

# U.S. ARMY JOINT MUNITIONS & LETHALITY LIFE CYCLE MANAGEMENT COMMAND

## FY2008 ANNUAL COMMAND HISTORY EXECUTIVE SUMMARY



### The Ammunition Enterprise



PROGRAM EXECUTIVE OFFICE  
FOR AMMUNITION



JOINT MUNITIONS COMMAND



ARMAMENT RESEARCH DEVELOPMENT  
AND ENGINEERING CENTER

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**THE U.S. ARMY JOINT MUNITIONS AND LETHALITY  
LIFE CYCLE MANAGEMENT COMMAND  
FY 2008 ANNUAL COMMAND HISTORY - EXECUTIVE SUMMARY**

**JOINT MUNITIONS AND LETHALITY LIFE CYCLE MANAGEMENT COMMAND**

In FY 2008 the Joint Munitions and Lethality Life Cycle Management Command (JM&L LCMC) was commanded by Brigadier General William N. Phillips, who also served as the Program Executive Officer for Ammunition. The JM&L LCMC is responsible for bringing together organizations, people, infrastructure and processes required for total conventional ammunition life cycle management. In August 2004, the Assistant Secretary of the Army for Acquisition, Logistics and Technology, Claude M. Bolton and the former Commander, U.S. Army Materiel Command (AMC), General Paul J. Kern, agreed to formalize the Army's life cycle management initiative in order to deliver quality products to the Warfighter faster, while minimizing life cycle cost. The key to the life cycle management initiative was the integration of significant elements of acquisition, logistics and technology leadership to establish a closer relationship between AMC, the major subordinate commands (MSC) and the program executive officers (PEOs). The overarching objective of the JM&L LCMC is to have quality munitions in the right place, at the right time, at the right cost.

The JM&L LCMC mission is to develop, acquire, field, and sustain value-added ammunition for the joint Warfighter through the integration of effective and timely acquisition, logistics, and cutting-edge technology. The mission core competencies include: research, development, and engineering; acquisition and program management; logistics management; industrial operations; contracting; serving as the Single Manager for Conventional Ammunition (SMCA) Executor and Field Operating Activity; conducting industrial base management; providing real time munitions readiness reporting; maintaining worldwide asset visibility; centralized ammunition management; performing demilitarization and disposal of unserviceable stocks; and providing integrated lethality solutions.

The establishment of the JM&L LCMC aligns three organizations that execute the Army's munitions and lethality mission: the Program Executive Office for Ammunition (PEO Ammo) at Picatinny Arsenal, Dover, N.J., the Armament Research, Development, and Engineering Center (ARDEC) also located at Picatinny and the Joint Munitions Command (JMC) headquartered at Rock Island Arsenal, Rock Island, Ill. This annual command history contains full reports from each of the Ammunition Enterprise partners. In FY08, JM&L LCMC leaders focused on reinforcing the commitment behind the LCMC establishment and strengthening working relationships between ARDEC's science and technology workforce, PEO Ammo's acquisition professionals and JMC's logistics and sustainment experts. To institute enterprise goals the commands worked jointly to establish a strategic path forward.

***JM&L LCMC Leadership***



Brigadier General William N. Phillips  
Commanding General, Joint Munitions and  
Lethality Life Cycle Management Command;  
Commanding General, Program Executive  
Office for Ammunition



1 Oct 06 – 1 Aug 08  
Brigadier General James E. Rogers  
Commanding General, Joint Munitions Command;  
Deputy Commanding General,  
Joint Munitions and Lethality  
Life Cycle Management Command



1 Aug 08 - Present  
Brigadier General Larry D. Wyche  
Commanding General, Joint Munitions Command;  
Deputy Commanding General,  
Joint Munitions and Lethality  
Life Cycle Management Command



Mr. James C. Sutton  
Deputy, Program Executive Office for Ammunition



Dr. Joseph A. Lannon  
Director, Armament Research Development  
and Engineering Center

### *Accomplishments*

During FY08, the JM&L LCMC executed an annual budget of approximately \$6.1 billion on RDTE, Production and OPS/Sustainment missions. The JM&L LCMC employed 6,600 government and military personnel in addition to over 8,000 contractors and industry partners. The command worked on over 300 systems undergoing scientific research and development. Around 200 systems transitioned into production and another 500 systems were fielded for use by the Warfighter. Fielding ammunition in support of Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) continued to be most critical. Intense ammunition management allowed JM&L LCMC to meet 100% of ammunition requirements throughout the War.

The JM&L LCMC adopted Lean Six Sigma (LSS) across all organizations and became self sufficient in the implementation and sustainment of a thriving program. Projects completed have eliminated non-value added tasks within processes and avoided cost. One significant project improved production for insensitive explosive PAX-2 and generated a cost avoidance of approximately \$19 million. In correlation, a high speed process for loading PAX-2 into M80 grenades validated another \$37 million in cost avoidance. The culmination of numerous projects across PEO Ammo, ARDEC, and JMC has accumulated savings for all elements of the JM&L LCMC.

As part of JM&L LCMC's mission to incorporate commonality between munitions, the Army has increased production of smart munitions like the 155mm XM982 Excalibur round and leveraged identical technology to apply it to guided 105mm artillery round.

In FY08, JM&L LCMC initiated an Innovative Business Agreement. The command developed and implemented a pilot program with InSitech Inc. to demonstrate how in-sourcing of technologies from non-traditional sources and the use of innovative business practices (i.e. other transaction agreements) can facilitate solutions to technology gaps in order to reduce program costs, mitigate risk, and improve performance under select PEO Ammo programs. The pilot program is in consonance with the recommendations of the Final Report of the Defense Science Board Task Force on Defense Industrial Structure for Transformation, specifically recommendation 5 of the report, "Focus on Staying Ahead by Adequately Resourcing Engines of Innovation." The study will demonstrate how novel business arrangements and mechanisms can be implemented to create true public-private partnerships between DoD and the private sector.

Ongoing modernization is critical to maintaining a viable ammunition industrial base to meet future requirements. In FY08, 68 new modernization projects were funded to revitalize infrastructure and facilities and improve processes and functionality. Two major modernization projects include the Radford Army Ammunition Plant (RFAAP) Coal-Gasification Project and the Lake City AAP Small Caliber Production Modernization Project.

Several BRAC 2005 actions continued across the spectrum of JM&L LCMC. JMC led efforts to close five ammunition sites: Lone Star, Mississippi, Riverbank, and Kansas Army Ammunition Plants (AAPs) and the Red River Munitions Center. Termination of production at the sites and closure dates are projected between FY09 and FY12. To further implement BRAC mandates, JM&L LCMC partnered with Commanding Officer of the Naval Surface Warfare Center, Rear Admiral Archer M. Macy Jr., to begin construction of a \$75 million laboratory at Picatinny Arsenal which will support joint ammunition, joint weapons and joint lethality to support all Services.

Under the JM&L LCMC the enterprise managed and executed the production, fielding, and demilitarization of the following ammunitions rounds, items and equipment:

*Production*

- ✦ Small Caliber rounds
- ✦ 40mm Grenades and Illumination rounds
- ✦ Artillery Cartridges
- ✦ MK80 Bombs
- ✦ CDI BDU50 Bombs
- ✦ M18 Green Smoke Grenades
- ✦ Medium Cannon Caliber rounds (20mm, 25mm, 30mm)
- ✦ Large Caliber (120mm & 105mm)
- ✦ Mortar Cartridges
- ✦ BLU109 Bombs
- ✦ Propelling Charges

*Fielding*

- ✦ Excalibur rounds to OIF & OEF
- ✦ Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) to OIF/OEF
- ✦ M32 Systems to 17 BCTS
- ✦ 120mm and 60mm Mortar Weapon Systems to 17 BCTS
- ✦ Vehicle Optics Sensor System
- ✦ Improvised Explosive Device Interrogation Arms (IED/IA)
- ✦ 155mm Infrared Illumination to USMC (United States Marines Corps)
- ✦ Propelling Charges
- ✦ Mortar Fire Control System (M95) and Mortar Fire Control System (M96) to 7 HBCTs; completed 7 Resets
- ✦ Airlifted M789 (30mm) and shipped to ARCENT

Demilitarization (demil) continued to be a key mission focus for the command. The demil account comprises nearly one quarter of the worldwide wholesale stockpile and has the potential to impact Warfighter readiness. Although FY08 was a good year in terms of funding, the demil program is typically funded at about 60%

of the required annual stockpile reduction goals. It is important to continue forecasting demil in the POM to acquire additional funding to manage the stockpile and cost to maintain its growth. In order to eliminate unserviceable stocks and free up critical storage space, JM&L LCMC completed conventional ammunition and individual assets of missile demilitarization.

The JM&L LCMC organizations have successfully worked together to accomplish all facets of the conventional ammunition mission in support of the Warfighter. The command impacts current operations and strives to increase lethality. The M777 Lightweight 155 mm Howitzer, which fires the Excalibur round, was designed as a digitally programmed weapon. Lighter than the more commonly used M198 Howitzer, it is reportedly more accurate. Both the 155mm Excalibur round and the M777A2 howitzer were developed by ARDEC to provide more timely and accurate firepower. The Excalibur round is produced and distributed by McAlester and Iowa Army Ammunition Plants managed by JMC, while overall Program Management of the Excalibur program was executed by PEO Ammo.

Additional JM&L LCMC initiatives and accomplishments are summarized within the PEO Ammunition, JMC and ARDEC sections below.

## **PROGRAM EXECUTIVE OFFICE FOR AMMUNITION**

The Program Executive Office for Ammunition (PEO Ammo) is committed to providing superior ammunition to the Soldier. The PEO is responsible for life-cycle acquisition management of all conventional ammunition, which includes integrating budgets, acquisition strategies, R&D and life-cycle management across all ammunition families. PEO Ammunition is located at Picatinny Arsenal, New Jersey and is comprised of four Program Management (PM) offices; PM Close Combat Systems, PM Maneuver Ammunition Systems, PM Combat Ammunition Systems, and PM Joint Services. In FY08 PEO Ammo stood up the new Product Director's Office for Non-Standard Ammunition.

PEO Ammo has program and fiscal responsibility for 300 Army programs, comprised of Research Development Acquisition (RDA), Procurement Ammunition Army (PAA), Other Procurement Army (OPA), Weapon Track Combat Vehicles (WTCV) and Research Development Test and Evaluation (RDT&E) funding lines with an average per annum funding stream of approximately \$3.7 billion. In addition, PEO Ammo managed FY08 orders for other service ammunition valued at \$1.6 billion. PEO Ammo also managed Foreign Military Sales (FMS) orders at the value of \$563 million. In support of Army initiatives to implement Lean Six Sigma (LSS), PEO Ammo certified 89 Green Belt, 17 Black Belt and one Master Black Belt employees. LSS projects generated \$8 million in validated savings.

PEO Ammo ensures the supply and acquisition of conventional ammunition. The Army has made great strides in correcting shortfalls in supplying preferred ammunition items, and future budgets will continue to fill shortfalls. To mitigate risk, the Army relies on substitute munitions that often have lower lethality and accuracy to meet current requirements. In outyears, supplemental funding will remain necessary to replenish ammunition expended in OEF/OIF.

PEO Ammo will continue to manage industrial base modernization projects at the Army's government owned, contractor operated (GOCO) Radford, Holston and Lake City AAPs. Projects in future years will include: preservation and protection of idle industrial facilities that may be required for future requirements; care and maintenance of laid-away facilities and equipment; and the demilitarization of excess, obsolete, and unserviceable ammunition and missile components. Facility sizing issues are also expected to become further complicated by anticipated drops in ammunition requirements projected over the POM. Appropriate sizing of the government owned munitions production base remains critical to ensure affordable munitions and readiness for the Warfighter.

### ***Program Manager Close Combat Systems (PM CCS)***

The Program Manager Close Combat Systems (PM CCS) provides the Warfighter with world-class close combat, force protection and assured mobility capabilities across full spectrum operations through professional, integrates Joint life-cycle management. The PM is committed to helping Soldiers maintain freedom to move on the battlefield by developing and supporting technologically advanced: networked munitions, countermine and

explosive ordnance Disposal (equipment, demolitions, non-lethal equipment, grenades, pyrotechnics, shoulder launched munitions, and counter IED equipment.

PM CCS manages over 160 Army programs and acquisition of 50 items for other Services, with those numbers for other Services expected to grow starting in FY10. Total Army funding projected for PM CCS managed items in FY11-15 is around \$3.5 billion. PM CCS managed the development of networked munitions systems (NMS) that will comply with the President's policy to end the use of all persistent landmines by U.S. forces by December 2010. Development and system testing also continued on the Intelligent Munitions System (IMS), an alternative to anti-tank mines. In FY08 low rate initial production phase continued for the Spider. In August 2008, an Operational Need Statement (ONS) from the Combined/Joint Task Force-101, Afghanistan, was validated for request for Spider systems to theater in advance of planned initial fielding. PM CCS worked with Textron Systems and Alliant Tech Systems to support the ONS.

PM CCS continued development and demonstrative phases of countermines products such as the Airborne Surveillance, Target Acquisition and Minefield Detection System (ASTAMDS). PM CCS continued to field the AN/PSS-14 mine detecting set, a ground penetrating radar and enhanced metal detector which combine to increase metal detection. Detectors are presently deployed with Army and Marine Corps Combat Engineer Units in support of OEF/OIF. PM CCS also managed the EOD product lines which consist of all equipment purchases for Army EOD units (except vehicles, radios, and personal weapons). This product line started in 2003 with a budget of \$3 million and has grown to over \$50 million in FY08.

In the product area of anti-aircraft missiles and countermeasure flares which defeat them, there will be a continuing evolution. The M211, M212, M206 and XM216 Air Countermeasure Flares are part of a family of advanced Infrared (IR) decoy flares designed for use by Army helicopters and fixed wing aircraft to meet advanced threats. Three of the flares (M206, M211 and M212) are used in conjunction with one another to form the Advanced Infrared Countermeasure Munitions Flares (AIRCMM) solution. PM CCS increased production to meet war reserve and operational requirements for these rounds.

In support of OEF/OIF, PEO Ammo adjusted the acquisition strategies for grenades. The grenades program includes lethal grenades such as the M67 Fragmentation Hand Grenade and the AN-M14 Incendiary Grenade as well as multiple color smoke grenades (M18), screening smoke grenades (M83), and vehicle launched smoke grenades (M90, M76, and M82). The M67 systems contract established an additional CONUS source for the C70 detonator where only a single overseas (OCONUS) source had existed before. At the request of the Army, PM CCS expedited the incorporation of the confidence clip into new production as well as the existing inventory of lethal hand grenades.

The Product Manager Improvised Explosive Device Defeat/Protect Force (PM IEDD/PF) focused on the integration of IED defeat capabilities that will help our forces meet asymmetric threats. PM IEDD/PF managed 17 Programs and over \$600 million in FY08. PM IEDD/PF gained responsibility for the following programs in FY08: Self Protection Adaptive Roller Kits (SPARK), Cyclone Debris Blowers, WNS, Schonstedt (GA-72Cd Magnetic Locators), Culvert Denial, Flame Thrower, MRAP (Mine Resistant Ambush Protected) Rhino and Full Spectrum Effects Packages (FESP). In support of OEF/OIF, numerous SPARK IED rollers were provided to troops in Iraq and Afghanistan. Managers conducted multiple theater visits to build relationships and make in-stride production improvements in deployed programs.

### ***Program Manager Combat Ammunition Systems (PM CAS)***

The Project Manager for Combat Ammunition Systems (PM CAS) is comprised of two Product Managers for Excalibur and Mortar Systems. PM CAS equips Soldiers with all tube launched, indirect fire munitions, and mortar weapons systems for the Army's Current, Stryker and Future Forces. Under the SMCA responsibilities, PM CAS procures ammunition for other Services through life cycle program management of artillery and mortar products in the following categories: precision-guided munitions, smart munitions, conventional munitions, mortar weapons systems, mortar fire control systems, fuzes, and fuze setters.

PM CAS managed over 59 active programs supporting Army, other Service, and FMS acquisitions totaling more than \$2.5 billion in FY2007-2009 and projected \$4.6 billion in FY2010-2015. In FY08 the XM982 Excalibur

program continued an incremental development approach to provide rounds to Soldiers quickly. Excalibur Increment Ia-2 is in production transition and will provide significantly increased range for the M777A2 Lightweight, M109A6 Paladin, and Future Combat System's Non-Line of Sight Cannon. Increment Ib is in competition and will be fielded in FY2013 to provide further enhanced performance at significantly lower unit costs.

PM CAS continued programs to create Insensitive Munitions (IM) explosives to replace TNT and Comp B in artillery and mortar ammunition. As a result, two candidate explosive fills (IMX-101 and IMX-102) successfully passed all engineering level IM tests. Production studies of the explosive commenced in FY08 at Holston Army Ammunition Plant (HSAAP) leading to production of explosives. PM CAS also completed procurement and fielding of Lightweight M224A1 60mm mortar weapons and associated equipment. Fielding these items addresses a number of system shortcomings identified during OEF/OIF.

### ***Project Manager for Maneuver Ammunition Systems (PM MAS)***

The Project Manager Maneuver Ammunition Systems (PM MAS) provides direct fire combat and training ammunition capabilities to Warfighters (Army, Navy, Air Force, Marines) and government agencies to support dismounted Soldiers, combat vehicles, helicopters, Naval vessels and high performance aircraft. The PM does this through life cycle program management of ammunition in the following categories: small caliber, medium caliber, medium cannon caliber, and large caliber. PM MAS executes the development and production of ammunition for the Abrams Tank System, Bradley Fighting Systems, Stryker Mobile Gun Systems, FCS Mounted Combat System and Infantry Carrier Vehicle, Apache, and numerous other weapon platforms using medium and small caliber ammunition. PM MAS managed 189 items with over \$2 billion in FY08 funds across all Services.

PM MAS was instrumental in the delivery of cannon caliber cartridges in FY08. Acquisition and production were accelerated to meet critical Warfighter requirements for the 30mm M789 High Explosive Dual Purpose (HEDP) Cartridge. Longstanding field issues with the M789 used on the Apache helicopter were resolved and production was accelerated while PM MAS began the process to add a second source supplier.

In FY08 additional large caliber cartridges were produced, in order to mitigate impacts from the BRAC mandate to relocate the production capability. Currently the only production source for 105mm steel cartridge cases is located at Riverbank AAP and will be relocated to Rock Island Arsenal. This strategy allows the offeror to procure 105mm cartridge cases in advance of the relocation, thereby ensuring uninterrupted deliveries during relocation. To ensure adequate supply before the relocation, PM MAS executed a multiple year contract for the M467A1 Target Practice with Tracer cartridge in FY08. The Product Manager Large Caliber awarded a production contract for the M1028 canister cartridge and is executing the \$232 million engineering and manufacturing development (EMD) and low rate initial production (LRIP) contract for the mid-range munitions (MRM) program. The MRM is an ACAT II program to provide the FCS Mounted Combat System a beyond line of sight capability, which could also be added later to the Abrams tank.

In FY08, the Marine Corps placed two delivery orders that included unplanned quantities on the current production contract. The SMCA used the current M939 9mm Sub-Caliber Training Ammunition Production contract with ATK-Ammunition Accessories, Inc. (ATK-AAI) to quickly procure rounds of training ammunition.

### ***Program Manager for Joint Services (PM JS)***

The Project Manager for Joint Services (PM JS) integrates the Single Manager for Conventional Ammunition (SMCA) mission, providing all Services with conventional ammunition required to train and go to war. PM JS is responsible for: coordination and integration of SMCA activities, functions, processes and operations on behalf of PEO Ammo; demilitarization of DoD's conventional ammunition; execution of SMCA industrial base functions including Army Ammunition Plant modernization; providing technology solutions to improve ammunition manufacturing safety, effectiveness, quality and cost; and managing US Army ammunition logistics research and development efforts.

In FY08 the Army's liability for the demilitarization stockpile was estimated at over \$1.965 billion. Even though demil has received additional funding request increases during the FY10-15 POM decision process, additional authority beyond the current profile is required to ensure stockpile reduction.

Through the efforts of the Army G-8 office, additional funding was allocated to the Provision of Industrial Facilities (PIF) program to resource critical industrial facility projects with a steady state funding stream. The steady state funding stream scenario provides the Army with an attainable goal of leveling the PIF program funding at an affordable level across the POM period, while providing the resources necessary to initiate the highest priority industrial facility projects. This steady state balances “affordability” against reasonable “execution” goals. In support of industrial base modernization, \$184 million of GWOT supplemental funding was added to the base funding of \$161.9 million to execute projects at GOCO ammunition plants. The supplement brought total funding to \$346 million.

## **JOINT MUNITIONS COMMAND**

### ***Mission***

Under the JM&L LCMC, the Joint Munitions Command (JMC) ensured quality ammunition was wherever, whenever needed. Throughout FY08, JMC continued to supply ordinary and urgent wartime ammunition requirements for all Services. The primary mission of the JMC is to manage the production, storage, receipt/issue, inventory, transportation and demilitarization of conventional ammunition for all U.S. military services and selected non-DoD customers. The JMC is the Field Operating Activity (FOA) for the Single Manager for Conventional Ammunition (SMCA) and manages all aspects of the life cycle from procurement through demilitarization. JMC performs its mission through a production and logistics industrial base made up of 20 ammunition plants, centers, and depots and numerous commercial producers.

JMC served as the Accountable Property Officer and manager for 2.6 million tons of conventional ammunition and missiles valued at \$42 billion. In FY08 JMC obligated \$495 million in OMA funding. In addition to OMA, JMC executed \$98 million in BRAC funding, \$1.5 million in RDTE, \$563 million in FMS, and \$136 million in OMA reimbursable. Funding received from other customers and Services totaled over \$1.6 billion. JMC supported OEF/OIF with ammunition, of which, some was airlifted directly to theater. JMC accomplished demilitarization of ammunition at cost of \$155 million<sup>1</sup> and performed maintenance on stocks. JMC met 99.7% of training required delivery dates (RDDs) and 100% of mobilization RDDs, which ensured no impact to unit training for the last 48 months. These figures include joint service production and retrograde receipts, training, and operational call forward issues. In addition to annual Supply Depot Operation (SDO) funded receipts and issues, JMC separately funded Integrated Logistics Strategy (ILS) ammunition movement.

### ***Leadership and Organizational Changes***

The change of command ceremony for outgoing JMC Commander, BG James E. Rogers was held 1 August 2008. Incoming Commander COL (P) Larry Wyche accepted command on that day and was promoted to Brigadier General on 19 September 2008. Chief of Staff, Colonel Todd R. Smith retired from the military 18 June 2008 and Colonel Mark D. Klingelhofer arrived as his replacement in July.

In addition to leadership changes, BG Rogers realigned the installations into a new reporting structure effective 1 June 2008. This transformation balanced responsibility between COL 06 and LTC 05 commanders giving more oversight to the 06 colonels. It arranged the commands according to mission areas versus regional alignment. The realignment also placed installations with like missions together: Radford and Holston AAPs were placed under Pine Bluff Arsenal; Lake City AAP moved under McAlester AAP. Milan and Mississippi AAPs were aligned under Crane AAA.

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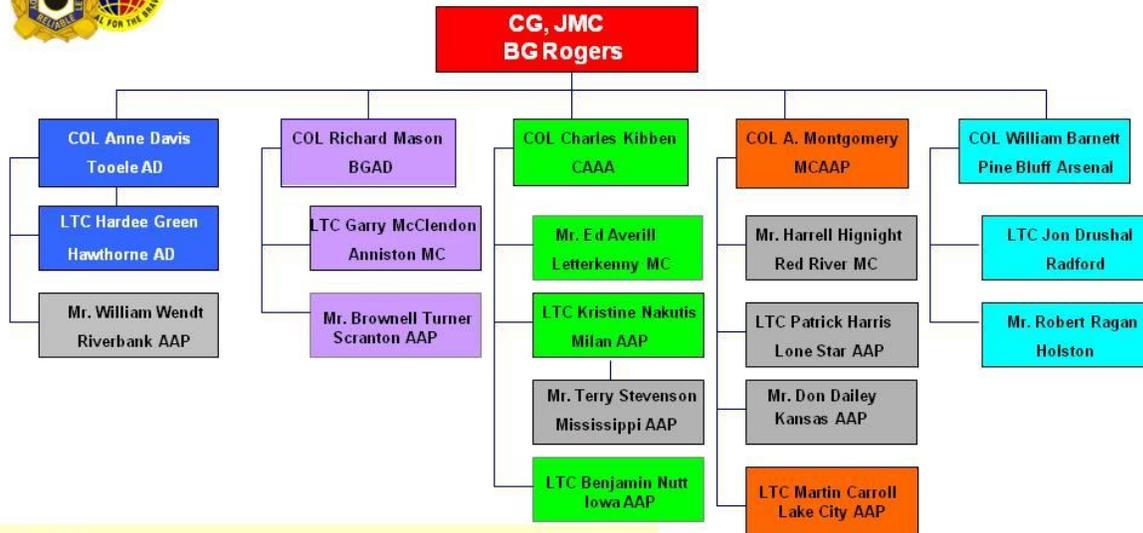
<sup>1</sup> The conventional ammunition demilitarization program received \$97 million in FY08 funding. An additional \$55M in expiring FY06 funding was added to fund the program at \$153 million for FY08. This is the most funding ever received in a single year for conventional ammunition demilitarization.



# UNCLASSIFIED

## Short to Midrange Alignment

Effective 01 Jun 2008



**Criteria:**  
 Balance responsibility  
 Retain existing Munitions Center linkages  
 Alignment by mission area takes precedence over regional alignment  
 Minimize turbulence from near-term (Jun 08) to long-term (post-BRAC)  
 Near-term move date (1 Jun 08) driven by Change of Command and NSPS considerations

BRAC Closures

**UNCLASSIFIED**

Within JMC headquarters, the Enterprise Integration Office (AMSJM-EI) was created in September 2008 to manage JMC's implementation of the Logistics Modernization Program (LMP).

### *Foreign Military Sales*

In FY08, JMC Security Assistance Office continued to support the Security Assistance and Acquisition missions that support the reconstitution of the Iraq and Afghanistan military forces. The available weapon systems for the Iraq and Afghanistan military forces are predominately from the former Soviet and Eastern European. Security Assistance is responsible for procurement of nonstandard ammunition for these weapon systems. At the end of FY08, 211 open cases were managed totaling \$14 billion in support of 51 countries. The significance of the FMS program is evident when comparing FY04 to FY08 total sales (conventional standard and non-standard ammunition); indicating an increase of over \$625 million or approximately 600%. The JMC Security Assistance Office has reported a 35% increase in FMS case dollars executed from FY07 to FY08, and much of that increase is due to the non-standard ammunition mission.

Significant hours and support were spent on a non-standard ammunition contract awarded to AEY Inc., a Miami based contractor, for supply of non-standard ammunition for the Afghanistan National Army and Afghanistan National Police forces in January 2007. The AEY contract was valued at \$298 million, of which \$154 million had been awarded. The AEY contract gained national attention on the front page of the New York Times when AEY was suspended for suspected fraudulent performance. The New York Times article resulted in the expenditure of significant resources in response to both the production of documents and witnesses for the investigation. JM&L LCMC Commanding General, William N. Phillips and Director of Army Contracting, and Defense Contract Management Agency (DCMA) testified before the US House of Representatives Oversight and Governmental Reform Committee to discuss the AEY, Inc. irregularities and the Army's application of lessons learned to improve acquisition and logistics performance.

After the hearings, Army officials announced that it had suspended its contract with AEY, Inc. for violation of the contract terms. Officials from the Army Legal Services Agency notified AEY Inc. that the company was suspended from future contracting with any U.S. government agency. JMC contract with AEY, Inc. to provide non-standard ammunition to the Afghan Security Forces was terminated due to contract irregularities. Legal action precluded immediate re-competition for the requirements until JMC was so notified. Once able to proceed, action was taken to award the contract requirements that had not been delivered to a new contractor by JMC. Award of the re-procurement requirements will continue into FY09.

### ***Low Level Radioactive Waste Executive Agent***

As the Department of Defense Executive Agent's (DODEA) representative for low-level radioactive waste (LLRW), JMC's Rad Waste Team disposed of LLRW. There were no shipment or transportation violations during the period, marking this the eighth consecutive year without a violation.

### ***Continuous Improvement***

Brigadier General James Rogers made it a priority for JMC to continue implementation and sustainment of Lean Six Sigma (LSS) and continuous improvement programs across JMC. JMC finished working with LSS consultant firm, Accenture (formerly George Group, LCC) to achieve this goal, and the support contract ended. JMC completed 166 projects (15 Black Belt, 125 Green Belt, 26 Rapid Improvement Events/Just Do Its) that resulted in savings and cost avoidance in excess of \$15.7 million over the FY. These projects improved business operations in the areas of ammunition maintenance, renovation, demilitarization, safety, washout, breakdown, production, quality, training, procurement, transportation, and force protection processes. JMC provided its first class of in house training taught by Master Black Belts (MBBs) and moved towards sustaining itself by generating belt candidates in-house and managing projects and program.

In accordance with continuous improvement and identifying process areas to apply the LSS program, it became clear that JMC lacked definitive strategic goals and objectives and a method to track and achieve them. JMC implemented the Strategic Analysis & Execution (SA&E) process to tie in to the Department of the Army (DA) strategic planning process, the Army Campaign Plan (ACP) and the Army Force Generation (ARFORGEN) process. The SA&E moved JMC to developing more meaningful, measurable strategic objectives for the command. The new system integrated SA&E objectives and metrics into the DA Strategic Management System (SMS). The SA&E focuses on immediate one year goals and future five and fifteen year projected goals. By April 2008, the installations and Defense Ammunition Center (DAC) reported their progress via SA&E measurement. In December 2008, the JMC worked with the JM&L LCMC to establish an integrated LCMC strategic path forward.

### ***Integrated Logistics Strategy***

JMC continued improving readiness, logistics management, supply, and support to theater operations. The Integrated Logistics Strategy (ILS) is a command level ammunition logistics strategy that aims to establish an optimum balance among inventory, a warm base (i.e., workload and workforce) and outload capability. To assure a disciplined measured approach, the ILS incorporates key decision-making principles in a framework that allows the JMC to continually assess the dynamic operating environment and modify strategic direction based on current and future requirements and Warfighter needs. Beginning in FY07, the command developed a Network Strategy through establishment of a new storage baseline; completion of stockpile stratification; and determining the minimum number of sties required to store the CONUS stockpile. During FY08, JMC refined the strategy for the Army, incorporated other Service/AMCOM (Aviation Missile Command) requirements and prioritized those requirements. JMC executed positioning projects at the installations totaling \$25 million and executed \$16.7 million in storage rapid improvement projects which generated additional storage space.

### ***Support to the Overseas Contingency Operations***

JMC continued to support the Warfighter by filling requisitions for overseas contingency operations (OCO). High-demand 30mm M789 HEDP rounds were airlifted directly from production to theater. Increased expenditure of the M789 rounds also required monthly airlift of new production to SWA from November 2007 through September 2008. Alliant Tech Systems, Inc. (ATK) and General Dynamics Ordnance and Tactical Systems

(GDOTS) continued to be the primary producers of medium caliber ammunition for the U. S. Government. Over \$246 million for procurements resulted in the award of 14 different contracts (9 to ATK and 5 to GDOTS).

In FY08, JMC led the stand up and operation of a SWA Ammunition Assessment Team to address RESET planning. The team assessed the ammunition maintained at the using unit level, identified packing requirements to support RESET/retrograde of units' basic loads, provided guidance to units for proper ammunition storage, answered units concerns on all Class V matters, and identified CAT I serial numbers for accountability. The team identified packaging required to get unit ammunition back to a serviceable condition before stocks went through relief in place/transfer of authority (RIP/TOA) or return to supply points, minimizing the unnecessary loss of otherwise serviceable ammunition.

Since the beginning of OIF/OEF, the JMC Quality Directorate has consistently deployed 50% of its workforce to theater to provide the following capabilities: Senior QASAS, Multi-National Corps-Iraq; perform assessments of ammunition at forward operating bases (FOBs) in Iraq; surveillance/logistics functions for the Army Field Support Brigade-Iraq and Afghanistan at the Ammunition Supply Points (ASPs); and serve as representatives at the Coalition Munitions Clearance sites throughout Iraq to ensure explosive safety procedures are maintained. In FY08 LAR deployments were filled to increase support to the Warfighter.

### ***JMC Ammunition Industrial Base***

JMC managed operations at 13 ammunition plants, 3 munitions center, 3 ammunition storage depots, and the Defense Ammunition Center in FY08. The ammunition installations focused on supporting regular mission and wartime requirements. Each plant has provided detailed reports in individual annual historical summaries in this report. The following section highlights their accomplishments and challenges.

#### ***Defense Ammunition Center (DAC)***

The Defense Ammunition Center (DAC) provided a strong presence in the support of OEF/OIF by deploying personnel with expertise and training in Quality Assurance Specialist (Ammunition Surveillance) (QASAS) ammunition management, explosives safety and other needed fields. DAC experts answered over 600 AmmoHelp questions and with provided over 16,000 copies of the newly revised "Hazard Classification of United States Military Explosives and Munitions" or "The Yellow Book," to the ammunition community.

DAC was responsible for the fielding of two Desert Optimized Equipment (DOE) Suites were fielded in August 2008. The DOE Suite is a transportable, self-contained, multi-use system consisting of modular workshop containers, power container (generator and compressor), and equipment and tools for fielding to SWA to provide work areas to support ammunition turn-in, inspection, surveillance, incidental maintenance, re-issue or retrograde at poorly facilitated locations or forward areas. Fabrication of a third DOE Suite was initiated, with fielding targeted for spring 2009

DAC continued Ammunition Peculiar Equipment (APE) program support of the Automated Tactical Ammunition Classification System (ATACS). The satellite communication system continues to demonstrate its value through remote monitoring, diagnostics, updates and recommended solutions to the field operating staff. During FY08 the M1 version of the ATACS was received, incorporating product improvements suggested by the customers. The M1 version is currently undergoing validation testing. An additional upgrade to the ATACS includes head stamp recognition to reject non-authorized ammunition manufacturers. The DAC ATACS team was recognized as nominees to the AMC Outstanding Integrated Products/Weapon System of the Year competition.

#### ***Tooele Army Depot (TEAD)***

Tooele Army Depot (TEAD) shipped and received containers to SWA in support of OEF/OIF. TEAD demilitarized conventional ammunition. Despite a very lean year for depot workload, TEAD ended FY08 \$35.5 million in excess of plan in new orders, \$7.5 million in excess of plan in revenue, \$2.4 million in excess of plan in depot expenses and had better than planned for net operating results (NOR) by \$5.2 million. TEAD employees worked on 118 Lean Six Sigma projects, which resulted in \$812K savings.

TEAD and Dyno Nobel have teamed together in the recycling of propellants generated from disassembly operations of 20mm projectiles and 152 mm propellant charges. Other partnerships include fabrication of fixture kits and sets in support of Corpus Christi Army Depot's (CCAD) Apache helicopter program. Tooele directly supported the Warfighter by producing add-on-armor kits for the M939 cargo truck and counter weight bumper kits for the M1078 2-1/2 ton cab-over truck.

#### *Hawthorne Army Depot (HWAD)*

Hawthorne Army Depot (HWAD) shipped and received ammunition. HWAD seeks to expand its demilitarization program and looked for ways to enhance the capabilities of the Western Area Demilitarization Facility (WADF). Specifically, efforts began on the operation of the Plasma Ordnance Disposal System (PODS), Bulk Energetics Disposal System (BEDS) and upgrade of the rotary incinerator in the WADF. Over the year, 14 buildings were renovated for the storage of elemental mercury. A variety of military units that were mobilized for deployment to Iraq or Afghanistan, trained at Hawthorne.

#### *Blue Grass Army Depot (BGAD)*

Workload greatly increased at Blue Grass Army Depot (BGAD) during FY08. Blue Grass shipped and received tons of ammunition. BGAD demilitarized ammunition and explosives and performed various maintenance operations. The Chemical Defense Equipment (CDE) Division processed and shipped Material Release Orders (MROs) in support of sustainment and contingency operations. Of these, the CDE team filled Go-To-War requests supporting Soldiers for OEF/OIF.

In October 2007, Tank-Automotive Armaments Command (TACOM) awarded BGAD a substantial and important element of the Mine Resistant Ambush Protected (MRAP) effort, including a financial investment of more than \$30 million to upgrade facilities and purchase state-of-the-art laser and water jet cutting equipment. Mid-FY08, BGAD began cutting and producing armor components for MRAP vehicles, Gunner Protection Kits, Stryker Kits, and more. BGAD support to the critical MRAP mission included the assembly and shipping of kits to theater.

Construction of the BGAD Chemical Demil Facility had funding starts and stops as cost overruns dictated a DoD review of cost. Award of a design build contract was announced for the Joint Reserve Training Center and Field Maintenance Shop in September 2007. The \$18.5 million dollar facility was directed by BRAC and is being managed by the Commonwealth of Kentucky Adjutant General's Office.

#### *Anniston Defense Munitions Center (ADMC)*

Anniston Defense Munitions Center (ADMC) achieved ISO:9001 certification in May 2008. Anniston shipped and received ammunition. ADMC completed the markings of TOW missiles, minor maintenance on Hellfire missiles, and demilitarized M15 land mines via open detonation. Anniston's Missile Recycling Center (MRC) processed TOW missiles, recycled scrap metal, and returned components back to the manufacturer for use in the production of new missiles. Anniston also ran a successful pilot program to perform minor maintenance on MILVANS (containers).

#### *Scranton Army Ammunition Plant (SCAAP)*

In FY08, SCAAP received \$26.2 million in production base support (PBS) projects compared to \$5.2 million in FY07. A majority of the funding is being used to fund projects involving SCAAP's forging capabilities.

#### *Crane Army Ammunition Activity (CAAA)*

Crane Army Ammunition Activity (CAAA) shipped various ammunition items in direct support of OEF/OIF. Crane continued production of mortar and artillery candles and production rates hit a modern day record total of illuminating candles for the year. CAAA also completed renovation of MJU 32A/B and 38A/B countermeasure flares to support critical wartime requirements. Additional units will be renovated to serviceable status in 2009. Crane continued production of decoy flares, the Knights Wand, Falcon and Maple Leaf. CAAA

will complete workload and be the U.S. producer of melt/pour M54A1 burster tubes for the M485 WP (white phosphorus) projectile load in FY09.

#### *Letterkenny Munitions Center (LEMC)*

Letterkenny Munitions Center (LEMC) shipped and received ammunition in FY08. LEMC completed demilitarization for fuzes, mines, and missiles. Letterkenny finished renovation projects of the Air Force and Navy HARM missiles. Additional workload included inspection and renovation for Joint Air-to-Surface Standoff Missile (JASSM), Tactical Air Launched Decoy (TALD)/Improved Tactical Launched Decoy (ITALD), AIM Sidewinders, AIM Sparrows, and Army Tactical Missile System (ATACMS)/Guided Multiple Launch Rocket (GMLRS).

#### *Milan Army Ammunition Plant (MLAAP)*

Milan Army Ammunition Plant (MLAAP) continued production of 40mm and increased production for 60mm mortar and mortar components. MLAAP added Spider grenade production to its mission and prototype production runs resulted in final product development and shipment for testing and acceptance. Shipments to the field will occur in early FY09. Production of 40mm was steady, however, fuze receipts caused production slowdowns during portions of production. Milan produced high velocity 40mm rounds, low velocity M433 40mm rounds, propelling charges, M888 60MM mortar rounds and additional items not listed. The Milan plant operations and maintenance contract competition was ongoing throughout the year. The new contract was awarded to American Ordnance, LLC with a base period of ten years, with three options of five years each, for a total potential period of 25 years. Based on cost data and investigation of alternatives developed by American Ordnance, JMC finalized business case analyses on decisions for relocation of ICM Artillery, MLRS, mortar, and M67 grenade functions to MLAAP.

#### *Iowa Army Ammunition Plant (IAAAP)*

Iowa Army Ammunition Plant (IAAAP) continued to be the U.S. producer of 120mm tank training cartridges and continues to maintain the production capability to load, assemble, and pack (LAP) the entire family of 120mm cartridges. Iowa remained the U.S. producer of the 155mm M107 high explosive projectiles and one of two producers of the 155mm M795 high explosive projectiles. The Modular Artillery Charge System (MACS) continued to meet production goals. A renovation program was continued to return unserviceable 120mm M830 high explosive cartridges to a serviceable status. Limited production of Javelin K-Charge, Sidewinder, and XM982 Excalibur missile warheads continued as programmed. American Ordnance, LLC (AO) won the IAAAP operations and maintenance contract with a base period of ten years, with three options of five years each, for a total potential performance period of 25 years. The Iowa AAP Installation Restoration Program won first runner up for the FY07 Secretary of the Army Environmental Award for Environmental Restoration, Team/Individual category.

#### *McAlester Army Ammunition Plant (MCAAP)*

McAlester Army Ammunition Plant (MCAAP) produced inert and live-loaded bombs, renovated rounds of various munitions, recovered energetics, and demilitarized rounds of various munitions. In FY08, MCAAP completed an urgent order by the Air Force for BLU-126 general purpose, high explosive, low collateral bombs. MCAAP also successfully transitioned the Sensor Fuzed Weapon (SFW) production process from Kansas Army Ammunition Plant (KSAAP) to the site and a new Wood Fabrication Facility was completed at the installation.

#### *Lake City Army Ammunition Plant (LCAAP)*

Lake City Army Ammunition Plant (LCAAP) manufactures and delivers 5.56mm, 7.62mm, and .50 caliber small caliber ammunition to our armed forces. After a period of buying .30 caliber blank cartridges from a foreign manufacturer, the ATK started up a production capability at Lake City. Mid-year, a major quality/delivery issue arose when a wire bound crate manufacturer had discontinued required Wood Packaging Markings (WPM). Acceptance and shipment of products was halted until corrective action could be taken to assure the required markings were applied to all wood packages. LCAAP continued modernization projects funded at \$70.5 million. Collaborative efforts amongst JMC, ARDEC and PM MAS structured the government's position for the LCAAP

small caliber ammunition contract extension with Alliant Techsystems, Inc. (ATK) and a four year contract extension was negotiated.

#### *Pine Bluff Arsenal (PBA)*

Operational controls of industrial activities at Pine Bluff Arsenal (PBA) were transferred from the U.S. Army Chemical Materials Agency (CMA) to JMC officially on 1 Oct 2008. In FY08 Pine Bluff successfully implemented an ISO 14001:2004 Environmental Management System (EMS). Over the year, PBA received the AMC Force Protection Award, destroyed the last VX mine, and began a new housing project. PBA produced rounds of illuminating, infrared and smoke munitions and completed white phosphorus fill of munitions. PBA performed maintenance on National Biological Chemical Defense (NBCD) items.

#### *Radford Army Ammunition Plant (RFAAP)*

Radford Army Ammunition Plant (RFAAP) continued to produce propellants, energetics and munitions for our Nation while the Army focused on how to modernize the plant. A primary focus for Radford was the planning and execution of modernization projects worth over \$229 million. Integrated Product Teams (IPT) concentrated on modernizing the Powerhouse, Nitric Acid Concentrator/Sulfuric Acid Concentrator (NAC/SAC) and Nitrocellulose (NC) production capabilities. The design of a gas-fired steam plant was completed, providing a potential replacement for the aging coal-fired, co-generation plant. The initial design phase for the replacement of a 28 year old Nitric Acid Concentrator/ Sulfuric Acid Concentrator (NAC/SAC) was completed. Significant improvements were made to the reliability and efficiency of the powerhouse to keep it operational for the next decade. Finally, studies began to increase the quality and efficiency of the nitrocellulose production and for improvements to the solvent recovery system. Radford and its operating contractor Alliant Techsystems (ATK) received the Small Group Secretary of the Army Energy and Water Management Award in the Efficiency/Energy Management category at the Army's 30th Annual Secretary of the Army Energy and Water Management Awards at the GovEnergy Conference in August 2008.

#### *Holston Army Ammunition Plant (HSAAP)*

Holston Army Ammunition Plant (HSAAP) is the production scale manufacturer of RDX and HMX based explosives in the United States. In FY08, Holston continued development of new insensitive munitions such as PAX-21, Air Force products (CXM-AF), and BAE Systems Ordnance Systems, Inc. (OSI) products (OSX). OSI successfully produced High Bulk Density Nitroguanidine, IMX-101, PAX-2A, and other products on a large scale. Large-scale manufacture of DNAN (a new explosive to support PAX-21 and other insensitive munitions (IM) melt-cast explosives provided challenges in processing and handling of DNAN wastewater. Issues were resolved by use of a neutralization step. IM artillery formulation IMX-101 was selected as the top candidate for use as the fill for the M795 artillery program. The formulation passed all of the IM tests required for new IM compliant explosives, including being the first to successfully pass the Shaped Charge Jet Impact Test with the 81mm projectile. The Tennessee Army National Guard and US Army Reserve began plans to construct a new Armed Forces Reserve Center (AFRC) on Holston property in accordance with BRAC 2005 mandates.

#### *BRAC Installations*

Lone Star AAP, Kansas AAP, Riverbank AAP, Mississippi AAP, and the Red River Munitions Center (RRMC) were in process of ending missions and slated for closure. The JMC BRAC transition team conducted planning and execution strategies for the impending moves of operations at closing installations: cartridge case production from Riverbank AAP to Rock Island Arsenal; Sensor Fuzed Weapon (SFW) production from Kansas AAP to McAlester AAP; and detonator production from Lone Star AAP to Iowa AAP. Mississippi AAP and the Red River Munitions Center prepared for mission closure and transfer of land to the local reuse authorities. JMC is postured to reach milestones for realignment and closures through 2011.

### **ARMAMENT RESEARCH DEVELOPMENT AND ENGINEERING CENTER**

The United States Army Armament Research, Development, and Engineering Center (ARDEC) conducted or managed research, development, and life cycle engineering in support of items in production and integrated

logistics support for assigned armament and munitions systems and materiel. ARDEC also procured and managed initial production quantities and provided technical support to Soldiers and equipment in the field. ARDEC maintained a technology base to facilitate the design, development, procurement, production, and life cycle support of assigned materiel or transitioned technologies. ARDEC director, Dr. Joseph Lannon maintained responsibility for all the center's activities as an organization under the U.S. Army Research, Development, and Engineering Command (RDECOM).

ARDEC examined capability gaps that exist in ammunition, IED defeat, bombs and other areas to see what next generation weapons and capabilities are needed to defeat our enemies in the next 2-15 years. PEO Ammo worked closely with ARDEC to transition new technologies into acquisition programs to get new technology produced, tested and fielded. Together the two entities work to shorten lead times, procurement, and production timelines. Once a system is developed, acquired, and fielded, JMC provided the readiness and logistics support to sustain the capability.

Total ARDEC funding for FY08 was approximately \$841 million. Research, development, test, and evaluation (RDTE) direct funding was funded at \$244 million. ARDEC obligated \$54 million in OMA funding and \$7 million of Army Working Capital Fund (AWCF) funds. Other reimbursable funding from DoD totaled \$72 million, of which \$69 million was obligated. Validated Value Engineering (VE) savings credited to ARDEC totaled \$19 million. The largest savings of \$6 million came from work on tank cartridges, followed by \$5 million saved by changes to containers for 155mm M982 projectiles. ARDEC supported current operations through the push of eight items to full materiel releases during FY08 and conditional materiel releases for two more. ARDEC also arranged 13 urgent materiel releases (UMRs), of which 12 received approvals in under 180 days.

ARDEC continued receiving awards for innovation and commitment to excellence. On 23 April 2008, the Secretary of Commerce presented ARDEC with the Malcolm Baldrige National Quality Award at a ceremony in Washington DC, making ARDEC the first DoD organization to receive the award. In October 2007, the NDIA Annual System Engineering Conference recognized the Excalibur effort as one of DoD's top five programs for 2006. It particularly noted the role of ARDEC's fire control system in meeting the Army's urgent need for Guided Positioning Systems GPS-guided projectiles. ARDEC's M115A2 and M116A1 Perchlorate Free Pyrotechnic Simulators Team won the 2007 Army Environmental Excellence in Weapons Acquisition Award. The award recognized a four year effort to eliminate toxic pollutants from the energetic formulations used in battlefield effects simulators. ARDEC was also chosen for the DA Research and Developmental Lab of the Year Award for a Large Development Laboratory. They also received the DA Research and Developmental Lab of the Year Collaboration Award for HMMWV Improvement Program.

Four ARDEC development teams received Army Top Ten Greatest Invention Awards for 2007 on 12 June 2008. The inventions were the objective gunner's protection kit, XM982 Excalibur projectile, the M110 SASS, and the Picatinny blast shield for the lightweight armor vehicle (LAV). Army Research and Development Team Achievement Awards for development of RKG Simulators, the 1st Army Explosive Formulation to Pass all IM Tests, XM982 Excalibur, High Tension Wrapping of Thermoplastic Composite Structures, XM19 & XM32 Abrams Reactive Armor, enabling technologies for muzzle brakes, Optical Sighting Systems and the Rattlesnake was also earned in FY08. Four ARDEC researchers and scientists from Brooklyn Polytechnic University shared the Lou Zernow Best Paper award given at the 24<sup>th</sup> International Ballistics Symposium held in September 2008. The award was for the paper which made the most significant contribution to the advancement of fundamental understanding in ballistic science. The winner, chosen from over 150 submissions, was on the combined effects of aluminized explosives.

ARDEC's projects and accomplishments are extensive. This summary will touch briefly on some of the programs that relate specifically to ammunition, although it is noted that the armament mission performed at ARDEC is as critical to the performance of newly developed technologies and munitions. For a more extensive view of ARDEC missions, see their complete historical report in Part II.

### ***Ammunition Plant Improvements***

In February 2008, ARDEC evaluated the Kansas AAP prototype flexible, single-cell HE injection loading unit as the unit poured TNT into 155mm M795 artillery projectiles and PAX-21 into 60mm mortar rounds. Results

indicated the prototype delivered consistent quantities of molten explosive, was easily programmable, and required little change over time. At Lake City AAP, ARDEC and Alliant TechSystems (ATK) conducted a failure mode and effect analysis (FMEA) on the high speed small caliber loading and assembling line, which resulted in electrical and control upgrades to the production line.

### ***Production and Field Support - Support to OEF/OIF***

ARDEC continued supplying urgent material requests for SPARK and SPARK mine roller extension kits. ARDEC also released the XM152 Portable Excalibur Fire Control Systems (PEFCS) in January 2008, which allows Paladin gunners to fire the Excalibur projectile. To accomplish release, the Automated Test Systems Division accelerated the schedule for release of the software downloader to field the item ahead of schedule. The 155mm XM982 Excalibur projectile was also released as a follow-on urgent materiel release in support of OEF. The Excalibur Program Office estimated troops in Iraq have fired Excalibur rounds between May 2007 and the end of FY08.

FY08 ARDEC safety assessment reports supported the safety release of the fire marker unit pyrotechnics dispenser which operated with the M30 and M31A1 pyrotechnic cartridges as an IED trainer for CENTCOM troops.

The contractor, QESAD, developed the ammunition stockpile reliability program for the M211 IR decoy flare and delivered for approval in August 2008. This plan established initial shelf life and certification of storage period requirements and was necessary to continuing urgent materiel release of the M211 to OEF/OIF.

ARDEC efforts resulted in the production of several insensitive munitions explosives like Picatinny Arsenal Explosive - PAX-41. Successful completion of a manufacturing DOE led to PAX-41 transitioning to production size quantities and demonstrating sound manufacturing readiness level (MRL).

### **SUMMARY**

As the Nation continued to support contingency operations in Iraq and Afghanistan the JM&L LCMC enterprise improved the life cycle process to provide lethal, cost effective and reliable munitions to all Services and Warfighters now and for the future. Ammunition leaders embraced the LCMC implementation and started planning for the future of munitions using tools like Lean Six Sigma and the Strategic Analysis and Execution (SA&E) matrix. Modernization of processes and facilities began at critical single point failure production sites like Radford and Lake City AAPs. The PEO Ammo addressed funding shortfalls for conventional ammunition products, industrial base, modernization, demilitarization and manpower as it planned future budget POMs. JMC ammunition installations and depots provided constant support to production, maintenance, shipping, and receiving operations in support of current operations. Many employees from the organizations deployed to support and solve ammunition issues in the field. ARDEC continued its path of excellence as it improved and invented munitions and armaments relevant for current and future operations. Each JM&L LCMC organization describes challenges and accomplishments individually within the body of this report.