

Raytheon Partnerships With Suppliers

A Win/Win

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The Outsourcing Trend...

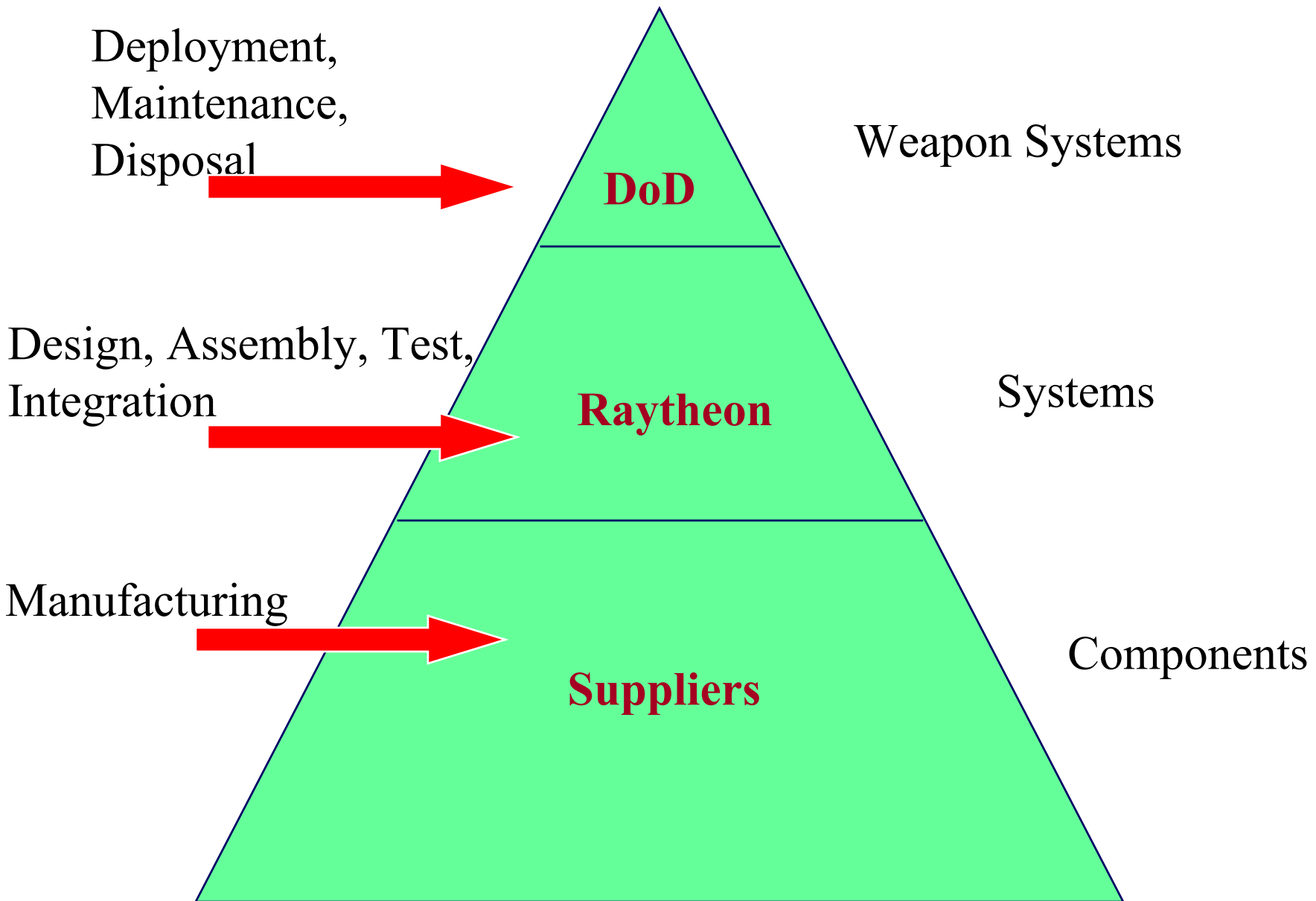
- More and more companies are outsourcing manufacturing operations
- Many wet metal finishing operations are now outsourced to small and medium sized suppliers
- The EHS burden has been “shifted” to our supplier base
 - EHS stewardship is now outsourced
- Small suppliers have limited resources

OEM Responsibility Question

- Do OEMs have a responsibility to share expertise and best practices with their suppliers for mutual benefit?
- Small to medium sized companies run very lean organizations, many times without EHS full-time equivalents (wear many hats)
- How do OEMs best interface with their suppliers?



The Big Picture



Interdependency – “*mutually dependent*”

- The web of relationships between internal company plants and external suppliers and OEMs
- Interdependency is a huge issue that many companies have not yet quantified
- Quantifying the cost impacts is complex and the numbers are staggering
- Supply chain business interruption impacts can be devastating to business
- Risk insurers provide coverage for business interruption
- Therefore, insurers have a vested interest in the viability of supplier operations

OEM / Supplier Relationships

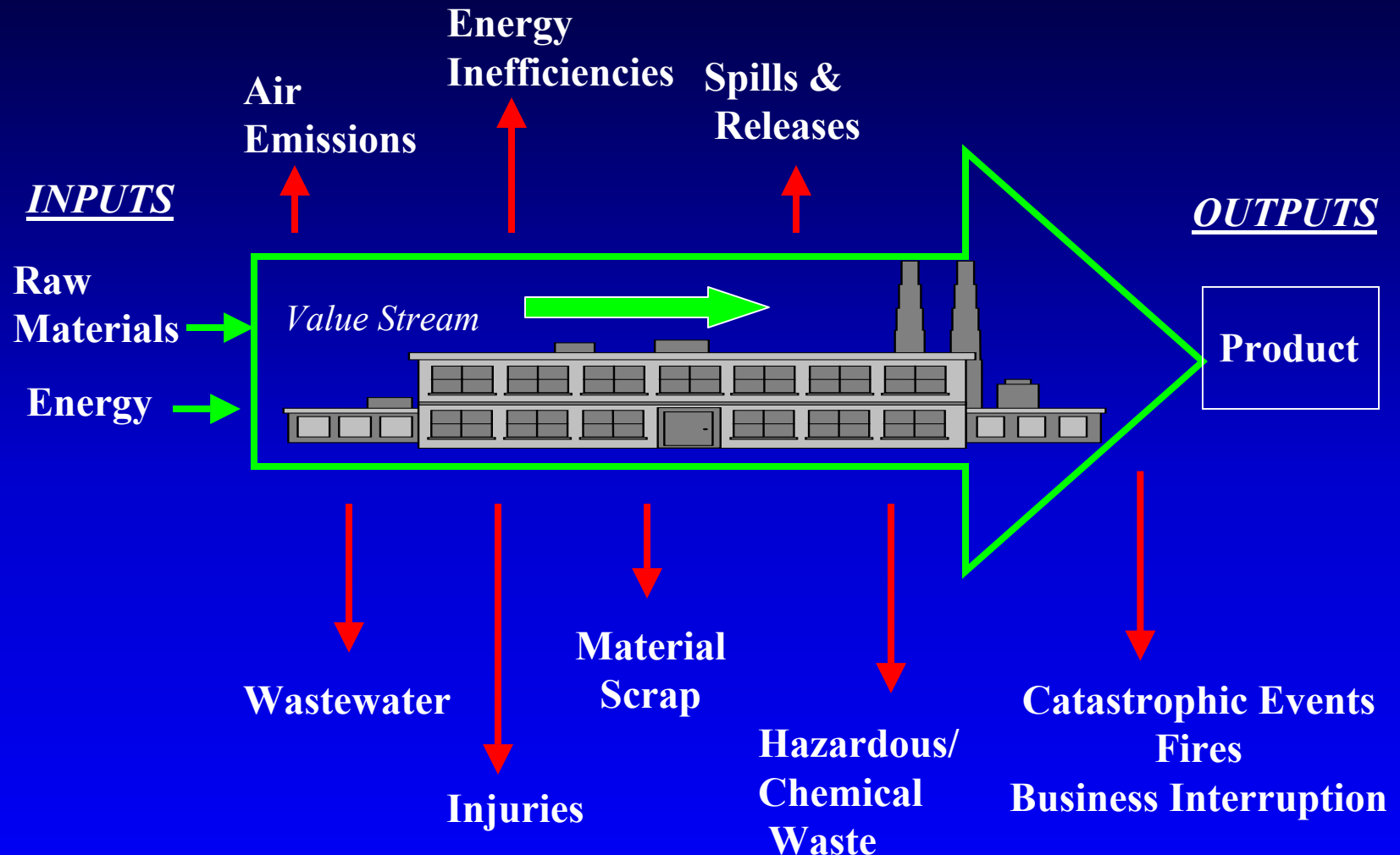
- OEM's can mentor suppliers in their supply chain
- It's the right thing to do....
- It makes good business sense
- Ensures the integrity of the supply chain
- How to best work together takes some innovative thinking...

EHS performance is a barometer of business performance

Good EHS is good business



Value Stream Defects / Inefficiencies



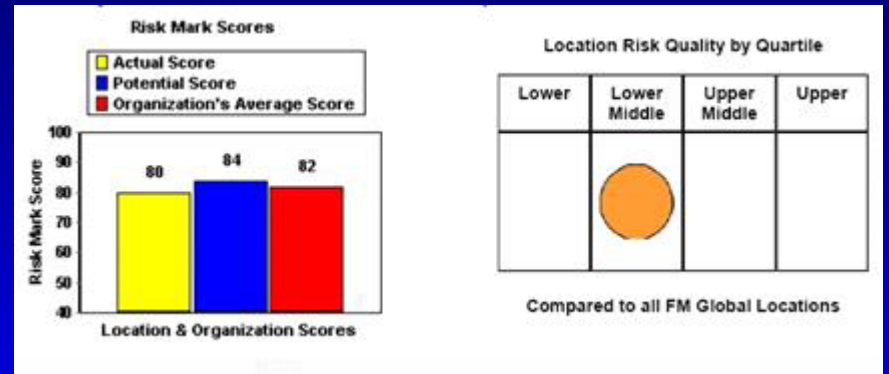
OEM / Supplier Relationships

- **Several examples of partnerships with suppliers:**
 - **Supply Chain Partnerships**
 - **Asset protection evaluations of key suppliers by Raytheon's property insurer**
 - **Asset protection – Raytheon lessons learned**
 - **Share master agreements with our supply chain**
 - **Central chemical management services**
 - **EPA Green Suppliers Network**



Asset Protection Evaluations of Key Raytheon Suppliers Raytheon

- Raytheon property insurer would perform asset protection evaluations of key Raytheon suppliers
- Detailed report generated would be forwarded to the supplier to help assist them with identifying and mitigating their asset protection risks
- It's a win/win/win for Raytheon, the supplier, and the insurer



Understanding the Hazards at this Facility

The most significant hazard at this facility is the large quantity of combustible liquids in the large bay areas of Building Nos. 3 and 3E. The large quantity of combustible liquids can create a severe fire resulting in the loss of the building and contents. Adequate protection is achieved by the use of AFFF foam water deluge systems protecting these large areas.

Reliability of the fire protection water supply for Building No. 3 is severely impaired due to the lack of control and access to the fire pumps for this building. This will be minimized by the project that is being worked on to use of the fire protection water supply that is available for Building No. 3E.



Asset Protection Evaluations of Key **Raytheon** Suppliers

- The theory is that if we evaluate a supplier's operation from an asset protection perspective, they will take step to mitigate risks
- Raytheon would provide the supplier the FM Report for their use and evaluation
- If appropriate a Raytheon asset protection specialist could help the supplier sort out the issues and develop a corrective action plan



Asset Protection Broadly Defined

- **Protection of:**
 - **People- your most valuable asset**
 - **Buildings / Infrastructure**
 - **Product**
 - **Inventory- parts/finished goods, WIP, customer's parts**
 - **Business continuity**
 - **Earning potential**



Your Most Valuable Asset...

No one wants this.....



The Business Case for Asset Protection

- **Asset protection makes good business sense**
- **Properly run asset protection programs**
 - **Avoid business interruption**
 - **Lower insurance costs**
 - **Protect people, property and earning potential**
 - **Contribute to supply chain integrity / reliability**

Raytheon Lessons Learned for Suppliers

- Heated polypropylene tanks
- Bonding and grounding of flammable liquids
- Thermography studies

The Heated Combustible Tank Immersion Heater Issue

- Polypropylene tanks outfitted with electric immersion heaters
- Polypropylene is combustible
- Low liquid condition, heater can runaway and catch the tank on fire
 - Polypropylene burns like a flammable liquid- fire spread
 - Acrid, toxic smoke, particulates in the air = smoke damage
- Most plating shops have experienced some type of heater malfunction in a polypropylene tank
 - Meltdown or fire may result

Typical Poly Hood



What's Raytheon's History?

- Several major fires related to poly hoods / plating tanks
- Source of ignition?
 - Exclusively electrical in nature, not flammable liquids
- What's the control / preventive measure?
 - Fire detection and suppression in poly hoods / duct work
 - Limit flammable storage in under hood cabinets
 - Evaluation of use of polypropylene to house electricals
 - In some cases, updated to stainless hoods



Polypropylene hood fire
FM Global Research Center – November 2004



What's The Solution?

- Provide necessary overheat controls on immersion heaters
- Inspect and test the devices periodically to ensure proper operation (quarterly)
 - Why? Corrosive / wet environments under which they operate
- If feasible, use stainless tanks in place of heated poly tanks (cost)
- Check with vendors about alternative materials

Bonding and Grounding of Flammable Liquids

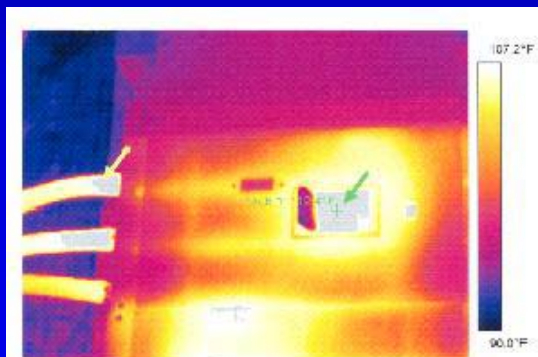
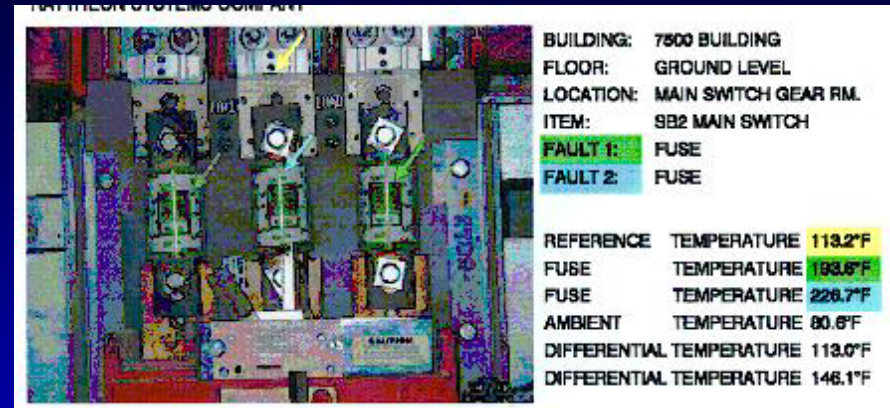


Thermographic Evaluations

- **Use of infrared technology to assess the health of the electrical distribution system, among other uses – preventive maintenance, energy audits etc.**
- **Identify potential problem areas BEFORE they cause problems**
 - **Hot spots or overheating in electrical distribution equipment – fuses, breaker panels etc.**
 - **Overheating bearings in critical equipment**
 - **Energy loss evaluations for roofs, walls, windows etc.**
- **Unique skill set required to ensure data generated is useful / practical (Certification)**

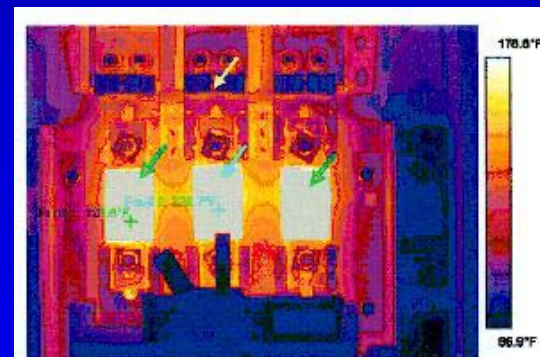


Thermographic Images



EXPLANATION:

HEAT IS BEING CREATED AT TOP 400 AMP BREAKER, INTERNAL. THIS BREAKER SHOULD BE REPLACED.

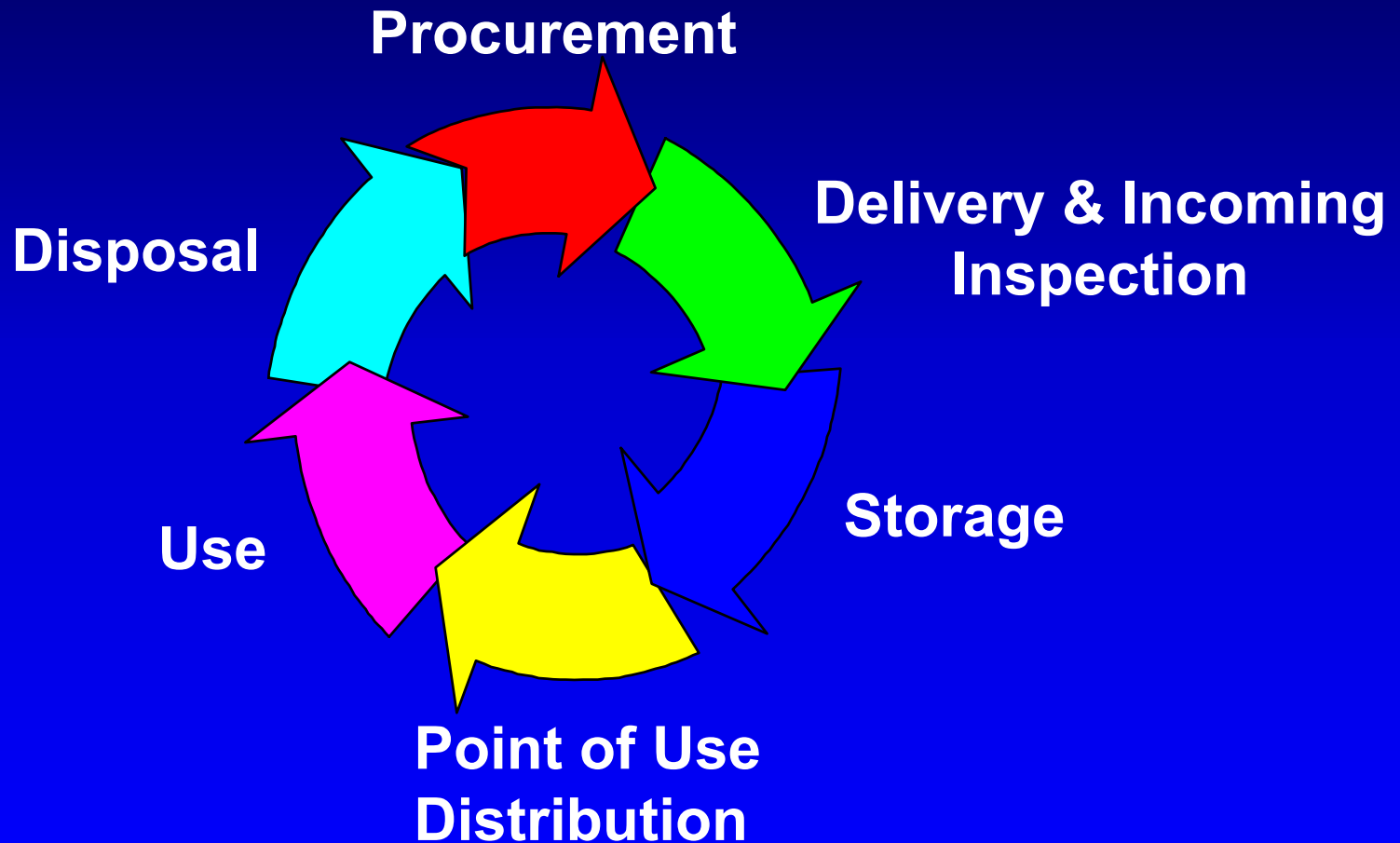


EXPLANATION:

HEAT IS BEING CREATED AT A PHASE, B PHASE AND C PHASE FUSES BECAUSE OF LOAD. FUSES SHOULD BE 1600 AMPS AS THE SWITCH IS RATED AT 1600 AMPS.

Central Chemical Management Services

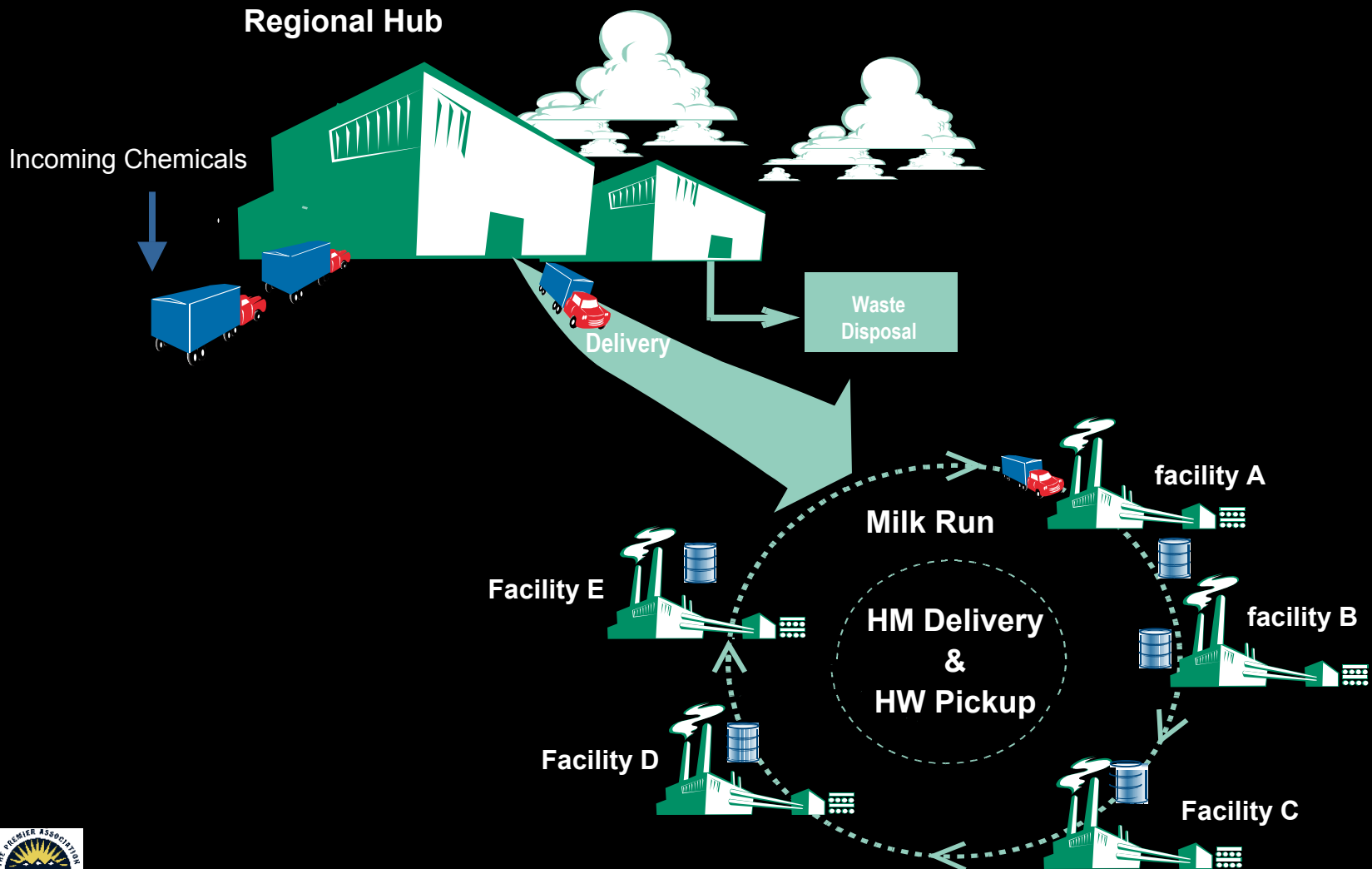
Chemical Life-Cycle Stages



Total Chemical Life-Cycle Costs

- Procurement
- Delivery and Incoming Inspection
- Storage
- Point of use distribution
- Use
- Disposal
- PPE
- Specialized storage areas
- Specialized fire detection and suppression systems
- Insurance
- Spills / releases
- Permitting and reporting requirements

Central Chemical Management



Advantages of Central Chemical Management

- On-line MSDS's - 24/7
- On-line ordering from "catalog"
- One invoice versus many
- "Free" environmental report data
 - Algorithm built in to do calculations for SARA 313 reporting
 - EPA TRI, MA TURA (Form Ss)
 - Target chemical queries- lead, cadmium, beryllium etc.
- Just-in-Time (JIT) chemical delivery
 - Fewer shelf life issues (labpack reduction= cost savings)
- Potential to track chemical use to department or machine at point of use
- No need for incoming inspection of chemicals
- Pollution prevention initiatives
 - Incentive to lower chemical usage
- Greatly reduced on-site chemical storage



Uniquely Incentivized Agreements

- Incentivized to minimize chemical use
- Goal is to make chemical use more efficient
- Identify less hazardous chemical substitutes
- Cost share agreement between customer and central chemical mgt. supplier

Advantages of Reduced On-Site Chemical Volumes

- Minimization or elimination of chemical storage space = increased production space
- Lowered risk to host community
- Lessened need for specialized fire detection / suppression systems
- Lowered overall facility risk = asset protection
 - Fewer flammable liquids on-site, fewer spills/releases

Why Central Chemical Management for Suppliers?

- Lower, fresher on-site chemical inventory
- Increased buying power for the supplier (min buys)
- Reduced labpack disposal needs
- Increased quality of parts / services



The Green Suppliers Network - EPA

- **Clustering of suppliers by category**
 - **Automotive, Aerospace etc.**
- **Suppliers are approached for lean manufacturing evaluations of their operations**
- **Evaluations are done by respective state Manufacturing Extension Partnerships (MEP)**
- **Some cost sharing is done with EPA and the supplier**
- **Resulting report provides the supplier ideas for making their operations more efficient**
- **Confidentiality of information is preserved (competition sensitive)**

Lean & Clean Outcomes



- Efficient use of labor, time and capital
- Efficient use of energy and raw materials
- Maximum quantity of products from least number of inputs
- Create a pathway for growth without an equal rise in consumption
- Sustained business viability

GSN Review Approach



- GSN reviews follow established 360vu Lean & Clean procedures that concentrate on the root causes of waste in selective processes and provide a framework for successful implementation
- A 360vu advisor will be assigned to each GSN review to work closely with the supplier's management team to establish a project plan with defined tasks and deliverables
- The 360vu advisor provides real-time coaching / facilitation in addition to training and knowledge transfer throughout the process

In Summary.....

- **Improving our suppliers fosters the integrated supply chain concept**
- **OEMs have a responsibility to share expertise and best practices for mutual benefit of stakeholders**
- **Helping our suppliers will help us grow our business and delight our customers**



What are the Challenges?

- Figuring out how best to assist suppliers with their EHS challenges
- Proceeding in concert with legal department concerns...
- Striking the balance of mentoring....not strong arming
- Getting more integrated with supply chain management and quality organizations
- Getting EHS on the SCM radar screen
 - Currently the attributes are cost, quality and delivery.....
- Implementing a program enterprise-wide

