



DEPARTMENT OF THE ARMY  
OFFICE OF THE ASSISTANT SECRETARY  
INSTALLATIONS AND ENVIRONMENT  
110 ARMY PENTAGON  
WASHINGTON, DC 20310-0110

JAN 28 2009

SAIE-ESOH

MEMORANDUM FOR

Assistant Chief of Staff for Installation Management, 600 Army Pentagon Washington,  
DC 20310-0600  
Commander, U. S. Army Materiel Command, 9301 Chapek Rd., Ft. Belvoir, VA 22060

SUBJECT: Reducing Toxic and Hazardous Chemicals under Executive Order (EO)  
13423, *Strengthening Federal Environmental, Energy and Transportation Management*

1. The Under Secretary of Defense for Acquisition Technology and Logistics, 3 Dec 08, memorandum, subject as above (Enclosure 1) requires the Services to implement a Toxic and Hazardous Chemical Reduction Plan. The Army Plan (Enclosure 2) was developed with input from your staffs and is also enclosed. The plan will be effective as of the date of this memorandum.
2. The Plan targets reductions of trichloroethylene, methylene chloride, and hexavalent chromium in specific applications by significant industrial users. It is based on existing reduction efforts and will have minimal reporting requirements based on existing data sources. I am requesting assistance from your staffs in fixing a calendar year 2009 baseline for the three chemicals, targeted reductions for calendar years 2010 through 2013, and appropriate reporting mechanisms.
3. My point of contact for this action is Mr. Robert Luther at (703) 697-4032.

Enclosures

Tad Davis

Addison D. Davis, IV  
Deputy Assistant Secretary of the Army  
(Environment, Safety, and Occupational Health)

- GREATLY APPRECIATE  
YOUR SUPPORT OF  
THIS IMPORTANT  
INITIATIVE!



ACQUISITION,  
TECHNOLOGY  
AND LOGISTICS

THE UNDER SECRETARY OF DEFENSE  
3010 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3010

DEC - 3 2008

MEMORANDUM FOR SECRETARY OF THE ARMY  
SECRETARY OF THE NAVY  
SECRETARY OF THE AIR FORCE  
UNDER SECRETARY OF DEFENSE (COMPTROLLER)  
DEPUTY UNDER SECRETARY OF DEFENSE  
FOR ACQUISITION AND TECHNOLOGY  
DEPUTY UNDER SECRETARY OF DEFENSE  
FOR LOGISTICS AND MATERIAL READINESS  
DIRECTOR, DEFENSE RESEARCH AND ENGINEERING  
ASSISTANT SECRETARY OF DEFENSE (NETWORKS  
AND INFORMATION INTEGRATION)  
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE  
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Reducing Toxic and Hazardous Chemicals under Executive Order (EO)  
13423, *Strengthening Federal Environmental, Energy and Transportation  
Management*

The Department of Defense (DoD) has implemented policies and programs to manage and reduce its toxic and hazardous chemicals use over the last decade. In accordance with the *DoD Agency-Level Toxic and Hazardous Chemicals Reduction Plan* (the Plan) submitted to the Office of the Federal Environmental Executive (OFEE), DoD conducted an analysis that revealed further opportunities for improving DoD chemical management and lifecycle costs. The plan must be implemented by January 9, 2009. To comply, each Service will:

- Identify a minimum of three toxic/hazardous chemicals for reduction, potential elimination, or replacement by less toxic/hazardous chemicals, using the EO 13423 Implementing Instructions' criteria of March 29, 2007, in Attachment A.
- Establish current-usage "baselines" for the identified chemicals from best-available information sources, in order to develop future-usage benchmarks, in keeping with the intent of the Plan.
- Report to the DoD Environmental, Energy and Transportation Executive Committee the planned reductions of current usages and estimated required resources. Additional guidance is provided in Attachment B.

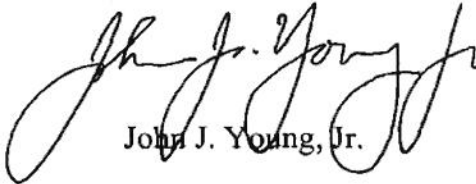
Encl 1



As DoD's supply chain integrator and manager of many of the Services' hazardous materials, the Defense Logistics Agency will assist the Services in their efforts to comply with the Plan. Areas of opportunities exist in product specification review/revision, product substitution possibilities, and introduction of green products.

The purchase of Electronic Product Environmental Assessment Tool registered products is required by EO 13423 and the DoD Electronic Stewardship Plan. Draft OFEE guidance of July 1, 2008, is included as a reduction strategy in Attachment C.

The above measures will be adopted in appropriate DoD policy. My point of contact is Dr. Carole LeBlanc at 703-604-1934.



John J. Young, Jr.

Attachments:  
As stated

**Attachment A.**

**EO 13423 Implementing Instructions Criteria  
for the Selection of Toxic and Hazardous Chemicals  
to Reduce or Eliminate**

1. Quantity of the chemical or material in use by the agency
2. Human and/or environmental toxicity of the chemical
3. Potential for human and/or environmental exposure to the chemical or material
4. Potential harm to the environment associated with the use or release of the chemical or material, including impacts to air quality, surface water, groundwater, soils/land, and climate systems
5. Persistence of the chemical in the environment
6. Availability of controls to manage identifiable risks
7. Impacts on mission capability and business costs
8. Existing environmental hazard lists such as priority chemicals identified by EPA's Resource Conservation Challenge, and any agency-specific toxic or hazardous chemicals lists, [www.epa.gov/epaoswer/osw/conservation/priorities/chemical.htm](http://www.epa.gov/epaoswer/osw/conservation/priorities/chemical.htm)
9. The available substitutes for ODSs identified by EPA's Significant New Alternatives Policy Program, [www.epa.gov/ozone/snap/index.html](http://www.epa.gov/ozone/snap/index.html)
10. Contaminants identified by the U.S. Geological Survey as part of its National Reconnaissance of Emerging Contaminants, <http://toxics.usgs.gov/regional/contaminants.html>
11. Where appropriate, regional- and watershed-based environmental improvement efforts such as the Chesapeake Bay Prioritized Chemicals of Concern Program, the Great Lakes Bi-national Strategy or local watershed efforts.

**Attachment B.**

**Green Procurement Programs (GPPs) and Alternative Chemicals**

Joint Strike Fighter (JSF) Hazardous Material Screening Tool:	Contact David.Asiello@osd.mil or (703) 571-9068
OSD Comparative Report on Services' Chemical Ranking Systems:	Contact Carole.LeBlanc@osd.mil or (703) 604-1934
<p>DoD GPP  <a href="http://www.acq.osd.mil/dpap/Docs/policy/greenprocurement/GPP%20Strategy%2009082004.doc">www.acq.osd.mil/dpap/Docs/policy/greenprocurement/GPP Strategy 09082004.doc</a>                  Defense Technical Information Center (DTIC), Service GPPs searchable  <a href="http://www.dtic.mil">www.dtic.mil</a>                  Defense Logistics Agency (DLA) Green Procurement Report (GPR)  <a href="http://www.dlis.dla.mil/erisgpr">www.dlis.dla.mil/erisgpr</a>                  Federal Acquisition Regulation (FAR) – Affirmative Procurement Programs:                  Contracting for Environmentally Preferable Products and Processes  <a href="http://acquisition.gov/far/current/html/Subpart%2023_7.html">http://acquisition.gov/far/current/html/Subpart%2023_7.html</a>                  Office of the Federal Environmental Executive (OFEE) Green Purchasing  <a href="http://www.ofee.gov/gp/gp.asp">www.ofee.gov/gp/gp.asp</a>                  General Services Administration (GSA) Environmental Initiatives  <a href="http://www.gsa.gov/Portal/gsa/ep/home.do?tabId=10">www.gsa.gov/Portal/gsa/ep/home.do?tabId=10</a>                  Joint Service Solvent Substitution (JS3) Database  <a href="https://js3.ctc.com">https://js3.ctc.com</a>                  Joint Group on Pollution Prevention (JG-PP) Projects  <a href="http://www.jgpp.com/projects/projects_index.html">www.jgpp.com/projects/projects_index.html</a></p>	<p>Strategic Environmental Research &amp; Development Program  <a href="http://www.serdp.org">www.serdp.org</a>                  Environmental Security Technology Certification Program  <a href="http://www.estcp.org">www.estcp.org</a>                  Advanced Surface Engineering Technologies for a Sustainable Defense, ASETSD                  Defense formerly the Hard Chrome Alternatives Team (HCAT) runs a public website at <a href="http://www.hazmat-alternatives.com">www.hazmat-alternatives.com</a> and a pass-worded site at <a href="http://www.materialoptions.com">www.materialoptions.com</a>                  EPA Environmentally Preferable Purchasing (EPP)  <a href="http://www.epa.gov/epp/pubs/products/index.htm">www.epa.gov/epp/pubs/products/index.htm</a>                  EPA Design for the Environment (DfE)  <a href="http://www.epa.gov/df">www.epa.gov/df</a>                  USDA Biobased Products  <a href="http://www.biobased.oce.usda.gov">www.biobased.oce.usda.gov</a>                  Green Seal (U.S. non-profit organization)  <a href="http://www.greenseal.org">www.greenseal.org</a></p>

**Worksheet for Implementing EO 13423 Chemical Reductions\***

The Services are to inform the DoD Environmental, Energy and Transportation Executive Committee whether a planned reduction is expected to be within budgeted resources, or requires reprogramming.

SERVICE:						
Identification of Chemicals Due to OSD by January 9, 2009 (minimum of three)	Chemical Name and CAS Number, if applicable	Family (F) or Type (T) or Not applicable (N/A)	Baseline/year (approx. pounds, gallons, etc. used) <sup>1</sup>	As of (approx. dates)	Based on Est. Total Usage OR Est. <sup>2</sup> Intensity-specific Usage (please describe)	<sup>3</sup> Reduction Goals
Toxic/Hazardous Chemical 1						
Reasons for Selection:						
Toxic/Hazardous Chemical 2						
Reasons for Selection:						
Toxic/Hazardous Chemical 3						
Reasons for Selection:						
<sup>1</sup> May require the monitoring of credit card/local purchases for accurate record keeping.						
<sup>2</sup> Could reflect the substantial use of a chemical in a particular application, for which better data are available.						
<sup>3</sup> Realistic But Meaningful Reduction Goals Due to OSD by January 9, 2009 (may be reported as percentages).						

- \*Toxic/hazardous chemicals can be identified for reduction by, for example,
- (1) Specific chemical name and CAS (Chemical Abstract Service) Number
  - (2) Chemical family (for instance, those products containing hexavalent chromium) or
  - (3) Chemical type (i.e., those products with significant global warming potentials, but may not otherwise be related).

**IMPORTANT**

**Hazardous Materials (HAZMAT) Pharmacies and improved ERP (Enterprise Resource Planning) systems may be critical in establishing current baselines and future benchmarks affordably and accurately.**

**In particular, standardized Product Hazard Data (PHD) and Hazardous Process Authorizations (HPA) are key enablers of hazardous materials tracking and control. Otherwise, it may be too resource-intensive to maintain 24/7 awareness of HAZMAT usage.**

Guidance For Federal Agencies:  
How to Use EPEAT to Meet Your E.O. 13423 Toxic and  
Hazardous Chemicals and Materials Reduction Goals

**Purpose**

This document provides guidance for federal agencies that choose to include the purchase of Electronic Product Environmental Assessment Tool (EPEAT) registered products as a strategy for achieving the toxic and hazardous chemicals and materials reduction goals of Executive Order (E.O.) 13423, "Strengthening Federal Environmental, Energy, and Transportation Management." Use of this guidance is **not required** for any federal agency or facility.

**Background Information**

E.O. 13423 and the March 2007 E.O. Implementing Instructions established the following goals and requirements for electronic stewardship and toxic and hazardous chemicals and materials reduction:

- Section 2(e) of E.O. 13423 requires Federal agencies to "ensure that the agency (i) reduces the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency..." Section 3(a) of the E.O. requires Federal agencies to "implement within the agency sustainable practices for... (vi) reduction or elimination of acquisition and use of toxic or hazardous chemicals..."
- Section 2(h) of E.O. 13423 requires that "In implementing the policy set forth in section 1 of this order, the head of each agency shall: (h) ensure that the agency (i) when acquiring an electronic product to meet its requirements, meets at least 95 percent of those requirements with an Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic product, unless there is no EPEAT standard for such product."
- Section VIII.A of the E.O. Implementing Instructions specify that "No later than January 24, 2008, each agency, at all appropriate organizational levels including appropriate facilities, organizations, and acquisition activities, shall develop *written goals* and *support actions* to identify and reduce the release and use of toxic and hazardous chemicals and materials, including toxic chemicals, hazardous substances, ozone-depleting substances (ODSs), and other pollutants that may result in significant harm to human health or the environment."
- Section XII of the E.O. Implementing Instructions specify that "by May 1, 2007, each agency shall develop and submit to OFEE a plan to implement electronics stewardship practices for all eligible owned or leased electronic equipment in support of the goals in section 2(h) of the E.O. The plan shall: (1) Address the three life-cycle phases for electronics assets: acquisition, operations and maintenance, and end-of life. (2) Be developed and implemented in coordination with the energy, environmental, information technology, acquisition, financial and property officers, and facility managers and maintenance personnel, within each agency. (3) Address how the agency will: (i) Acquire 95 percent of its electronic products as Electronic Product Environmental Assessment

## Guidance For Federal Agencies: How to Use EPEAT to Meet Your E.O. 13423 Toxic and Hazardous Chemicals and Materials Reduction Goals

Tool (EPEAT)-registered (for products for which there are EPEAT standards). a. Agencies will ensure applicable IT contracts incorporate appropriate language for the procurement of EPEAT-registered equipment, and address any future FAR clauses related to EPEAT. b. Agencies will strive to purchase to EPEAT Silver rated electronic products or higher if available.”

Federal agencies may address these sections of the E.O. and Implementing Instructions by 1) purchasing EPEAT-registered electronic equipment; and 2) including the purchase of EPEAT-registered equipment as a strategy for reducing their acquisition, use, and disposal of toxic and hazardous chemicals and materials, in their chemical management plan.

### **How to Calculate Amount of Reduced Toxic and Hazardous Chemicals and Materials in EPEAT-Registered Products**

All EPEAT-registered products must meet the European Restrictions on Hazardous Substances (RoHS) Directive, which provides specific threshold amounts of certain hazardous substances in electronic products. The Directive addresses cadmium, mercury, lead, hexavalent chromium, and certain brominated flame retardants.

EPEAT also has other required and optional criteria related to environmentally sensitive materials (see table below). “R” indicates which criteria are required, and “O” is next to optional criteria which an EPEAT Silver or Gold registered product may meet:

#### **EPEAT – IEEE 1680 Standard – Section related to Hazardous or Toxic Substances**




##### **4.1 Reduction/elimination of environmentally sensitive materials**

- R 4.1.1.1 Compliance with provisions of European RoHS Directive upon its effective date
- O 4.1.2.1 Elimination of intentionally added cadmium
- R 4.1.3.1 Reporting on amount of mercury used in light sources (mg)
- O 4.1.3.2 Low threshold for amount of mercury used in light sources
- O 4.1.3.3 Elimination of intentionally added mercury used in light sources
- O 4.1.4.1 Elimination of intentionally added lead in certain applications
- O 4.1.5.1 Elimination of intentionally added hexavalent chromium
- R 4.1.6.1 Elimination of intentionally added SCCP flame retardants and plasticizers in certain applications
- O 4.1.6.2 Large plastic parts free of certain flame retardants classified under European Council Directive 67/548/EEC
- O 4.1.7.1 Batteries free of lead, cadmium and mercury
- O 4.1.8.1 Large plastic parts free of PVC


## Guidance For Federal Agencies: How to Use EPEAT to Meet Your E.O. 13423 Toxic and Hazardous Chemicals and Materials Reduction Goals

To determine whether or not products you purchase meet each of the optional criteria listed above, search the EPEAT Registry at <http://www.epeat.net/Search.aspx>. Enter the product information (Type, Manufacturer, Rating) and click the "Search" button. Select the correct product from the Search results, and view the Optional criteria on the Product Detail page:

### Product Detail

 [Printer-friendly](#)    [Export to CSV](#)    [Export to EXCEL](#)

#### Product Information

**Product Type:** Desktops  
**Product:** OptiPlex 745 Energy Smart MT  
**Manufacturer:** Dell, Inc.  
**URL:** [http://www.dell.com/content/products/category.aspx/optix\\_energy?c=us&l=en&s=biz](http://www.dell.com/content/products/category.aspx/optix_energy?c=us&l=en&s=biz)  
**Rating:** **EPEAT** 

**Listing Date:** 5/1/2007  
**Monitor Type:**  
**Monitor Size:**  
**Product Status:**  Active

**Exceptions:** 1. Certain exceptional configurations may fall outside E-star 4.0 requirements. Please specify E-star 4.0 compliance when ordering.

IEEE 1680-2006 Criteria Category Summary	Optional Points
4.1 <a href="#">Reduction/elimination of environmentally sensitive materials</a>	5/5
4.2 <a href="#">Materials selection</a>	0/3
4.3 <a href="#">Design for end of life</a>	5/5
4.4 <a href="#">Product longevity/life cycle extension</a>	2/2
4.5 <a href="#">Energy conservation</a>	1/2

EPEAT-registered products have less toxic and hazardous chemicals and materials, when compared to conventional electronic products that do not meet the RoHS directive. These reductions can be easily measured and reported.

### Calculating Reductions in Toxic and Hazardous Chemical and Materials

The Electronics Environmental Benefits Calculator (EEBC) can be used to calculate the specific toxic and hazardous chemicals and materials reductions that are the result of the acquisition of EPEAT-registered products meeting the following criteria:

- 4.1.1.1 (Required of all products)
- 4.1.3.1 (Required of all flat panel video display devices)
- 4.1.3.2 (Optional for flat panel video display devices)
- 4.1.3.3 (Optional for flat panel video display devices)



## Guidance For Federal Agencies: How to Use EPEAT to Meet Your E.O. 13423 Toxic and Hazardous Chemicals and Materials Reduction Goals

Acquisition information for three different EPEAT-registered products can be entered into the EEBC on Tab 3a "User input\_Purchasing." The following data may be entered on Tab 3a:

- Product ID (optional): Enter an identifier that will be used for this product in the EEBC. If no ID is entered, the EEBC will list the product as "no user ID given."
- Product type (required): Select one product type - Computer Processing unit; Cathode ray tube monitor; Liquid crystal display; or Notebook computer.
- Number of products (optional): Enter the number of products purchased, leased or acquired under seat management. If no number is entered, a default of one is used.
- EPEAT Registered (required): Select Yes/No, whether the product is EPEAT-registered.
- EPEAT Registration tier (required): Select the EPEAT registration tier of the product (Bronze, Silver, or Gold). This entry is only available if EPEAT Registered is selected as "Yes." If "Do not know" is selected, a default of Bronze is used.

No further information is required to calculate the benefits of the purchase of EPEAT-registered products, however, more specific information about the optional criteria that each entered product meets *may* be entered into the EEBC on Tab 3c "Alt user input-Purchasing." Data entry in this Tab is not required, and if no data is entered in Tab 3c, the EEBC will use default assumptions for which optional criteria the entered product meets, based on the entered EPEAT registration tier in Tab 3a. The following data, related to hazardous substances, may be entered on Tab 3c, under "Reduced Toxicity" for each entered product (1 through 3):

- RoHS compliance: *Do NOT check Yes/No here*, the EEBC will use the data entered in Tab 3a.
- Hg declaration, enter # of lamps with Hg: Enter number of lamps, declared by the manufacturer for required criteria 4.1.3.1.
- Maximum average Hg content per lamp, in milligrams: Enter the average mercury content per lamp, declared by the manufacturer for required criteria 4.1.3.1.
- Max average of 3 mg Hg/lamp: Check the box if the manufacturer declared the product as meeting optional criteria 4.1.3.2.
- Hg-free lamps: Check the box if the manufacturer declared the product as meeting optional criteria 4.1.3.3.

After data entry is completed, the environmental benefits that are the result of the acquisition of the entered EPEAT-registered products are displayed in the EEBC on Tab 5a "RESULTS-savings." The savings specific to reduced toxic substances are listed by criteria, under "PURCHASING, Reduced Toxicity," for the total of all of the entered products, and for the breakdown for each of the entered products.

As an example, assume that a federal agency purchased the following EPEAT-registered equipment:

- 10,000 Gold-registered computer desktops
- 10,000 Gold-registered liquid crystal display (LCD) monitors

Guidance For Federal Agencies:  
How to Use EPEAT to Meet Your E.O. 13423 Toxic and  
Hazardous Chemicals and Materials Reduction Goals

This data may be entered in Tab 3a in the EEBC:

PURCHASING INFORMATION:	
USER INPUT	Input data or click answer
<b>Product 1</b> Enter a product ID, if desired  Choose one	<b>Computers</b> <input checked="" type="radio"/> Computer Processing unit (CPU) <input type="radio"/> Cathode ray tube monitor (CRT) <input type="radio"/> Liquid crystal display (LCD) <input type="radio"/> Notebook computer
12 Number of products purchased	10000
14 Is the product EPEAT registered?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not applicable
15 If yes, which EPEAT registration tier?	<input type="radio"/> Bronze <input type="radio"/> Silver <input checked="" type="radio"/> Gold <input type="radio"/> Do not know
17 Initial cost per unit (US\$) (Optional)	
<b>Product 2</b> Enter a product ID, if desired  Choose one	<b>Monitors</b> <input type="radio"/> Computer processing unit (CPU) <input type="radio"/> Cathode ray tube monitor (CRT) <input checked="" type="radio"/> Liquid crystal display (LCD) <input type="radio"/> Notebook computer
23 Number of products purchased	10000
25 Is the product EPEAT registered?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not applicable
26 If yes, which EPEAT registration tier?	<input type="radio"/> Bronze <input type="radio"/> Silver <input checked="" type="radio"/> Gold <input type="radio"/> Do not know
28 Initial cost per unit (US\$) (Optional)	
<b>Product 3</b> Enter a product ID, if desired	<input type="radio"/> Computer processing unit (CPU)

## Guidance For Federal Agencies: How to Use EPEAT to Meet Your E.O. 13423 Toxic and Hazardous Chemicals and Materials Reduction Goals

The results provided in Tab 5a of the EEBC indicate that, in total, these EPEAT-registered products have 744 kg (~1,636 lbs) less toxic materials than conventional computer desktops and monitors:

Criteria reference E=EPEAT		<b>SAVINGS</b> (difference from baseline) (kWh, kg, or \$) <small>(savings are presented in scientific notation, e.g., 1.23E+08 = 1,230,000, and 1.23E+00 = 1.23)</small>					
CRITERIA/ATTRIBUTES		Energy savings	Primary material savings	GHG emission savings	Air emission savings	Water emission savings	Toxic material savings
<i>For explanations of calculations see Sheet 5b.</i>		(kWh)	(kg)	(kg of CE)	(kg)	(kg)	(kg)
<b>GRAND TOTAL (for all life-cycle phases)</b>		9.99E+06	1.50E+07	7.29E+05	3.40E+07	7.34E+04	7.44E+02
<b>TOTAL All product purchases</b>		9.99E+06	1.50E+07	7.29E+05	3.40E+07	7.34E+04	7.44E+02
<b>Subtotal: computer product 1 purchase</b>		1.90E+06	1.66E+06	1.06E+05	3.44E+06	8.40E+03	4.06E+02
<b>Subtotal: computer product 2 purchase</b>		8.09E+06	1.33E+07	6.22E+05	3.06E+07	6.50E+04	2.58E+02
<b>Subtotal: computer product 3 purchase</b>		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>TOTAL: Equipment use</b>		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

By purchasing EPEAT-registered equipment, the federal agency has reduced the quantity of toxic materials that it acquires, uses and will eventually have to dispose of.

### Conclusion

The purchase of EPEAT-registered electronic equipment reduces the amount of toxic and hazardous chemicals and materials acquired by a federal agency. Federal agencies may choose to use these purchases as a strategy to reduce their overall acquisition of hazardous chemicals and materials, and may track and report these reductions under their chemical management plan.

## ARMY TOXIC CHEMICAL REDUCTION PLAN

### SECTION 1. INTRODUCTION

It is a goal of the U.S. Army to improve long-term sustainability by transforming installations, depots, and arsenals and adapting its activities to be more effective, efficient, and environmentally conscious. Consistent with that goal is the Army's commitment to reducing or eliminating the acquisition, use, and disposal of toxic and hazardous chemicals and materials under Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*.

President Bush signed EO 13423 on 24 January 2007 requiring Federal agencies to reduce or eliminate the acquisition, use, or disposal of toxic and hazardous chemicals and materials. On 29 March 2007, the Council of Environmental Quality (CEQ) issued implementing instructions specifically requiring the Department of Defense (DoD) to develop a plan for achieving these reductions.

On 1 February 2008, DoD submitted a toxic and hazardous chemical reduction plan to the Office of the Federal Environmental Executive (OFEE) pursuant to EO 13423. The Plan provides for the lifecycle management of chemicals focusing on three key phases for weapon systems and facilities: acquisition, operations and sustainment, and disposal. In support of this Plan, DoD provided specific directives to the Services in a 3 December 2008 memorandum, Subject: Reducing Toxic and Hazardous Chemicals under Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy and Transportation Management*, which requires the implementation of a plan by 9 January 2009 that identifies target chemicals; establishes usage baselines; and facilitates the reporting of planned reductions, current usages, and estimated resource requirements.

The Army has long emphasized the reduction in acquisition, use, and disposal of hazardous chemicals throughout the life cycle of weapons systems and in all aspects of industrial and troop-based installation operations. In all elements of its mission, the Army has sought to develop management practices that eliminate or minimize the use of toxic and hazardous chemicals and substances. In response to EO 13423 and the DoD toxic and hazardous chemical reduction plan, the Army is taking the necessary steps to ensure the consistency of its activities with those directives and the documentation of meaningful baselines and reductions.

#### **EXECUTIVE ORDER 13423, STRENGTHENING FEDERAL ENVIRONMENTAL, ENERGY AND TRANSPORTATION MANAGEMENT**

Executive Order 13423 was signed by President Bush on 24 January 2007 to establish requirements for strengthening the environmental, energy, and transportation management of Federal agencies. Section 2 of EO13423 sets forth goals for the heads of federal agencies that include:

- Improving energy efficiency and reducing greenhouse gas emissions
- Using renewable energy resources
- Reducing water consumption
- Purchasing environmentally preferable goods and services
- Reducing toxic and hazardous chemicals and materials, diverting solid wastes, and maintaining prevention and recycling programs

Encl 2

- Reducing petroleum consumption by fleet motor vehicles and using alternate fuel vehicles
- Acquiring energy efficient and environmentally preferable electronic equipment

The Order requires the implementation of sustainable practices to achieve those goals and the use of Environmental Management Systems (EMS) as the primary management approach for addressing environmental aspects.

EO 13423 rescinds several previously issued EOs, including: EO 13101, EO 13123, EO 13134, EO 13148, and EO 13149. It is supplemented by implementing instructions, issued by the CEQ on 29 March 2007. The Office of Management and Budget (OMB) is integral in the execution of EO 13423, as the EO requires the OMB Director to issue instructions concerning periodic evaluation, budget matter, and acquisition relating to its implementation by each of the Federal agencies.

### **Toxic and Hazardous Chemical Reduction Requirements**

Section 2(e)(i) of EO13423 sets forth a goal for the heads of federal agencies that states:

*Ensure that the agency reduces the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency.*

The EO 13423 Implementing Instructions were issued by CEQ on 29 March 2007, and provide specific guidance to agencies for meeting the EO. The Instructions require Federal agencies to develop written goals and support actions to achieve toxic reduction goals, and provide a list of criteria for agencies to consider in identifying the list of toxic chemicals. The EO Instructions specifically state:

*No later than January 24, 2008, each agency, at all appropriate organizational levels including appropriate facilities, organizations, and acquisition activities, shall develop written goals and support actions to identify and reduce the release and use of toxic and hazardous chemicals and materials, including toxic chemicals, hazardous substances, ozone-depleting substances (ODSs), and other pollutants that may result in significant harm to human health or the environment.*

*In identifying the list of toxic chemicals, hazardous substances, and other pollutants, each agency shall consider:*

- *Quantity of the chemical or material in use by the agency.*
- *Human and/or environmental toxicity of the chemical.*
- *Potential for human and/or environmental exposure to the chemical or material.*
- *Potential harm to the environment associated with the use or release of the chemical or material, including impacts to air quality, surface water, groundwater, soils/land, and climate systems.*
- *Persistence of the chemical in the environment.*
- *Availability of controls to manage identifiable risks.*
- *Impacts on mission capability and business costs.*

- *Existing environmental hazard lists such as priority chemicals identified by EPA's Resource Conservation Challenge, and any agency-specific toxic or hazardous chemicals lists.*
- *The available substitutes for ODSs identified by EPA's Significant New Alternatives Policy Program.*
- *Contaminants identified by the U.S. Geological Survey as part of its National Reconnaissance of Emerging Contaminants.*
- *Where appropriate, regional- and watershed-based environmental improvement efforts such as the Chesapeake Bay Prioritized Chemicals of Concern Program, the Great Lakes Bi-national Strategy or local watershed efforts.*

**U.S. DEPARTMENT OF DEFENSE EXECUTIVE ORDER 13423: AGENCY-LEVEL TOXIC AND HAZARDOUS CHEMICAL REDUCTION PLAN**

On 1 February 2008, DoD submitted a toxic and hazardous chemical reduction plan to OFEE pursuant to EO 13423. The plan provides for the lifecycle management of chemicals focusing on three key phases for weapon systems and facilities: acquisition, operations and sustainment, and disposal. The plan depicts the DoD programs, initiatives, and actions necessary to reduce procurement, use, release and disposal of toxic and hazardous chemicals under EO 13423. The plan strives to clarify the Department's status and planned next steps with regard to chemical management, both needed to ensure successful implementation of the EO.

In order to carry out the plan, OSD provided specific directive to the Services in the 3 December 2008 memorandum that required plan implementation by 9 January 2009. To comply, each Service will:

- Identify a minimum of three toxic/hazardous chemicals for reduction, potential elimination, or replacement by less toxic/hazardous chemicals, using the EO 13423 Implementing Instructions' criteria of 29 March 2007.
- Establish current-usage "baselines" for the identified chemicals from best available information sources, in order to develop future-usage benchmarks, in keeping with the intent of the Plan.
- Report to the DoD Environmental, Energy and Transportation Executive Committee the planned reductions of current usages and estimated required resources.

These requirements serve as the basis for the Army Plan. The following sections describe the Army's methodology for the identification of target chemicals; consideration and procedures for establishing baselines; and plans for reporting reductions, and usages.

## SECTION 2. DEPARTMENT OF THE ARMY TOXIC AND HAZARDOUS CHEMICAL REDUCTION PLAN

### Selected Toxic and Hazardous Chemicals

In identifying three toxic and hazardous chemicals to target for reduction pursuant to EO13423, the Army used criteria outlined in the EO. Specifically, the Army analyzed existing information and data concerning acquisition, use, and disposal of chemicals as well as physical characteristics and formulations, toxicity, exposure, and mission-related concerns. In spite of established management practices that minimize the potential for releases or exposure to the three chemicals identified below, there exists sufficient concern, because of the toxicity and regulated status of the chemicals to warrant targeting them. Moreover, the quantity of these chemicals used in Army operations presents an opportunity for reduction. The three toxic chemicals that the Army has targeted for reduction are trichloroethylene (TCE), methylene chloride, and hexavalent chromium.

#### Trichloroethylene (TCE)

Trichloroethylene (TCE) is a heavy colorless or blue-dyed liquid used in cleaning solvents and degreasers. The 11<sup>th</sup> Report on Carcinogens published by the U.S. Department of Health and Human Services identifies TCE as a compound reasonably anticipated to be a human carcinogen. The Clean Air Act (CAA) defines TCE as a hazardous air pollutant and a volatile organic compound. TCE is listed on the DoD Emerging Contaminants Action List which contains those materials that have been assessed and judged to have a significant potential impact on people or the DoD mission. TCE was actually implemented in many applications throughout the Army as a replacement for 1,1,1-trichloroethane (TCA), a Class I ODS that was banned under the Montreal Protocol and Title VI of the Clean Air Act. Subsequently, the Army has been successful in implementing suitable alternatives for most TCE applications. However, large quantities of TCE are still used for vapor degreasing in the overhaul and repair of combat vehicles and small arms.

The Army recognized the importance of reducing its TCE usage and is already strategically targeting reduction opportunities in large industrial operations. Efforts are underway to evaluate each part processed in TCE vapor degreasers to determine if other existing cleaning methods can be used instead. Preliminary findings for some operations suggest that up to 90% of the parts evaluated thus far are candidates for diversion to other cleaning methods. The Army is investigating alternative technologies to replace TCE for all remaining vapor-degreasing applications. Research, development, test and evaluation funds have been committed to demonstrate the alternatives.

#### Methylene Chloride

Methylene chloride, otherwise known as dichloromethane, is a nonflammable liquid typically found in paint removers and industrial solvents. Methylene chloride is a key ingredient in many immersion paint removers, hand-wipe paint removers, and certain aerosol coatings used in Army operations. The 11<sup>th</sup> Report on Carcinogens published by the U.S. Department of Health and Human Services identifies methylene chloride as a compound reasonably anticipated to be a human carcinogen. The CAA defines

methylene chloride as a hazardous air pollutant. The Army has reduced its use of methylene chloride-based paint removers in recent years, often by switching to non-chemical methods such as abrasive blasting, hand sanding and other mechanical processes. However, large quantities of methylene chloride are still used for immersion paint removal in the overhaul and repair of combat vehicles and aviation systems.

The Army recognized the importance of reducing its methylene chloride usage and is already strategically targeting reduction opportunities in large industrial operations. The Army is investigating alternative chemical materials to replace methylene chloride for all remaining immersion applications. Research, development, test and evaluation funds have been committed to demonstrate three promising alternatives in large dip tanks.

### Hexavalent Chromium

Chromium exists in several forms with very different environmental and health characteristics. Chromium in valence state of 3+, often called trivalent chromium, is an essential mineral for human health. Chromium in valence state of 6+, often called hexavalent chromium, is toxic and carcinogenic. The 11<sup>th</sup> Report on Carcinogens published by the U.S. Department of Health and Human Services identifies hexavalent chromium compounds as known human carcinogens. The CAA defines them as hazardous air pollutants. Industrial uses of hexavalent chromium compounds include chromate pigments in dyes, paints, inks, and plastics; chromates added as anticorrosive agents to paints, primers, and other surface coatings; and chromic acid used to electroplate metallic chromium onto metal parts to provide a decorative (known as bright chrome), protective coating, or to build up wear surfaces (known as hard chrome). Hexavalent chromium can also be formed when performing "hot work" such as welding on stainless steel or melting chromium metal.

Hexavalent chromium is a significant chemical in DoD and Army weapon systems due to its corrosion protection properties. The Army uses three types of materials containing hexavalent chromium. The first type of material can only emit/release hexavalent chromium before and during its application to a substrate, after which the chromium reverts to valence state zero. Examples include the chemicals used in bright chrome and hard chrome plating baths. The second type of material mainly emits/releases hexavalent chromium before and during its application to a substrate, after which the majority of the chromium on the treated part is in valence state of 3+. The third type of material can emit/release hexavalent chromium at any point during its life cycle, increasing the risk of environmental and occupational exposure. Examples include primers, sealants and other coatings that can liberate hexavalent chromium during spraying, sanding, mechanical paint removal, incineration, and other processes. Hexavalent chromium is listed on the DoD Emerging Contaminants Action List, which contains those materials that have been assessed and judged to have a significant potential impact on people or the DoD mission. Because of the lifecycle risk associated with hexavalent chromium in these materials, the Army has targeted them for reduction. Of this third type of hexavalent chromium-containing material, the Army uses primarily two types of epoxy primers, MIL-PRF-23377 and MIL-PRF-85582, that are applied to aluminum and magnesium substrates on aviation assets for corrosion resistance. The Army is conducting research to replace these chromate epoxy primers. Non-chromate epoxy primers have been qualified under both specifications in recent years, and the Army is planning to implement them to reduce its use of hexavalent chromium. Initial reductions are targeted at the Army's primary aircraft maintenance installations: Corpus



Christi Army Depot, TX, Fort Rucker, AL and two Aviation Classification and Repair Depots located in Groton, CT and Gulfport, MS. The Army uses other chromate-containing coatings such as TT-P-1757 alkyd primer, DOD-P-15328 wash primer and MIL-PRF-81733 polysulfide sealant; however, alternatives have not yet been validated to replace them. For these reasons, the two epoxy primers identified (MIL-PRF-23377 and MIL-PRF-85582) are the most feasible source of hexavalent chromium reductions from Army surface coating operations

### **Army Usage Baselines**

Preliminary baselines have been established by the Army based on 2006 data for each of the three toxic chemicals selected. Trichloroethylene and methylene chloride baselines use Toxics Release Inventory (TRI) data reported pursuant to Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA). Hexavalent chromium baselines utilize survey data collected by the Army.

#### Trichloroethylene (TCE)

The primary source for preliminary baseline data about TCE is TRI data. Because of the nature of use of TCE in Army facilities (i.e., vapor degreasing), it is estimated that the quantity of TCE reported as released is equivalent to the total used. In 2006, no Army installations other than Anniston Army Depot met TRI reporting thresholds for TCE. Data indicate that there is minimal or no use of TCE by installations other than Anniston. Anniston reported releasing 108,200 pounds of TCE in 2006 through on- and off-site disposal and other releases. This figure serves as the preliminary baseline for total Army TCE use. Information collected by Anniston Army Depot provides additional data correlating TCE use/emission with production activity (manhours). As appropriate, an activity index may be factored into the baseline and future reduction targets.

<b>Chemical</b>	<b>Army Baseline</b>
Trichloroethylene	108,200 pounds

#### Methylene Chloride

As with TCE, TRI is the primary source for preliminary baseline data on methylene chloride. Although some methylene chloride used is not released, the TRI release data provides the best estimate of usage. As appropriate, this data will be refined and correlated to provide the most accurate characterization of methylene chloride use. In 2006, no Army installations other than Anniston Army Depot met TRI reporting thresholds for methylene chloride. Although there are some other uses of methylene chloride by Army installations, Anniston is considered the sole significant user. Anniston reported releasing 261,800 pounds of methylene chloride in 2006 through on- and off-site disposal and other releases. This figure serves as the preliminary baseline for total Army methylene chloride use. As appropriate, an activity index may be factored into the baseline and future reduction targets.

<b>Chemical</b>	<b>Army Baseline</b>
Methylene Chloride	261,800 pounds

Hexavalent Chromium

A data call conducted from 2004-2006 is the primary source for baseline data on use of chromate epoxy primers. The Army's four primary aircraft maintenance installations reported using a combined total of 1,200 gallons per year of MIL-PRF-23377 and MIL-PRF-85582 primers. These four installations serve as the preliminary baseline for total Army use of hexavalent chromium in this application.

<b>Chemical</b>	<b>Army Baseline</b>
Hexavalent Chromium	1,200 gallons of MIL-PRF-23377 and MIL-PRF-85582 primers

**Developing Reduction Goals and Implementing the Army Toxic and Hazardous Chemical Reduction Plan**

The Army will establish and implement a specific reduction strategy once usage baselines including appropriate activity indices have been confirmed for each of the three chemicals. In the event that a viable alternative is not approved for a particular chemical, the Army will reevaluate the reduction goal. The Army uses the EMS framework as a tool to identify and continually manage environmental aspects and impacts. Where possible, reduction goals will be achieved using this framework and other widely accepted sustainable approaches. In developing and implementing the strategy, the Army will evaluate resource requirements and report those requirements as appropriate through the DoD Environmental, Energy and Transportation Executive Committee. The Army is committed to ensuring the refinement and implementation of this the plan consistent with the requirements of EO 13423 and the goals of its national security mission.

The Army plan targets reductions of trichloroethylene, methylene chloride, and hexavalent chromium in specific applications by significant industrial Army users. The chemicals, applications, and users were identified in accordance with the criteria of EO 13423 and using the best available information. By targeting specific applications and users, this strategy is anticipated to have the most significant and cost-effective reduction in these chemicals, without an impact on the Army's mission. Consistent with past practices, the Army will continue to pursue further reductions in these and other chemicals in its weapon systems and base operations, taking advantage of new information, process improvements, and alternative materials.