

Strategy Research Project

Defense Industrial Base (DIB): Munitions Realignment for 2020

by

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United States Army War College
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Abstract

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The end of Operation Iraqi Freedom and the projected completion of Operation Enduring Freedom in 2014 present strategic budgetary challenges to our political and senior military leaders. As the U.S. Army transitions from an organization at war to an organization focused on garrison-based training, the requirement to retain the munitions Defense Industrial Base (DIB) capability is absolutely necessary. This essay describes the current status of the munitions DIB, identifies the current types of facilities in the federal inventory, and provides analysis on capacity for policy adjustments. It focuses on the U.S. Army's strategic pivot to the Asia-Pacific region and the Army of 2020 to identify any excess or shortfalls in the current capacity. It then recommends changes to facility types and locations to maximize efficiency and effectiveness of future munitions support.

Defense Industrial Base (DIB): Munitions Realignment for 2020

The Joint Force will be prepared to confront and defeat aggression anywhere in the world. It will have the ability to surge and regenerate forces and capabilities, ensuring that we can meet any future threats, by investing in our people and a strong industrial base.

—Leon E. Panetta (January 2012)
Secretary of Defense¹

With the termination of Operation Iraqi Freedom (OIF) and the projected completion of Operation Enduring Freedom (OEF) in 2014, U.S. political and senior military leaders are faced with the challenge of re-setting the joint force in a time of serious fiscal constraints. They must operate the Department of Defense (DOD) under a Continuing Resolution (CR) during 2013 within the confines of the 2012 budget through approximately 27 March 2013. They must prepare for sequestration of DOD funding as decreed by the American Taxpayer Relief Act of 2012.² In 2014, the Army will conclude over 13 years of conflict and begin reducing and rebalancing the force. Subsequent changes in force structure will complicate the strategic environment. In this turbulent environment, DOD leaders are challenged to realign the munitions Defense Industrial Base (DIB) to support the future Joint Force. They must consider realignment options to achieve immediate savings, but they must as well avoid short-term solutions that degrade munitions preparedness and prove to be costly over time.

This essay describes the current disposition of facilities and the capability of the organic munitions DIB. It seeks to determine whether the current capacity is sufficient to support the Joint Force of 2020. Historical patterns of neglect during interwar periods include lack of managerial control, under-funding, and long lead times for ammunition production. Forthcoming decisions on base closures and realignments will impact the munitions DIB. To provide a useful background for these decisions, this essay examines

the results of legislative actions taken to support arsenals and depots since 1991. It then analyzes the consequences of these actions in the context of the 2012 completion of the 2005 Base Realignment and Closure (BRAC) decisions. Finally, it considers the impacts on the munitions DIB when strategic rebalancing of the U.S. Army to the Asia-Pacific region is complete.

The projected reduction in the size of the force over the next five years provides an opportunity to evaluate the current support structure to meet on-going requirements. This examination of capabilities versus requirements between 2014 and 2020 should enable planners to predict future demands while measuring the effects of growing transportation costs. The increased transportation costs to support the strategic shift to the Asia-Pacific region may be mitigated by reorienting some of the East coast oriented munitions support base toward the West coast. This essay proposes fiscal saving options for maintaining the munitions DIB. It then recommends options to maximize efficiency and effectiveness of production and distribution of ammunition to end users. It also informs strategic leaders of risks to the munitions DIB and identifies benefits of reoriented regional support. It seeks to ensure that tough decisions made now provide reversible options to realign and strengthen the munitions operational reach for the Army of 2020.

History of the Arsenal

Historically, the challenges associated with right-sizing the munitions DIB began in 1775 with the establishment of the first Continental Army Depot Arsenal in Carlisle, Pennsylvania. Today, the challenge to right-size the munitions DIB must address two competing requirements – the need to maintain reserve capacity to replenish war reserves and a fiscal requirement to meet peacetime demands. For over 200 years the

requirement has remained unchanged; but what has changed is the management of expansion and contraction of the munitions DIB. The arsenal system established in 1775 supported efforts to organize, produce, manage, and supply the colonial Army if it were to gain independence. In total, 27 facilities were established for the Continental Army during the Revolutionary War. Immediately following the war, dramatic cuts in military expenditures were implemented, causing major cuts in ammunition production. The munitions DIB was reduced to four facilities, which significantly limited munitions production in support of the War of 1812. That same year, Congress recognized the shortfall in capacity, funding, and management and implemented an annual authorization of defense funds. Also, it established the Ordnance Department (OD) to conduct the business of providing war materials.³

Despite the efforts of Congress, the newly formed OD struggled to build national capacity to keep pace with expansion of the country and increased need for munitions. In 1862, the OD presented a plan to execute a “grand arsenal” concept, which addressed capacity shortfalls. Although supported by Congress in principle, it was not resourced. Decision makers sought to reduce the size, to consolidate, and to modernize the DIB. However, the new arsenals served only to meet peacetime requirements and maintain the human capital to support expansion for wartime needs and sustain research and development. When expansion was required, the OD plan was to contract additional production capability to support those requirements. Although political leaders understood the growing requirements, often domestic programs drew more funding than the nation’s investments in its ammunition infrastructure. This arsenal base and commercial contracting plan serves as the foundation for the current munitions DIB.⁴

As the country prepared for WWI, OD efforts to support total war proved to be inadequate. Many existing facilities could not meet wartime requirements. A planning board determined the munitions DIB was in dire need of expansion and modernization. Even if funds were provided to expand manufacturing, it would take months to acquire the machine tools and technical expertise required for execution. As troops were committed overseas, Great Britain and France agreed to provide U.S. forces with ammunition in exchange for production of smokeless powder, high explosives, and propellants. Between 1915 and 1918, U.S. production facilities expanded to 185 organic and commercial plants. Following WWI, the munitions production capacity was again divested. Commercial industry abandoned military munitions support to avoid being branded as “merchants of death” in public opinion. Commercial and organic munitions facilities were almost completely dismantled, and facilities and machine tools were sold.⁵

In 1919, with little assistance from the War Department, the OD Chief appointed a munitions board to determine what munitions stocks and facilities should be maintained in the long term for future mobilization. The OD recommendations to the Secretary of War were dismissed, and the OD was required to store and maintain munitions reserves beyond manageable levels. Storage costs limited the OD ability to manufacture new ammunition because the cost to maintain existing reserves consumed over 60% of appropriated funds. Efforts made during the inter-war period to prevent deterioration of war reserves proved ineffective. In 1926, Congress passed Public Law 318 authorizing the exchange of deteriorated ammunition. Then in 1928 a special program was initiated for munitions surveillance but not for renovating facilities. These

measures exposed the underfunding problems as lack of funds continued to limit the OD's ability to maintain existing reserves and expand production capability. The debate to renovate or purchase new ammunition continued until WWII. Technological improvements in weapons and ammunition design, doctrinal changes, and growing supplies of obsolete and deteriorated ammunition created an even larger gap between capacity and requirements required for WWII.⁶

As WWII approached in 1940, the U.S. Army munitions DIB experienced its largest expansion. This surge was facilitated by the first government-owned contractor-operated (GOCO) plants. Companies like Remington, Western, Winchester, and DuPont contributed significantly to the design of weapons, production of small-caliber munitions, and production operations of powder and explosives. Additional assistance in production experience and managerial practices were introduced into the munitions DIB by companies like Coca Cola, Quaker Oats, and Eastman Kodak. As industrial mobilization quickly increased, the requirements decreased. Between 1943 and 1944, as the Allies gained advantages, the munitions DIB no longer had manufacturing capacity issues. Instead it faced storage problems as a result of over-production. Immediately after the war ammunition plants began to shut down. The OD reduced the munitions DIB GOCO operations from 84 to 38 plants at the end of WWII. Excess plants were either transferred to the operating contractor, sold on the open market, employed for demilitarization, or placed on inactive (cold) status without money for maintenance. By 1945, appropriations and the level of funding required to maintain these facilities proved inadequate. The munitions DIB then deteriorated into a state of disrepair.⁷

In the early 1950s, the strategic focus soon oriented toward Korea, but by then the WWII excess presented new issues for the munitions DIB. Advances in technology rendered much of the excess munitions obsolete. This reality, combined with deteriorating excess, highlighted issues with maintenance and surveillance. The lessons learned during previous inter-war periods were not applied in mobilization planning, management, and sustainment of the munitions DIB during the Korean War. Since Congress expected a short Korean Conflict, the OD request for \$2.4 billion to restart ammunition production was cut to \$374 million. This decrease extended the timelines associated with activation of warm and cold facilities as well as GOCO plants. In this boom-or-bust industry, commercial leaders were not inclined to support full mobilization until Congress formally declared war. So it took almost two years for the organic and commercial base to achieve full capacity. By 1955 the OD took the first steps to establish the munitions DIB we rely on today by identifying munitions operations as predominately inherent to military operations and critical to military readiness.⁸

Although the Korean Conflict generated only limited demand on the munitions DIB as compared to WWII, the Conflict highlighted the importance of commercial industry's role in providing munitions. Between 1953 and 1965, the munitions DIB was reduced from over 40 to 26 ammunition plants. Most of these facilities were maintained in a cold status. Again they experienced significant delays in production due to underfunding, technological upgrades on equipment, and personnel training. "The Army Munitions Command (MUCOM) controlled the plants, but the fourteen storage depots were controlled by the Army Supply and Maintenance Command." This created no visibility between production, storage, and distribution. As the Vietnam War escalated,

the same problems that surfaced during the Korean Conflict recurred. In addition, other issues plagued the munitions DIB; including inaccurate supply rates for forecasting, stockpile reporting, obstructions to timely contracting, and uncertainty regarding the length of the conflict. In 1970, the Joint Logistics Review Board, also known as the Besson Board, published a report designed to alleviate future problems within the munitions DIB; it described the fragile relationship between private industry and the munitions DIB. This report documented the volatility associated with the production of munitions and financial risks to which private manufacturers are exposed. The board recommended that the munitions DIB be excluded from privatization policy initiatives; it proposed the best way to assure availability of reliable munitions was to maintain a warm base. The Vietnam War again emphasized the importance of maintaining an adequate munitions DIB.⁹

Between the Vietnam War and the early 1980s, the pattern of neglect to the munitions DIB continued; however, a few key lessons were captured during the war. Quantity and quality should not be reported as a single number; a reliable inventory should indicate both the amount and the condition of munitions. Constant changes in force deployment numbers and stock status changes created unmanageable production schedules. It was clear that standard consumption rates were illusory; consumption varied wildly over short term periods.¹⁰ “In 1978, 318 U.S. plants produced ammunition. By 1995, six years after the Berlin Wall fell, there were fewer than 100.”¹¹ This decline in facilities was brought about by the “peace dividend” realized from the end of the Cold War and ensuing political decisions directing base closures.

These base closures had no impact during Operation Desert Storm (ODS); the munitions DIB easily fulfilled ODS demands. The only problems identified in ODS arose because of transportation issues. Legislative actions implemented in 1990s and the DOD's implementation of the Single Manager for Conventional Ammunition (SMCA) also contributed to future success. The post-9/11 Global War on Terrorism (GWOT), now referred to as Overseas Contingency Operations (OCO), required the lowest levels of production since WWII. Again, the munitions DIB performed well – with a single exception: small arms ammunition production could not support the requirements generated by OEF, OIF, and training. This combined requirement revealed a shortfall in production capacity. Accordingly a \$19.2 million contract was awarded to Lake City Army Ammunition Plant (AAP), provided by Defense Emergency Relief Funds (DERF). This initiative increased small arms ammunition production from 800 million to 1.2 billion rounds per year. To further address this shortfall, the SMCA executed urgent buy contracts with Israeli Military Industries, Olin Winchester, and the United Kingdom. Additionally, the SMCA implemented other measures to acquire ammunition, such as account transactions between services, reclamation procedures, and maintenance recovery. The performance of the munitions DIB since 1991 provides no strategic rationale for sustaining additional facilities. Even so, the demands of efficiency, fiscal responsibility, and effectiveness warrant initiatives to right-size the munitions DIB for 2020. The historic expansion and contraction of the munitions DIB explains why maintaining reserve capacity to replenish war reserves and the fiscal requirement to meet peacetime demands are a constant challenge.¹²

Single Manager for Conventional Ammunition (SMCA)

A change to the pattern of neglect and lack of management to the munitions DIB started in 1977 when DOD delegated responsibility to the Army as the SMCA. This action resulted from Congressional inquiry about who was responsible for the SMCA. In 1981, in a Secretary of the Army charter, delegation of this responsibility to the Army Materiel Command (AMC) became institutionalized. AMC has further designated the operating agency responsibility to the Joint Munitions Command (JMC), which is responsible for the management of conventional ammunition for all Services. This action facilitated reductions in ammunition expenditures and improved managerial efficiencies. A single service, the Army assumes total control of conventional ammunition. As the SMCA, JMC manages wholesale net requirements, procurement, production, storage, distribution, disposal, transportation, cataloging, inspection, maintenance, and standardization of all conventional ammunition.¹³

Effective management has been a principle SMCA challenge from the very beginning. Technological shortfalls to improve inventory automation, funding shortfalls, lack of visibility of stockpile balances, unsteady requirements, and fluctuating production schedules have prevented effective and efficient management. Consolidated management of service-wide wholesale stocks improved effectiveness and saved money. In the 1980s, this management effort, combined with SMCA execution of centralized purchases under the Conventional Ammunition Working Capital Fund (CAWCF), encouraged service transfers of ammunition creating enormous efficiencies. In the 1990s, the Government Accountability Office (GAO), the National Defense University (NDU), and National Academy of Sciences published several documents that

highlighted concerns with reports of excess inventory within the services, the SMCA's lack of visibility of retail assets, and inconsistent ratings of the condition of ammunition.¹⁴

Funding gaps and reporting issues resurfaced in the wake of the 9/11 terrorist attack. Ammunition with temporary condition codes that had returned from ODS remained in the inventory, posing serious problems. Reports at the time were based on volume, not condition, which created strategic risks. To address these risks, the SMCA directed the creation of the Munitions Readiness Report (MRR) that would disclose the readiness, production schedule, quality, and serviceability for each ammunition item up to 24 months out. Significantly, by 2007 the Navy, Marine, and Air Force systems were linked to the MRR. Then ammunition stocks became completely visible when the SMCA worked with industry to develop the Industrial Base Assessment Tool (IBAT). This web-based system tracks and documents the production capabilities, capacities, schedules, deficiencies, and industrial base metrics of the entire ammunition supply chain. The implementation and constant refinement of the MRR and IBAT for reporting and visibility now provide the SMCA with the ability to inform strategic decision-makers on the current and future capability of the munitions DIB¹⁵

Base Realignment and Closure (BRAC)

Since 1988, "BRAC has been the process used by the DOD and Congress to close excess military installations and realign the total asset inventory in order to save money on operations and maintenance."¹⁶ For the JMC, BRAC meant the closure of idle facilities and plants and the consolidation of munitions production and storage capability. This process evolved over several iterations of BRAC in 1989, 1991, 1993, and 1995. "BRAC 2005 presented a unique challenge for the munitions DIB. It was the first time that operating plants were mandated to close while ongoing manufacturing

operations were being conducted.”¹⁷ Accordingly, four AAPs and one munitions center transferred their production, demilitarization functions, and numerous other capabilities to other facilities. “The four AAPs that closed as a result of the BRAC decision were Lone Star in Texas, Riverbank in California, Kansas, and Mississippi. Their closure resulted in a one-time cost of \$371.5 million, and an estimated net annual recurring savings of \$39.9 million.”¹⁸ Remaining after this drawdown were seven production plants, one ammunition activity, two munitions centers, two arsenals, and three depots.

These reductions supported one of the three goals established by the Secretary of Defense, to reduce excess infrastructure. Execution of BRAC recommendations led to challenges when delays in completing one action led to delays in completing others. The unprecedented scope and complexity of this consolidation required coordinated military construction with sequential moves as the DOD identified the need for new and renovated facilities to enhance capabilities. Realized savings for all of the 2005 BRAC decisions are not estimated to occur until 2018.¹⁹

Regardless of achieved savings, Congress holds the DOD responsible for resourcing the ammunition requirements needed to support the Joint Force. AMC fulfills this responsibility through the DIB, which coordinates efforts of organic and commercial providers. Assuming that a projected BRAC committee meets within the next few years, the timing is optimal to review the locations, production capacities, and distribution requirements associated with current active locations.

The 2012 Munitions DIB

The 2012 munitions DIB is maintained and managed in the continental United States (CONUS) by the JMC under the AMC. The JMC manages facilities at 15 locations, which span across 13 different states. Of the 15 locations, nine actively

produce ammunition; the remaining six execute supporting functions and provide knowledge, research and development, and distribution support. Implementation of the 2005 BRAC decisions greatly influenced the current inventory of facilities. More importantly, BRAC decisions propelled the munitions industrial base to achieve efficiency through mergers, redundancy, and commercial partnerships. The facilities are divided into categories determined by who owns and operates them. Currently, there are only two government-owned, government-operated (GOGO) facilities - McAlester AAP (MCAAP) and Pine Bluff Arsenal (PBA). The remaining facilities are all GOCO facilities. The critical issue is whether the government has retained the right balance of these facilities and whether it is sustaining the right capacity in the right locations to support the future demands of the Army of 2020 and beyond.

The following table displays the facilities by location, type, and munitions capability.²⁰

Table. 2012 Munitions DIB Facility Characteristics

Facility	Location	Type	Capability
Blue Grass Army Depot (BGAD)	Richmond, Kentucky	GOCO	Centralized ammunition management for Southeast region thru ANMC
Hawthorne Army Depot (HWAD)	Hawthorne, Nevada	GOCO	Western Area Demilitarization, ammunition renovation. ARMS* program
Tooele Army Depot (TEAD)	Tooele, Utah	GOCO	CITE* for Ammunition Peculiar Equipment, shipping, receiving, storage, renovation, demilitarization, and testing
Anniston Munitions Center (ANMC)	Anniston, Alabama	GOCO	Artillery & small arms overhaul/repair, conventional ammunition renovation, receipt, surveillance, issue, demilitarization, disposal, and storage
Crane Army Ammunition Activity (CAAA)	Crane, Indiana	GOCO	Munitions CITE, receives, stores, issues, ships conventional ammunition, mortar, projectile manufacturing, demilitarization, maintenance, and renovation
Holston Army Ammunition Plant (HSAAP)	Kingsport, Tennessee	GOCO	Manufacture full-spectrum explosives, R&D, ARMS program
Iowa Army Ammunition	Middletown,	GOCO	Medium and large caliber munitions, tank

Plant (IAAAP)	Iowa		ammunition, artillery, mines, and mortar production. ARMS program
Lake City Army Ammunition Plant (LCAAP)	Independence, Missouri	GOCO	Small arms ammunition, medium and small caliber links production. NATO test center, ARMS program
Letterkenny Munitions Center (LEMC)	Chambersburg, Pennsylvania	GOCO	Ammunition surveillance, storage, shipping, maintenance, demilitarization, and reclamation
McAlester Army Ammunition Plant (MCAAP)	McAlester, Oklahoma	GOGO	Group Technology Center, manufacturer of bombs, rockets, and capability to renovate projectiles, mortars, and small arms
Milan Army Ammunition Plant (MLAAP)	Milan, Tennessee	GOCO	Manufacture grenades, artillery, and mortars. Load, assemble, and pack ammunition. ARMS program
Radford Army Ammunition Plant (RFAAP)	Radford, Virginia	GOCO	Manufacture propellants: nitroglycerine and nitrocellulose, powders, medium caliber ammunition. ARMS program
Scranton Army Ammunition Plant (SCAAP)	Scranton, Pennsylvania	GOCO	Manufacture projectiles and mortars. ARMS program
Pine Bluff Arsenal (PBA)	Pine Bluff, Arkansas	GOGO	CITE* for smoke, illumination, and non-lethal munitions, produces 41 critical go-to-war items
Rock Island Arsenal (RIA) Joint Manufacturing and Technology Center	Rock Island, Illinois	GOCO	Home of Joint Munitions Command, Quad City cartridge case facility, Joint Manufacturing and Technology Center (JMTC) CITE, no munitions
*CITE-Center of Industrial and Technical Excellence			
*ARMS-Armament Retooling and Manufacturing Support			

As displayed in the table, the primary function of the three Army depots is management, demilitarization, and distribution. Only TEAD receives, stores, issues, maintains, demilitarizes, and tests ammunition. Two munitions centers, ANMC and LEMC, share the primary mission of receiving, storing, surveilling, issuing, and maintaining munitions. RIA operates a cartridge case facility and has no munitions operations. It also serves as the home for the JMC headquarters. The nine remaining locations include one arsenal, one munitions activity, and seven ammunition plants. All nine of these production locations are located in the eastern United States. The furthest west is MCAAP in Oklahoma.

From 1945-1991 the orientation of the munitions industrial base toward the east coast was consistent with the Soviet threat to our European allies. Decisions during the earlier iterations of BRAC were not predicated on the current global economic situation. Given growing concerns regarding Chinese intentions in the Asia-Pacific region, the current location of the munitions industrial base must be reviewed. The rebalance to the Asia-Pacific region may support future BRAC decisions to further realign, consolidate, or establish new facilities. Key factors in decisions of this magnitude are Congressional support, capital investment, retention of intellectual capital, environmental and safety issues, and laws governing depots and arsenals. Senior leaders must be sensitive to comparisons of current production and capacity with evolving requirements and avoid a rush to irresponsible and reckless decisions.

Legislative Controls

Congressional support and control of the industrial base has been established in numerous laws, amendments, statutes, initiatives, incentives, and programs governing depots and arsenals. Initial legislative control began in the 1920s with the Arsenal Act (1920). This control continues to enable Congress to maintain the current organic structure. The most relevant to future realignment options of the munitions DIB which enables Congress to exercise this control: the Working Capital Funds (Subcontracting) (1991), the Authority to Sell Outside the Department of Defense (1993), the Centers of Industrial and Technical Excellence (CITE Statute) (1997), the Enhanced Use Leases (2000), the Arsenal Support Program Initiative (2001), and the Cooperative Activities Pilot Program (2004).²¹ These combined legislative actions exercise Congressional control; protect our national investments; and enhance, sustain, and support the health and welfare of a strong munitions DIB.

Since 1991, six legislative actions have impacted the munitions DIB design currently supporting the Army. Myra McKittrick, of the Lexington Institute, summarizes this legislation:

- Working Capital Funds (Subcontracting) (1991) - which allows facilities in the organic base to sell products or services to the private sector. (10 U.S.C. 2208(j))
- Authority to Sell Outside the Department of Defense (1993) - that permits depots and arsenals involved in the manufacture of certain items to sell them outside the Department of Defense. The proceeds from such sales are returned to the Working Capital Fund rather than to the facility that made the sale. (10 U.S.C. 4543)
- Centers of Industrial and Technical Excellence (CITE Statute) (1997) - which grants authority to depots now designated "Centers of Industrial and Technical Excellence" (CITE) in their respective core competencies, to enter into partnerships with private industry. These partnerships offer unprecedented flexibility to the depots to perform subcontract work for private industry (and possibly vice versa), and for private companies to use facilities or equipment at the depots for either military or commercial purposes. (10 U.S.C. 2474)
- Enhanced Use Leases (2000) - which creates incentives for both organic facilities and the private sector to negotiate long-term leases of public property in return for cash or in-kind investments in the facilities. (10 U.S.C. 2667)
- Arsenal Support Program Initiative (ASPI) (2001) - that permits arsenals to enter into cooperative agreements with private companies, in which the company may use arsenal facilities and/or equipment in exchange for investing in the maintenance or upgrade of arsenal property. Through annual appropriations, Congress provides funds for arsenals to renovate or adapt their unused facilities for potential users. (Public Law 106-398, Section 343)
- Cooperative Activities Pilot Program (2004) - which authorizes all Army industrial facilities (arsenals, ammunition plants, depots or 'a manufacturing plant') to enter into a variety of cooperative arrangements with 'non-Army' entities. Cooperation can include direct sales or subcontracting by the Army facility, work share arrangements, and teaming to jointly bid on new federal contracts. The pilot program provides additional flexibility by allowing the Army facilities to enter into fixed-price and multi-year contracts to deliver goods and services, and

allow the non-Army entity to make incremental and in-kind payments. This statute does not include any provisions for accounting for the proceeds of any of these cooperative arrangements. (10 U.S.C. 4544)²²

“In October of 1992, Congress established the Armament Retooling and Manufacturing Support (ARMS) program. This program was designed to encourage commercial use of underutilized portions of facilities. These efforts would lower the cost of ownership of GOCO ammunition plants while creating jobs and retaining critical skills in machinery in the industrial base.”²³ Currently, seven locations execute this program: HWAAP, HSAAP, IAAAP, LCAAP, MLAAP, RFAAP, and SCAAP. Four other locations were identified as CITE: TEAD, CAAA, PBA, and RIA. The MCAAP is the only facility currently receiving the benefits of the Arsenal Support Program Initiative, and BGAD maintains an enhanced use lease to Lockheed Martin for repairs to aircraft.²⁴ The collective benefit achieved by these facilities includes growth in volume of production, growth in manufacturing capabilities, upgrades of arsenal property, and increased revenues.

These legislative actions broke down the barriers to cooperation and partnership between the organic industrial base and commercial industry. The results of the 2005 BRAC and the present alignment of the munitions DIB demonstrate clearly that the Army and DOD have benefited from considerable cost savings. “In FY09, total savings to the government equaled \$407 million, which exceeded investments and incentives of \$274 million.”²⁵ The success of the ARMS program encouraged the commercial use of inactive facilities. In the last twenty years, implementations of congressional action provided the necessary measures to sustain the munitions DIB infrastructure through partnership and cooperation. Commercial industry keeps valuable equipment operating,

executes facility upgrades, and takes responsibility for facility maintenance while avoiding large capital investments and the volatility of a boom or bust industry.

Asia-Pacific Considerations

The current National Security Strategy focuses on rebalancing U.S. forces to the Asia-Pacific region. Thirteen of the current facilities are oriented toward the eastern half of CONUS. Further, eight of the fifteen locations are in the eastern third of the country. Current locations of the munitions DIB reflects 50 years of Europe-oriented Cold War priorities. As the force returning from Europe stabilizes in CONUS, it is safe to assume that DOD will realize decreased costs associated with transportation of ammunition. The problem that remains is the growing costs associated with the production and distribution of ammunition to end-users in the Asia-Pacific region. It may now be wise to reorient selective capability of the munitions DIB toward the western United States. A balanced production and distribution capability across the nation would yield savings in future transportation costs and shorten the operational reach to support that region and thereby reduce DOD spending.

“Operational reach is the distance and duration across which a joint force can successfully employ military capabilities.”²⁶ To determine whether the current industrial base distribution process is sufficient to support the Joint Force of 2020, we must consider operational reach with respect to transportation. Within the U.S. “only two ammunition ports, Military Ocean Terminal Concord (MOTCO) and Military Ocean Terminal Sunny Point (MOTSU)”²⁷ support the shipment of ammunition across the Pacific and Atlantic Oceans. The amount of time required to cross the Pacific Ocean from MOTCO is estimated at 11.4 days to Japan, 12.9 days to Korea, 15 days to Australia, and 17.9 days to the Philippines. The amount of time required to cross the

Atlantic Ocean from MOTSU is estimated at 28.9 days to Indonesia, 31.6 days to Australia, and 34.7 days to Korea. Within the Asia-Pacific region travel takes 4 days from Guam to Korea, 6 days from Australia to Korea, 1.5 days from Japan to Korea, 6.7 days from Indonesia to Japan, and 5.8 days from Indonesia to Korea.²⁸ It is clear that transportation within the Asia-Pacific region is cheaper than a shipment from the West coast, which is less expensive than from the East coast.

With no existing production capability on the West coast, the key factor that adds additional transportation cost and time is the movement required to ship ammunition at least 1,700 miles across the U.S. to reach MOTCO. Traveling at least 400 miles per day adds an additional four days or more for Pacific coast movement by ground or rail. This reality is neither responsive nor fiscally prudent given current fiscal conditions and the continuing rise in transportation costs. A correction of this deficiency helps to improve the munitions DIB operational reach that benefits the Joint Force through 2040.

The current munitions DIB infrastructure reflects the decisions made ten years or more ago. Therefore decisions made today will certainly have impacts into the next decade and beyond. As the U.S. transitions from over a decade of conflict to the challenges of 2020, it is important to make reversible decisions. “Reversibility is a concept that is a key part of the decision calculus – including the vectors on which we place our industrial base. This includes an accounting of our ability to make a course change that could be driven by many factors, including shocks or evolutions in the strategic, operational, economic, and technological spheres.”²⁹ Divesting capability in the munitions DIB without the ability to reverse course could be strategically catastrophic. Over the next few years, multiple factors will affect future munitions

support. Reductions in force structure will reduce annual training requirements between 2013 and 2020. The final positioning and condition determination of ammunition retrograded from OEF and OIF potentially impacts war reserves, current training, and prepositioned stocks. Regionally aligned unit training in the Asia-Pacific region can serve as the munitions DIB rehearsal to validate mobilization plans.

As Combatant Commanders (CCDR) orient their strategies toward partnered training and engagement, it may be strategically advisable to consider potential foreign sources for munitions production in the Asia-Pacific region. This opportunity facilitates prepositioning of ammunition in partnered nations to support regional operations. An option available to strategic leaders is through “Security of Supply” arrangements. “The DOD has entered into arrangements with several nations to ensure the mutual supply of defense goods and services. These bilateral Security of Supply arrangements allow the DOD to request priority delivery for DOD contracts, subcontracts, or orders from companies in these countries.”³⁰ Given the uncertain future, options must be identified for the munitions DIB posture.

Strategic Options

In order to improve operational reach and prepare the munitions DIB for the Army of 2020, consider the following four options: 1) continue to operate as currently aligned; 2) further diversify capability among existing facilities while eliminating the least productive facilities and execute a capital investment to meet production requirements for the West coast and the Asia-Pacific region; 3) seek foreign sources of supply and Security of Supply arrangements to fulfill future Asia-Pacific regional requirements while reducing or maintaining the CONUS munitions DIB production capability; or 4) execute

a balanced mix of the three previous options to achieve the greatest level of reversibility and improve operational reach.

Option 1: Status Quo

Continue to operate as currently aligned. This option recommends no immediate changes to the munitions DIB and supports continued operations as currently aligned. The challenge to continue to right-size the munitions DIB competes between two requirements - the need to maintain reserve capacity to replenish war reserves and a fiscal requirement to meet peacetime demands.

With the recent completion of the 2005 BRAC decisions, the JMC needs protected time to stabilize the munitions DIB. The requirement to retrograde or reposition OIF and OEF ammunition will not be completely realized until the OEF mission is complete in fiscal year 2014. The inspection and condition code application process will require time before final disposition is determined. Additionally, the rebalancing of forces within CONUS will not be complete until the remaining units from OEF redeploy and training requirements stabilize. The ability of the munitions DIB to sustain readiness can only be achieved when manning requirements for steady state operations can be determined. The way to mitigate the volatility associated with uncertain requirements is to let the munitions DID stabilize war reserves and sustainment requirements before making an uninformed decision affecting personnel for the near term, mid-term, and long term support to the force.

The consolidation of redundant facilities and improved production capability has already enhanced responsiveness while eliminating the cost of idle facilities. The divestiture of organic production to contracted operations has reduced facility costs to the government while maintaining intellectual capital and gaining technological

improvements in production. The execution of the 2005 BRAC and the application of legislation helped to achieve the “Deputy Secretary of Defense order that to the maximum extent feasible, the Army will transition government owned ammunition production assets to the private sector.”³¹ There are only two GOGO facilities at this time producing inherently governmental products and critical go-to-war items. The current munitions infrastructure provides sufficient capacity to meet the future demand. This is supported by the munitions DIB success in support of ODS, OIF, and OEF. The shortfall in ammunition production at the LCAAP was corrected and is better postured. As most of the munitions DIB is commercially operated and profit oriented, future production will drive manning and costs to align with requirements. This self-correcting situation encourages the DOD to resist temptation to right-size before the time is right.

This option does not address rising transportation costs, a lack of balance to the West coast, or support to the Asia-Pacific region. The risk associated with status quo is the historical trend to reduce munitions funding during inter-war periods. Congress, the DOD, and the Army must protect funding to accomplish JMC’s two requirements.

Option 2: Western Shift

The second option calls for further diversification of capability among existing facilities while eliminating the least productive facilities and executing a capital investment to meet production requirements for the West coast and Asia-Pacific region. The objective is to achieve improved regional orientation toward the western U.S. in order to support the Asia-Pacific region. Within the next ten years, the execution of a capital investment in the West creates better alignment within CONUS and Asia-Pacific regional support. This option promotes the Army’s ability to allow existing facilities to compete amongst themselves on a cost basis determined by the JMC. The most

productive, efficient, and cost-effective facilities would survive while leaders determine whether an investment in a new regional facility in the western U.S. would provide long-term savings in transportation costs.

As re-basing and the redeployment of units are completed, the ability to identify the genuine requirement to support training will emerge. The analysis of distribution efficiency in the context of production and transportation cost is critical as senior leaders consider the next series of potential basing decisions. Redundancy at several locations prudently assures surge capability by maintaining trained personnel to support future expansion. The JMC has already achieved a degree of success by aligning the largest production capability closest to the largest consumer. Limited production capability oriented for the West coast supports training requirements for units on the West coast, unit rotations at the National Training Center (NTC), and the Asia-Pacific region. The HWAD serves as a prime candidate for consideration due to location and existing human capital. A West coast shift of production also improves the distribution network by reducing the transportation days required to cross the country, a distribution network that relies on rail and ground transportation. This would potentially reduce travel by days within CONUS to both the NTC and MOTCO.

A current example of success is the basing locations for Heavy Brigade Combat Teams (HBCT) and the proximity of tank rounds needed for training and/or deployment. Currently, HBCT's are based in Georgia, Texas, Kansas, and Colorado. Tank rounds are currently produced at the IAAAP, which is centrally located among its primary customers. The only long haul is support for brigade level training at the National Training Center (NTC) in California. A facility located near Ft. Irwin, CA or expansion of

the HWAAP provides redundancy and maintains experience by producing limited volumes. Orienting toward the western United States should also intensify competition between contracted operators, which should generate future savings.

Since this action depends on the next BRAC decision, the actual savings associated with this action would not be realized until many years after execution. The 2005 BRAC benefits will not be realized until 2018. The costs are likely to be substantial and the greatest risk for a new venture. Production at other locations should continue until the new production is working at full capacity. In fact, costs would spike for a brief period to ensure the transition is seamless to DOD customers. With more than two-thirds of current capacity oriented toward the Eastern U.S., this is the right time to consider a shift in strategic orientation once basing is complete and requirements stabilize. Because of the cost this option creates, congressional support may be difficult to secure. The benefit however is responsive support and improved operational reach.

Option 3: Foreign Supply

Seek foreign sources of supply and Security of Supply arrangements to fulfill future Asia-Pacific regional requirements while reducing or maintaining the CONUS munitions DIB production capability. This option relies on foreign suppliers to fulfill limited future requirements while operations in the CONUS munitions DIB continue to meet war reserve and CONUS training requirements. This option is viable because the U.S. currently maintains “Security of Supply” arrangements with seven countries: Australia, Canada, Finland, Italy, Netherlands, Sweden, and the United Kingdom.³² As U.S. strategy focuses on rebalancing forces to the Asia-Pacific region, it seems reasonable to consider leveraging current arrangements with partners and allies to establish long-term contracts to support regional requirements outside CONUS for

training and contingencies. Execution of these bi-lateral arrangements builds the partnership between the countries as well as establishes mutual assurance. An expansion and implementation of these arrangements to other allies within the Asia-Pacific region would solidify the existing commitments while improving operational reach within the region. Australia serves as a great example for this option.³³ The U.S. and Australia share a number of common munitions as a result of foreign military sales.

Before committing to this venture however, U.S. leaders must decide what munitions, and in what volumes, will be provided by foreign contractors. A contract with any partner can pose very specific strategic risks. The risk of a declined commercial industrial base as a result of an over commitment to a foreign source could force the loss of intellectual capital and reduce the benefits already gained through partnership. As an overarching concern, the DOD must “monitor the effects of the budget reduction on the munitions DIB and potential impact to the prime contractors’ and subcontractors’ capacity for critical components on identified programs. The Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics must continue to perform annual targeted industrial capabilities assessments on complex critical munitions components and contractors.”³⁴ Knowing and understanding the impact on single-source providers and government core competency production is critical to future decisions affecting the munitions DIB. Additionally, a failure to meet requirements may result in catastrophic consequences for supported commanders and jeopardize the nation’s defense. Detailed attention to lead times and operational needs may be time-sensitive, and this concern may be avoided by a redundant CONUS back-up supply of these munitions.

The second risk is that competition between foreign and national companies could potentially drive our industrial capacity to reduced levels that are incapable of supporting a deployed Army. History already provides samples of neglect to the munitions DIB when underfunding occurs. Shortfalls in production or requirements in excess of warm based capacity would take months to overcome. Risk assessments would be necessary to evaluate the security of supply on a case by case basis. Contracted companies could potentially over commit and prove unreliable if they have competing national requirements. Additionally, a change in political favor would create a strategic dilemma placing unpredicted strain on the munitions DIB. The JMC must weigh the benefits to risks to avoid over reliance on any one foreign source.

Any decision to support this option would not warrant the closure of existing facilities, but would encourage reduced organic production and significantly reduce transportation time. During the OIF/OEF small arms ammunition shortfall, the United Kingdom provided required assistance through this arrangement. Maintaining multiple options prevents over reliance and builds a portfolio of choices. Current U.S. legislation supports this option and monitors its sensitivity annually in reports to Congress to maintain visibility on contracts, and safeguard National interests.

Consideration of this option also provides capability beyond our borders in the event of a loss to one of our two ammunition ports. Transportation issues affecting support to ODS should be a lesson applied to future mobilization planning. The option is not risk averse, however, the very nature of the problem requires consideration of solutions that achieve balanced distribution and increased operational reach.

Option 4: Balanced Mix

Execute a balanced mix of the three previous options to achieve the greatest latitude for reversibility. The fourth and final proposed option executes components of the other options. Initially, no action is taken for at least three to five years in order to allow requirements to reach equilibrium. On-going competitive analysis would be conducted in existing facilities. The worst performers would be considered for closure. At the same time, this analysis would either confirm or deny the cost benefits of capital investment oriented toward the West coast. The regional shift within the United States would be accompanied by consideration of foreign sources from allied and partnered nations to provide regional support. Such arrangements would favor countries with which the United States already has Security of Supply arrangements in place. These agreements can be accomplished through legislative support with allies in Europe and the Asia-Pacific region.

Recommendation

The balanced mix option offers the best flexibility through its consolidated approach. It includes reversibility, redundancy, partnership, and fiscal responsibility. Accepting the current posture on munitions facilities and capability for the next five years requires patience. No immediate actions are required to execute this option. However, detailed planning and analysis is required to forecast the desirability of regional options, both continental and abroad. It provides an opportunity for deliberations by business professionals, political leaders, and Army leaders.

The potential long-term cost savings and operational reach generated by this option outweighs the political barriers that might accompany approval to “Go West” and seek more foreign sources. These must be overcome. The inclination to act in a time of

fiscal austerity should not drive immediate changes. A rush to implement further changes in the munitions DIB before realizing the full value of the 2005 BRAC is reckless and irresponsible. A phased execution of realigned munitions support on a regional basis with robust, productive, redundantly capable facilities will generate successful munitions support to the Army of 2020 and beyond.

Implementation of the balanced mix option requires patience. Facilities currently in the inventory possess the intellectual capital and capability to meet the Army of 2020 requirements on a competitive basis. The consequences of decisions made when the threat is low will increase exponentially over time. The experiences of the last thirteen years must be incorporated into the decisions senior leaders make now. Since ammunition is usually heavier than any other managed commodity, the cost of transportation it is an important factor for future operations. Evaluation of these costs should consider all forms of transportation and include time-distance factors in response to CCDR contingency plans. Key opportunities associated with implementation include additional cost savings, responsive support, strengthened partnerships, improved positioning, and improved distribution.

Conclusion

In May 2005 the Secretary of the Army published recommendations to “realign or close installations to integrate critical munitions production and storage, manufacturing... and material management capabilities to enhance Joint productivity and efficiency and reduce costs.”³⁵ This task was completed as a result of the 2005 BRAC and effective implementation of JMC management tools. As operations in OEF complete, the opportunity to improve the munitions DIB for the 21st Century is here.

Rebalancing, redundancy, and reversibility of industrial-based facilities present numerous opportunities for decision-makers as the nation seeks to stabilize the economy. In light of the economic challenges the U.S. has faced during the last few years, relocating facilities in areas most depressed would bolster the economy. Skilled labor across the country adapts to meet the needs of the nation and to gain the rewards due to hard-working Americans. The retention of newer equipment and the building improvements gained through legislative ingenuity of the 2005 BRAC, along with commercial partnerships, could provide surge capacity well beyond 2020 provided the decision process encourages leaders to achieve further savings from on-going cost reductions in producing munitions.

Support of the new strategic orientation toward regional allies will also facilitate strengthened partnerships if foreign companies win contracts to provide munitions. Regionally aligned allies with capable and committed industries will not only improve their economic well-being but are also expected to provide reciprocated benefits in other areas, especially technology. With an improved distribution network across the country and around the world, the benefits of improved positioning not only support sustained training for our military but also reduce requirements for mobilization, for cargo space, and for transportation by positioning munitions support as far forward as possible.

Current and future leaders need to improve regional distribution of munitions production. During the Cold War industrialization was heavily weighted toward the East Coast, which led to closures of government-owned facilities in the Western U.S. Capital investments in infrastructure across the nation during the mid-20th Century should be leveraged in this new century. Empty buildings across the nation can meet capacity

requirements for potential regional balancing of organic industrial munitions facilities. This realignment meets military requirements with reduced costs that are passed on to the government. Disciplined implementation of the final option, over time, will provide a munitions DIB aligned and capable of supporting the Army Force of 2020 and beyond.

Endnotes

¹ Barack H. Obama II, Leon E. Panetta, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, D.C., The White House, January 2012), 3.

² Deputy Secretary of Defense, *Memorandum for Secretaries of the Military Departments*, Washington, D.C., January 10, 2013, 1.

³ Joint Munitions Command, *History of the Ammunition Industrial Base*, (Rock Island, Ill.: JMC History Office, December 2010), 3-4.

⁴ *Ibid.*, 4-5.

⁵ *Ibid.*, 6-8.

⁶ *Ibid.*, 9-12.

⁷ *Ibid.*, 14-18.

⁸ *Ibid.*, 20-23.

⁹ *Ibid.*, 24-27.

¹⁰ *Ibid.*, 27, 38.

¹¹ Richard Lardner, "Ammunition Industry Preparing for EBB In Demand," *Tampa Tribune*, July 24, 2007.

¹² Joint Munitions Command, *History of the Ammunition Industrial Base*, 3, 41, 53-54, 61-62.

¹³ *Ibid.*, 41-44, 60.

¹⁴ *Ibid.*, 45-46, 49-50.

¹⁵ *Ibid.*, 46, 56-59.

¹⁶ *Ibid.*, 54.

¹⁷ *Ibid.*, 55.

¹⁸ U.S. Government Accountability Office, *Military Base Realignment and Closures: Updated Costs and Savings Estimates from BRAC 2005* (Washington, DC: U.S. Government Accountability Office, June 29, 2012), 20, 22, 38-39.

¹⁹ U.S. Government Accountability Office, *Military Base Realignment and Closures: Key Factors Contributing to BRAC 2005 Results* (Washington, DC: U.S. Government Accountability Office, March 8, 2012), 1.

²⁰ Headquarters, U.S. Army Materiel Command, *The Metal Book* (Redstone Arsenal, Alabama: U.S. Army Materiel Command, 2011), 12-13, 16-17, 26-51.

²¹ Myra McKittrick, *The Army's Organic Industrial Base: What is the Future for Depots and Arsenalns?* (Arlington, VA: Lexington Institute, February 2005), 4-5.

²² *Ibid.*, 5.

²³ Joint Munitions Command, *History of the Ammunition Industrial Base*, 59-60.

²⁴ Headquarters, U.S. Army Materiel Command, *The Metal Book*, 12-13, 16-17, 26-51.

²⁵ Joint Munitions Command, *History of the Ammunition Industrial Base*, 60.

²⁶ U.S. Joint Chiefs of Staff, *Joint Operation Planning*, Joint Publication 5-0 (Washington, DC: U.S. Joint Chiefs of Staff, August 11, 2011), III-33.

²⁷ Edward G. Keating and Daniel Sommerhauser, *Technical Report: Funding Ammunition Ports* (RAND Corp, Santa Monica, CA, 2012), xi.

²⁸ U.S. Naval War College, *Joint Military Operations Reference Guide*, (Newport, RI: U.S. Naval War College, July 2011) D-2.

²⁹ Barack H. Obama II, Leon E. Panetta, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, 7.

³⁰ Manufacturing and Industrial Base Policy (MIBP), *Security of Supply*, <http://www.acq.osd.mil/mibp/sec.supply.html>, Researched January 26, 2013.

³¹ Major Mark W. Siekman, Dr. David A. Anderson, and Allan S. Boyce, "Small-Arms Ammunition Production and Acquisition: Too Many Eggs in One Basket?," *Army Sustainment*, PB 700-10-05 Volume 42, Issue 5 (September-October 2010): 63

³² Manufacturing and Industrial Base Policy (MIBP), *Security of Supply*, <http://www.acq.osd.mil/mibp/sec.supply.html>, Researched January 26, 2013.

³³ Manufacturing and Industrial Base Policy (MIBP), *Security of Supply*, http://www.acq.osd.mil/mibp/docs/US-AS_Security_of_Supply_Arrangement.pdf, Researched January 26, 2013.

³⁴ Under Secretary of Defense for Acquisition, Technology and Logistics, *Annual Industrial Capabilities Report to Congress* (Washington, D.C.: Under Secretary of Defense for Acquisition, Technology and Logistics, August 2012), B-5.

³⁵ Secretary of the Army, Francis J. Harvey, *Department of the Army Analysis and Recommendations BRAC 2005 Volume III, Department of Defense Report to the Defense Base Closure and Realignment Commission* (Washington, D.C.: Department of Defense, May 2005), 9.

