



# **Green Chemical Management and DOE O 450.1A**

## ***Where We Are . . . Where We Want to Be***

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Office of Environmental Policy and Assistance, HS-22  
Joint EFCOG/DOE Chemical Safety and Lifecycle  
Management Workshop  
March 10-12, 2009



# Background



- EO 13423, *Strengthening Federal Environmental, Energy and Transportation Management*, directed Federal agencies to eliminate or reduce the quantity of toxic chemicals, including ozone-depleting substances, acquired, used, or disposed.
- DOE Order 450.1A, *Environmental Protection Program* and its CRD revised to implement EO requirements complex-wide.
- EO Implementing Instructions directed agencies to develop a plan for identifying and reducing the release and use of toxic chemicals.
- DOE/EFCOG Chemical Safety Topical Committee (CSTC) formed a Task Team to evaluate how the Department should comply with the EO toxic chemical reduction provisions.
- Recommendations of the CSTC formed the basis of DOE's toxic chemical reduction plan, and related-revisions to DOE O 450.1A.



# Background



- *CSTC's key recommendation: Use a site-specific, EMS-based approach*
  - No corporate (one-size-fits-all) reduction targets, no limiting lists of chemicals
  - Sites to reduce/eliminate toxic chemicals through their Environmental Management Systems (EMS):
    - Determine site-specific chemicals, reduction goals, and actions --considering site characteristics
    - Establish goals and actions as objectives and measurable targets, respectively, in EMS
    - Report measured performance annually through the on-line Pollution Prevention Tracking and Reporting System



# Other CSTC Recommendations



- Update DOE O 450.1 to reflect EO requirements
- Modify and add reporting elements to reflect toxic chemical reduction requirements to DOE's Pollution Prevention Tracking and Reporting System (PPTRS)
- Use PPTRS to monitor and assess performance in meeting site EMS objectives and targets and achieving DOE's sustainable environmental stewardship goals (O 450.1A)
- Develop, apply, and share tools to make using non- or less-toxic alternatives more feasible
- Cover full life-cycle of chemical management



# Progress in Meeting CSTC Recommendations



- DOE O 450.1A contains sustainable environmental stewardship goals, including a green chemical management goal to implement EO toxic chemical reduction provisions
- DOE O 450.1A requires reporting of toxic chemical reduction progress through PPTRS
- PPTRS now includes reporting elements to track toxic chemical reduction progress
- DOE Guide 450.1A-*alpha* (draft) includes sustainable practices and “example” EMS objectives and targets to help enhance green chemical management



# DOE O 450.1A Green Chemical Mgt. Goals



- Reduce or eliminate the acquisition, use, and release of toxic and hazardous chemicals and materials
- Maximize the acquisition and use of environmentally preferable products in the conduct of operations
- These goals, along with sustainable practices, are found in Attachment 2 of DOE O 450.1A, *Environmental Protection Program*



# Site Progress in Meeting DOE O 450.1A Green Chemical Management Goals



- Green Chemical Management in EMS
  - Sites reporting successes and best practices
- PPTRS Reporting
  - New toxic chemical reduction elements
  - Awards and accomplishments



# Green Chemical Management in EMSs – Reported Successes



- Implemented major effort to dispose of unneeded chemicals (Y-12)
- Initiated chemical reduction program (SLAC-NAL)
- EMS process helps to identify interim milestone steps (SLAC-NAL)
- Established chemical control program for depleted uranium hexafluoride conversion project (Portsmouth)
- Chemical management practices have “minimized the generation of chemical and hazardous wastes” (Bettis)





# Green Chemical Management in EMSs – Reported Best Practices



- Publish list of site-specific chemicals headed for disposal to encourage reuse (NETL)
- Evaluate chemicals proposed for on-site use for potential impacts on site environmental compliance (Paducah)
- Initiate pilot chemical management service to improve lifecycle management of chemicals (PNL)



# Recent Green Chemical Management Awards



## 2008 Closing the Circle P2 Star Awards – Honorable Mentions

- Green Chemistry Saves Big Bucks (SNL)
- Using EMS to Improve Chemical Management (PNL)



# Recent Green Chemical Management Award Nominations



## 2008 Closing the Circle P2 Star Award Nominations

- Recycling of R-114 chlorofluorocarbons (Portsmouth)
- Using online chemical exchange program to avoid future accumulation of unneeded chemicals (SNL)
- Partnering with university campus chemical redistribution program (SLAC)



# Recent Green Chemical Management Accomplishments



- Instituted solvent recycle and purification to minimize solvent use and waste generation (ORNL/CNMS)
- Rolled out *ChemAgain*, a chemical redistribution program to divert useable excess chemicals from the laboratory's waste stream (PNL)
- Revised management of lead solder scrap to eliminate generation of hazardous waste (ORNL)
- Procured green janitorial cleaners (SLAC)



# Where do we want to be?



- More sites meeting more green chemical management goals
- DOE recognized as a federal leader in green chemical management



# Open Discussion: How do we get there?



## Some Ideas:

- Training – Topics? Formats?
  - EPA, industry programs (e.g., cradle-to-cradle design)
  - New laws, regulations, requirements (e.g., California Green Chemistry Initiative)
  - Technical (e.g., product substitution/process change)
- Green Chemical Management Guide
  - Best practices, lessons learned, tools, and web-based resources
  - Other?



# Open Discussion: How do we get there?



## Some Ideas:

- Awards
  - President's Green Chemistry Challenge (EPA)
  - Closing the Circle
- Technical and other assistance
  - Networks (e.g., monthly/quarterly green chemical management calls)
  - Site visits (to share information)
  - Short webinars on specific topic or site
- Other?



# For further information



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# Supplemental slides



# Sample sustainable practices for reducing acquisition, use, and release of toxic chemicals



- Establish objectives and targets for minimizing acquisition, use, and disposal. For example
  - Use more environmentally benign solvents and solventless systems
  - Design products and processes that reduce or /eliminate the use and/or generation of hazardous substances
- Use tools (e.g., Green Chemical Alternatives Purchasing Wizard) to identify more benign alternatives
- Participate in voluntary environmental partnership programs



# Sample sustainable practices for maximizing acquisition and use of environmentally preferable products



- Establish environmentally preferable purchasing objectives and targets
- Specify environmentally preferable products in the acquisition of site supplies and services, such as
  - Recycled-content products
  - Biobased-content products
  - Acceptable substitutes for ozone depleting substances
  - EPA Energy Star and FEMP-designated projects
- Participate in voluntary environmental partnership programs



# New Toxic Chemical Reduction Elements in PPTRS



- Has the site identified its list of toxic chemicals and materials for which reduction goals will apply?
- Has the site identified the actions it plans to take to meet its toxic chemical reduction goals?
- Please describe your site's progress in achieving the site's toxic chemical reduction goals. Include description of the chemicals being targeted, the reduction goals, efforts completed to date, and next steps, if any.
- Has your site implemented a chemical inventory tracking system that integrates information throughout the entire chemical lifecycle covering procurement, storage, use, transfer/movement, and final disposition?



# New Toxic Chemical Reduction Elements in PPTRS (Con't)



- Does your site use tools such as the Green Chemical Alternatives Purchasing Wizard to identify more environmentally benign alternatives and substitutes for laboratory-related chemicals or processes?
- Does the EMS include practices to maximize the use of safe alternatives to ODS?
- Does the site participate in a voluntary environmental programs such as National Environmental Performance Track or the National partnership for Environmental Priorities?
- Have objectives and targets for achieving toxic chemical use and release reduction goals been established in the EMS?

