential during the first two workshops. SPC was extremely fortunate to have the following senior personnel participate: Mr. Robert Wilson of the Federal Preparedness Agency; Mr. Sean Foohey, of the Office of Industrial Mobilization, Department of Commerce; Mr. George E. Pugh, President of Decision Applications; Mr. Jack Faucett, President of Jack Faucett Associates; and Dr. Garry Fromm of SRI International. Each of these gentlemen made unique and valuable contributions to the discussions.

The fourth workshop benefited greatly from the participation of the following individuals who also gave up a day of their busy schedules to improve the content of the SPC work: Miss Rosemary Hayes from the Program Analysis Division of the Institute for Defense Analyses; Messrs. Arnold Lewis and Arnold Marvin from the Resources Management Division of the Federal Preparedness Agency; Mr. Leon Karadbil of the Industrial Resources Division, Industrial Mobilization, Department of Commerce; Captain Ken Cornell of the Defense Programs Group at the Industrial College of the Armed Forces; and LTC. Albert W. Small of the Studies and Gaming Agency of the Joint Chiefs of Staff. Again, each of these participants contributed to a stimulating day-long discussion.

In addition to these participants, SPC was requested by the DCPA Project Monitor to allow representatives of other contractors to attend who are also involved in DCPA's Economic Research study effort. These included: Mr. Howard M. Berger of Analytical Assessments Corporation; General Les Bray of the Analytic Sciences Corporation; Dr. Mark Earle and Mr. Frank Hoeber of SRI International; Mr. Richard K. Laurino of the Center for Planning and Research, Inc.; and Dr. David W. Peterson of Pugh-Roberts Associates. It is to their credit that each of these individuals made significant

contributions to at least one of the workshops. In addition, there is a valuable understanding between these contractors as to what the others are studying for DCPA. Based on this SPC experience, this appears to be a useful technique for assuring the coordination of the various efforts being supported by the Economic Research Division of DCPA.

Finally, invitations were also extended to other members of the DCPA staff that might be interested in this SPC work. Capt. Richard E. Peterson of DCPA's Hazard Evaluation and Vulnerability Reduction Division attended the fourth workshop and contributed to its discussions.

The following sections describe briefly the subject material covered at each of the four workshops:

A. WORKSHOP #1: DECEMBER 15, 1978; WORKSHOP #2: JANUARY 3-5, 1979

These first two workshops were devoted to the development of a simple methodology for estimating the latent industrial mobilization potential of the Soviet Union. It was recognized from the outset that lack of good information on current Soviet capabilities would be the constraining factor in making a comparative estimate between U.S. and Soviet capabilities. Based on a "strawman" approach developed at SPC, the first workshop was devoted to changing and improving that methodology in the context of information that might be available. It was also quickly determined that there is a dirth of current applicable data on which to base firm estimates. The SPC consultants recognized that what was being proposed in the way of a "top-down" view had not been previously done.

The result of the first workshop, then, was a better formulation of a possibly useful methodology, for which the consultants could provide reasonable judgmental inputs. The second workshop was convened shortly thereafter to develop the methodology and apply quantitative estimates to the various factors that had been deemed significant. The workshop met on January 3, and the following day was spent in confirming and adding to the data base. This material was incorporated into the analyses in the concluding workshop session on January 5.

B. WORKSHOP #3: FEBRUARY 23, 1979

The third workshop was used to develop equivalent confidence in parameter values for the American latent industrial mobilization potential, using the methodology derived from the first two workshops--and subsequently refined. Again, there was spirited discussion, caused in part by the fact that this approach was more general and less specific than the techniques normally applied to discern actual present U.S. mobilization capabilities. In some respects, it was difficult to constrain the U.S. experts from going into more detail than had been determined to be available for the Soviets. In any event, the "strawman" prepared for this workshop was again significantly modified and improved by the inputs from those with greater practical expertise. It might be noted here again that neither the participants of the first workshops nor the participants of the third workshop are responsible for the final conclusions contained in the appendix to this report. They contributed greatly to the input, but were not expected to endorse the output that was synthesized in final form after the meeting. To take but a single example of the value of their expertise, SPC had recommended making a firm distinction between durable and non-durable goods with respect to mobilization potential. The workshop participants strongly discouraged this approach as arbitrary and meaningless. The distinction was dropped.

C. WORKSHOP #4: APRIL 27, 1979

The hiatus between workshops #3 and #4 was used to gain insights from the industrial community to either support or contradict the overall conclusions concerning U.S. mobilization potential. As has already been described, there appears to be general agreement that the U.S. is capable of a far more extensive mobilization effort--in most areas--than is currently being visualized or planned for. To this extent, these interviews were supportive of the output of Workshop #3.

Workshop #4 discussions revolved mainly around the relationships between civil defense and industrial mobilization planning. To a significant extent, the discussions were biased by differing views of the maximum

civil defense and mobilization efforts that might be required--either separately or at the same time. These differences in basic assumptions were thoroughly clarified by the end of the workshop. Nonetheless, a great deal of practical information was obtained (such as the current state of the Executive Reserve), which would not otherwise have come to the attention of the SPC project group. Again, however, it must be clearly understood that the final synthesis of the material in Chapter V is not necessarily endorsed or supported by any or all members of the workshop. It was prepared and revised from an initial "strawman" on the basis of the extensive and productive comments received. There is no guarantee that SPC has correctly synthesized the diverse inputs from this workshop group--even though we have benefited significantly from the SPC consultant who has reviewed the final composition of the report, with special emphasis on Chapter V.

In conclusion, SPC is convinced that the workshop approach is an excellent mechanism for broadening the judgment and experience that can be brought to bear on a relatively modest study effort--particularly where the anticipated output is of a general qualitative nature. This permits an interesting combination of theory and practice to be concentrated on a single issue with reasonable assurance that the result has some general stimulative value. It is also a useful means for determining where equivalent (or better) work already exists, and for assessing whether or not fresh ground is being plowed. In general, SPC was surprised to find how little current thought has been given to some of these issues, and how little reliable background data exists. While the final end-product lacks detailed specificity, SPC believes that it does contain general information that can be of value to future emergency preparedness planning and research.

VIII. POTENTIAL AREAS FOR FUTURE RESEARCH

From the outset, it has been intended that this exploratory study should raise more questions than it answers. In some respects, these questions are more rhetorical than real, because they are intended to be illustrative of the impact of changing the basic assumptions under which mobilization and civil defense are now pursued. From this standpoint, it would not be prudent to establish additional research programs to answer each question.

Nonetheless, we believe that the adequacy of current planning and research is intimately tied to the range of contingencies perceived. By singling out a plausible alternative that is not commonly considered in either mobilization or civil defense planning, it is possible to "test" the adequacy and completeness of current research and planning--and to raise warning flags where present efforts appear lacking. If we accept the premise that planning for the "unthinkable" should be as insensitive as possible across the entire range of plausible scenarios, then it is important to scope that range as well as possible. This study does not claim to have done that--other than to show the possible implications of a long and serious pre-attack phase. There are many other possibilities as well.

Consequently, DCPA/FEMA has, among other steps, asked SPC to conduct a research effort aimed at developing a conceptual framework for assessing the adequacy of national FEMA plans, programs, and policy options for continuity of government and post-attack and post-war national recovery. This study will be undertaken over the ensuing year, and will include the following six specific tasks:

1. The development of a conceptual framework in which to build a comprehensive long-range research and analysis study concerning mobilization and resource management policy options. This will build on the exploratory work reported herein.

2. The investigation of policy options that could produce differing national postures during the pre-attack phase of a confrontation with the Soviet Union, and the determination of their impact on emergency preparedness alternatives for minimizing the effects of subsequent nuclear strikes. This too will build on the exploratory work done under the present contract.

3. The identification and definition of major elements of the framework, including the four attack phases (i.e., pre-attack mobilization capabilities, trans-attack damage limiting, post-attack emergency reconstitution, and post-war recovery), and the major segments of the national entity that would be involved. This will be a more rigorous attempt to improve the content and display of the chart on page 9. Ideally, one would like to be able to expand that chart to include the total range of plausible scenarios in one direction, and the total listing of related segments of the national entity in the other. The resulting matrix would then form a check list within which all emergency preparedness research and planning could be related for completeness and thoroughness.

4. The development of a broad range of illustrative scenarios embodying all reasonable phases of a major nuclear war, and the description of the plausible limits within which FEMA research and analysis should be conducted. This involves the application of the matrix described above to determine the realistic range of scenario variations that should be considered in FEMA thinking and planning. It would attempt to bound the horizontal axis of the chart on page 9.

5. The investigation of some selected illustrative impacts on the national posture arising from different policy options regarding the pre-attack phase. In essence, this would be an attempt to explore the importance of policy considerations along the vertical axis of the chart on page 9.

6. The identification of policy options that appear to enhance the continuity of government and minimize the effects of nuclear strikes on subsequent attack phases. This task would single out continuity of government for special consideration as an application of the matrix approach described above, looking both up and down the vertical axis, and out along the horizontal axis to relate various policy options to the requirements envisioned in each element of the matrix.

If successful, this effort should provide some useful insights into the adequacy of current civil emergency planning. It may also identify some areas in which national civil emergency planning guidance may deserve upgrading. As mentioned previously, the world situation has changed markedly since the last national guidance was developed in the mid 1960s. In fact,

the exercise of preparing this "conceptual framework" may be quite helpful in identifying areas in which consideration might be given to adjusting that national guidance.

This study clearly suggests that the relative mobilization potential of the U.S. and the Soviet Union may have changed markedly from existing "conventional wisdom." It is another area that has received little attention over the past 15-20 years, according to available literature. If the current situation is accurately reflected by the appendix to this report, there are strong hints that current U.S. thinking about mobilization requirements deserves review. Clearly, however, the work done here lacks the depth required to make any strong irrefutable assertions. It does suggest, however, that an in-depth look at this "mobilization balance" is warranted, using more sophisticated techniques and sources than were available to this study. The question, of course, is not so much whether this additional work should be done, but by whom. If separate agencies perform the in-depth studies for the two sides, it seems highly unlikely that comparable results will be achieved. While FEMA may be a suitable group to look at the U.S. side, it is not clear that they have the expertise to look at the Soviet side. If the CIA were to undertake the task, the reverse would probably be true. Possibly the Office of the Secretary of Defense or the National Security Council would be more appropriate agencies to lead such a study effort. In any event, a rigorous, in-depth study of competitive industrial mobilization appears to be in order because of its strategic implications, not just its administrative implications for FEMA.

Finally, this study has raised some questions about the desirability of at least planning for a vastly enhanced civil defense program during a period of competitive mobilization. It would appear to be sheer folly to have no plans to improve the survivability of our population--and our way of life--if the time, resources, and will suddenly became available to do it. Some research on this issue is currently under way. It is quite likely that more could readily be justified within the expanded conceptual framework proposed herein. The art of "brinksmanship" can be turned into a skill, with suitable planning.

If further research indicates that renewed interest in industrial mobilization is warranted, and if further research indicates that a vastly enlarged surge civil defense program would be constructive, then, of course, it will be desirable to look more closely at the possibly competing demands of the two efforts. Some potential areas of conflicting demands have been suggested by this study. Until either or both concepts win greater acceptance, however, it does not appear worthwhile to devote additional research and analysis skills to their resolution.

IX. THE STATE OF THE ART

Based on the foregoing, it should be relatively clear that the overall state of the art with respect to the areas studied in this exploratory effort is rudimentary at best in at least seven different areas. These are summarized below and discussed in greater detail in the preceding chapters.

U.S. Industrial Mobilization Planning

Defense Department planning for a meaningful industrial mobilization effort appears to have atrophied almost completely over the past 15 or 20 years. It proved difficult to even hold discussions in this area without describing what was meant. There is virtually no planning evident to these authors for any long period of tensions or involvement in lesser contingencies prior to the "balloon going up" in the NATO area. This lack of interest in a long warning time was apparently spawned during the period of U.S. nuclear superiority and has not been changed since, despite the remarkable changes in the world balance of power and the vast number of current regional instabilities around the world.

U.S. Industrial Mobilization Capabilities

Possibly the best proof that there has been no industrial mobilization planning lies in the fact that there is no current body of available information to indicate with high confidence what our current national industrial mobilization capabilities are. Industry does not know, and apparently the government has never asked in recent years. Few people seem to understand that our primary growth in GNP has been in the area of services--not manufacturing. There appears to have been little concern for the amount of manufacturing effort that has drifted abroad to countries of lower salaries and higher relative productivity. In short, we do not know what our current capabilities are.

Soviet Mobilization Capabilities

Perhaps because of our own lack of interest, there is also very little detailed understanding of the Soviet mobilization capabilities--or plans. While this study has purposely been kept at an unclassified level, there is no indication that a classified study would yield more definitive answers. There are some efforts underway to create more complex "input-output" models of the Soviet economy, but these have been basically for other purposes and we see no reason to believe that our knowledge of Soviet capabilities is any more precise than equivalent knowledge of our own capabilities at this time.

Mobilization Planning for Civil Defense

Consistent with Defense planning, there appears to be little consideration within the Civil Defense community of what might be done in a "crash program" to enhance our civil defense posture during times of increased tensions or limited military involvements. As in the case of Defense planning, the primary emphasis appears to have been almost exclusively on an intercontinental nuclear exchange that comes as a "bolt from the blue" with only a few days' warning. While this may indeed be one practical scenario, it is certainly not the only one that should be considered. It is understood that some small efforts are underway to look at what might be done with more warning. Again, however, the state of the art is rudimentary at best, and the concept itself appears to lack credibility within the community.

Federal Emergency Preparedness Planning Guidance

As discussed earlier in this report, there appears to have been no update of federal emergency planning guidance since 1966. This outstanding guidance does not recognize either the changes in the world at large, or even the very significant changes in the federal government structure itself (DOE and FEMA, to mention but two). Clearly, federal preparedness planning has been an important occupation for only a few dedicated people within the federal bureaucracy, and has--at least until recently--lacked any high-level focus. The almost complete lack of federal funding is, per se, the best indication of top-level indifference to the overall problem area.

Range of Plausible Contingencies Envisioned

It appears clear that there is no master set of contingencies around which the federal government designs and tests its current emergency preparedness plans. Each agency appears to adopt its own "worst case" for planning purposes. The result is a lack of preparedness planning for other than "worst cases." In essence, this denies the American population one of their most valuable attributes: the ability to energize their own capabilities and initiative on short notice to "accomplish the impossible." This is discussed at length elsewhere in this report.

Potential Overlap Between Civil Defense and Industrial Mobilization

Since there is little if any evident planning across a variety of plausible emergency scenarios, it is not surprising that there appears to have been little recognition of the potential overlap between two such competing national efforts. If there is time for neither civil defense nor industrial mobilization before the onset of intercontinental nuclear warfare, then clearly there will be no conflict or overlap between the efforts from an industrial base standpoint--although some of the crisis management systems (emergency staffs, communications, etc.) might still be common. If there are months or years of warning and preparation time, however, then considerable overlap might develop. Little appears to have been done to maximize the effectiveness of U.S. responses to this type of contingency.

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> For too long, the observation that mobilization is useless in a nuclear conflict of thought is very shortsighted, neglecting most of the more plausible forms of superpower confrontation.

Of course, absolute guarantees of security are impossible. But, judged by the standards of relative disutilities and costs, a mobilization base could lead to a more effective program for managing crises and expanding deterrence in the years ahead.

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This paper is a report on the Federal Preparedness Agency Symposium bearing the same title. Basically, the purpose of the symposium was to bring together government officials, university and research institute personnel, and representatives from the business community to investigate theories of preparedness and define the needs for the U.S. and its allies. The participants were grouped into five panels that met concurrently:

I. Philosophy/Strategy of CEP and Deterrence
II. Relation of Preparedness to International Crises and Alliance Cohesion
III. National Preparedness Capabilities
IV. Resource Management Preparedness and National Security
V. Civil Emergency Preparedness and the American Political System.

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- output trends
- U.S.S.R. and the world economy
- outlook for Soviet agriculture
- defense burden and arms controls
- labor supply and constraints.

The concluding chapter summarizes the analyses and synthesizes the many topics with a broad overall outlook for the Soviet economy. The chapter reflects on constraints--e.g., slow growth of the labor force and an ailing agricultural sector; problems in the composition of Soviet output--e.g., considerable poor quality and a distorted mix; problems of economic reform--e.g., flexibility vs. tight central control; alternative prospects--e.g., status quo scenario vs. economic reform; and the implications of Soviet prospects for the outside world.

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from Moscow and its relocation to several sites east. He notes that the successful evacuations, of course, resulted in a temporary and very serious loss of aircraft production because of time in transit and problems arising from the transfer dislocation and from loss of metallurgical plants to the German invasion. The relocated and newly created aircraft manufacturing complexes brought production back to normal and then to a substantial increase in output.

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This interesting and quite useful memorandum reviews the current issues for U.S. civil defense; indicates the status, objectives, and policy of U.S. civil defense; examines the objectives and status of civil defense in the U.S.S.R. and other selected nations; identifies the strategic implications of civil defense status; develops some policy alternatives for the U.S.; and provides a rather extensive bibliography. Some of the outline conclusions note that the current U.S. civil defense system (a) could not help ensure national survival or enable differences of more than 1/20th of U.S. population to survive all-out nuclear attack, and (b) does not provide defense against CBR attack, for industrial protection, or for post-attack recovery. He observed that "neither U.S. public law nor administration policy specifies population survival objectives, readiness levels, or C.D.[sic] system completion dates."

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tools to existing nuclear-attack-generation and damage-assessment models is the first technique for analyzing the ability of an economy to sustain a war materiel production after low levels of nuclear attack; (3) the major defect of existing input-output models in this use is the inability to represent adequately the variation in production coefficients as the capacity of an industry is increased beyond a pre-attack equilibrium situation--an approach to correcting this defect is included.

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- "Evacuation of people from danger areas have been routinely successful, even when specific places for them had not been made in advance."
- "Familiarity of local officials with emergency plans and capabilities appears the most important desiderata in preparing for evacuation."

- Some evidence indicates that large-scale participation in public evacuation drills could be counterproductive in a subsequent disaster evacuation.

Appropriate conclusions reflecting the findings are drawn. An appendix provides a list of historical incidents of pre-disaster evacuation; these are categorized according to the types of disaster--fire, flash flood, flood, and hurricane.

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programs dealing with the three categories of emergencies, and it then provides some implications for future organizational development arising from the review. The implications section concludes with a list of "fundamental principles" including, for example:

- "The agency charged with economic mobilization and other civil emergency preparedness should be a civilian agency. . . ."
- "Responsibility at the Federal level for civil emergency preparedness and response should be centralized in a single agency. . . ."
- "The range and diversity of crises and emergencies for which centralized Federal planning should be done is growing. . . ."
- "Under our Federal system...Federal and state emergency preparedness should be compatible. . . ."

U.S. Department of Commerce, "Current Industrial Reports," Construction Machinery, Bureau of the Census, 1977.

U.S. Department of Commerce, "Current Industrial Reports," Survey of Plant Capacity, Bureau of the Census, 1977.

U.S. Department of Commerce, "Annual Survey of Manufactures," General Statistics for Industry Groups and Industries, Bureau of the Census, 1976.

U.S. Department of Commerce, "Annual Survey of Manufactures," Origin of Exports of Manufacturing Establishments, Bureau of the Census, 1976.

U.S. Department of Commerce, Business Statistics, Bureau of Economic Analysis, 1977, pp. 68-71, 76-77.

U.S. Department of Commerce, Statistical Abstracts of the United States, 1977, Bureau of Census, 1977, pp. 376, 399, 800-803.

U.S. Senate, Department of Defense Authorization for Appropriations for Fiscal Year 1979, Part 9 - Research and Development, Committee on Armed Services, April-May 1979, 96th Congress, 1st Session.

These hearings cover mission definitions, program funding, and related material on strategic force management, ICBM survivability, theater nuclear forces, sea-based deterrent, strategic bomber force, and strategic programs.

U.S. Senate, Economic and Social Consequences of Nuclear Attacks on the United States, Study prepared for Joint Committee on Defense Production Congress of the United States, Committee on Banking, Housing, and Urban Affairs, March 1979, 96th Congress, 1st Session.

This study examines the general effects of large-scale nuclear attacks on the U.S. (economic and population damage nationwide and regional), specific effects of such attacks (food production, energy supply, medical care, education), and the social and political implications of nuclear attacks. The study, in looking at the social and political emergencies, examines the experience of the British and Japanese in World War II. A major finding is that ". . . pre-attack planning cannot be limited solely to the short-term problems of immediate physical survival but must also provide for meeting basic social needs and coping with long-term disruption."

Yosphpe, Harry B., "Mobilization, Industrial," Encyclopaedia Britannica, U.S.A., 1973.

This article is an excellent treatment of the background and problems of industrial mobilization and covers the experience of World Wars I and II, the Korean Mobilization, post-Korean security objectives and requirements, the Vietnam experience, some brief but instructive comments about a possible nuclear exchange situation, and conclusions. The article notes in concluding that the economic ". . . potential seemed to hold the key to success in modern war. . . ."

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