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BLOCK 20 (continued)

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STUDENT ESSAY

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THE MUNITIONS BASE: CAUSE FOR ALARM FOR STRATEGIC PLANNERS

BY

LIEUTENANT COLONEL MICHAEL R. JORGENSEN

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USAWC MILITARY STUDIES PROGRAM PAPER

THE MUNITIONS BASE: CAUSE FOR ALARM FOR STRATEGIC PLANNERS

AN INDIVIDUAL ESSAY

by

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7 April 1986

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ABSTRACT

AUTHOR: Michael R. Jorgensen, LTC, QM

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Serious doubts exist as to the capability of the munitions industrial base to support surge or mobilization requirements generated by a conflict lasting more than 60 days. The fluctuations of the base from 1945 to the present were examined. Data was gathered using a literature search and an analysis of Army POM submissions in the 80's. After the resolution of a conflict, the U.S. historically allows the munitions base to deteriorate. Resources programmed for base modernization and maintenance are siphoned off to fund other priority projects. Mobilization potential suffers. The resultant weakened base is incapable of responding to conflict in less than 18 to 24 months, forcing strategic planners to favor the short war scenario. The U.S. should adopt a firm industrial base policy, with a 6 month response time as its primary goal. Congress and DOD should resource the munitions base accordingly. Such actions will enhance the deterrent capability of the base and ensure its ability to sustain our military forces in time of war.

"Arsenals, ammo plants and industrial equipment that are poised for use...are as essential to the deterrence of war as armored divisions or aircraft carriers when a nation is threatened".¹

A strong, active industrial base provides the powerful bone and sinews behind a nation's military punch. A major influence on a nation's ability to win wars is the industrial base's capability to support and sustain the combat forces. The inability of the industrial base to do so, whether perceived or actual, negates the deterrent value of that base, and puts the nation's survival at risk. Our strategic planners are aware of this, and include the capability of our base as one of the many critical factors that influence our national strategy. Historically, the US industrial base has enjoyed a reputation of being capable of extraordinary responsiveness in time of national need. Recently, however, serious doubts have been raised as to the base's ability to respond rapidly in a crisis.

The purpose of this paper is to examine the munitions portion of our industrial base, and to determine its capability to respond to surge and mobilization requirements in a timely fashion to support a conflict of a duration longer than 30 to 60 days (a short war).

In the late 70's, questions were raised at many levels concerning the condition of the Army's munitions industrial base. Initial doubts as to its sustaining capability surfaced in the findings of both the 1978 mobilization exercise NIFTY NUGGET and the follow-on 1980 exercise PROUD SPIRIT. The substance of the findings was that the base was inadequate to support the Army's needs in case of a major conflict.²

This was not news to DOD planners and resource managers, who had for years recognized that the industrial base as a whole was experiencing a steady deterioration.³

The level of concern increased considerably, however, with the publishing of the report of the Defense Science Board 1980 Summer Study Panel on Industrial Responsiveness. The Board dissected the base, and found a myriad of serious problems. First, productivity in the defense sector was lagging due to low levels of capital investment in the industry. In the highly competitive quest for capital, these firms' return on investment in defense markets was not favorable, hence many firms were avoiding defense markets in favor of more profitable ones. Additionally, the instability and uncertainty of defense programs made them unattractive to contractors. The majority of the programs were one year buys or less, with no guarantee of future buys. Very few programs allowed contractors to operate lines at efficient production rates. Programs were also subject to sudden reductions or cancellations, leaving contractors with empty lines and bloated inventories. These uncertainties lead to lengthening lead-times, as contractors moved Defense contracts to the end of the line, while more stable and profitable ones were accomplished first.

A particularly serious finding showed that significant numbers of second and third tier subcontractors had fled the defense industry. They had become fed-up with uncertain annual buys, small quantities, excessive and costly administrative requirements, poor profit incentives and non-transfer

of incentives from primes to subs. The net result was a seriously depleted subcontractor base and a severe shortage of skilled labor.

The Board also found, speaking to the munitions area specifically, that the industry was strongly dependent on government owned facilities and machine tools, many of which were either obsolete or in desperate need of modernization.

Finally, the Board found that Industrial Preparedness Planning was totally inadequate. Critical items had not been identified, there was no realism in the DD Form 1519 process (an agreement between the government and a contractor in which the government agrees to procure specific items from the contractor and the contractor agrees to supply those items to the government, in case of mobilization), and there was very little overall capability to surge in an emergency situation. Taking a shot at Congress, the Board found that the growing congressional practice of micro-management of individual program lines in the budget had an adverse effect on stability and ultimately resulted in additional disincentives for participating contractors. In a nutshell, "Industrial Preparedness could [not] be used as an effective element in support of the Nation's deterrent posture".⁴

The Board's report, in addition to identifying the disease, offered a reasonable cure. The basic recommendation was to stabilize government acquisition programs through the use of multiyear procurements. The report further recommended economic revitalization and investment in the

industry be achieved by innovative acquisition procedures.

Expeditious payments, advance payments, use of economic price adjustment clauses, and development and use of various incentive clauses, were advanced as ways to stimulate contractor interest. Congress could help by enacting bills aimed at stimulating capital investment. Finally, the report recommended a total restructuring of the Industrial Preparedness Program.⁵

This report offered the clearest and most accurate statement to date of the problems suffered by the industrial base at the close of the decade. It also generated a high level of interest in Congress. In September 1980, the Committee on Armed Services conducted a series of hearings on the capability of the US industrial base. The major concerns of the panel were whether or not the base was able to produce the weapons systems that were listed in the then current Five Year Development Program (FYDP), and, could the base respond to accelerated production rates in time of crisis.⁶

Not surprisingly, the panel found an

"industrial base crippled by declining productivity, aging facilities and machinery, shortages in critical materials, increasing lead times, skilled labor shortages, inflexible government contracting procedures, inadequate defense budgets and burdensome government regulations and paperwork."⁷

It is interesting to note that one committee member submitted references depicting the same problems that had been published in 1941! The panel indicated that these problems

were symptomatic of trends that had been growing in the nation's economy, specifically declining productivity, shortages of skilled labor, and increasing dependency on the products and raw materials of other countries. The committee also admitted that the current tax policy, inadequate defense budgets and on-again, off-again procurement practices exacerbated the problem. Additionally, Industrial Preparedness Planning was found to be almost non-existent. Finally, and most importantly, the committee realized that the problems had been identified before and had been studied to death. The solution was action.

The most significant legislative recommendations were to inject flexibility and incentives into the defense contracting practices to promote efficiency and improve productivity, and to make more use of multiyear procurement. The most noteworthy non-legislative recommendation was that the President establish a central point of contact in the Executive Department to monitor and take action on industrial base problems and to rejuvenate industrial preparedness planning. Finally, language in the report urged DOD to follow the recommendations made in the Defense Science Board Report.⁸

A snapshot of the base taken at the onset of the 80's was not a pretty picture. The base suffered from serious equipment and resource problems, it was incapable of surging to meet emergency requirements, and many felt it could not even support the major systems programmed for the 1980 FYDP buy.

The munitions portion of the base, while suffering from the same problems, was not quite as badly off. This was due to the recognition by the munitions community in the late 60's that a significant munitions production base modernization program was necessary to support the escalating Vietnam conflict.⁹ At this time, the condition of the base was a far cry from the model of industrial might that had existed at the height of World War II.

In April 1945 there were 4,267 prime contractors in the munitions business, receiving over \$19 billion worth of contracts. Eighty-four government-owned contractor operated (GOCO) plants working at peak production pushed ammunition and explosives through their assembly lines for distribution to the European and Pacific theaters. In five short years, however, the War Department diverted, disposed of, or gave away the bulk of the capability on which it had spent billions just the decade before. GOCO plants were reduced from 84 to 38. Many of the excess plants were sold to the private sector, and were converted to the manufacture of commercial products. With the onset of the Korean War, it took 12 months and \$500 million to activate sufficient capability to support the relatively limited requirements of that conflict. Upon cessation of hostilities, smart government planners tried to continue many of the scheduled modernization and readiness projects. These projects, however, became victims of the peacetime economy, and spending emphasis shifted from defense to social programs.

Throughout the late 50's and the 60's, the government

ARMY AMMUNITION PLANTS
WWII TO DATE

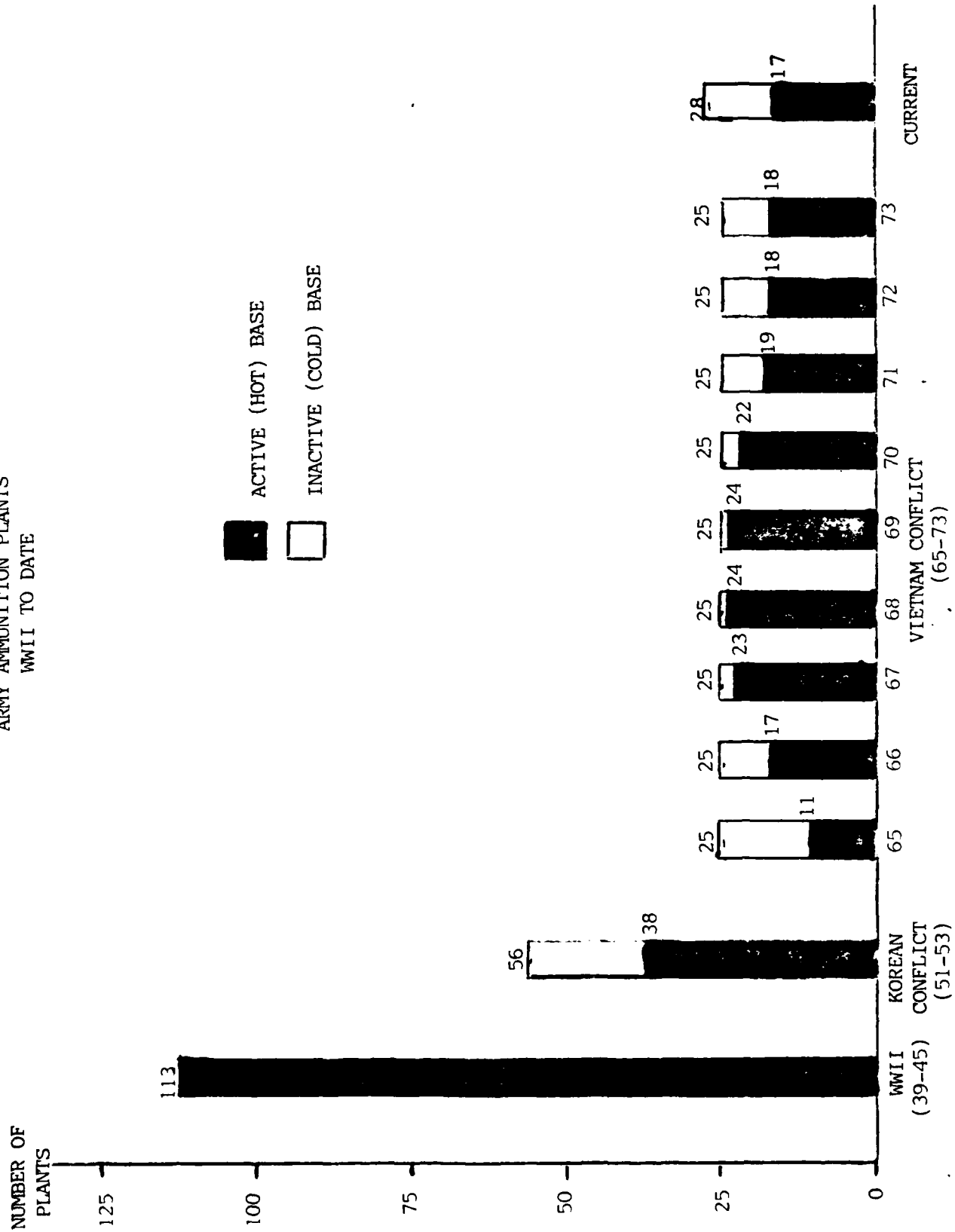


Figure 1

ignored the fact that the most economical way to maintain a strong base is to resource a viable maintenance program from year to year. As a result, by 1964 deterioration of the base had become severe. Many plants and facilities had again been closed or sold off, leaving only eleven plants capable of supplying munitions in case of war (see Figure 1). The majority of the equipment in these plants was obsolete or badly in need of maintenance. Hundreds of millions of dollars had to be spent to bring these facilities back to levels necessary to support the growing Vietnam conflict.¹⁰ It became obvious to the munitions community that the re-opening of the base would be a costly repeat of the post WWII and Korean War experiences. Therefore, in 1968 the AMC's Munitions Command proposed a Munitions Production Base Modernization Program to DOD. The initial estimate was a 2 billion dollar 10 year effort. Upon completion of a Kaiser Engineering Study, the reestimated program became a \$3.7 billion 12 year effort (see Figure 2).

The first priority for modernization was the propellant and explosives portion of the base. They were huge producers and consumers of acids, and were in a generally corroded and depleted condition. As a result, they were major polluters. Additionally, the operations were extremely hazardous. Production accidents were usually disastrous, hence contractors were prone to putting themselves out of business. They also had been built with the technology of the 30's, and replacement parts were difficult to procure.

MODERNIZATION MASTER PLAN
FY70-FY81
(\$ MILLIONS)

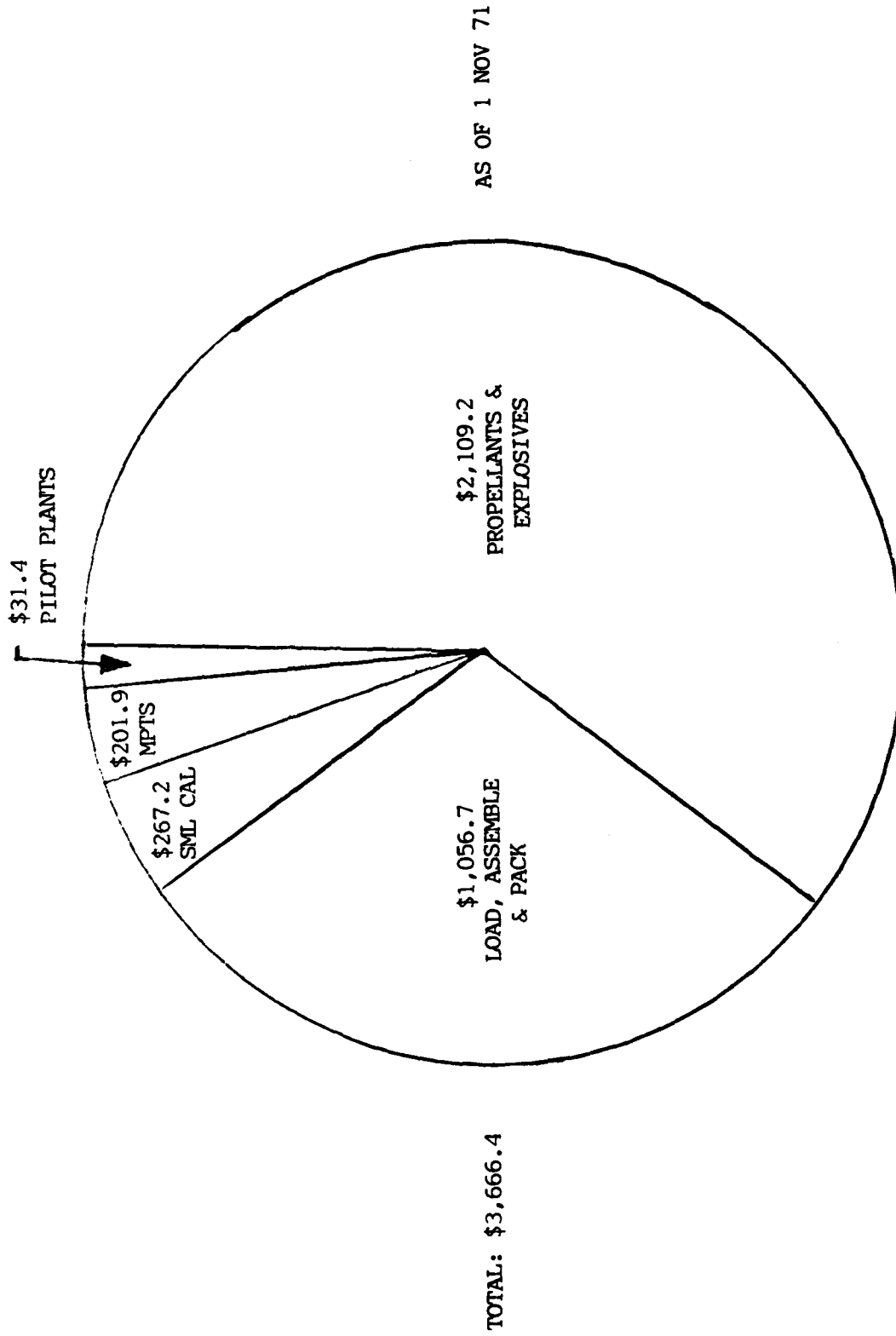


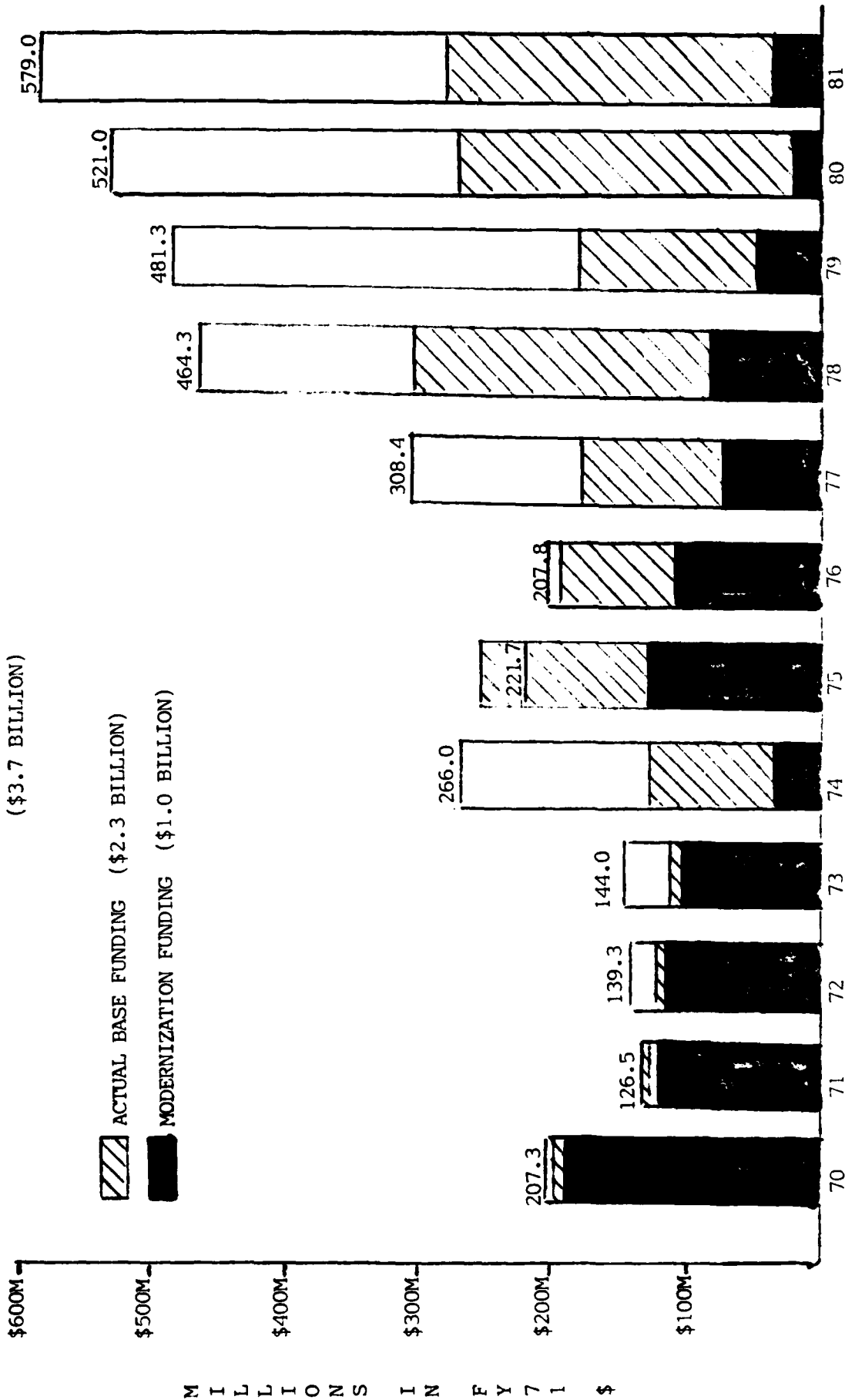
Figure 2

The second major priority was the load, assemble and pack area. This included melting of explosives, filling of munitions and assembly of munitions. These operations were labor intensive and hazardous. Additionally, new technology had to be acquired in order to modernize the processes, hence requiring a large out-year investment. The small caliber, metal parts and pilot plants programs, while receiving less resources, were nevertheless important to the overall program.

The munitions community felt that the proposed program would support the Vietnam conflict and bring the base to an acceptable level to support any future strategy. DOD, to the Army's surprise, accepted the program and began to resource it. This caught the Army unprepared. Many of the projects funded had not even been through final design, so the dollars appropriated had to be held for one to two years while design was completed. Many of the plants requiring modernization were in full production supporting the effort in Vietnam, so phase-in opportunities had to be taken to preclude production breaks. Finally, the Army found itself insufficiently staffed in the munitions community to properly manage this windfall.

In 1972, the GAO recommended that the Army provide intensive management to this area via a project manager. The Army, therefore, established the Munitions Base Modernization and Expansion Project Manager Office in 1973, which ultimately brought organization and centralized management to this critical area.¹¹

12 YEAR MUNITIONS PRODUCTION FACILITIES
 MODERNIZATION PROGRAM (NOVEMBER 1971)
 (\$3.7 BILLION)



FY AS PLANNED (\$ FIGURES ON TOP OF BAR)

Figure 3

In the early 70's then, the modernization program took off like a jackrabbit. But as the decade progressed, it was destined to take a backseat the Initial Facilities/Expansion program (see Figure 3). This was due to the entry of new and improved munitions into the inventory to support the Army's weapons systems modernization programs. Dollars that would have otherwise gone into modernization projects were used to resource new facilities. Therefore, in spite of the surge of interest in the condition of the base in the late 60's, and in spite of actions taken to correct the faults, the late 70's saw a return of the same problems and issues that had plagued the base after previous wars, with the resultant deterioration, and sustainment capability questions.

Modernization was not the only culprit. Defense Planning Guidance in the late 70's also impacted adversely on the base. During this timeframe, a trend concerning the length of a potential conflict had developed. From a world-wide, long war scenario of the 50's, the pendulum had swung to a limited, or short war, concept. The latter was reflected in DOD Consolidated Guidance which placed "almost total emphasis on a no-warning, high intensity short war in central Europe".¹² (The very same guidance, however, stated Army goals as being able to defeat Warsaw Pact forces in Europe and defend NATO, to protect US interests in the Persian Gulf, and to support allies in the Asian Pacific Basin.)¹³ In spite of the global responsibilities, the short war idea remained paramount.

There were three basic reasons for this emphasis. First, modern warfare had become more lethal. The pace of conflict, as shown in the Israeli Wars of 1966 and 1973, was lightning fast, with the resolution point occurring within 30 days of conflict initiation. In this situation, munitions support must be available from prepositioned stockpiles, and the industrial base does not have time to react. Secondly, the US industrial base itself was, at this time, incapable of supporting anything more than a limited conflict. And third, it was simply too expensive in the prevailing resource-constrained environment to upgrade the base to support a sustained conflict. Literally billions of dollars were necessary to bring the base to the point where it could respond quickly in either a surge or mobilization role and support a large conflict within months of M-day.¹⁴

Included in the Defense Guidance was a phenomenon known as sizing. This deals with how much capability is built into a production facility. Figure 4 depicts the sizing trend over the last 25 years. Initially, plants were sized to produce all possible requirements, from peacetime through mobilization quantities. This is an expensive proposition, and in peacetime, large portions of the plant and the equipment are not used. It is cheaper to size a facility to support less than total requirements. The smaller the requirement, the cheaper the facilitization and maintenance costs. As resources became more restricted in the late 70's, the smaller sizing guidance was very attractive to resource managers. In actuality, DOD could afford nothing else because of higher priority resource claimants.

AMMUNITION FACILITY SIZING GUIDANCE

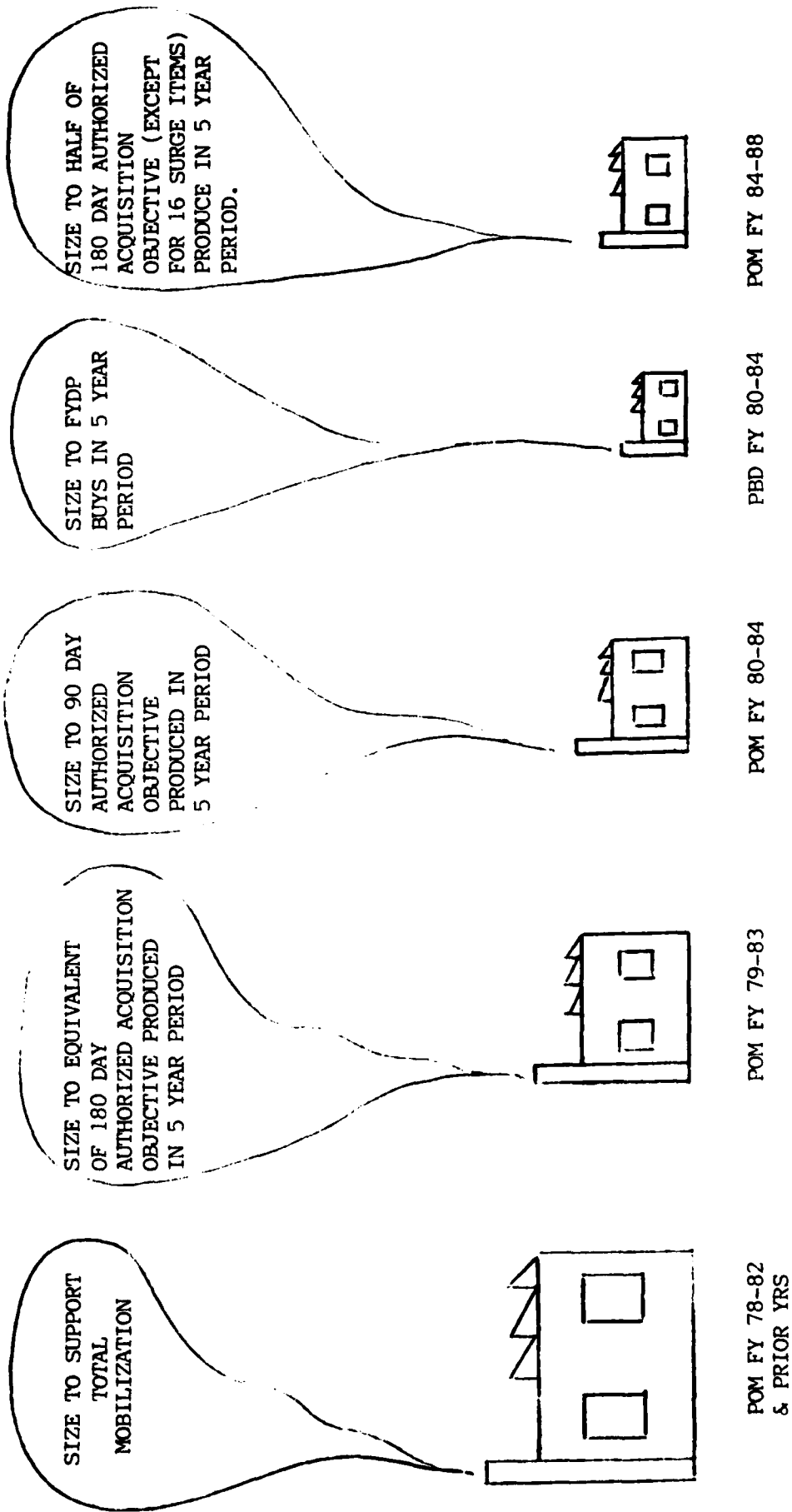


Figure 4

Unfortunately, the smaller the facility, the less capable it is to respond to surge or mobilization requirements.

To summarize the state of the munitions base in 1980: due to resource restraints, planning assumptions, procurement practices, lack of capital investment, and all the ills that affected the US production base as a whole, it was in sad shape. In spite of the progress made in the early 70's, history had repeated itself.

As mentioned earlier, the reports of the Defense Science Board and the Houe Committee on Armed Services had very accurately stated the problems, and had offered sound recommendations on how to solve same. More importantly, these reports rejuvenated interest in the industrial base at all levels of government.

This interest slowly evolved into action. Congress began working on legislation that would encourage capital investment in the industrial base, make contractor involvement in defense programs more profitable, and reduce the administrative burden placed on contractors. DOD guidance recognized the deteriorated state of the base, and gave specific direction to the Army to focus on production base planning, to identify and reduce production bottlenecks, to reduce lead times and to modify procurement practices (use more multiyear procurement and contractor incentives). More importantly, the guidance recognized that sizing was a problem, and reversed the trend of the last 25 years.¹⁵ Follow-on Army Guidance directed the appropriate subordinate commands to modernize the base, revitalize subcontractor support

tiers, and implement new procurement practices.¹⁶

The base also benefited from the arrival of the Reagan administration and its increased Defense spending. Analysis of subsequent POM submissions shows a tremendous increase of industrial base resourcing, especially in the outyears. All of these actions were the source of great delight to the industrial base community, which began to view the 80's with cautious optimism and waited with great interest for these initiatives to bear fruit.

Due to the nature of the legislative and budgeting processes, the results of the initiatives taken in 1980 do not begin to show until 1983/1984. It is appropriate then to take another snapshot of the munitions base at that time. The "camera" used to do so is the Ammunition Production Base Study, done by the Army in response to congressional direction.¹⁷ Congress wanted to know how the base had prospered as a result of the various initiatives taken in the early 80's. Specifically, the study's purpose was to determine the status of the production equipment, evaluate the capability of the facilities to produce the types and quantities of ammunition requested in the then current FYDP, and estimate the cost of developing and maintaining a base capable of satisfying anticipated production requirements throughout the remainder of the century.

The study found that there had been significant progress made in the upgrading of portions of the munitions base since 1980. Thanks to the Single Manager Conventional

Ammunition (SMCA) concept, the base had become truly integrated, by absorbing the Navy's conventional ammunition facilities. This, plus use of increased automation throughout the system, allowed the SMCA to more accurately determine requirements and resultant shortfalls. It also allowed for smarter resource application decisions. A Depot Improvement Program was in progress, correcting equipment deficiencies and upgrading inventories. A Conventional Ammunition Working Capital Fund (CAWCF) had been established, which promoted economies through consolidation of purchase orders, allowing refinements in the management of industrial stocks and improved cost visibility throughout the system. The use of multiyear procurement was increasing, which meant the achievement of cost savings through program stability and more economical production runs. Planning had improved, both in procurement and maintenance areas. This meant more efficient program management, more cost avoidances, and readiness enhancements. The Ammunition Specialist Career Program had been developed to produce the expertise needed to replace the employees retiring from careers that had begun in the late 40's and early 50's. Various staff positions had been created and/or upgraded in order to keep up with the growing workload. Additional emphasis was evident in the areas of inventory management, mobilization management and simplified procurement practices. Most importantly, the study found that the munitions base was capable of producing the types and quantities of ammunition requested in the then current FYDP, a considerable achievement compared to the situation than existed in 1980.

These improvements were morale boosters to those in the industry. Unfortunately, the study also found that some familiar problems still plagued the munitions base.

While the active production equipment had, for the most part, been modernized or replaced, and was highly capable of performing its mission, much of the facilities and equipment needed for surge and mobilization purposes was either in a terrible state of disrepair or missing completely. There was also an unfunded backlog of maintenance at a staggering \$1.7 billion. This backlog translated into an 18 to 24 month reaction time in case of mobilization. Additionally, the base required a significant investment (\$55 billion for the period 1990-2000) to meet estimated mobilization requirements. Finally, an extensive effort was required to replace propellant, explosive and load, assemble and pack facilities that were starting to age and deteriorate accordingly.¹⁸

In other words, while active portions of the munitions base had improved since 1980, the surge and mobilization portions, which directly affect sustainability in mid- to long range conflicts, continued to suffer. What had happened? Significant plus-ups had been made in the outyears of the 1980 POM specifically to help solve the mobilization problem. Where were the fixes?

An analysis of POM submissions from 1980 to 1986 illustrates the "Phenomenon of the Disappearing Dollars" or PD². Let us examine the Provision of Industrial Facilities,

or PIF, line in the Army POM FY84-88:

| FY | <u>84</u> | <u>85</u> | <u>86</u> | <u>87</u> | <u>88</u> |
|-----|-----------|-----------|-----------|-----------|-----------------------|
| PIF | 299 | 426 | 419 | 447 | 1184 (\$ in millions) |

Figure 5

The resourcing indicated in the first year (84) is accurate, is tied to specific projects, and will probably survive the various scrubs as the POM travels through the PPBS process. These projects basically support the active portion of the base, the facilities that are producing the ammunition required in the early years of the FYDP. Examples of these projects are, initial production facilities for new rounds, expansion of facilities for critical items, automation of production lines, and elimination of safety or environmental hazards. The dollars shown in the outyears cover active plants plus surge and mobilization enhancement projects. Now let us look at the PIF line in the POM submissions for FY 83-87 through FY87-91 (see Figure 6).

Note that as FY87 gets closer to becoming the budget year, the reality of resources and constraints takes over. The projects that ultimately survive are those required to produce "today's" ammunition, or to correct a serious environmental or safety problem. Surge and mobilization enhancement projects become billpayers used to pay for other Army programs judged to be more critical. Thus, PD², or "why we never get there". As modernization

THE PHENOMENON OF THE DISAPPEARING DOLLARS (PD²)
(\$ IN MILLIONS)

PROVISION OF INDUSTRIAL FACILITIES
(PIF)

| | <u>FY83</u> | <u>FY84</u> | <u>FY85</u> | <u>FY86</u> | <u>FY87</u> | <u>FY88</u> | <u>FY89</u> | <u>FY90</u> | <u>FY91</u> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| POM FY83-87 | 407 | 518 | 515 | 610 | 679 | | | | |
| POM FY84-88 | | 299 | 426 | 419 | 447 | 1184 | | | |
| POM FY85-89 | | | 313 | 245 | 389 | 481 | 600 | | |
| POM FY86-90 | | | | 280 | 486 | 716 | 677 | 702 | |
| POM FY87-91 | | | | | 275 | 378 | 417 | 416 | 404 |

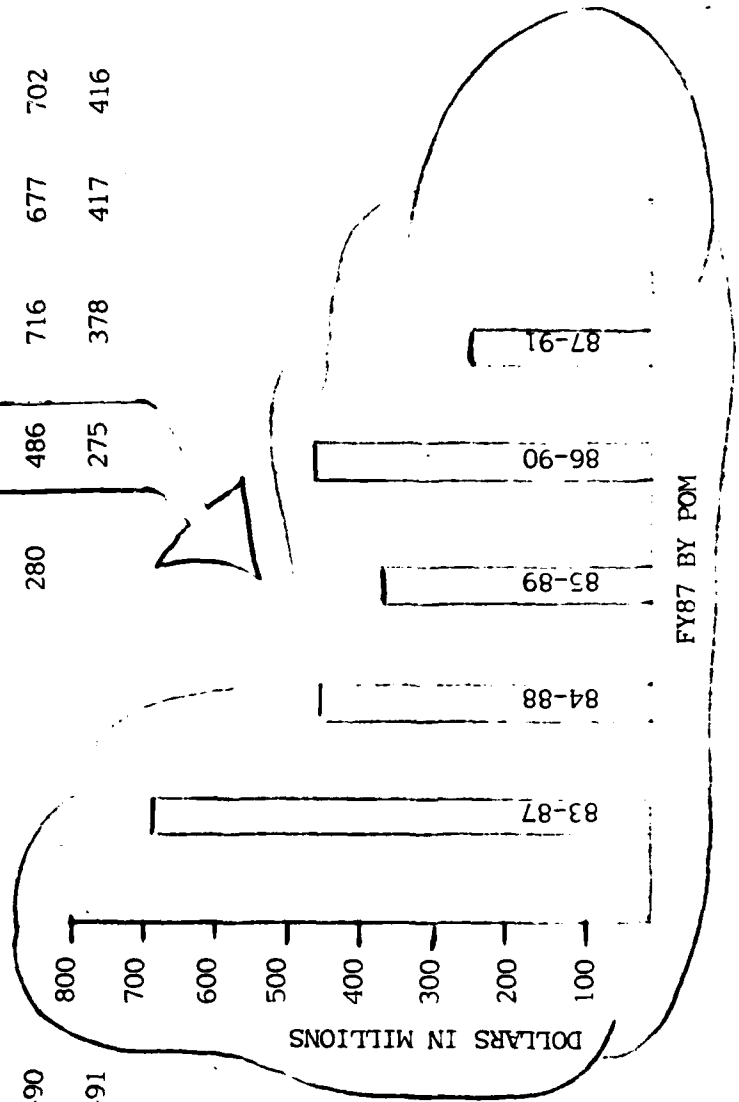


Figure 6

suffered in the 60's, so has mobilization suffered in the early 80's.¹⁹

The Ammunition Production Base Study laid out some very sensible recommendations; fund the FYDP ammunition requirements, perform the required backlogged maintenance, fill production equipment voids, expand stockpiles, build additional explosive and propellant facilities and equipment to meet the mobilization requirements shortfall, and develop a phased 15 year plan to accomplish the above. By following the recommendations, the study concluded that the base could reduce the estimated 18 to 24 month response period to a more desirable 6 months.

Realizing that resource restraints probably would not allow all recommendations to be funded, the study suggested implementation of those that would allow the base to meet FYDP requirements and would gradually improve response time of the inactive base. Specifically, fund the FYDP buy, expand the explosives and propellant stockpiles, and beginning in 1987, fund a "mobilization wedge" that would help remedy the problems that existed in that critical area. Additionally, the study recommended that sizing criteria for facilities producing critical items (war stoppers) should be increased.²⁰

The study was received with a great deal of interest by both DOD and Congress, both of which continued to support production base funding and other initiatives recommended by the Ammunition Production Base Study. In addition to funding the projects requested by the Army in the FY85

submission, DOD plussed-up the munitions base account by \$110 million, an apparent response to the suggested mobilization wedge.²¹ Not to be outdone, Congress, in response to the FY86 submission, plussed-up the munitions base line by \$103 million (again, in addition to the projects requested by the Army), to correct deficiencies in existing mobilization base facilities.²²

The next snapshot of the munitions base is taken just prior to the Gramm-Rudman machinations, and once developed, gets mixed reviews. The SMCA has made significant improvements in base management, the requirements determination process is more accurate, there have been beneficial improvements in the acquisition process, both for the government in cost savings and contractors in program stability. IPP planning is much better, many of the laid-away production lines have been modernized, and the use of automation and computerization has improved efficiency and asset visibility. Additionally, the Mississippi Army Ammunition Plant, a brand new modern facility, is in the final stages of completion. Surge and mobilization response times are starting to come down for selected items.

The persistent historical problems, however, are still in existence. Base sizing guidance is driven by affordability rather than requirements. There is a considerable maintenance backlog and serious voids in equipment packages. Worst of all, the base is still incapable of a timely response to mobilization requirements that would develop in the medium to long range conflict scenarios.²³

These problems are not insolvable. Significant progress can be made if leaders at various levels were to act positively on the following recommendations. At the national level, the administration must, with the support of Congress and DOD, establish and pursue a firm, unchanging industrial base policy. The US does not have a national industrial base policy that is the product of government, industry, Congress, and the public. We must develop this policy, and include in it a mobilization lead time goal of 6 months, and a commitment to support this level of effort once achieved.²⁴ Congress must continue their support of the base through supportive legislation on acquisition program improvement initiatives, and resourcing. DOD must both apply resources and adjust sizing guidance upward. Finally, procurement programs must be stabilized to the maximum extent possible. The temptation to micromanage the munitions program line by budget line, for whatever reasons, must be avoided by Congress.

Stockpiling is not the answer. The production, maintenance and storage costs of a 12 to 18 month supply of munitions is billions of dollars more than the costs of maintaining a responsive base. Additionally, as new and more modern munitions enter the inventory, significant portions of a huge stockpile would become obsolete, and would require significant resources to dispose of the excesses. It is extremely doubtful that sufficient facilities and land could be procured to support the storage of these tremendous quantities of munitions.

While still incapable of responding to surge and mobilization requirements in less than 18 to 24 months, the buildup of the munitions base today is slowly gaining momentum. It is on the threshold of being able to make significant reduction in lead times thanks to an innovative DOD/Defense Industrial Quality Excellence Program²⁵ and the continued day to day hard work of the munitions community. What is desperately needed is increased resourcing of the mobilization wedge. If this support is received, strategic planners can count on a strong base to provide them additional options to short war scenarios, to reinforce the viability of their plans, and to strengthen the deterrent capability of this nation's military might.

The bogeyman of the Gramm-Rudman-Hollings law bodes ill for the munitions community and the base. The munitions account has historically been one of the first lambs sacrificed in the search for resource reductions. Cuts in the munitions account mean serious cuts in the production base account. These cuts will probably translate into the laying off of skilled employees, increasing the maintenance backlog, and shelving mobilization projects, all of which would be devastating to the base.²⁶

The resultant loss of momentum in this critical area would leave strategic planners contemplating nothing but short war scenarios with some rather unpleasant alternatives if a quick victory is not forthcoming - nuc them or surrender.

ENDNOTES

1. Association of the U.S. Army, Special Report Army Industrial Preparedness: A Primer on What it Takes to Stay Until the War is Over, May 1970, p.11.
2. Roderick L. Vawter, Industrial Mobilization, the Relevant History, p.1.
3. Ibid., Chapters 3 through 5.
4. Department of Defense, Report of the Defense Science Board 1980 Summer Study Panel, January 1981, p.1.
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