Ammunition Industrial Base Management

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Industrial Base Management Scope

Quarterly Meetings
Bi-Weekly Telecons

SMCA Industrial Base Integrated Product Team

- •PEOs
  - Ammo
  - Missiles & Space
- •PMs
- •AMC
- •JMC
- •ARDEC
- •Industry
- •EDCA
- •Army G3/G4/G8
- •OUSD(AT&L)
- •GSA
- •ASA(ALT)
- •ACSIM/AEC
- •USMC
- •USAF
- •USN
- •ASA(I&E)
- •DCMA
- •CMA

Mission:

- Provide Integrated Supply Chain Management of the Ammunition Production & Logistics Base
- Optimize Preparedness of the National Technology & Industrial Base to Respond to Current and Future Warfighter Requirements

Accelerate Solutions for the Warfighter

General Responsibilities:

- SMCA Directives & Army Regulation 700-90, Army Industrial Base Process
  - Develop & Maintain an Overarching Industrial Base Strategic Plan
  - Maintain GOCO Army Ammunition Plant Production Capabilities
  - Plan, Budget & Implement PAA-Activity 2 and RDT&E
- Implement Section 806, Public Law 105-261, Procurement of Conventional Ammunition– Permits SMCA to Restrict Procurements to Sources within NTIB

PEO Ammo –Industrial Base Support Agreements w/ AMC

- ARDEC (Aug 2003); JMC (June 2004); CMA-Pine Bluff (Dec 04); TACOM (Dec 04)

Importance of Good Partnerships

Ongoing Industrial Base Initiatives

- **Production Base Support Program**
- **AAP Modernization & Cost Reduction**
  - ✓ Resources for Radford, Lake City, Holston
  - ✓ NC Upgrade at Radford
  - ✓ FY05 Congressional Activity: LC, RF, LS, Iowa, KS
  - ✓ FY06 Congressional Activity: Holston, Scranton, Kansas
  - ✓ WP LAP Upgrade @ Pine Bluff Arsenal
  - ✓ Congressional Report: Aug 06
- **Industrial Base Preparedness Planning**
  - ✓ 313 End Items
- **Strategic Planning**
  - ✓ Nov '04 Plan Implementation & 2006 Update
- **BRAC Implementation**
- **Section 806 Implementation**
  - ✓ End Item/Component At-Risk List
  - ✓ Sustain Critical Capabilities
- **Armament Retooling & Manufacturing Support (ARMS)**
- **Environmental Management**
  - ✓ Power House Emissions: Sep 07
- **SMCA Industrial Base Assessment Tool**
- **Single Point Failure Analysis**
  - ✓ 300 Items; ~80 Critical
  - ✓ Congressional Report: 28 Feb 06
- **Heavy Metals Charter Implementation**
  - ✓ Conference Mar 2006
- **Disaster Recovery Planning**
  - ✓ Radford AAP Test Case, NC/Acid/Hydra
- **ARDEC Center for Manufacturing Science**
  - ✓ Partnering & Technology Transfer to Industry
- **GOCO/GOGO Capacity Utilization Analysis**
- **GOCO AAP Facility Use Contracting**

Key Industrial Base Challenges (Jan 2006)

Impact on Ability to Meet Requirements

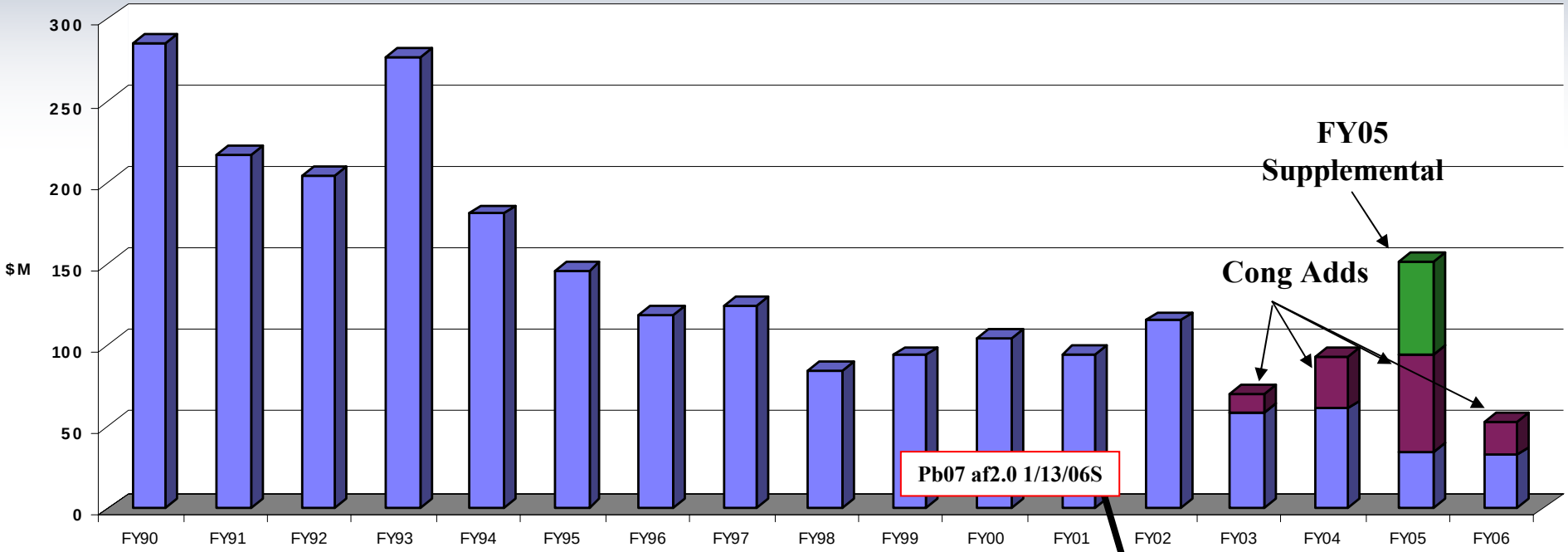
1. Sustaining Supply Chain When Post-War Ammo Requirements & Resources Drop
2. Effective Acquisition Strategies & Section 806 Implementation to Sustain Critical NTIB Suppliers & Capabilities
3. Environmental Compliance (e.g., EPA's Powerplant standards)
4. Obtaining Adequate Resources for Modernizing AAPs, Depots & Commercial Sector
5. Effective Partnering with Commercial Sector
6. Reduce Supply Disruption (and Operating Costs) During BRAC Transition
7. Effective Single Point Failure Item & Process Risk Management

6 Sigma/QFD Criteria

Impact on Ability to Operate Effectively & Efficiently

1. Predicting & Adapting to Future Warfighter Demands (Requirements)
2. Effective Partnering with the Commercial Sector
3. Maintaining Financial Viability of Suppliers
4. Mitigating Volatility in Requirements & Budget
5. Rightsizing & Reducing AAP Operating Costs & Increasing Efficiencies
6. Effective Employment of Required Technology for Future Ammo

Procurement of Ammunition, Army- Activity 2, Production Base Support Funding



APE		FY05	FY06	FY07	FY08	FY09	FY10	FY11
1200	Industrial Facilities (06 Pres Bud)	$ 34.270	32.56	~~33.02~~	~~36.34~~	~~37.26~~	~~34.11~~	~~35.08~~
	Congress Add	$ 59.670	21.06					
	Supplemental/ PBR0711PF2.0	$ 57.800		115.15	79.59	81.62	35.39	36.472
	Subtotal	$ 151.740						
1500	Maintenance of Inactive Facilities	$ 4.430	5.78	4.74	4.42	4.62	4.55	4.57
2000	Layaway of Industrial Facilities	$ 1.940	0.34	3.06	3.44	5.09	9.69	9.97
2500	Armament Retooling & Manuf Supp	$ 4.743	2.71	2.77	2.94	3.01	3.14	3.18
	Total IF, MIF, LIF and ARMS	$ 162.853	62.45	125.72	90.39	94.34	52.77	54.19

Critical Single Point Failures Snapshot

(Oct 2005)

General	Direct Fire	Indirect Fire	Close Combat
	✓ Small & Med Cal Propellants	✓ Laminac Adhesive ✓ Projectile Bodies ✓ Grenade Bodies	
✓ Atomized Mag ✓ Black Powder	✓ Small Cal Ammo	✓ TNC ✓ Fuzing Components ✓ Batteries ✓ WP ✓ TFE Lubricant ✓ Propellants M110 / M9	✓ CM Flares ✓ C70 Det ✓ Laminac Adhesive ✓ HHS Seals ✓ M18 Smoke Dyes
✓ VAAR ✓ Polysulfide ✓ TNT ✓ Lead Azide ✓ C4 Tag Agent ✓ RDX ✓ NC / Cotton Linters	✓ Links	✓ Propellant M30 ✓ Burster Tubes	✓ Grenade Fuzing

- 300+ Single Point Failures
- 80 + Critical SPFs

Mitigation Status

- In Planning
- Funded & In Mitigation
- Risk Mitigated

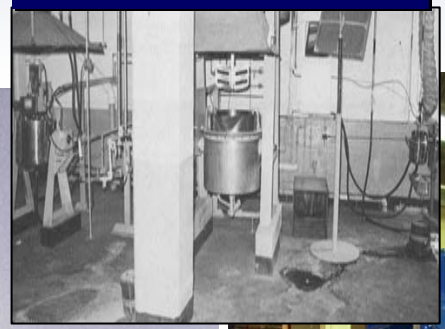
Manufacturing Science & Technology Transfer Center Recent Investments

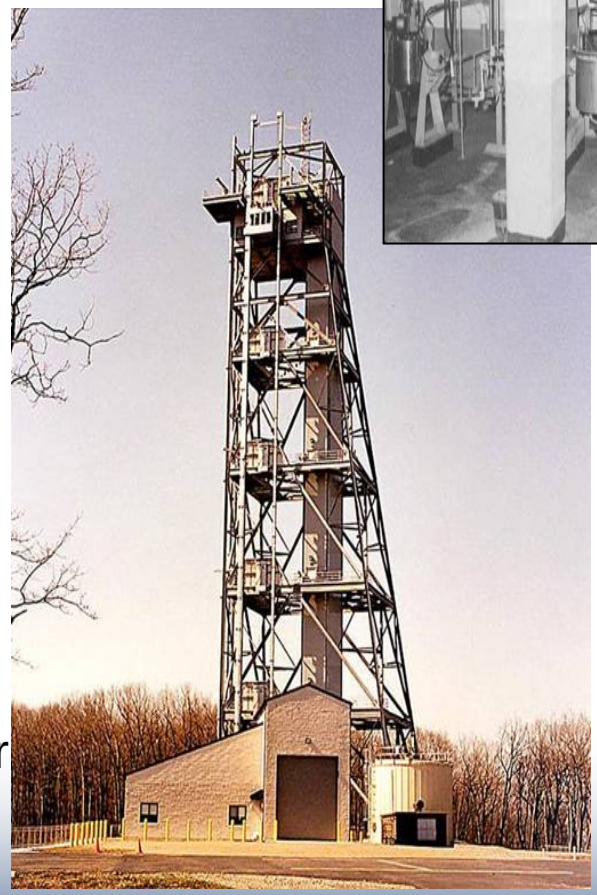
Picatinny Arsenal, NJ

Collaboration w/ Industry & Academia

- Universal Screw Extruder
- Pressure Caster for light weight materials (MMC)
- Cast Cure Explosive loading pilot plant capability
- Explosive Crystallization Science Equipment
- Smart Munitions MMW/IR/SAAL capability
- Advanced Materials Processing
  - ✓ Nano
  - ✓ Welding
  - ✓ Machining
- Advance Coating technologies for energetics

New Manufacturing Processes (e.g., Lead Azide)





Precision Armaments Laboratory

Explosive Cast Cure Loading

Required GOCO AAP Modernization Resources-Summary (Mar 05)

Priority	GOCO Facility	Core Processes	Critical Required Mod ($M)	Essential Mod ($M)	Total ROM
1	Radford (VA)	Propellant Manufacturing (Rocket, Artillery, Tank, Med Cal; NC for all Propellants)	$136.5	$228.0	$364.5
2	Lake City (MO)	Small Caliber	$167.4	$70.0	$237.4
3	Holston (TN)	Explosives - HMX, RDX	$90.2	$104.6	$194.8
4	Iowa (IA)	Load, Assemble & Pack (LAP) - Tank/Artillery, FASCAM	$62.3	$87.3	$149.6
4	Milan (TN)	LAP - Mortars, 40mm Cartridges; C-4 Extrusion	$20.7	$38.5	$59.2
4	Scranton (PA)	Large Caliber Metal Parts- Artillery/Mortars	$7.0	$13.5	$20.5
5	Riverbank (CA)	Large Caliber Metal Parts- 5" Steel, 105mm Cartridge Cases; Mortar/Cargo Metal Parts	$9.6	$5.1	$14.7
6	Lone Star (TX)	LAP - Grenades, Initiators, Detonators, Mines, ICM	$0.2	$32.3	$32.5
6	Kansas (KS)	LAP-Sensor Fuzed Weapon; Mortar/Artillery; ICM	$0.0	$17.0	$17.0
X	Mississippi (MS)	Semi Active - Cargo Metal Parts	$0.0	$0.0	$0.0
			$493.9	**$596.3**	**$1,090.2**

($M)	FY05	FY06	FY07	FY08	FY09	FY10	FY11	Total
Critical Required	$21.80	$115.40	$134.94	$121.93	$85.39	$14.40	$0.00	**$493.86**
Additional Needed	$0.00	$97.30	$102.60	$105.40	$92.90	$133.90	$64.20	**$596.30**
Total Mod Required	$21.80	$212.70	$237.54	$227.33	$178.29	$148.30	$64.20	**$1,090.16**

Key

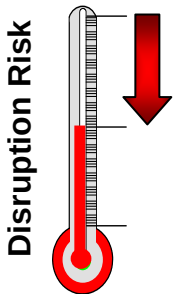
- Propellant
- Small Caliber
- Energetics
- Metal Parts
- LAP

Radford AAP, Radford, VA (est. 1941)

Mission: Manufacture large volumes of propellant ingredients, propellants and TNT.
Size: 6,901 acres, 2,540 buildings, 214 igloos
Employees: 28 Government, 1,200 contractor, 19 tenants
Contractor: Alliant Techsystems
Major Customers: Army, Marine Corps, Navy, Air Force, NASA

Problem/Need:

- Only US/CA Source for Nitrocellulose; Critical DoD SPF
- ~$20M/Yr Operating Deficit; Inefficient Operating Footprint
- Equipment At or Past Useful Life
- Loss of Capability Impacts Delivery of All Ammo
- 71 Acid Plant Production Failures Past 12 Months



Payoff (Critical Mod):

- Risk of Acid/NC Supply Disruption Significantly Reduced
- Increased Quality & Yield
- ~$6M Annual Benefit

Critical Modernization: $136.5M

	FY05	FY06	FY07	FY08	FY09	Total ($M)
Required ($M)	31	40	32	36.5	13	152.5
PEO Ammo IF	16					16
Additional Required	15	40	32	36.5	13	136.5

- Nitric/Sulfuric Acid Plant
- NC Production Lines
- Quality Lab
- Power Plant Upgrade & Environmental Compliance

Essential Modernization: $228M

- Single & Multi-Base propellant facilities
- Continuous Multi-Base propellant facilities
- Environmental Controls
- Solventless Upgrade

Holston AAP Capacity Modernization

- $3.5M FY05 Project:
  - Expand capacity for manufacture of crude RDX by 2M lbs/month
    - Effect of increasing capacity for manufacture of HMX
  - Modernize control system and piping in Bldg D-10 and maintain second nitration reactor in ready status
  - 22 month period of performance
  - Benefits munitions used by all Services

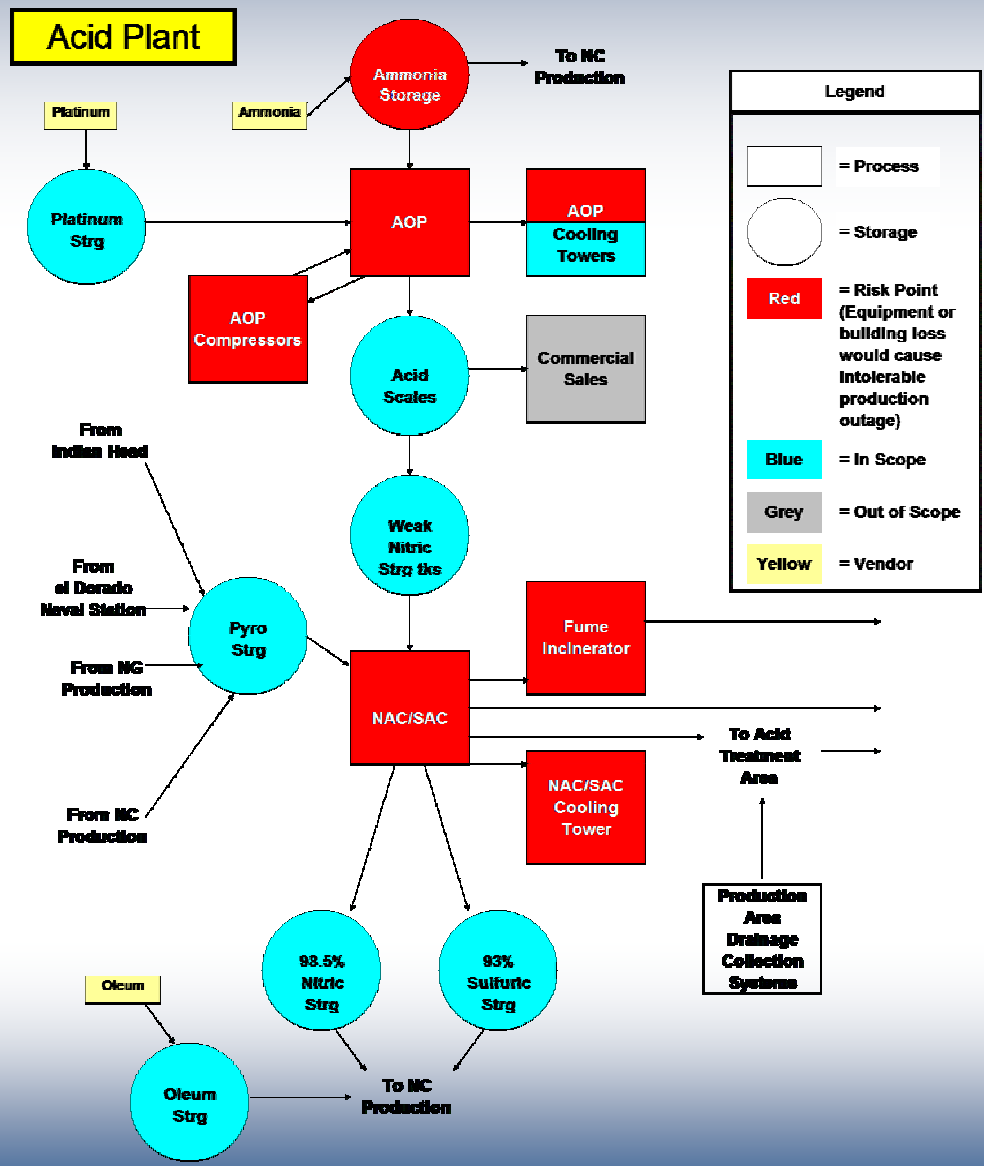
- $4.4M FY05 project
  - Enhance operator safety by eliminating need to handle dry RDX in a batch process
  - Increase through-put by transitioning to a continuous RDX drying and FEM grinding operation in one building (N-3)
  - 24 month period of performance
  - Benefits IM explosives used by all Services

Disaster Recovery Planning

Radford AAP:

Acid Plant Process Flow Diagram & Risk Points

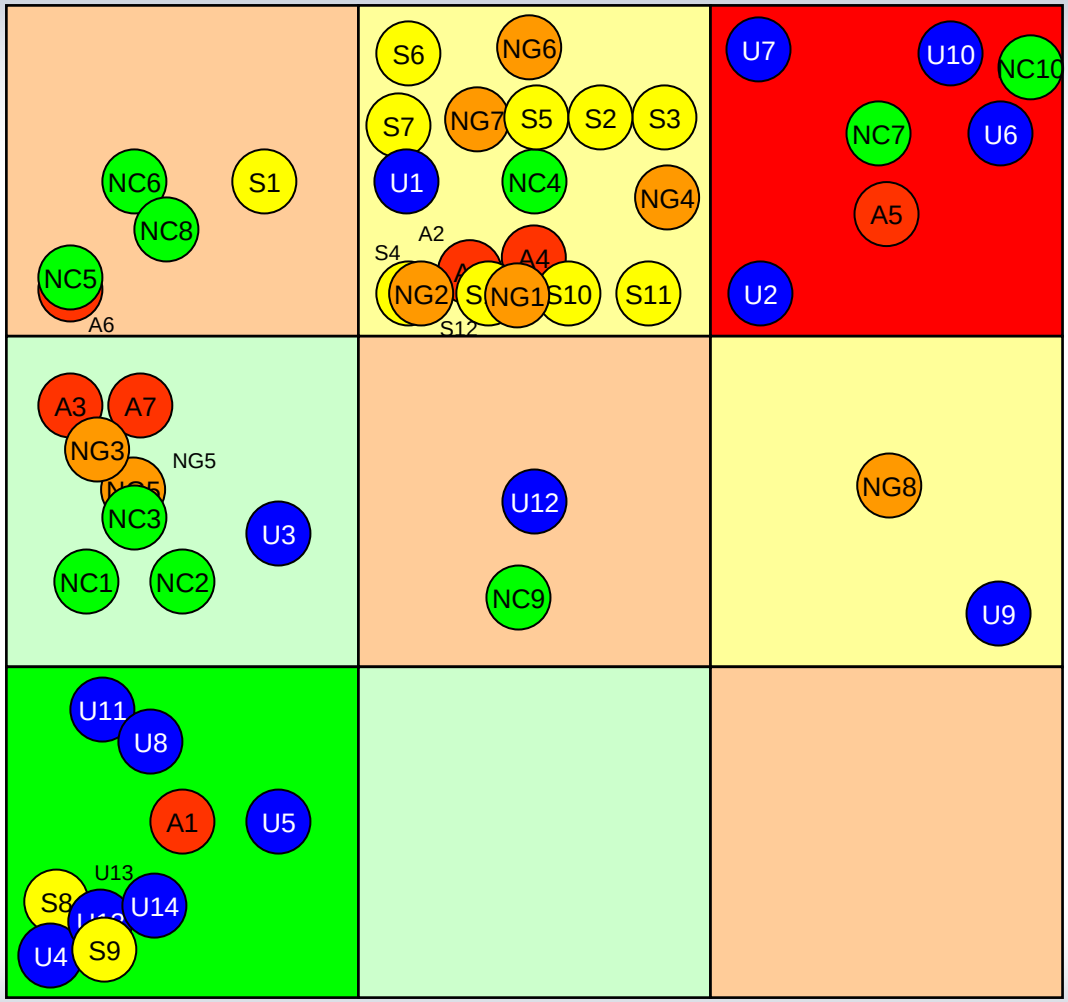
- Ammonia Storage
- AOP
- AOP Cooling Towers
- AOP Compressors
- NAC/SAC
- Fume Incinerator
- NAC/SAC Cooling Tower



Pre Mitigation Composite Risk Summary

Impact – Loss of Production
Low: 0 – 14 Days
Med: 15 – 30 Days
High: 30+ Days

Probability – That Loss Occurs
Low: 10+ yrs
Med: 2 – 10 yrs
High: 0 – 2 yrs



Risk ID	Risk Area	I	P	Risk
A5	NAC/SAC	H	H	High
NC7	Jordan Beater House	H	H	
NC10	Bldg 4026 Wringer House	H	H	
U2	Raw Water	H	H	
U6	Potable Water - Horseshoe	H	H	
U7	Acid Waste Treatment	H	M	
U10	Steam	H	H	
A2	AOP	H	M	
A4	AOP Compressor House	H	M	
NC4	Continuous Nitrator	H	M	
NG1	NG Nitration/Neutralization	H	M	
NG2	NG Storage Houses (2)	H	M	
NG4	Distribution House	H	M	
NG6	Solvent Prep House	H	M	
S2	Saw & End Inhibitor House	H	M	
S3	Dowel Rod	H	M	
S4	Spiral Wrap	H	M	
S5	Cuff, Coning & End Sleeve	H	M	
S6	100% UT/RTR	H	M	
S7	Burn Test Area	H	M	
S10	EC Tape Mixer	H	M	
S11	P4 Tape Heat Process	H	M	
S12	Pelletizer Process	H	M	
U1	Central Lab	H	M	
U12	Plant Compressed Air	H	M	
NG8	Metal Detection	M	H	
U9	Hazardous Waste (Incineration)	M	H	
A6	Fume Incinerator	H	L	Moderate
NC5	Selective Catalytic Reduct Unit	H	L	
NC6	Boiling Tub House	H	L	
NC8	Poaching/Blending House	H	L	
NG7	Slurry Mix House	H	L	
S1	Chemical Grind	H	L	
NC9	Settling Pits	M	M	
A3	AOP Cooling Towers	M	L	Low
A7	NAC/SAC Cooling Tower	M	L	
NC1	Pulp Cutter	M	L	
NC2	Linter Cutter	M	L	
NC3	Acid Weigh House	M	L	
NG3	Nitration Control House	M	L	
NG5	Distribution Control House	M	L	
U3	Filtered water	M	L	
U5	Potable Water	L	L	
A1	Ammonia Storage	L	L	
S8	Final Inspection	L	L	
S9	Packaging	L	L	
U4	Fire Water	L	L	
U8	Bio Waste Treatment	L	L	
U11	Electricity - All Sources	L	L	
U13	Filtered Water Sludge Processing	L	L	
U14	Bio Waste Sludge Processing	L	L	

High Risk
Moderate Risk
Low Risk

Industrial Base Metrics

C-6a-- Percent Resourced Industrial Facilities Requirements

Performance Criteria: **Actual 37%**				
Measure	Weight	Target	Max	Min
C-6a	**20%**	**80%**	**100%**	**50%**

•Measures the amount of Government investment in the organic production base versus the amount identified as needed to sustain required capabilities over the POM.

•A Modernization Report to Congress is being developed and is scheduled for completion by 3QFY06.

Industrial Base Metrics

C-6b-- Percent of Critical Single Point of Failures (SPF) Mitigated and in Risk Mitigation

Performance Criteria:		Actual 75%		
Measure	Weight	Target	Max	Min
C-6b	**20%**	**80%**	**100%**	**50%**

•Sum of Mitigated Critical Single Point Failures and SPFs w/ Resourced Mitigation Plans Divided by Total Critical SPFs

• Critical Single Point Failures are those sources in the supply chain that pose an unacceptable risk to meeting the warfighters' requirements if lost.

Industrial Base Metrics

C-6c-- Percent Production Base Readiness

Performance Criteria: Actual 90%				
Measure	Weight	Target	Max	Min
C-6c	**20%**	**80%**	**100%**	**50%**

- **Measures the percent of items where the production base is able to meet the POM (06-11) demand.**

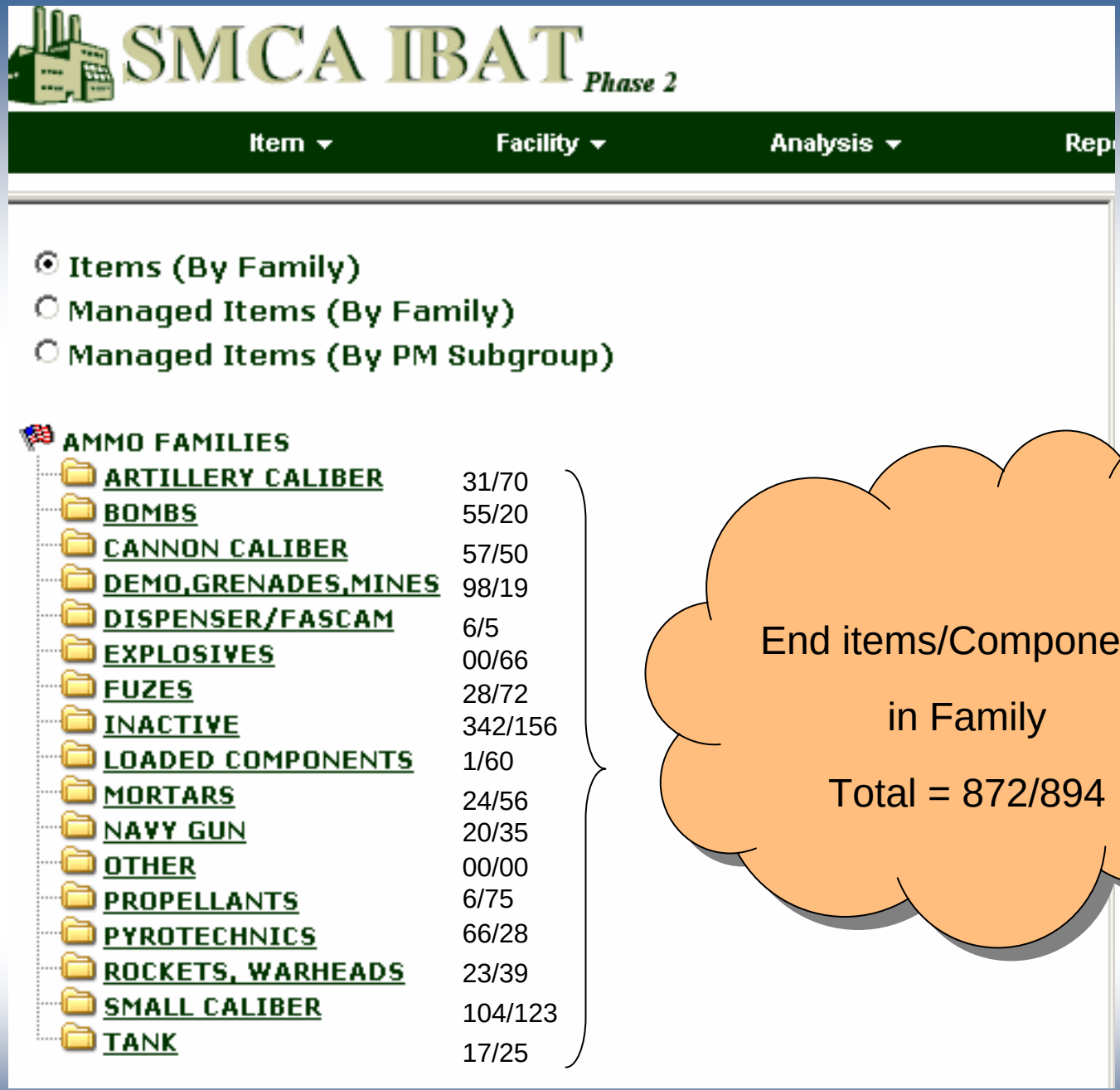
- **The production base's ability to meet the POM demand is modeled using the SMCA Industrial Base Assessment Tool (IBAT). All items in each POM year are produced concurrently.**

SMCA IBAT *Phase II*

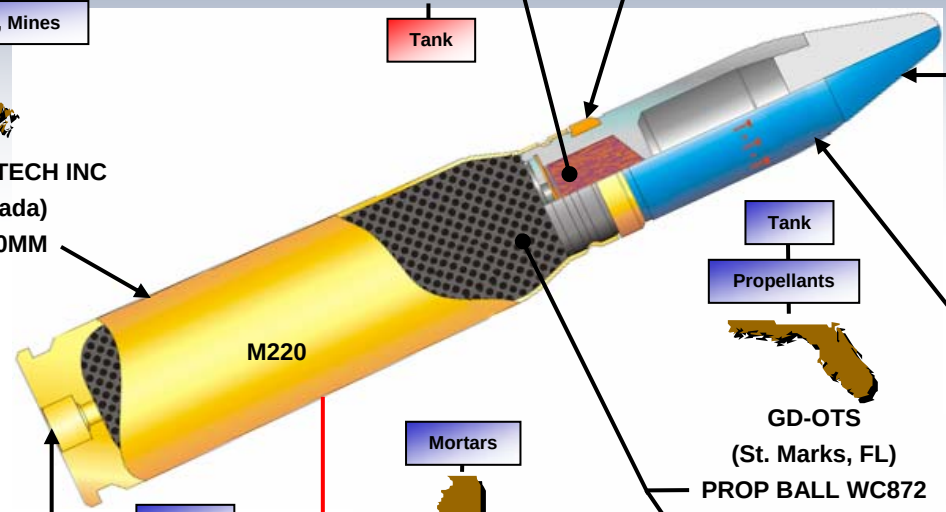
- **SMCA IBAT is a real time web based application focused on POM buys as well as contingency operations**

- **Contains near real time info on**
  - **Capacities**
  - **Single, sole, foreign sourced**
  - **Skills/technologies**
  - **Stockpile Levels**
  - **Deliveries versus schedules**
  - **Customer Satisfaction**
  - **Environmental**
  - **Safety**
  - **Financial Viability**
  - **Tiered Bill of Materials**
  - **Identification of Producing Facilities**
  - **POM Item Costs**

- **Contains useful analytical tools**
  - **Pacer reports (3 levels)**
  - **Goes into lists**
  - **Base responsiveness against any set of requirements**


SMCA IBAT Phase 2
Item
Facility
Analysis
Items (By Family)
Managed Items (By Family)
Managed Items (By PM Subgroup)
AMMO FAMILIES
ARTILLERY CALIBER 31/70
BOMBS 55/20
CANNON CALIBER 57/50
DEMO,GRENADES,MINES 98/19
DISPENSER/FASCAM 6/5
EXPLOSIVES 00/66
FUZES 28/72
INACTIVE 342/156
LOADED COMPONENTS 1/60
MORTARS 24/56
NAVY GUN 20/35
OTHER 00/00
PROPELLANTS 6/75
PYROTECHNICS 66/28
ROCKETS, WARHEADS 23/39
SMALL CALIBER 104/123
TANK 17/25
End items/Components
in Family
Total = 872/894

CTG 20MM 4 HEI M56A3 1 TP-T M220 W/LK M14A2 (A653)



Small Caliber
Mortars
Artillery Caliber
Demo, Grenades, Mines

SNC INDUSTRIAL TECH INC
(Quebec, Canada)
CASE CTG 20MM

Tech Ord
(Clear Lake, SD)
TRACER

Tank

VARIOUS COMMERCIAL
COPPER BAND

Artillery Caliber

ITW HIGHLAND
(Waterbury, CT)
ALUM NOSE

Fuzes
Small Caliber
Loaded Components

ATK (LCAAP)
(Independence, MO)
LINK M14A2

Fuzes

GALION INC
(Galion, OH)
PROJ BODY

Tank
Propellants

GD-OTS
(St. Marks, FL)
PROP BALL WC872

Mortars

GD-OTS
(Marion, IL)
LAP

Fuzes
Small Caliber

ATK (LCAAP)
(Independence, MO)
LAP
PRIMER

Artillery Caliber

AMRON LLC CO
(Antigo, WI)
CASE CTG 20MM

PSI
(Byron, GA)
M505A3 FUZE

ACCURATE ARMS CO
(McEwen, TN)
COMPOSITION A4
LOADING

VARIOUS COMMERCIAL
COPPER BAND

- Commercial
- Government Owned
- Other Families By Producer
- Component In Other Families

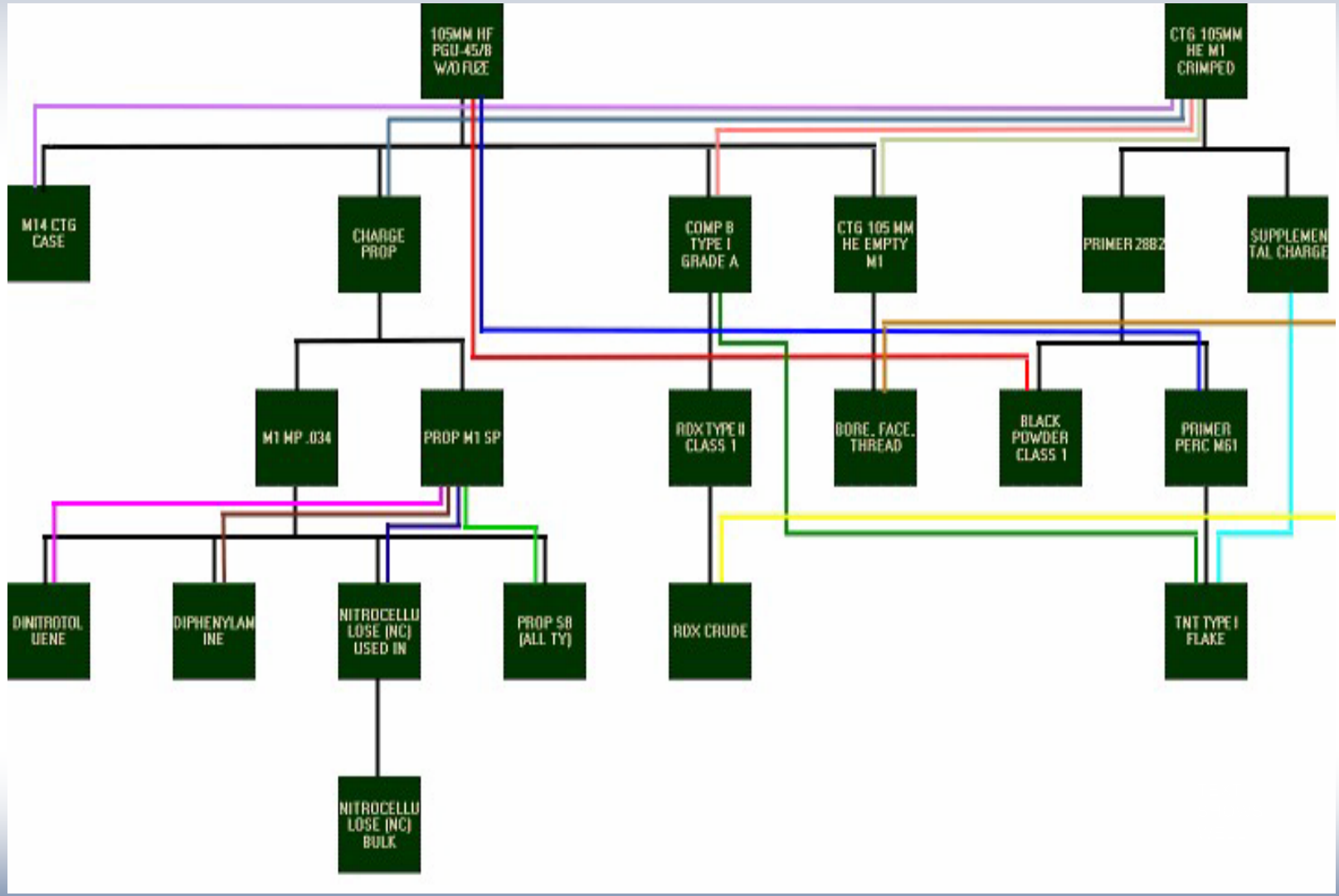
Summary: Item Has 11 Main Components, 10 Producers Operating In 9 States And 1 Foreign Country.

Family: Cannon Caliber

Base Capability Constraints:

- No Current Issues.

Material / Supplier Network - Example



Ammunition Industrial Base Management

The Ammo Enterprise Continues to Make Progress Prioritizing and Resolving Critical Industrial Base Challenges in Consonance With the Joint Ammunition LCMC