



Industry Panel Munitions Executive Summit

“Munitions Operations in a
Complex Business Environment”



Panel Format

- Introduction of the panel members
- Panel members will conduct an eight to ten min briefing on their topic
- Open the panel for questions

Panel Members

- Moderator:
 - Kevin Knotts; President and CEO of Azimuth Consulting Services
- Panel Members
 - Andrew Wilson; President and CEO - EXPLOINSIGHTS Inc.
 - Bruce Daniels; Chief Financial Officer - Medico Industries Inc.
 - Rob Shenton; Vice President, Competitive Improvement Program, Operations - Aerojet Rocketdyne
 - Pat Nolan; Vice President and General Manager, Missile Products Division - Orbital ATK
 - Shilpa Amato; Executive Vice President - Nalas Engineering Services Inc.



Explosives & Large Caliber LAP

ANDREW WILSON

EXPLOINSIGHTS Inc.



Briefing Agenda

- A tale of two Industrial Base sectors:
 - Explosives Manufacture & Large-caliber LAP
- Business condition @ end of 20th century
- Industry ‘forces’ coming into play
- How each has fared
 - Lessons learned
 - Suggestions for achieving balance



Explosives & Ammunition LAP

Late 20th Century – at the end of a decade of declining ammunition buys

USG Energetic Materials

- 2nd World War products
 - RDX, HMX
 - Dated infrastructure
 - Uncompetitive
 - Facing the death spiral?
- Industry forces in play:
 - Protection (PL-806)
 - OSD ‘IM’ Mandate
 - Significant Modernization \$
 - Sole-source supply

USG LAP Industry

- Large, work-loaded GOCO’s
 - Comp B & PBX filled products
 - Dated infrastructure
 - Increasingly uncompetitive
 - “Survival of the fittest”?
- Industry forces in play:
 - LPTA* (“low-bid”) Procurements
 - More competition, less workload
 - (No PL-806 / IM benefit for LAP)
 - (Some) Modernization \$

*LPTA – Lowest Price Technically Acceptable

How does this play out?



Explosives & Ammunition LAP

≈15 Years later - where are we now?

USG Energetic Materials

- ✓ Stabilized base
- ✓ Leveraged R&D
 - ✓ JIMTP ↔ IRAD ↔ DOTC
- ✓ Broader product portfolio
 - ✓ Melt-pour/PBX; future-proof:
 - ✓ Twin Screw Extrusion, RAM Injection Mold, 3D-print
- ✓ LPTA not a key factor
- ✓ Mobilization ready
- ✓ Sustaining Munitions:
– A viable “Going Concern”

USG LAP Industry

- ❖ Extensive rationalization
 - ❖ LSAAP, KSAAP, MLAAP*
- ✗ Mobilization disabled
 - ✗ Increasingly outdated
- ✗ Not LPTA competitive
 - ✗ High fixed costs, R&D impact
- ✗ Facing the death spiral?
→ Capability imbalance

✗ Sustaining Munitions:
“Going Concern” viability?

*MLAAP is open, but has a zero production mission today



Explosives & Ammunition LAP

Strategies have protected a vital USG capability – are there lessons here?

- Energetic materials are not commodities
 - Free enterprise (& LPTA) drives short-termism
 - Not good for critical ammunition component supply
 - USG Strategic Initiatives have worked
 - ✓ PL-806; IM, GOCO Modernization
 - ✓ Sole source (i.e. not LPTA...)
 - Use of safeguards to ensure “taxpayer value”

Explosives Manufacturing industry is **strong, capable and viable**



Explosives & Ammunition LAP

Ideas for appropriately managing the last USG Large Caliber LAP plant

- Ammunition LAP is also not a commodity
 - GOCO QD Arcs, storage, transportation
 - These are critical assets – cannot be replicated quickly
- Ideas for achieving balance
 - Non-LPTA procurements for critical items
 - “Lowest price bid” stifles innovation (R&D killer)
 - Evaluate mobilization potential as a factor?
 - Creative long-term contracts to promote more investment
 - Re-invigorate the “ARMS” program
 - Synergistic consolidation - COCO @ USG LAP facilities?

US Large Caliber LAP appears to be at a **viability crossroad**

Thank you!



COCO's – We met the surge
requirement, what's next

BRUCE DANIELS

Medico Industries, Inc.

- Quality supplier for over 78 years
- Produced over 24 million metal parts for our Armed Forces



- - 3 Facilities
- - 545,000 sq/ft
- - 73 Acres
- - 384 Employees

Privately Owned & Operated

Medico Industries, Inc.



Sawing	Forging	Heat Treating	Machining	Welding	Testing	Coating	Inspection	Packaging
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Steel

Aluminum

Brass/Copper

Preform/Upset

Piercing

Backward

Extrude

Cold Coining

Spherodizing

Normalizing

Tempering

Stress Relieving



Ultrasonic Testing

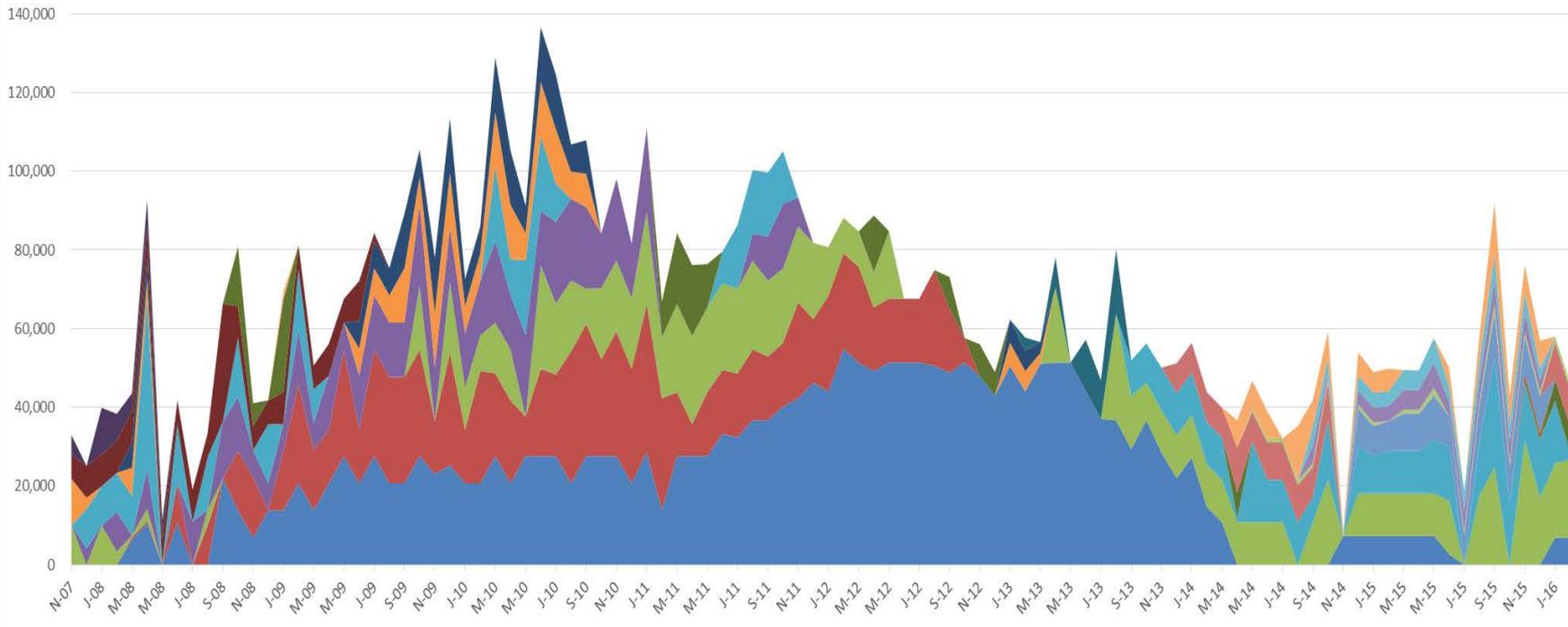
Magnetic Particle Inspection

**ISO
9001:2008
Certification**

**American Petroleum
Institute Certification**

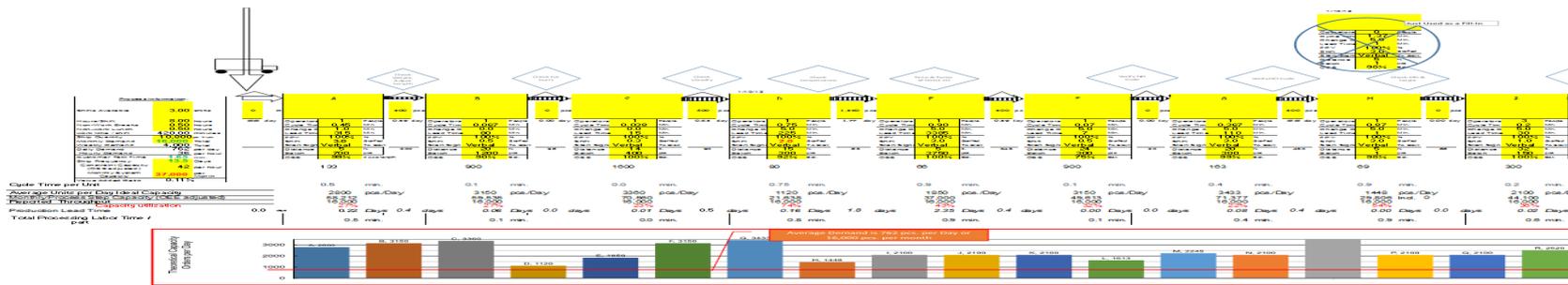
The Challenging Terrain Facing Ammunition Manufacturers

Prime DoD Contracts - Monthly Rates



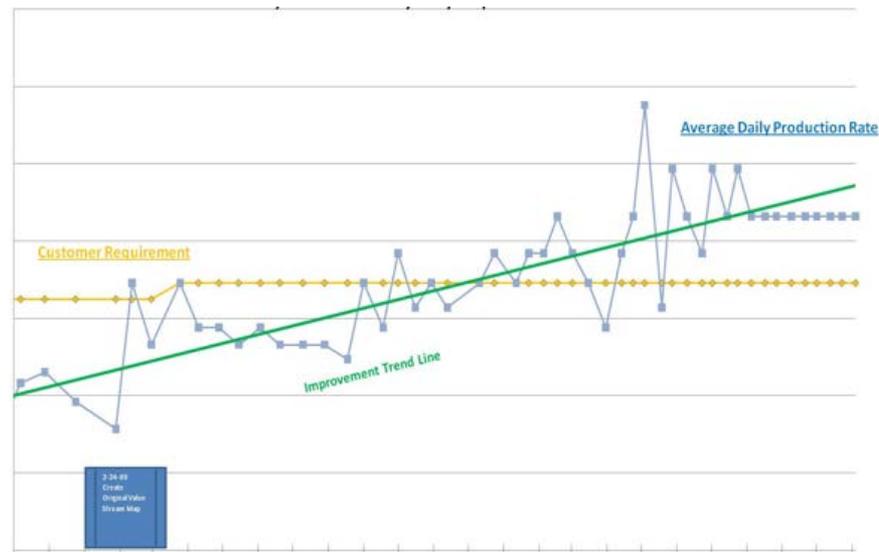
Lean Manufacturing Techniques

- 2009 Accelerated Production for 60 & 81mm mortar shell bodies
 - Reduced process variability: Value Stream Maps
 - Reduce Process Cycle Time: Improved equipment, Standardize, Training
 - Identified labor imbalance and corrected: Cellular layout & Training
 - Reduced waste in excess in-house transportation: Plant layout
 - Improved communications through shift meeting
 - **DID NOT SACRIFICE QUALITY FOR QUANTITY**
 - Monthly-Quarterly Status Meetings to include Government Representatives



Lean Manufacturing Techniques

- Results:
 - Lead time reduced from 16 days to 2.25 days

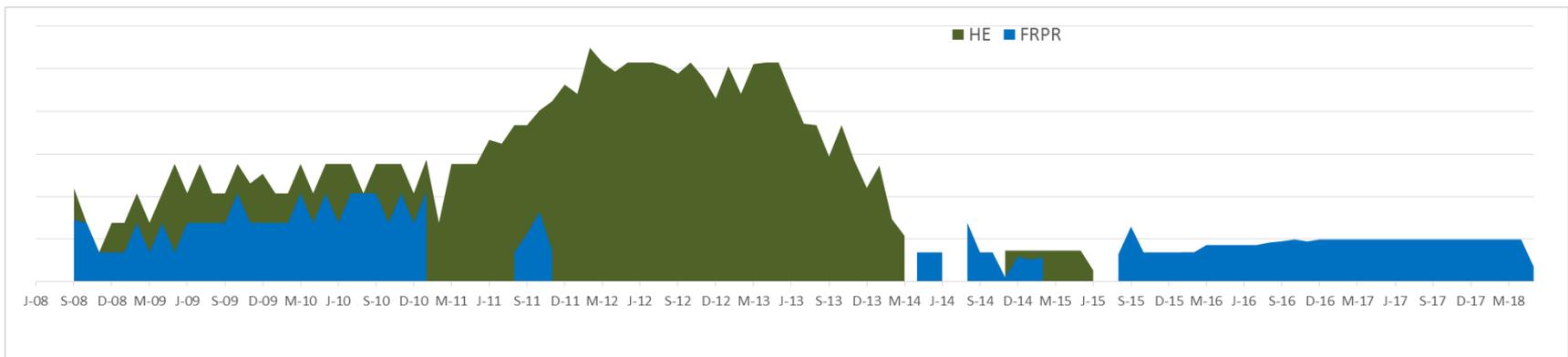


- Current:
 - Continuous use of VSMS for reduced requirements aids in reducing costs

Metal Parts

Current Trends

- Change in Requirements:
 - More training rounds
 - Less high explosive rounds
- Increase in foreign sales via USG contracts
- Continued focus on safety
- Continued focus on lethality



Company Owned/Company Operated COCO Advantages

- Direct access to Owners/Decision Makers
 - Reduces response time
 - Great communications
 - Clear objectives
- Ownership
 - Building & Equipment
 - Modifications
 - Flexibility of use
 - » Commercial Product

Example: Medico rebuilt and installed forging presses, machining centers & provided additional electrical service and air compression in a new facility. Parts were being produced within **5 months** from the start of the project.

Over 9 million parts –
Automotive, Gas &
Oil Drilling industries



COCO Disadvantages

- Return on Investment - 100% risk for shareholders
- Our customer is often the biggest competitor - Government invests in lower rate production equipment at government owned facilities
- Workload of Government Owned Plants

Thank you!



Affordability and the Challenges in a COCO Environment

ROBERT SHENTON

Vice President, Competitive Improvement Program, Operations
Aerojet Rocketdyne

THE CHALLENGE

Provide the warfighter with the most advanced weapons in low volume market at an affordable price

THE IMPERATIVE

Embracing change

LANDSCAPE PERSPECTIVE

- Single product line facilities not sustainable unless steady state production exists
- Erratic production rates create inefficiencies
 - Inability to maintain skilled staff
 - Escalating knowledge/experience loss
 - Loss of learning due to production gaps further compounding affordability
- Mentality – Hold or reduce cost with erratic, limited production quantities, but do not change anything
- Legislative environmental changes impact our current business processes and add costs
- Significant resistance to change exists within the government/customer community
- Problems compound through the supplier change
- As a publicly traded company it becomes a requisite to align the critical needs of the end user with the company's financial health

APPROACH

- Diversify the business portfolio to provide a wider offering of goods and services to prime contractors and end users
- Consolidation of facilities to create diversity at sites
- Diversity in product offerings helps limit the risk that is associated with unfunded products
- Consolidating energetic operations to fewer sites increases plant utilization
- Significant non-recurring investment required. Business model challenging and requires government/customer partnership.
- Industry needs to embrace change including our methodology for managing change
- Change process itself needs to promote affordable approach
- Other process changes are also required to reduce cost
 - Additive Manufacturing
 - Digital Factories
 - In-Line Inspection

CRITICAL MATERIALS

- Decisions between critical systems (platforms) and critical materials should be made with the end user in mind
 - World's most lethal warhead useless without system to launch it
 - Senseless to have the most accurate system in the world but cannot defeat the target
- Balance required between the critical materials, subsystems, and systems must be maintained in DOD planning
- Diversify to provide the critical products along with a full portfolio of products to survive the lean periods

ENVIRONMENTAL CHALLENGES

- Best practices of the 70's and 80's failed to prevent issues
- It is incumbent on the industry to remedy to current standards
- Remediation costs are a significant element of current product cost
- Affordability through competitive improvement initiatives are required to adequately address legacy issues
- Expect innovative environmental approaches to be a continuing focus for the foreseeable future in defense products for both new processes and issues from the past

SUMMARY

- Diversify the portfolio
- Continue to manufacture critical materials at a required minimum rate to maintain facilities for this particular need
- Use the core technologies to pursue similar products
- Maintain financial health by offering more products than the critical product at minimum sustaining rate
- Consolidation of facilities increases diversity and utilization rates
- Develop robust waste management practices throughout the value stream
- Improve efficiency of all processes through continuous improvement, lean manufacturing, judicious use of capital reinvestment in technologies
- Government/customer/suppliers must embrace change and enable through more streamlined change management methodology

Thank you!





Staying in front of your Supply Chain

PAT NOLAN

Every Program/Market area is facing similar challenges

External Challenges

Internal Challenges

Legacy TDP's

- Design Intent

Regulatory

- Environmental
- Safety
- Exportability

Oversite/Compliance

- Primes
- DCMA / DCAA
- PM's – PCO's
- ARDEC / Labs

Supply Chain

- Obsolescence
- Single Source
- Counterfeit Parts
- 2nd/3rd Tier Failures

Energetics & LAP	Tactical Propulsion	Tactical Subsystems	Fuzing & Warheads
<ul style="list-style-type: none"> • Alliant Powder  <ul style="list-style-type: none"> • MCA LAP 	<ul style="list-style-type: none"> • Air Launched  <ul style="list-style-type: none"> • Surface Launched 	<ul style="list-style-type: none"> • Metals & Munitions  <ul style="list-style-type: none"> • Structures 	<ul style="list-style-type: none"> • Fuzing & Electronics  <ul style="list-style-type: none"> • Warheads 

Competition

- Foreign Investment vs
- Support of the Industrial Base

Limited Production

- Lost Learning
- Inactive Lines/overcapacity
- Exportability

Limited Discretionary

- IP Ownership

Acquisition Timelines

- Long Lead Funding
- Complex Proposals

Stakeholder Expectations

- OTD/ Quality
- Profit
- Cash Flow
- ROIC

Fewer New Starts

- Brian Drain

External Challenges

Internal Challenges

Legacy TDP's

- Product Improvement Programs
- Performance Specs

Limited Production

- Lean/Six Sigma
- Robust SPC
- Focused Investment
- ERL (Export Readiness level)

Limited Discretionary

- CRADA's
- More S&T Funding

Acquisition Timelines

- Reduced Solicitation requirements

Stakeholder Expectations

- Execution Excellence
- Increased International Sales

Fewer New Starts

- University Partnerships
- CRADA's
- International Sales - ERL

Competition

- Innovation/commerciality
- LT - Strategic Sourcing Agreements

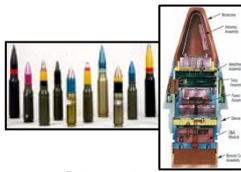
- Regulatory
- Robust Internal Controls
 - Safety culture
 - Strong EICO

Oversite/Compliance

- Robust QMS
- Relationship building
- DCMA Mgmt Councils
- CRADA's, ETC

Supply Chain

- Second Sourcing
- Benchmarking
- SQE
- Six Sigma/Lean/SPC

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Thank you!





Small Business Opportunities and Challenges in the Energetics' Community

SHILPA AMATO

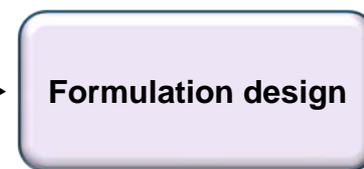
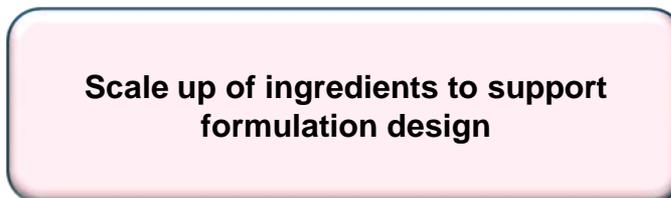
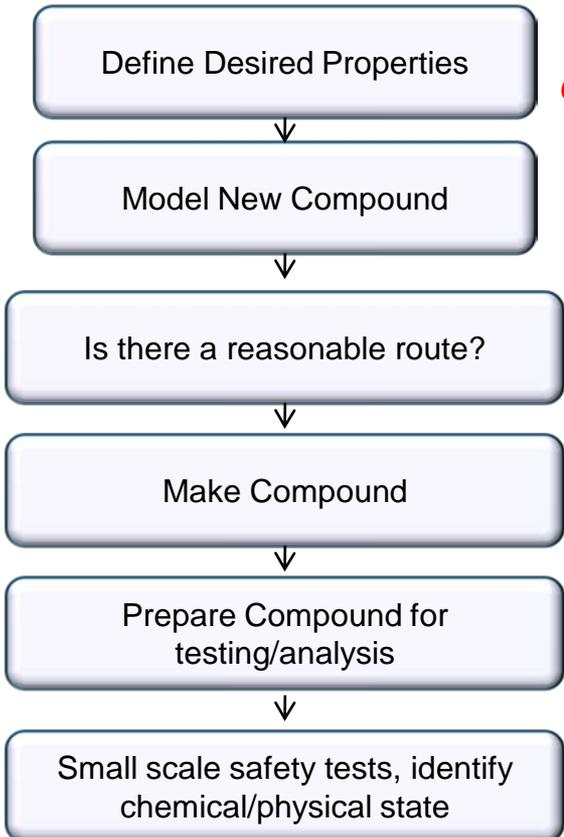
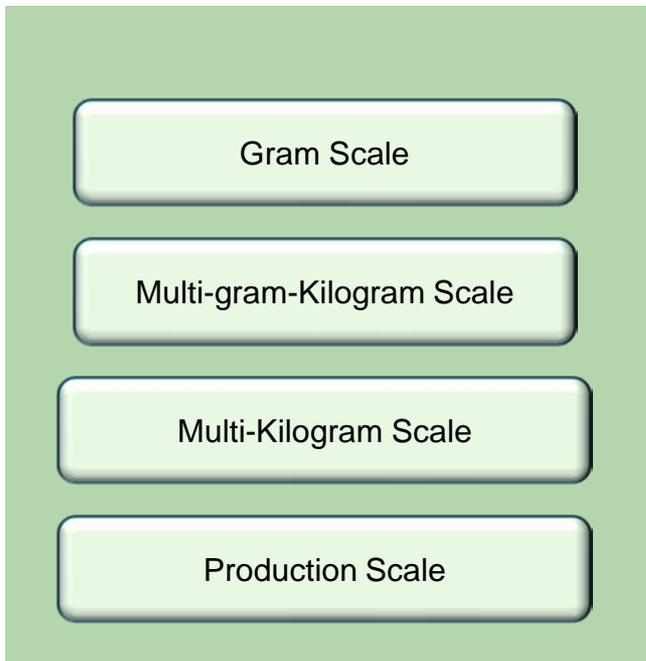
Outline

- Energetic precursors
 - What are the demands?
 - Where do we get them?
 - Why overseas?
 - Environmental restrictions and cost base \$\$\$
 - How can we shift the buys towards US.
 - PL-806
 - Critical Ingredients
- Contracting challenges
 - Small and large businesses
 - Pharma analogy

Process Development

There is a demand for precursors to support these development efforts and to demonstrate commercialization

Data generated at each scale



General Flow

- We REALLY like that new “Super Material”
- Proposals are funded (6.1/6.2)
- We STILL really like “Super Material”
- Proposals are written (6.3/6.4)
 - Responses:
 - Too costly, too immature, not environmentally friendly, precursors are from China, not happening...
- *We REALLY like that new “Super Duper Material”... proposals are funded...*



Example: Furazans

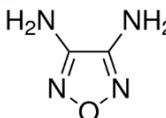
- No US Supplier until 2015 (researched since the 1960s or earlier)
- Current cost is >\$40/gram through Sigma
- How many transitions failed due to cost of precursors? No domestic source?
- How can we make these transitions seamless without the formulator being responsible for costs and availability of raw materials?

749524 ALDRICH

3,4-Diaminofurazan

97%

Synonym: 1,2,5-Oxadiazole-3,4-diamine



Price and Availability

SKU-Pack Size	Availability	Price (USD)	Quantity
749524-1G	✔ Only 3 left in stock (more on the way) - FROM	44.20	<input type="text" value="0"/>

Current Ingredients?

- TATB (tens of thousands of lbs/yr)
 - Precursor is trichlorobenzene (OCONUS source)
- TNT
 - Ingredient in Comp B (OCONUS source)
- DNAN (million of lbs/yr)
 - Precursor is 4-Nitroanisole (OCONUS source)
- CL-20
 - TADA (OCONUS source)
- BTTN
 - Butanetriol (OCONUS source)



Contracting Woes

- Why do we spend so much time and money on administering a contract? We turn scientists trying to solve real issues into administrators checking boxes
- Once a company is exposed to this culture common sense tells small business to stay out of government contracts (too much hassle)
- The best and brightest may be offering their services to other communities to avoid the hassle

Contracting Woes

- How much time and money do we waste on contract clauses? Regulatory?
 - DCAA, DCMA, DSS, ITAR, Contracting Officer, Government Property, IUID? What is next? Value added?
- Pharmaceutical Analogy
 - We need “material”, “service”, “development”
 - Standard terms, Master Service Agreement
 - 2-5 days for award
 - Purchase order
 - Signed same day
 - Start work
 - Same day



Thank you!



Questions