Exceptional service in the national interest

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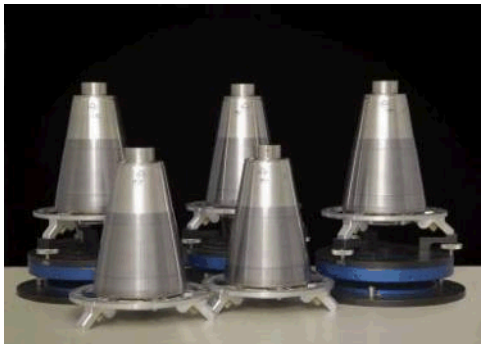

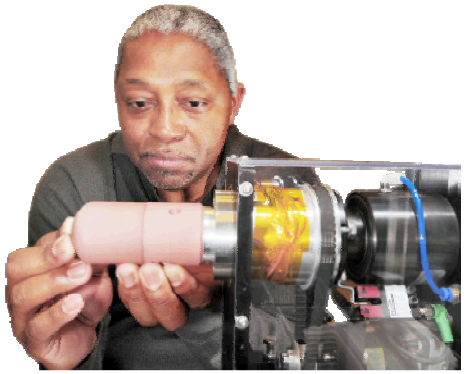

Defying Obstacles

SNL Production A Historical Review

Jaime L. Moya
Sr. Manager, Explosive Technologies & External Production

2011 Supplier Conference – October 5, 2011

U.S. DEPARTMENT OF ENERGY | NNSA

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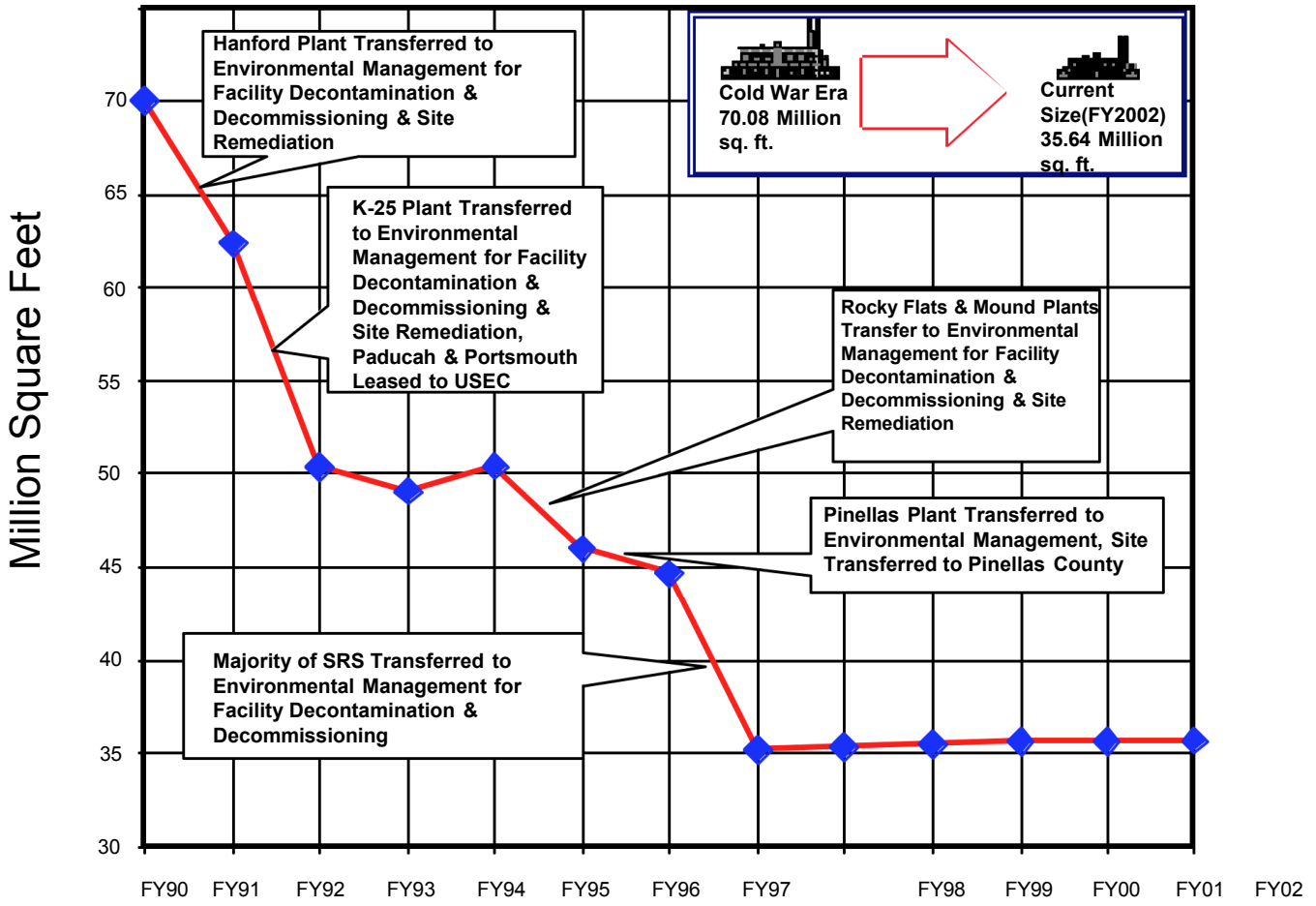
Periods of Challenge for SNL Production

- The End of the Cold War Period (FY94 – FY97)
  - Established SNL's Production Enterprise
  - Rapid Reactivation
- The End of the Complex transformation Period (FY97 – FY07)
  - First deliveries to the stockpile
- The End of LEP Design & Qualification Period (FY07 – Present)
  - Continuous Production

These Challenges Begin with Evolution of the Post Cold War Nuclear Weapons Complex



- Reconfiguration of the Production elements – *smaller, responsive and less expensive*
- Nonnuclear components – complex designs with high reliability requirements

Sandia In-House Production

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Systems
- Parachute
- Cone Ballast

Power Sources
- Thermal Batteries

Microelectronics
- Analog ASICs
- Digital ASICS
- MEMS Devices

Neutron Generators
- Neutron Generator Subassemblies
- Neutron Tubes
- Active Ceramics

External Production

Magnetics, Capacitors, Frequency Devices
- Capacitors
- Clocks
- Coils
- Inductors
- Resonators
- Transformers
- Switch tubes

Optoelectronics
- Lasers

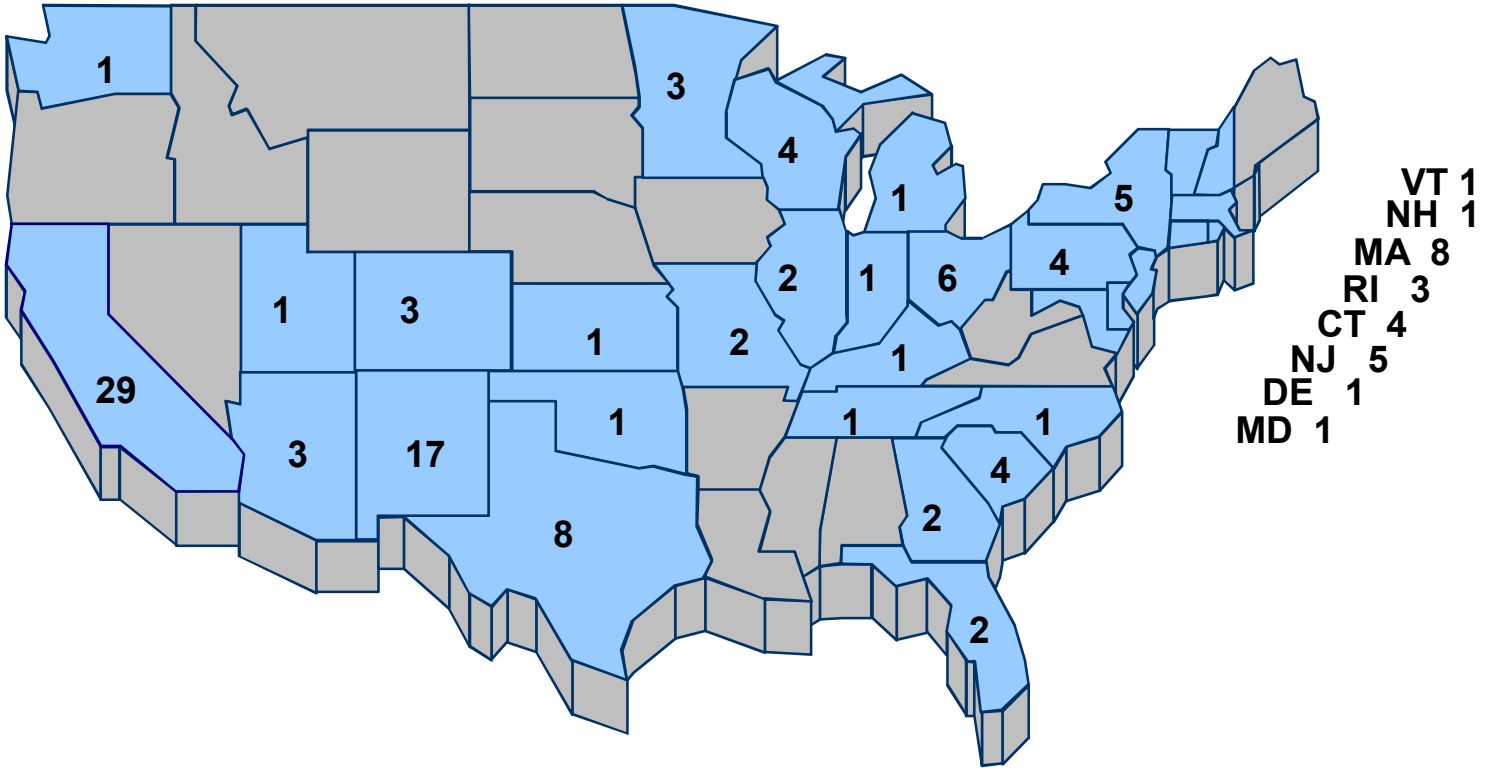
Power Sources
- Double Layer Hybrid Capacitors
- Lithium Batteries
- Silver Zinc Batteries
- Thermal Batteries
  - CoS_2 & FeS_2

Microelectronics
- Packaging of ASICs

Explosive Components
- Actuators
- Ignitors
- Primer Plates
- Spin Rocket Motors
- Percussion Primer
- Driver
- Latch Indicator
- Timers
- Detonators
- MDF

In order to strike a balance between complexity, cost, and responsiveness, SNL divided production between in-house and external

Materials Value Stream to Support In-House Production



- 126 Suppliers across 32 states
- About $12M – $13 M of expenditures per year

SNL has leveraged its Commercial Supply Base for Specialized, High-Reliability Components

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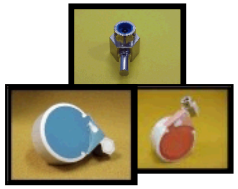
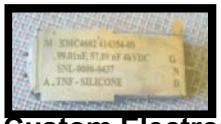


Detonators
Timer/Drivers

Datatronics
(Romoland, CA)

Capacitors

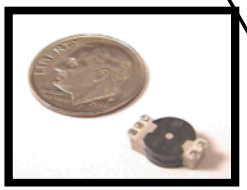


Perkin-Elmer
(Miamisburg, OH)

Custom Electronics
(Oneonta, NY)

Sprytron

Flyback
Transformer



Perkin-Elmer
(Salem, MA)

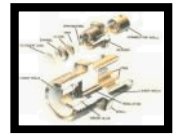
Mil-Spec, Inc.
(Pomona, CA)

Evans Capacitor
(East Providence, RI)

Statek (Orange, CA)

Ensign Bickford
(Simsbury, CT)

Vanguard
Electronics
(Huntington Beach,
CA)



Actuators

ATK Corp.
(Elkton, MD)

Pacific Scientific
(Holli

Mild Detonating
Fuse (MDF)

Eagle-Picher Industries
(Joplin, MO)

Power Sources

Spin Rocket Motor
(SRM)

Teaming with Suppliers Enables SNL to Successfully Deliver Mark Quality Product

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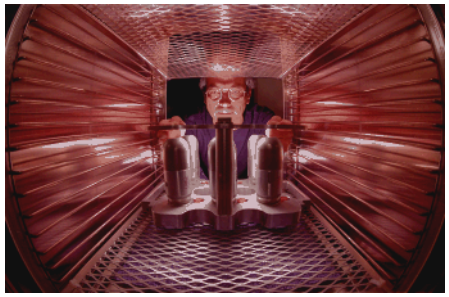


Neutron Generator Production

- FY95 – Started Construction (~$62M)
- FY97 - Plant was commissioned
- FY99 - First Mark Quality Unit
- FY08 – Shingo Award

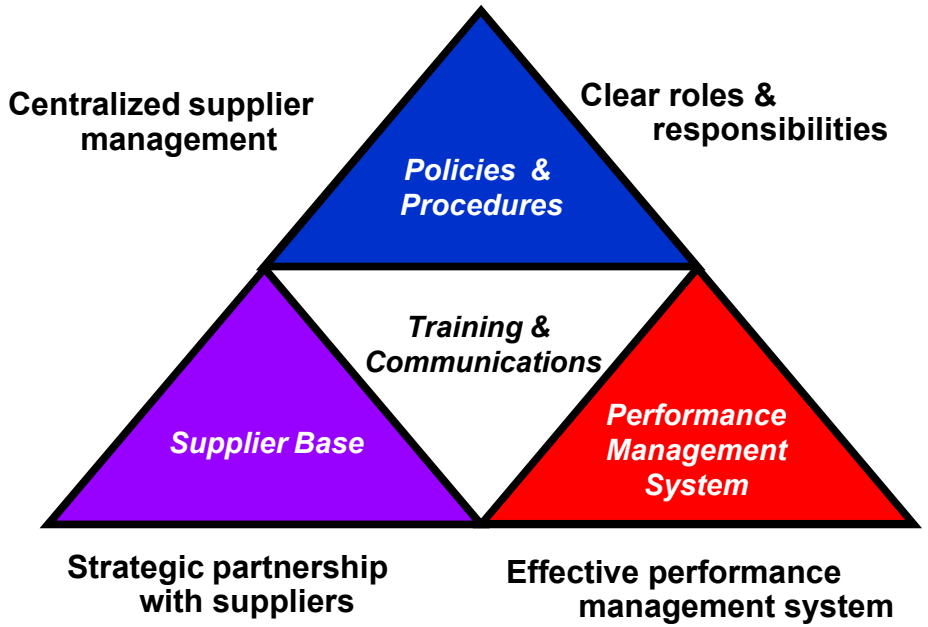
W76-1 Life Extension Program

- FY04 – Started Production Prove–In
- FY06 - First Mark Quality Units
- Present – Build-out phase

Issues Encountered During Continuous Production

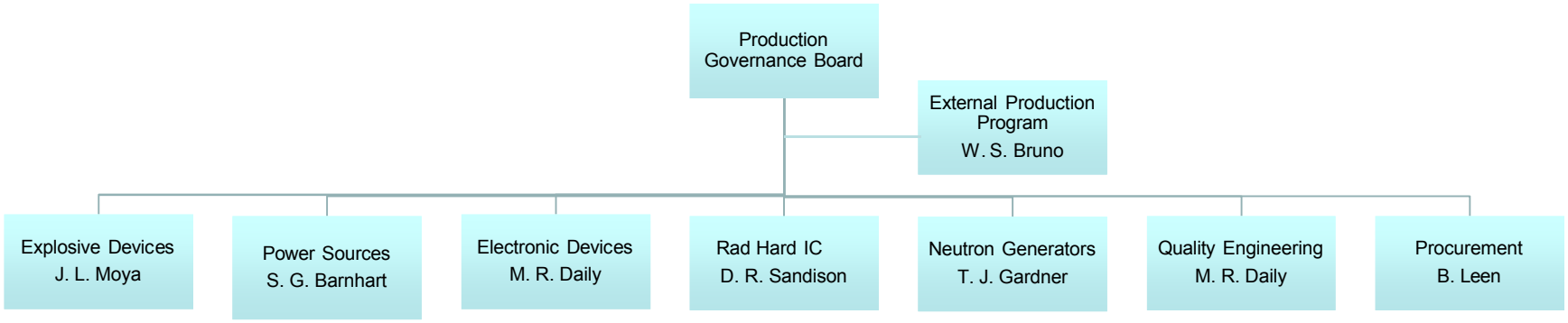
- High rate of product rejections ~15%
- Unclear quality expectations
- Utilized unqualified suppliers
- Identified weaknesses in the Supplier Quality Management System
  - Lack or substandard documentation associated with non-conformances
  - Use of un-calibrated equipment
  - Failure to actively manage second tier suppliers
  - Failure to track corrective actions
- Multiple uncoordinated supplier interfaces
  - Procurement
  - Quality
  - Metrology
  - Technical Line
- Supplier performance monitoring lacked consistency

Supplier Quality Management Framework



Goal : To develop a System that yields consistently acceptable outputs from the supply base

Production Governance Board Integrates the Core Elements of Production



Responsible for measuring and managing production activities & supplier performance

- Define metrics and their targets and track performance against metrics
  - Supplier watch list
- Ensure issues are proactively identified, characterized, communicated, and resolved
  - Conflict resolution
- Identify and disseminate best practices
  - Supplier Recognition
- Document, publishes, and capitalize on lessons learned
- Anticipate future production challenges

Quality

- Pre-acceptance
  - Type, number & severity of defects
- Acceptance
  - 1st Time Acceptance
  - Product Acceptance Defects
  - % Parts Accepted
  - Lots w/ Non-conformance
- Escapes

Delivery

- On-time delivery – Supplier & Customer

Cost

- Price per unit

FY11 Metrics Indicate Solid Performance

Quality

G

- Product Acceptance Performance (Goal = 93%)
  - **SNL acceptances – 96% YTD**
    - **8 rejections out of 186 submittals (1 rejection = Q4)**
  - **SSO acceptances – 98% YTD**
    - **1 rejection out of 54 submittals (1 rejection = Q4)**
- Product Acceptance Defects (Goal = <1 per lot)
  - **Avg. defects per submittal = .20**
  - **Explosives = 0.7**
  - **NG = 0.1**
- Escapes (Goal = < 4)
  - **2 YTD**

Delivery

Y

- Customer Delivery (Goal = 100%)
  - **External Production = 97%**
    Failures of the MC4682 impacted our ability to meet PCD schedule

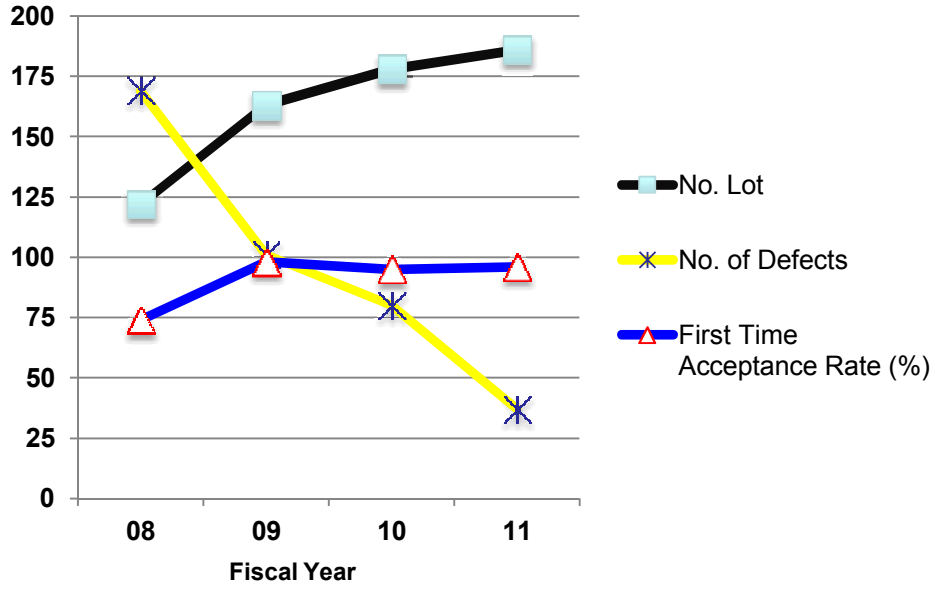
Cost

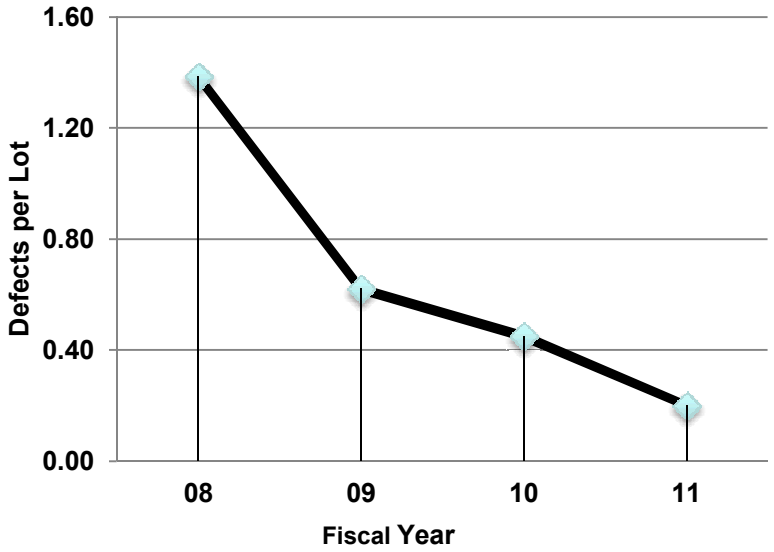
G

(Goal = increase < than rate of inflation)

- Most products are within acceptable limits
- A few products are approaching end-of-life

In Fact, Over the Last Four Years, Performance Has Continuously Improved





- Performance Improvement Driven by
  - Clarification regarding roles & responsibilities
  - Training - "Preparing for a Successful Acceptance"
  - Deployment of tools – Requirements Maps
  - Pre-acceptance process

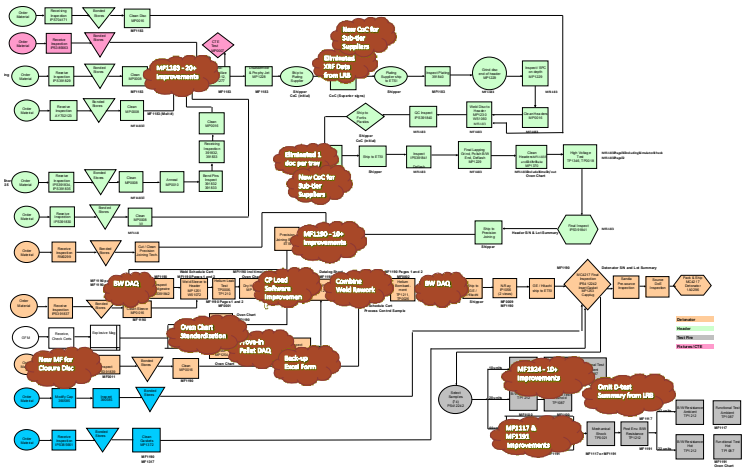
- Continuous Improvement will require
  - More cost effective strategy involves defect prevention mind-set

Defect Elimination Kaizen - A Joint Effort between Excelitas Technologies & Sandia

Goals:

- Reduce the number of documentation defects - Piece Part Cleaning thru Functional Test
- Reduce wasteful documentation in Lot Record Books
  - Redundant information
  - Unnecessary data
- Incorporate mistake proofing / error prevention into production processes

Process Map – Part Cleaning to Functional Test



Accomplishments:

- Eliminated approx. 40,000 opportunities for error/defects
- Eliminated approx. 50 pages of production paperwork from the LRB
- Eliminated approx. 22,000 fields that require manual entry

We can chart our future clearly and wisely only when we know the path which has led to the present. -Adlai E. Stevenson, US Vice President, 1893-1897

- History has shown that our partnerships are critical in our ability to overcome obstacles and support the enduring NW stockpile
- How do we ensure the future success of the production enterprise?
  - Fulfillment of the reconfiguration vision
    - *Responsive and cost-effective enterprise*
  - Our mission is clear
    - *Ensure the safety, reliability, and integrity of the nuclear weapons stockpile*
  - Remember what drives the business
    - *Exceptional service in the national interest*