ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2008

BUDGET ACTIVITY	PE NUMBER AND TITLE
6 - Management support	**0605805A - Munitions Standardization, Effectiveness and Safety**

	COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
	Total Program Element (PE) Cost	36145	40947	20857	21146	22023	23078	23599
296	PYROTECHNIC RELIABILITY & SAFETY	877	1111	1141	1184	1191	1291	1491
297	Mun Survivability & Log	4894	5012	5857	5863	5653	5522	5601
857	DOD EXPLOSIVES SAFETY STANDARDS	1480	1578	1648	1691	1932	2269	2310
858	ARMY EXPLOSIVES SAFETY MANAGEMENT PROGRAM	431	398	464	476	489	500	511
859	LIFE CYCLE PILOT PROCESS	18750	22745	3745	3800	3953	4019	4076
862	FUZE TECHNOLOGY INTEGRATION	1997	2125	2181	2225	2269	2313	2354
F21	NATO SMALL ARMS EVAL	981	1000	1019	1041	1052	1049	1049
F24	CONVENTION AMMO DEMIL	6735	6978	4802	4866	5484	6115	6207

A. Mission Description and Budget Item Justification: This Program Element supports continuing technology investigations. It provides a coordinated tri-service mechanism for the collection and free exchange of technical data on the performance and effectiveness of all non-nuclear conventional munitions and weapons systems in a realistic operational environment. It provides for NATO interchangeability testing (F21); Joint munition effectiveness manuals used by all services; development of standardization agreements (STANAGS) and associated Manuals of Proof and Inspection (MOPI); operation of the North American Regional Test Center (NARTC); evaluation of demilitarization methods for existing conventional ammunition (F24); evaluation of useful shelf life, safety, reliability and producibility of pyrotechnic munitions; and improvement of explosives safety criteria for DOD munitions via the DOD Explosives Safety Board (857). Pyrotechnic Reliability and Safety (296) supports pyrotechnic research, development and testing to identify, characterize and resolve reliability, safety, storage and manufacturing issues that impact production availability and field use of pyrotechnics. Project 296 will result in the development and demonstration of new, safe, reliable and environmentally acceptable munitions. Munitions Survivability and Logistics (297) will make Army units more survivable by applying technologies to reduce the sensitivity of munitions to unplanned stimuli (e.g. bullet impacts, fragment impacts, fast cook off, slow cook off, sympathetic detonation, shaped charge jets) and by testing and demonstrating munitions logistics system solutions that prevent or minimize catastrophic explosive events and accelerate ammunition resupply. Project 297 also supports the Army Insensitive Munitions (IM) Board's reviews. The Army Explosives Safety Management Program (858) was established in FY01. The U.S. Army Technical Center for Explosives Safety uses the funds in this project to evaluate current explosives safety standards and develop new, scientific and risk-based standards to meet U. S. Army explosives requirements. The Life Cycle Pilot Program (LCPP) (859) will assess production base capabilities and needs over the acquisition life cycle of various munitions and will address the producibility of ammunition including the transition to type classification and production, and the ability of the production base to cost effectively produce quality products on schedule. The Fuze Technology Integration program (862) will improve performance and lower the costs of existing proximity fuzes and enable new applications in submunitions and medium caliber fuzes, addressing advanced proximity fuze sensor technology, Micro-electromechanical Systems (MEMS), Safety and Arming (S&A) technology, and Electronic S&A (ESA) technology for smart munitions.

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B. Program Change Summary	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2008/2009)	36914	19606	20992
Current BES/President's Budget (FY 2009)	36145	40947	20857
Total Adjustments	-769	21341	-135
Congressional Program Reductions		-259	
Congressional Rescissions			
Congressional Increases		21600	
Reprogrammings	271		
SBIR/STTR Transfer	-1040		
Adjustments to Budget Years			-135

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605805A - Munitions Standardization, Effectiveness and Safety**	**296**

COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
296 PYROTECHNIC RELIABILITY & SAFETY	877	1111	1141	1184	1191	1291	1491

A. Mission Description and Budget Item Justification: This project will support pyrotechnic research, development and testing to identify, characterize and resolve reliability, safety, storage and manufacturing issues that impact production availability and field use of pyrotechnics, including training realism. Project will result in the development and demonstration of new, safe, reliable and environmentally acceptable munitions.

Accomplishments/Planned Program:	FY 2007	FY 2008	FY 2009
Mitigation of Perchlorates	294	360	
Service Life Studies	131		
Heavy Metal in Green Illuninants	307	295	175
Fragmentation Studies	145	155	
Nanoparticles for Pyro Items		270	380
Safer, More stable items			280
Multifunction Pyro Simulators			306
Small Business Innovative Research/Small Business Technology Transfer Programs		31	
Total	877	1111	1141

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605805A - Munitions Standardization, Effectiveness and Safety**	**297**

COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
297 Mun Survivability & Log	4894	5012	5857	5863	5653	5522	5601

A. Mission Description and Budget Item Justification: This project supports the Army Transformation by making Army units more survivable through the investigation, testing and demonstration of munitions logistics system improvements that prevent or minimize catastrophic explosive events and accelerate ammunition resupply. Key thrusts are munitions storage area survivability, insensitive munitions (IM) technology integration and compliance, weapon system rearm, munitions configured load enablers and advanced packaging and distribution system enhancements. Within each thrust, a broad array of solutions will be identified, tested, and evaluated against developed system measures of effectiveness. Optimum, cost effective solutions that enable the rapid projection of lethal and survivable forces will be demonstrated. The early stages of force deployment are especially critical. Theater ammunition storage areas are vulnerable and present the enemy with lucrative targets. These areas and distribution nodes contain the only available munitions stocks in theater. Loss of these munitions could cripple the force, jeopardize the mission, and result in high loss of life. This project mitigates vulnerabilities and ensures a survivable fighting force.

Accomplishments/Planned Program:	FY 2007	FY 2008	FY 2009
Developed scoring patterns and techniques for cylindrical and rectangular metal munitions packaging that will create a venting system during propellant burning to reduce internal pressures and minimize explosive reactions.	345		
Demonstrated a less sensitive high-performance, melt-castable explosive to replace Composition B explosive in mortars and other warheads for reduced sensitivity to unplanned stimuli.	500		
Demonstrate new IM explosives formulated from new less sensitive basic explosive ingredients and binders to meet the most difficult threats (sympathetic detonation and shaped charge jet impact).		1334	1800
Conduct reviews of munitions in development and production to determine if they meet a DoD 5000.1 requirement to withstand unplanned stimuli, manage technology integration efforts to meet the requirement, develop improved IM test capability, update and maintain IM compliance status database, the IM waiver process for the Army, and the PEO Ammunition IM Strategic Plan.	788	1165	1238
Developed and demonstrated standard test equipment and procedures to evaluate and down-select IM explosive candidates based on sensitivity to bullet and fragment imapcts and sympathetic detonation. This will ensure that generic Fragment Impact, Bullet Impact, Sympathetic Detonation, and Cook-off tests standardize rankings for new candidate IM explosives in a way consistent with their application in actual munitions.	556		
Reduced the sensitivity of Comp B explosive by modifying the formulation with a new wax binder. Successful implementation of this program will provide incremental IM improvements for large High Explosive filled munitions and achieve significant cost savings by using the Comp B for the ammunition stockpile.	297		
Demonstrate a new generation of IM booster material for a new family of IM explosives which cannot be initiated with a currently available booster.	376	570	800
Evaluate powder coating alternatives for painting ammunition/munitions containers to reduce hazardous waste and eliminate costly	253		

Volatile Organic Chemical (VOC) management associated with paints while insuring NBC survivability.			
Evaluated and developed recommendations for alternative materials and methods for strapping ammunition loads to pallets at load plants, depots, contractor facilities and in field operations.	64		
Investigate alternatives to both natural and processed wood ammunition packaging pallets and boxes that provide a cost effective, environmentally and phyto-sanitary compliant packing and unitization option.	109	100	
Design and demonstrate a tank ammunition container sized to be compatible with the Joint Modular Intermodal Container (JMIC) footprint in order to demonstrate rapid and seamless delivery of tank ammunition configured loads to the warfighter.	88	90	
Investigate and test alternative methods (blankets, coatings, dunnage) to achieve reductions in solar loading on ammunition packaging.			110
Investigate and evaluate commercially available and modified resealable barrier bags that will reduce life-cycle costs for many demolition items that undergo repacking multiple times during their expected shelf life.			100
Investigate and test alternative consolidation methods for small 60/81/120mm mortar and other similar systems. This will potentially eliminate packaging layers and cost, and enhance accessibility.			100
Investigate, develop, and test combination structures of various materials to lighten and enhance performance of munitions packaging. Insert molding, adhesive bonding, composite fabrication techniques will all be leveraged. Applicable to all ammunition items.			190
Evaluate alternatives to Polyethylene-laminated (PolyLam) paper material which is used in the construction of fiber container inserts in ammunition packaging. Identification of alternative materials will help to reduce fiber insert costs and ensure availability of inserts for ammunition production.		90	
Develop an injection blow molded container for training ammunition that is less expensive and more weather resistant than current fiberboard packaging.		198	
Demonstrate standard sized inter-modal shipping modules for ammunition. The modules will interlock with each other, top to bottom, and cargo platforms to form a stable, palletized, mixed-supply class configured load. They are automation friendly and rapidly re-configurable to meet changing user needs.	1518	500	519
Upgrade the ammunition Configured Load Building Tool to be able to operate it as a web based application. This would facilitate ease of use, reduce setup time for new users, and increase speed and efficiency in building configured ammunition loads for unit deployments.		250	150
Increase ammunition logistics system responsiveness by demonstrating Information Technology enhancements and identifying changes in ammunition business practices needed to improve accountability from the depot to the tactical user in the field.		175	50
Develop Munitions Survivability Software (MSS) improvements to include incorporating a government off the shelf mapping capability that will facilitate field use of this explosives safety storage planning software tool.		250	300
Design and develop an International Standards Organization-container based capability to retrograde ammo returned from deployed combat units. The system will include the capability to inspect, reconfigure and recertify ammunition for Future Combat System in ready to fire configuration at the weapon systems.		150	500
Small Business Innovative Research/Small Business Technology Transfer Programs		140	
Total	4894	5012	5857

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605805A - Munitions Standardization, Effectiveness and Safety**	**857**

COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
857 DOD EXPLOSIVES SAFETY STANDARDS	1480	1578	1648	1691	1932	2269	2310

A. Mission Description and Budget Item Justification: This program supports the Research, Development, Test, and Evaluation efforts of the DoD Explosive Safety Standards Board. It supports explosive safety effects research and testing to quantify hazards and to develop techniques to mitigate those hazards in all DoD manufacturing, testing, transportation, maintenance, storage, disposal of ammunition and explosives operations, and also to develop risk based explosives safety standards. Results are essential to the development and improvement of quantity-distance standards, hazard classification procedures, cost effective explosion-resistant facility design procedures, and personnel hazard/protection criteria.

Accomplishments/Planned Program:	FY 2007	FY 2008	FY 2009
Develop improved tri-service design procedures and improved computer codes for explosion-resistant structures. Initiate preparation of revised tri-service manual TM-51300.	255	279	314
Collect and analyze airblast/fragment/thermal data for revising DoD, NATO hazard classification.	234	245	246
Develop improved explosives and munitions tests and characterization data. Specifically, develop improved gap tests for rocket motors.	312	275	330
Develop improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepared revised Dod 6055.9-STD and 4145.26M.	215	252	223
Conduct other hazards analyses and expand/automate explosives safety databases. Develop improved Explosives Safety Mishap Analysis Module with links to accident reports.	258	275	261
Develop and improve risk based analysis tools for explosives safety. Develop sequence of operations prototype.	206	208	274
Small Business Innovative Research/Small Business Technology Transfer Programs		44	
Total	1480	1578	1648

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February 2008

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605805A - Munitions Standardization, Effectiveness and Safety**	**859**

COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
859 LIFE CYCLE PILOT PROCESS	18750	22745	3745	3800	3953	4019	4076

A. Mission Description and Budget Item Justification: This project supports the implementation of the Single Manager for Conventional Ammunition (SMCA) Industrial Base Strategic Plan through technology investigations, model based process controls, pilot prototyping, and industrial assessments. It will assess life cycle production capabilities required for all ammunition families, address design for manufacturability to facilitate economical production, identify industrial and technology requirements, and address the ability of the production base to rapidly and cost effectively produce quality products. Cost Reduction is an important part of the Life Cycle Pilot Process (LCPP). LCPP provides the resources to prototype critical technologies and develop the knowledge base to establish cost-effective, environmentally safe and modern production processes in support of the Munitions Industrial Base transformation.

Accomplishments/Planned Program:	FY 2007	FY 2008	FY 2009
Continue ongoing technology investigations. Developed concept designs and plans to transfer life cycle pilot process technology into the supplier base.	1441	1476	1543
Performed numerous production base readiness assessments to analyze present capabilities and identify trends in munitions and industrial technology. Identified over 700 single points of failure in the supplier base and began assessment of mitigation plans.	882	727	762
Develop "pilot" prototype processes for critical ammunition end items and components necessary to establish quality, affordable, and environmentally safe production.	2041	1374	1440
Established framework and operations for the NJ Nanotechnology and Micro-Electromechanical Systems (MEMS) Consortium in support of ammunition production modernization.	3888		
Continued development a new x-ray inspection system for munitions using a Cadmium Zinc Telluride (CZT) detector for automated munitions inspections and surveillance. Increased processing knowledge of CZT detector material.	972		
Continued development of processes to eliminate safety concerns and achieve net-shape manufacturing of advanced cluster energetic materials by developing novel coating and handling processes to support Insensitive Munitions (IM) explosive fill and transfer those processes to the supplier base. Developed advanced coating technology and began transfer of process technology to the explosive manufacturing Industrial Base.	3888	4826	
Establish commercial partnership with ARDEC's Center for Manufacturing Science for the prototyping process and capturing production knowledge in the arena of forged and drawn metal parts. Established framework for integrated data environment for sharing of manufacturing science.	1944	2317	
Investigated pilot processes for Single Point Failure mitigation and performed technology assessments in support of pilot scale prototyping of critical energetic ingredients and components for munition items.	2722		
Establish a focal point with the Defense Materials Technology Center to investigate innovative technology to support the needs of the munitions industrial base in metals manufacture.	972	1930	

Establish a focal point for polymer technology to investigate innovative polymer based components and manufacturing processes related to polymer based components for munition applications.		965	
Develop a pilot scale process for production of atomized magnesium within the National Technology and Industrial Base (NTIB).		965	
Develop and transition flexible manufacturing and inspection processes for thermal batteries used in munition items.		2799	
Develop technology for the sensing of depleted uranium munitions residues and investigate technologies for their management and removal.		4730	
Small Business Innovative Research / Small Business Technology Transfer Programs		636	
Total	18750	22745	3745

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605805A - Munitions Standardization, Effectiveness and Safety**	**862**

COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
862 FUZE TECHNOLOGY INTEGRATION	1997	2125	2181	2225	2269	2313	2354

A. Mission Description and Budget Item Justification: This program investigates maturing technologies and seeks potential candidates for integration on current fuzing and safe and arm devices. This program will implement these technologies into fuzing systems to preclude obsolescence and enhance performance of existing munitions. The program addresses two major areas: (1) risk mitigation and (2) block upgrades. The first area is risk mitigation, which will evaluate a second source Monolithic Microwave Integrated Circuit (MMIC) for artillery and mortar fuzes and a second source high G survivable tuning crystal for mortar fuzes. Risk mitigation efforts will evaluate and demonstrate second sources for fuzing systems that may reduce cost by providing competition, and maintain production when sources or parts are no longer available. It will also allow for the performance enhancement of current ammunition items by conducting aging studies of major fuze components to detect and identify latent defects. The second major area is block upgrades, which will evaluate and perform studies on improvements to the Bunker Defeat Munition (BDM) impact sensor; increase commonality of fuze components and requirements across all hand grenade programs; determine feasibility of common training fuze for 60, 81, and 120mm mortar rounds; determine feasibility of common mortar safe and arm device components for M734A1, M783 Fuzes; improve M759 fuze sensitivity of 30 mm munition . Block upgrades will enable the introduction of the latest technologies into fuzing, keep the fuzing design current to avoid obsolescence issues, and add capabilities.

Accomplishments/Planned Program:	FY 2007	FY 2008	FY 2009
Risk Mitigation: Successfully developed a second source for the signal processor on the M734 A1 fuze for mortars. Successfully demonstrated a 2nd environment sensor for mortar fuzing using optics for 81 mm, ferrous/ non-ferrous mortar tubes, and provided the design to PM CAS. Evaluating storage reliability of current artillery batteries for the Multi Option Fuze for Artillery (MOFA) fuze/determine possible solutions to battery electrolyte storage instabilities and upgrade a battery spin-airgun. Evaluating improvements to stockpiled training and war reserve fuzes to enhance capabilities and/or address deficiencies. Evaluating, new second source for Monolithic Microwave Integrated Circuits (MMICs) used in artillery and mortar fuzes, evaluate new battery and electronics sources for current inventory fuzes. Evaluate second source for electronic safe and arm device (ESAD) components. Perform study to evaluate potential 2nd source for high _g survivable tuning fork crystals for electronic time fuzes for mortars and artillery.	700	418	650
Block Upgrades: Lab and Field tests performed for Bunker defeat Munition (BDM) impact sensor signature collection. Target impact signature data collected. Fabricated fuze electronics and conducted a ballistic test of prototype BDM Fuze. Investigate drop in proximity upgrades for current airburst fuzing for mortar, artillery and other munitions. Evaluate proximity sensor upgrades for M734A1. Determining feasibility of a common training fuze for 60, 81, and 120mm mortar rounds. Prototyping a mortar common Safe and arm device for M734A1 and M783 rounds. Performing a study on commonality of fuze components and requirements across all hand grenades (M67, M84, and M18). Enhanced the M762A1/M767 Application Specific Integrated Circuit (ASIC), by improving manufacturability and functionality. Enhancing Turbine Alternator (T/A) on the M734A1/M783 mortar fuze to survive high _g gun launch environments.	1297	1648	1531
Small Business Innovative Research/Small Business Technology Transfer Programs		59	
Total	1997	2125	2181

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605805A - Munitions Standardization, Effectiveness and Safety**	**F21**

COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
F21 NATO SMALL ARMS EVAL	981	1000	1019	1041	1052	1049	1049

A. Mission Description and Budget Item Justification: This program assures complete interchangeability of small caliber and automated cannon-caliber ammunition and weapons among all NATO countries with all of the associated logistic, strategic and tactical advantages. Project involves development, maintenance and testing compliance of NATO standardization agreements (STANAGS) and staffing of the NATO North American Regional Test Center (NARTC).

FY 2009 funds maintain the NARTC and support NATO qualification/production testing of select ammunition types produced by LCAAP and second source manufacturers. Funds will continue to support the development of a STANAG and Manual of Proof and Inspection for 40mm Low Velocity Grenade ammunition and the NATO qualification of US 30mm x 137mm and 40mm High Velocity Grenade Ammunition. In addition, this funding will be used to support activities aimed at improvements for NATO cartridges, reducing ammunition costs while benefiting NATO interoperability and identifying new manufacturing technologies that can be shared with NATO participating manufacturers.

Accomplishments/Planned Program:	FY 2007	FY 2008	FY 2009
40mm High/Low Velocity Standardization	40	45	50
30mm Assessment Team	20	20	20
Maintain standardization of Qualified designs	100	100	100
New Ammo Design Qualification & NATO Nominated Weapon Evaluation	130	125	121
NARTC Equipment Purchases	60	80	95
Staff, Equip, Maintain NARTC	130	130	140
Aeroballistic Study of M856	143	80	50
Design & Refine Models	75	75	95
Optimize Manufacturing Process306	283	317	348
Small Business Innovative Research/Small Business Technology Transfer Programs		28	
Total	981	1000	1019

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605805A - Munitions Standardization, Effectiveness and Safety**	**F24**

COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
F24 CONVENTION AMMO DEMIL	6735	6978	4802	4866	5484	6115	6207

A. Mission Description and Budget Item Justification: Under the leadership and oversight of the Product Manager for Demilitarization, this project supports a continuing technology evaluation of demilitarization methods for all types of conventional ammunition in development, production, and storage, as well as conventional ammunition recovered from formerly used defense sites (FUDS). Project F24 will complete the development and demonstration of new, safe, and environmentally acceptable alternatives to open burning/open detonation (OB/OD), including recovery/recycle/reclamation equipment, and processes to reduce the extremely large stockpile of munitions in the resource recovery disposition account and munitions recovered from FUDS.

Accomplishments/Planned Program:	FY 2007	FY 2008	FY 2009
Prove-out testing of prototype plasma arc technology for conventional ammunition and resource recovery potential continued in FY07. Prove-out testing will be completed in FY08 and Demonstration/Validation tests will be completed in FY09.	1410	1714	469
Installation of re-designed equipment was completed for the cryofracture demilitarization process for anti-personnel landmines and other munitions in FY 07. Prove-out testing was initiated. Demonstration/Validation tests will be completed in FY08.	1231	500	
Development of integrated cryofracture/plasma arc technology on a mobile platform continued in FY07. Detailed design was completed. Equipment procurement will be conducted in FY08 along with sub-system testing. System assembley and installation will begin in FY09.	150	150	200
Development of recycle/reuse technology for magnesium continued. Equipment procurement for the prototype process was nearly completed in FY07. Equipment installation, prove-out testing and demonstration /validation will be conducted in FY 08 and FY09.	1380	1335	500
Develop, install and prove out of transportable alternative materials recovery capabilities for various energetic components. Technical supervision and support of the MPTS project continued and will be conducted through FY09.	144	184	184
Multi-based propellant recovery technology application. Pilot plant efforts will be conducted through FY09.			1307
Development of advanced resource recovery/reuse technology for explosives. Focus on Ultrasonic Removal technology development continued and will optimize pilot plant operations in FY08. In FY09, design of a prototype facility will be initiated.	20	500	1000
Development of Technology for Demilitarization of insensitive munitions will begin in FY09.			900
Implementation of advanced cutting technology will begin in FY09.			242
The purpose of this Congressional Add is to support recovery of critically needed propellant ingredients from obsolete and/or waste gun propellant formulations.	2400	2400	
Small Business Innovative Research / Small Business Technology Transfer Programs		195	
Total	6735	6978	4802