CEMP-RT Engineer Pamphlet 200-1-10	Department of the Army U.S. Army Corps of Engineers Washington, DC 20314-1000	EP 200-1-10 10 December 1999
	Environmental Quality GREEN BUILDING TECHNOLOGY IN HAZARDOUS WASTE CLEANUP APPLICATIONS	
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DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

EP 200-1-10

CEMP-RT

Pamphlet
No. 200-1-10

10 December 1999

Engineering and Design

GREEN BUILDING TECHNOLOGY IN HAZARDOUS WASTE CLEANUP APPLICATIONS

1. Purpose. This Engineer Pamphlet (EP) identifies Green Building technologies and opportunities at Hazardous, Toxic, and Radioactive Waste (HTRW) sites and provides guidance to U.S. Army Corps of Engineers (USACE) personnel and their contractors for use of Green Building technologies at HTRW sites.

2. Applicability. This EP is applicable to all Headquarters, U.S. Army Corps of Engineers (HQUSACE) elements and USACE commands executing HTRW projects assigned to USACE.

3. Distribution Statement. Approved for public release, distribution is unlimited.

4. References. References are provided in Appendix A.

5. Discussion. Green Building technologies can be defined as those that minimize waste generation, reduce energy consumption, encourage recycling, and conserve natural resources. Green Building technology, as defined in USACE guidance, is the design, construction, operation, and reuse/removal of the built environment in an environmentally and energy efficient manner. The use of Green Building technologies for federal projects is not only good for the environment, it has been mandated by the highest levels of the Federal Government. The President, the Department of Defense, and USACE have adopted policies that mandates the use of Green Building technologies. This document is a guide to comply with Green Building policies.

FOR THE COMMANDER:

RUSSELL L. FUHRMAN
Major General, USA
Chief of Staff

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Chapter 1
Introduction

1-1. Purpose

This Engineer Pamphlet (EP) identifies Green Building (GB) technologies and opportunities at Hazardous, Toxic, and Radioactive Waste (HTRW) sites and provides guidance to U.S. Army Corps of Engineers (USACE) personnel and their contractors for use of Green Building technologies at HTRW sites. Green Building technologies can be defined as those that minimize waste generation, reduce energy consumption, encourage recycling, and conserve natural resources. Green Building technology, as defined in USACE guidance, is the design, construction, operation, and reuse/removal of the built environment in an environmentally and energy efficient manner. For the purposes of this document, the terms Green Building Technology and Pollution Prevention are essentially synonymous.

1-2. Applicability

This pamphlet is applicable to all Headquarters, U.S. Army Corps of Engineers (HQUSACE) elements and USACE commands executing HTRW projects assigned to USACE.

1-3. References

The list of references is provided in Appendix A. In addition, an annotated bibliography of information sources and internet sites is provided in Appendix B.

1-4. Abbreviations and Acronyms

See Appendix C for a list of abbreviations and acronyms used in this pamphlet.

Chapter 2
Background

2-1. Necessity of Using Green Building Technologies

a. The use of Green Building technologies for federal projects is not only good for the environment, it has been mandated by the highest levels of the Federal Government. The President, the Department of Defense (DOD), and the USACE have adopted policies that mandate the use of Green Building technologies.

b. Executive Order (EO) 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition" (14 September 1998) has mandated the use of Green Building technologies for Federal activities including DOD and USACE. The EO requires that in developing drawings, work statements, specifications, or other product descriptions, agencies shall consider elimination of virgin material requirements, use of U.S. Department of Agriculture (USDA) designated biobased products, use of recovered materials, reuse of products, life cycle cost, recyclability, use of environmentally preferable products, waste prevention (including toxicity reduction or elimination), and ultimate disposal, as appropriate. The preamble to EO 13101 states that: "It is the national policy to prefer pollution prevention, wherever feasible. Pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should be employed only as the last resort."

c. Selected requirements of EO 13101 that may affect Green Building applications are summarized below. See Appendix D for the complete EO 13101.

(1) Agencies shall ensure that their affirmative procurement programs require 100 percent of their purchases of U.S. Environmental Protection Agency (USEPA) - designated items found in 40 CFR 247 (see Appendix E for the list of USEPA-designated items) to meet or exceed the USEPA guidelines unless written justification is provided. [These requirements and the Federal Acquisition Regulation (FAR) under which the USACE must operate are discussed in the Principal Assistant Responsible for Contracting (PARC) Instruction Letter 99-2. Documentation and reporting requirements are described in Paragraph 12(f) of the PARC Instruction Letter 99-2. The contents of the PARC Instruction Letter are provided in Appendix F.]

(2) Regulators have the authority under the Federal Facilities Compliance Act and section 6002 of the Resource Conservation and Recovery Act (RCRA) to evaluate compliance for Affirmative Procurement [EO 13101 Part 4, Sec. 403 (c)] during multimedia inspections of facilities (see Success Stories, Paragraph 5-5, Grand Forks Air Force Base).

(3) When developing, reviewing, or revising specifications, product descriptions, and standards, agencies shall consider recovered materials and any environmentally preferable purchasing criteria or energy efficiency criteria and ensure compliance with the criteria; otherwise, the Environmental Executive of the agency must provide justification.

(4) As items containing recovered materials have been designated by the USEPA, agencies shall modify their affirmative procurement programs.

(5) Agencies are encouraged to implement pilot programs to test and evaluate the principles of the Acquisition of Environmentally Preferable Products and Services and Energy Star products and materials (see Appendix E).

(6) Once the USDA Biobased Products List has been published, agencies are encouraged to modify their affirmative procurement program to give consideration to those products.

(7) Contracts at government facilities shall include provisions that obligate the contractor to comply with the requirements of this order.

d. As stated in the Defense Environmental Network and Information Exchange (DENIX) pollution prevention (P2) web page (http://www.denix.osd.mil/), pollution prevention supports the DOD's goals for readiness, quality of life, and modernization. Through resource conservation, source reduction, and recycling, pollution prevention programs assist DOD in:

(1) Enhancing operational readiness by minimizing the environmental challenges associated with every stage in the life cycle of a weapon system.

(2) Reducing health and safety risks to its personnel and neighbors in nearby communities while protecting the installation's natural resources.

(3) Reducing or eliminating compliance and cleanup problems.

(4) Implementing process improvements to increase productivity and quality.

(5) Curbing the growth of the environmental budget by eliminating rather than treating or cleaning up pollution problems, and improving the effectiveness of other DOD operations, maintenance, and procurement budgets through more efficient use of materials and resources.

e. In addition to these mandates for using Green Building technologies, USACE personnel should conform to Corps of Engineers Guide Specification (CEGS) 01355: "Environmental Protection".

2-2. Other Directives Mandating the Use of Green Building Technologies

a. There are many federal laws, executive orders, and executive memoranda that mandate energy and resource conservation and recovery for Federal activities. Early efforts include:

(1) Energy Policy and Conservation Act of 1975.

(2) Resource Conservation and Recovery Act (RCRA) of 1976.

(3) National Energy Conservation Policy Act of 1978.

(4) Federal Energy Management Improvement Act of 1988.

(5) Pollution Prevention Act of 1990.

(6) Energy Policy Act of 1992.

b. Recent directives for federal activities that relate to the use of Green Building technologies at HTRW sites include:

(1) Executive Order 13101 (September 14, 1998) "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition" directed federal agencies to consider recycling and the use of recycled material (this EO revoked and replaced EO 12873).

(2) Executive Order 12902 (8 March 1994), "Energy Efficiency and Water Conservation at Federal Facilities," encouraged the use of energy-efficient processes for industrial facilities and the procurement of energy-efficient products.

(3) Executive Order 12845 (23 April1993), "Purchasing Energy Efficient Computer Equipment."

(4) Executive Order 13123 (8 June 1999), "Greening the Government Through Efficient Energy Management."

c. More details of these directives and other directives and topics can be found at: http://www.eren.doe.gov/femp/greenfed/. The text of Executive Orders can be found at the White House web page: http://www.whitehouse.gov/search/executive-orders.html.

d. USEPA and DOE have a joint incentive program called "Energy Star," which provides information on and acknowledges products that are both economical and energy efficient (http://www.epa.gov/energystar).

2-3. Federal Acquisition Regulation (FAR)

a. The document, "The Affirmative Procurement Program," from the Office of the Secretary of Defense (August 1994), states that 100 percent of Defense purchases of procurement guideline items must meet or exceed guideline standards unless narrowly drawn conditions are met. The Federal Acquisition Regulation (FAR) was amended to require USEPA-designated items purchased by Federal activities to meet minimum standards for recycled content (Executive Order 12873, 1995). Federal, state, and local government agencies *and their contractors* that purchase more that $10,000 worth of these products must evaluate the feasibility of purchasing these designated products.

b. New guidance regarding FARs related to USEPA's Comprehensive Procurement Guidelines (CPGs) and Recovered Materials was issued in the spring of 1999 by HQUSACE. A copy of this guidance is provided in Appendix E.

c. USEPA's Comprehensive Procurement Guidelines and Recovered Materials Advisory Notices (RMANs) are available at: http://www.epa.gov/epaoswer/non-hw/procure.htm.

2-4. Overview of Green Building Concepts

a. The goals of the Pollution Prevention Act of 1990 were to increase the elimination, reduction, or recycling of wastes. The benefits of these activities are both environmental and economical (USEPA, 1991b).

b. The environmental benefits include:

(1) Avoiding the shift of pollutants among environmental media.

(2) Reducing the need for transportation and disposal of wastes.

(3) Reducing the total waste and pollutant burden to the environment.

(4) Reducing risks of exposure to toxic substances.

c. The economic benefits include:

(1) Reducing waste management, compliance, liability, and remediation costs.

(2) Increasing operating efficiencies.

(3) Creating markets for sale or reuse of wastes.

2-5. Pollution Prevention Hierarchy

a. The Pollution Prevention Act and recent guidance developed the pollution prevention hierarchy. Under the hierarchy (USEPA, 1991b):

(1) Pollution should be prevented or reduced at the source wherever feasible.

(2) Pollution that cannot be prevented should be recycled in an environmentally safe manner.

(3) In the absence of feasible prevention or recycling opportunities, wastes should be treated.

(4) Disposal or other releases into the environment should be used as the last resort.

b. Source reduction may be accomplished through:

(1) Good operating practices (e.g., segregating waste streams such as investigation-derived waste (IDW) from different investigation sites so that reusable wastes won't be contaminated with non-reusable wastes).

(2) Technology changes: i.e., incorporating new methods that create less waste or less toxic waste (e.g., minimizing stormwater entering a contaminated excavation, thus minimizing water requiring treatment).

(3) Input material changes (e.g., using environmentally preferred products such as water-based cleaners instead of solvent-based cleaners).

(4) Product changes (e.g., converting incinerator fly ash into a soil amendment rather than disposing as waste).

c. Recycling may include:

(1) Use and reuse of waste (e.g., recycling demolition debris; using fly ash as a concrete additive).

(2) Reclamation of constituents in waste materials (e.g., extracting usable metals from sludge resulting from treatment of contaminated media). (See Chapter 5 Success Stories, Paragraph 5-3, Ashland 2 FUSRAP Site: Recycling of Uranium Tailings.)

c. The USACE document, "Report on Treatment, Storage and Disposal Facilities for

Hazardous, Toxic, and Radioactive Waste" provides information on commercial recycling and hazardous waste treatment, storage, and disposal facilities in the United States. The report provides addresses and phone numbers of commercial hazardous waste landfills, hazardous waste incinerators, deep well injection facilities, fuel blending and cement kilns, recycling facilities, and transportation operations. The report discusses relevant regulations, and it provides costs and fees for the commercial facilities.

2-6. Life Cycle Analysis

The National Institute of Standards and Technology (NIST) in cooperation with the USEPA has developed an interactive PC-based computer program that allows planners to conduct life-cycle assessments on materials they are considering for buildings. The program, called Building for Environmental and Economic Sustainability (BEES), assesses the environmental impacts of a product through its entire life cycle, from raw material, through use, to disposal (NIST, 1998).

Chapter 3
Green Building Approach

3-1. Sustainable Design of Military Facilities

a. USACE criteria for sustainable design of military facilities provide designers with guidance for the construction of all new facilities, and the rehabilitation/renovation of existing facilities. Please note that this guidance is to be followed for all USACE HTRW projects, including DOD funded projects. Sustainable Design means designing, constructing, operating, and reusing/removing the built environment (infrastructure and buildings) in an environmentally and energy efficient manner. Selected sections of the USACE criteria are summarized below.

(1) Green Building goes beyond simply using green products and recycled materials. Green Building is an environmental consciousness or resource awareness about using or not using our valuable natural resources in an energy-conscious or conservative way.

(2) The goals of sustainable design include:

- Use resources efficiently and minimize raw material resource consumption (including energy, water, land and materials), both during the construction process and throughout the life of the facility.
- Maximize resource reuse, while maintaining financial stewardship.
- Move from fossil fuels towards renewable energy sources.

(3) Integrate applicable requirements from the installation Pollution Prevention (P2) Program into the project planning and goal setting process.

(4) Make decisions during the planning and design process to support an installation-wide reduction in the release of ozone-depleting chemicals and greenhouse gases, a reduction in the use of hazardous materials and pesticides, and a reduction in the generation of solid wastes.

(5) Use energy-conserving mechanical and electrical equipment and their accessories, including lighting, that meet or exceed existing USACE criteria.

(6) Investigate the use of cleaner fuels, such as natural gas and cogeneration where remote government owned power plants are available.

(7) Designers must incorporate sustainable design through the following:

- Consider total life-cycle costs and environmental impact of products and materials rather than just initial price.
- Select materials with low embodied energy (see Paragraph 4-25).
- Avoid environmentally harmful materials (e.g., toxic substances, ozone-

depleting substances).
- Avoid excessive packaging or assure recycling of the same.
- Buy locally to minimize transportation.
- Reuse salvaged materials.
- Use products made from recycled materials.
- Select materials that can be recycled at the end of their use.
- Specify a preference for recycled-content building materials in accordance with USEPA/USACE guidance.
- Specify material designated as biobased by the USDA Biobased Products Council.

b. Further information on potential green building aspects associated with a particular technology can be obtained by contacting points of contact from the USACE Center of Expertise for HTRW Specialty List which can be accessed at: http://www.environmental.usace.army.mil/org/special/special.html .

3-2. Green Building Planning Process

a. The following process is a suggested way to evaluate an HTRW project so as to incorporate Green Building opportunities. The process would be most beneficial if it were used iteratively throughout the life of a project, from the planning phases (e.g., during planning of a site investigation, or during the Feasibility Study for a remediation project) through completion of the response action. However, the process can be used at any stage of a project to help identify Green Building opportunities and facilitate their use. In order for the process to work effectively, responsibility for managing the Green Building aspects of a project needs to be clearly defined. In addition, it is important that personnel with expertise to plan and implement all critical Green Building opportunities for a project be actively involved.

b. Figure 3-1 provides a flow chart, and Figure 3-2 provides a more detailed description of the Green Building planning process. The Green Building opportunities and technologies are discussed in Chapter 4.

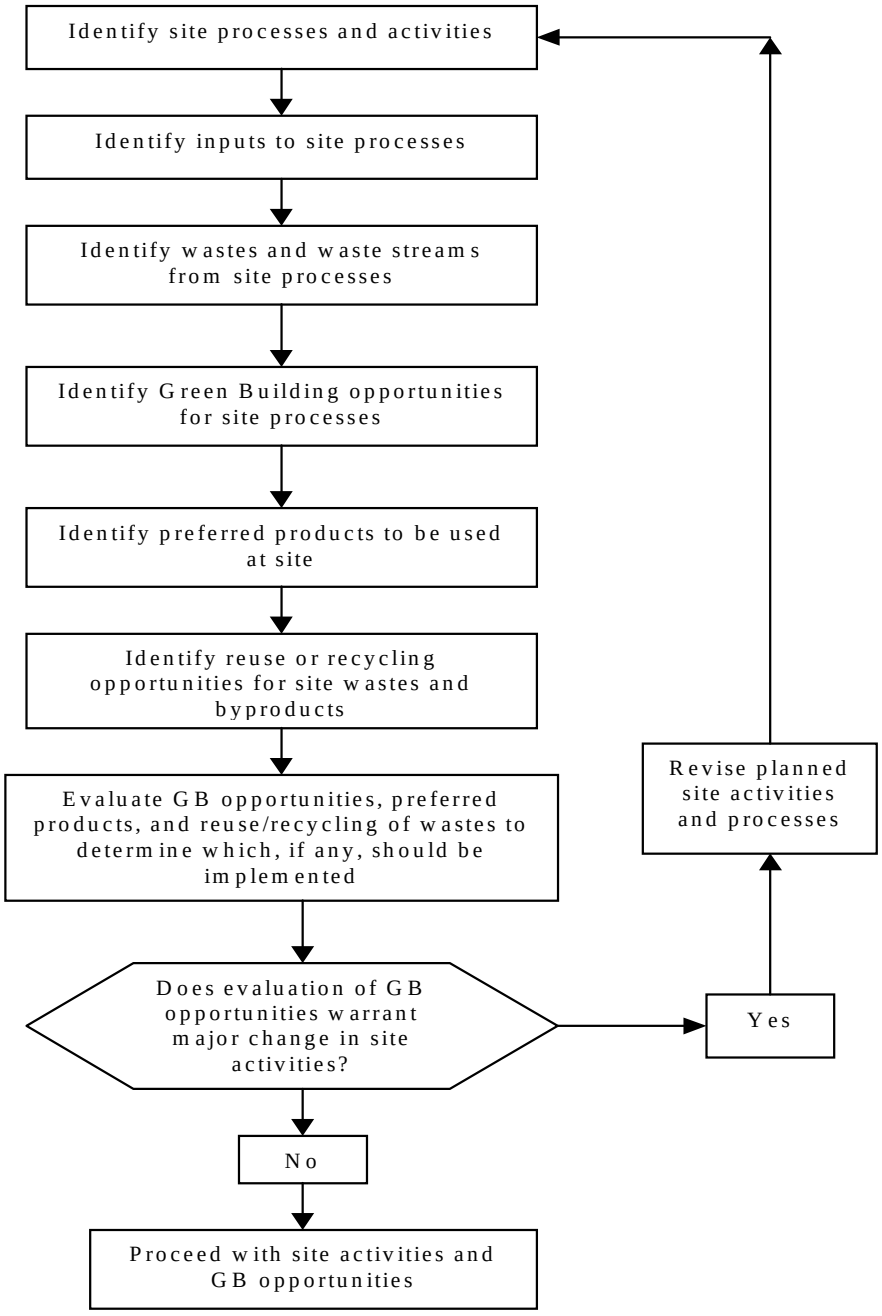

Figure 3-1. Green Building Planning Process Flow Chart

Step One

Identify processes and activities associated with the HTRW site.

Depending on the project and the phase of the project (i.e., planning for site investigations, doing the Feasibility Study, operating remedial action processes), many different processes and activities may be occurring, such as:

- Excavation.
- Product procurement.
- Incineration.
- Operation and maintenance processes (e.g., activated carbon regeneration or replacement).
- Soil or groundwater sampling.
- Clearing, grubbing, and debris removal.
- Chemical or physical remedial treatment processes (e.g., oxidation).

As part of this step, identify the person who will have primary responsibility for evaluating and implementating Green Building technologies. In addition, identify and consult personnel who are familiar with each site process or activity. For example, occupational safety and health personnel can give input on site safety, toxicities of alternative process chemicals, and risks of those processes.

Figure 3-2. Detailed Description of Green Building Planning Process.

Step Two

Identify inputs to the processes at the site.

Examples include:

- Energy to transport soils, or energy for construction.
- Energy to operate incinerators or treatment units.
- Materials and chemicals for treatment units (construction and treatment).
- Buildings materials.
- Operation and maintenance components, such as activated carbon.

Step Three

Identify wastes and waste streams.

Wastes include both materials that have been identified to be remediated and waste materials produced by the remediation process. Examples at HTRW sites might include:

- Treated water.
- Treated soils or sludges.
- Air emissions.
- Waste activated carbon/resins or other treatment residues.
- Investigation-derived waste:
  - Drilling cuttings.
  - Monitoring well purge water.
  - Decontamination wastes.
  - Personal Protection Equipment, sampling equipment, plastics.
- Treatment equipment, vessels, piping.
- Demolition materials.

Figure 3-2 (cont'd). Detailed Description of Green Building Planning Process

Step Four

Identify Green Building opportunities based on evaluation of inputs and wastes.

Green Building opportunities are activities that provide:

- Energy savings through alternative processes or operations that require less energy.
- Materials savings by:
  - Using less virgin material or use of more recycled material.
  - Using more “green” materials (e.g., those that require less energy or pollution to produce).
  - Using material that can be reused or recycled.
- Use of less toxic material.
- Less residue and waste:
  - Using treatment processes that result in less “waste” that requires disposal (see Chapter 5, Success Stories, Paragraph 5-4, Use of Cotton Coveralls instead of Tyvek).
  - Using “wastes” for beneficial purposes (e.g., using treated water for irrigation). (see Chapter 5, Success Stories, Paragraph 5-1, Mead Army Ammunition Plant: Concrete Rubble for Construction).

In this step, potential Green Building opportunities are identified and evaluated. The manager must decide whether they warrant implementation. For example, if the waste streams at a site are very small (e.g., a few feet of plastic tubing), the environmental benefits of recycling may not merit the time, energy, and money required.

Figure 3-2 (cont’d). Detailed Description of Green Building Planning Process

Step Five

Identify preferred products to be used at the site.

Use of preferred products is mandated by current EO 13101 and 40 CFR 247. Preferred products include:

- Recycled materials.
- Materials with at least the required minimum recycled content.
- Biobased materials.
- Energy efficient products.

Step Six

Identify uses or recycling opportunities for site wastes and by-products.

Many “wastes” can be used for beneficial purposes. This reduces both disposal needs and the amount of new materials needed. Examples might include:

- Use of treated water for irrigation or for wetland development.
- Use of treated soil for fill or landfill cover.
- Use of recovered fuels or solvents for energy (see Chapter 5, Success Stories, Paragraph 5-2, Holloman Air Force Base: Waste to Fuel).
- Use of demolition materials:
  - concrete rubble for aggregate (see Chapter 5, Success Stories, Paragraph 5-1, Mead Army Ammunition Plant: Use of Concrete Rubble for Construction).
  - wood for fuel.

Figure 3-2 (cont’d). Detailed Description of Green Building Planning Process

3-3. Regulatory Framework and Issues

a. Several laws and regulations govern activities at HTRW sites. It is beyond the scope of this document to discuss these in detail. However, the reader is reminded that, while working (including doing Green Building activities) at HTRW sites, all pertinent Federal, state, and local laws and regulations must be followed. The following are examples of some of the regulatory issues that may be encountered while planning or conducting Green Building activities.

b. The Resource Conservation and Recovery Act (RCRA) of 1976 and its subsequent amendments (e.g., the Hazardous and Solid Waste Amendments of 1984) set up comprehensive regulations for facilities that generate, transport, store, treat, or dispose of hazardous waste.

c. Several provisions in RCRA may affect attempts to use Green Building approaches (e.g., recycling of site materials) at HTRW sites. Some of the RCRA provisions that may affect Green Building activities at HTRW sites are as follows:

(1) Materials (e.g., soils) that are contaminated with a "listed" hazardous waste may be considered hazardous waste as long as the listed waste is present, even though the waste does not exhibit hazardous characteristics. This may preclude using these materials for beneficial purposes such as construction fill. This problem may be minimized by up-front discussions with the regulatory agencies. In addition, RCRA (40 CFR 266.20) has provisions for recyclable materials that undergo a chemical reaction that might allow recycling of hazardous wastes.

(2) Storing hazardous waste on-site for more than 90 days may trigger permit requirements (40 CFR 262).

(3) Transporting hazardous waste will trigger RCRA and Department of Transportation requirements.

d. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) enacted in 1980 and amended in 1986 (Superfund Amendments and Reauthorization Act) developed mechanisms to manage the cleanup of abandoned hazardous waste sites.

e. CERCLA provisions that might affect use of this EP include the requirement that remedial actions must satisfy Applicable or Relevant and Appropriate Requirements (ARARs). For example, wastewater used for beneficial purposes such as for irrigation would be required to meet applicable discharge requirements for the receiving stream, and volatile emissions would be required to meet applicable local air standards. Again, up-front discussions with regulatory agencies may be helpful in determining potential ARARs. There may be opportunities to use Green Building technologies for CERCLA actions because consideration of Innovative Technologies is a requirement of 40 CFR 300.430 (e) (5) when a Feasibility Study is done.

f. The Clean Water Act (CWA) regulates discharges to surface water. The act requires National Pollutant Discharge Elimination System (NPDES) permits for point source discharges. It also established a set of pretreatment standards for discharge to sewers. The CWA requires that permits be obtained for discharges from remediation activities to surface waters.

g. The Clean Air Act (CAA) and its amendments established National Ambient Air Quality Standards (NAAQS) for certain air pollutants. The NAAQS are maintained by regulating air emissions sources. In addition to NAAQS, emissions of other hazardous air pollutants (HAPs) are also regulated under the CAA. In some Air Quality Control Regions where the air quality standards are not being met, stringent restrictions on emissions sources may be applied.

3-4. Green Building Opportunity – Site Technology Matrix

a. The following Green Building Opportunity – Site Technology Matrix (Table 3-1) matches Green Building opportunities with selected site activities common to HTRW sites. The selected HTRW site activities are primarily remediation technologies from the Federal Remediation Technologies Roundtable Matrix (http://www.frtr.gov/matrix2/section1/toc.html). Many of the site remediation technologies included in this matrix closely resemble other technologies that are not specifically identified. For example, incineration and thermal desorption have substantially the same Green Building opportunities as other ex situ thermal treatment technologies, such as hot gas decontamination and pyrolysis. Therefore, most of the Roundtable remediation technologies are represented by the selected remediation technologies in the matrix. In addition to remediation technologies, other HTRW site activities, such as building and building material management, paving, and earthwork, are included in the matrix.

b. Note that the following Green Building opportunities are applicable to essentially all of the remediation technologies and are, therefore, not included in Table 3-1: contractual issues, paper reduction, partnering, waste segregation, and mobilization. Potential uses of the Green Building opportunities at HTRW sites are discussed in Chapter 5.

Table 3-1. Green Building Opportunity - Site Technology Matrix

Green Building Opportunities	Site Technologies									
	Solidification/Stabilization	Biopiles	Composting	Slurry Phase Bio Treatment	Chemical Extraction	Oxidation Reduction	Soil Vapor Extraction	Incineration	Thermal Desorption	Excavation/Off-site Disposal
IDW Management: Solids	X	X	X	X	X	X	X	X	X	X
IDW Management: Aqueous	X	X	X	X	X	X	X	X	X	X
Direct Push Sampling							X			
Sampling Equipment Management	X	X	X	X	X	X	X	X	X	X
Plastics Management	X	X	X	X	X	X	X	X	X	X
Occupational Health Safety: PPE Management	X	X	X	X	X	X	X	X	X	X
Electrical Equipment: Sizing and Efficiency		X	X	X	X	X	X	X	X	
Activated Carbon Management		X	X	X	X	X	X	X	X	
Optimize System Operation	X	X	X	X	X	X	X	X	X	X
Piping/Process Equipment Recycling/Reuse				X	X	X	X	X	X	
Use of Package Plants/Skid-Mounted Equip	X		X	X	X	X	X	X	X	
Plant Tissue Residue Management		X	X					X		
Resource Recovery from Treatment Sludges				X	X	X				
Reuse of Treated Soil										
Stormwater Management	X	X	X	X	X	X		X	X	X
Use of Waste Organic Material, Ag Wastes		X	X					X	X	
Use of Excavations for Aquatic Habitat	X	X	X	X	X	X		X	X	X
Use of Incinerators for Waste to Energy								X	X	
Buildings, Building Material Management		X	X	X	X	X	X	X	X	

Table 3-1 (cont'd): Green Building Opportunity - Site Technology Matrix

Green Building Technologies	Site Technologies									
	Air Sparging	Bioslurping	Dual Phase Extraction	In-Well Stripping	Passive/Reactive Wall	Bioreactors	Constructed Wetlands	Adsorption Absorption	Air Stripping	Ion Exchange
IDW Management: Solids	X	X	X	X	X	X	X	X	X	X
IDW Management: Aqueous	X	X	X	X	X	X	X	X	X	X
Direct Push Sampling	X	X	X	X	X				X	
Sampling Equipment Management	X	X	X	X	X	X	X	X	X	X
Wastewater Management						X	X			
Plastics Management							X		X	
Occupational Health and Safety: PPE	X	X	X	X	X	X	X	X	X	X
Electrical Equipment: Sizing and Efficiency	X	X	X	X		X		X	X	X
Activated Carbon Management	X	X	X	X		X	X	X	X	X
Optimize System Operation	X	X	X	X	X	X	X	X	X	X
Piping/Process Equipment Recycling/Reuse	X	X	X	X		X		X	X	X
Use of Packaged Plants/Skid-Mounted Equip	X	X				X		X	X	X
Plant Tissue Residue Management							X			
Resource Recovery from Treatment Sludges						X	X	X		X
Reuse of Treated Soils						X				
Stormwater Management						X	X			
Use of Excavations for Aquatic Habitat						X	X			
Use of Dredged Material, Lake Rehab						X				
Buildings, Building Material Management	X	X	X	X		X		X	X	X

Table 3-1 (cont'd): Green Building Opportunity - Site Technology Matrix

Green Building Technologies	Site Technologies									
	Precipitation Coag.	Sprinkler Irrigation	UV Oxidation	Slurry Walls	Bldgs, Const./Demol.	Paving/Concrete Work	Earth Works	Debris/Brush Removal	Landfill Covers Liners	Site Investigations
IDW Management: Solids	X	X	X	X	X					X
IDW Management: Aqueous	X	X	X	X						X
Direct Push Sampling										X
Sampling Equipment Management	X	X	X	X	X					X
Wastewater Management	X		X			X	X			X
Plastics Management	X				X			X		X
Occupational Health and Safety: PPE	X	X	X	X	X	X	X	X		X
Electrical Equipment: Sizing and Efficiency	X	X	X		X					
Activated Carbon Management	X									
Optimize System Operation	X	X	X	X	X	X	X	X	X	X
Piping/Process Equipment Recycling/Reuse	X	X	X							
Use of Packaged Plants/Skid-Mounted Equip	X	X	X		X	X				
Plant Tissue Residue Management								X		
Resource Recovery from Treatment Sludge	X									
Reuse of Treated Soil, Soil Residue	X					X	X		X	
Stormwater Management	X		X		X	X	X		X	
Use of Excavations for Aquatic Habitat	X		X				X			
Use of Dredged Material, Lake Rehab							X		X	
Building, Building Material Management					X	X		X		

Chapter 4
Green Building Technologies, Opportunities, and Issues at HTRW Sites

4-1. Contractual Issues

Possibly the most effective Green Building Technology Opportunity for HTRW sites is to incorporate Green Building considerations into the contracts for work at the site. Contracts should state that Green Building technologies are to be used where practicable and cost-effective. The USACE PARC Instruction Letter 99-2 (Appendix F) provides guidance for meeting Federal Acquisition Requirements for Recovered Material Certification (FAR 52.223-4) and Certification and Estimate of Percentage of Recovered Material Content for EPA-Designated Items (FAR 52.223-9). Following are some examples where Green Building technologies can be stipulated in contracts:

a. Stipulate that selection of high-efficiency electrical equipment (e.g., pump and blower motors) should be considered; the Energy Star Program and Federal Energy Management Program (FEMP) should be consulted.

b. Stipulate that materials used at the site (e.g., plastic liners and covers, building materials such as siding and roofing, and process tanks) should contain recycled material to the extent practicable.

c. Stipulate that materials used at the site should be selected with future recycling potential in mind and that materials taken from the site (e.g., construction debris, packaging) should be recycled to the extent practicable.

d. Stipulate that procedures and a coordinator responsible for implementing Green Building technologies be identified as part of the site work.

4-2. Paper Reduction

HTRW activities, due to the nature of mandatory reporting, have potential to require large volumes of paper. Much of this paper is used in reports (e.g., Preliminary Assessment, Site Inspection, Remedial Investigation) detailing conditions at the site. It is common to require contractors to supply numerous copies of these reports to the site managers and regulators. Considerable paper (and consequently forest resources) could be conserved by coordinating with managers and regulators to determine what portions of the reports are needed in hard copy format and what portions could be supplied in electronic format only. The use of CD-ROMs should be considered as an electronic format because of their large storage capacity. Care should be taken in the use of various electronic formats to avoid compromise of privileged information. When hard copies are needed, double-sided duplication should be used. The PARC Instruction letter

(Appendix F) provides guidance on the use of recycled content in paper and double-sided copying.

4-3. Partnering

Management of HTRW sites can be a complex process, requiring interaction among owners, managers, contractors, and regulators. Recently, the benefits of up-front cooperative decision-making (i.e., partnering) for Green Building applications at HTRW sites has been demonstrated in the areas of solid waste diversion, energy recovery and waste minimization. Since much of the decision-making at HTRW sites is regulation-driven, major benefits from the Green Building perspective can be achieved through partnering. That is, by cooperating with regulators from the start, agreements can be negotiated for compliance with regulations in a manner that provides the greatest Green Building benefits.

4-4. Waste Segregation

a. HTRW sites often consist of several sub-sites that have a variety of contaminants and varying degrees of contamination. Considerable cost and waste handling and treatment can often be avoided if wastes are segregated. Waste segregation often allows materials with low levels of contamination or with non-listed contaminants to be handled and treated differently (and often at much less cost) than those materials with high levels of contamination.

b. It should be noted that in some instances waste segregation may not be appropriate. For example, where waste volumes are very small, or where contamination is minimal, or where treatment processes dictate blending, it may not be cost-effective or environmentally beneficial to segregate wastes.

4-5. Mobilization

Energy and money can be saved if the activities (e.g., investigation activities) are planned in a way that minimizes the requirements for personnel to be on-site and that avoids repeated mobilizations to the site. The use of qualified local drilling contractors can provide a substantial energy savings compared to mobilization from great distances. Appropriate use of the USACE Engineer Manual 200-1-2, Technical Project Planning, guidance can be useful in this regard.

4-6. Management of Investigation-Derived Waste (IDW)

a. *Solid IDW (Soil, Sludge).* Considerable waste can be eliminated by managing investigation-derived waste (IDW) onsite. This can represent a significant cost savings depending on the volumes involved.

(1) Sometimes soil cuttings can be returned to the site of origin from the on-site staging area after they have been tested and shown to be "uncontaminated," shown to contain chemicals in concentrations below regulatory concern (i.e., by evaluating analytical data of samples from a boring), or by ensuring contaminants will be adequately addressed by the final remedial action. In this case, it is important to not mix cuttings from outside the area of contamination (AOC). In general, it is important to segregate waste streams from each other, and wastes from non-waste materials, so that in the event treatment is required, the amount of material to be managed can be minimized.

(2) Steel drums used to temporarily contain wastes such as soil cuttings and decontamination water can be cleaned and reused (minimizing the need for new drums) or sold for salvage. The state may also regulate waste metals, electrical equipment, and construction materials if they came into contact with hazardous site constituents, but may allow for reuse or recycling of the materials. In some cases, decontamination may be necessary.

b. Aqueous IDW. Sometimes regulatory agencies will allow decontamination and purge water to be discharged at a sampling site after the water has been sampled, tested, and shown to be "uncontaminated" or to contain chemicals in concentrations below regulatory concern. If the regulatory program and agencies will allow placing decontamination or purge water back onto the site, considerable waste can be eliminated.

(1) Alternatively, if waste water meets pretreatment requirements, it may be possible to discharge it to the local sanitary sewer. If these discharge options are not available, it may be possible to treat the water in the treatment process selected for remedial activities at the site.

(2) Otherwise this waste needs to be containerized, tested for hazardous characteristics, and disposed of (possibly in a hazardous waste facility). This can be very expensive, depending on the volumes involved. If multiple sites are sampled during a field investigation, consideration should be given to segregating wastes. If wastes from different sites are segregated, it may be possible to minimize the amount of decontamination waste that ultimately needs to be sent to a hazardous waste facility (i.e., wastes with low levels of contamination may be able to be disposed of in a municipal waste facility, such as a publicly owned treatment works).

(3) Other methods of minimizing wastes include reuse of drums and utilization of low-flow sampling methods. In particular, use of low flow (minimum draw-down) groundwater sampling methods (USEPA, 1995) results in smaller purge volumes and decreases waste disposal costs. However, it is important to remember that the sampling technique must provide representative samples and follow procedures that are acceptable to the regulators and the designer.

c. IDW Guidance. Two USEPA publications that describe management of investigation-

derived waste are: OSWER Publication 9345.3-03FS April 1992, “Guide to Management of Investigative-Derived Waste” (USEPA, 1992) and EPA/540/G-91-009, May 1991 “Management of Investigative-Derived Wastes During Site Inspections” (USEPA, 1991a). In addition, the USACE HTRW CX has a fact sheet on IDW management that can be found at the following web site: http://www.environmental.usace.army.mil/environmental/COMPLYfs.html.

4-7. Direct Push Soil Sampling

a. Where sampling with direct push equipment is both feasible and cost effective, using this technology can significantly reduce or eliminate soil cuttings and wastes. Direct push techniques can be used to characterize site media to confirm treatment processes. In addition, any in-situ technology that requires extraction or monitoring points be installed, such as soil vapor extraction, air sparging, or bioslurping, would be a candidate for direct push technologies, for installing extraction/injection wells or monitoring points.

b. An example of direct push soil sampling is the Site Characterization and Analysis Penetrometer System (SCAPS). It was developed by the U.S. Army Engineer (USAE) Waterways Experiment Station (WES) under the sponsorship of the U.S. Army Environmental Center to provide DOD with a rapid and cost-effective way to characterize soil conditions at DOD sites that are being cleaned up. The SCAPS platform is an 18,000 kg (20-ton) truck equipped with vertical hydraulic rams that force a cone penetrometer into the ground at a speed of 2 cm/s to depths of approximately 50 m in nominally consolidated fine-grained soils. The SCAPS multisensor penetrometer probes are equipped to simultaneously measure tip and sleeve resistance to determine soil stratigraphy, layer boundaries, and soil type, as well as contaminant-specific data to determine the presence of pollutants in each soil stratum. The soil and contaminant data are collected and processed in real time, which allows investigations to visualize site conditions in three dimensions.

c. The SCAPS sensors and samplers include a Laser Induced Fluorescence (LIF) Petroleum, Oil and Lubricant (POL) Sensor, an Explosives Sensor, a Thermal Desorption VOC Sampler, a Hydrosparge VOC Sensing System, and a Multiport Sampler. Few or no soil cuttings are generated by this direct-push technology. Use of SCAPS provides other advantages. The unit can decontaminate the push rods as they are withdrawn and containerize the decontamination fluids that are generated. This eliminates the need to build a separate decontamination station for drilling equipment. A trailer-mounted grout pumping system accompanies the SCAPS truck, and test holes are backfilled with pressurized grout as the push rods and probe are withdrawn.

d. For more information about SCAPS, contact: USAE Waterways Experiment Station, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, Phone (601) 634-2446. The web site is: http://www.wes.army.mil/el/scaps.html.

4-8. Sampling Equipment Management

a. As much as possible, sampling equipment (e.g., stainless steel scoops and bowls) should be reused after decontamination. Recycled and cleaned drums should be considered for storing IDW. Many of the "disposable" items that are routinely discarded at HTRW investigation sites can be recycled. This is true of most plastic items such as:

- Decontamination buckets and brushes.
- Tygon tubing.
- Teflon bailers and tubing.
- Tyvek clothing.
- Inner and outer gloves.
- Respirator cartridges.

b. Many DOD facilities at which USACE HTRW activities take place have active Pollution Prevention (P2) programs. Coordinating the recycling, reuse, or disposal of such items as bailers, tubing, plastic sheeting, gloves, and Tyvek protective clothing with the facility P2 Manager can minimize waste disposal and encourage recycling.

4-9. Wastewater Management

a. Sometimes, local publicly owned treatment works (POTWs) will accept aqueous wastes if they meet pretreatment requirements. Disposal of wastewater with a local POTW should be arranged in advance of the site investigation work, and it should be discussed with the regulatory agencies who will review project reports. All appropriate documentation of waste characteristics and volumes should be provided to the POTW prior to disposal.

b. Beneficial uses of the treated water (e.g., lawn and crop irrigation, constructed wetlands) should be investigated. Sprinkling water contaminated with low levels of VOCs in sprinkler irrigation systems can be used as a "disposal" method, and it can be used to air-strip the VOCs at the same time. The use of constructed wetlands for treatment is an immediate beneficial use of the water, providing green space and ecological habitat. However, providing ecological habitat may have negative effects if bioaccumulating contaminants are present. If beneficial uses of treated water cannot be found, discharging the water to a local sanitary sewer should be considered.

c. State or local authorities may allow discharge of treated water to the ground surface. An NPDES permit may be required if the water is to be discharged to a river, stream, waterway, or other location that can be defined as a "water of the state" or "water of the United States."

Some states define road ditches, or other normally dry drainage ways, as waters of the state if

discharge to the drainage way could potentially reach surface water or groundwater.

4-10. Plastics Management

a. Most plastic items used for decontamination and sampling activities (e.g., plastic sheeting, tubs, buckets, brushes, and scrapers) are recyclable thermoplastics. These waste streams will be low volume, and bulk sale of these items is unlikely. Most items will probably have to be shipped directly to a recycler or handled through the facility P2 program. Used liners and covers should be recycled. Liners and covers should be made of recycled material where feasible. Air stripper packing should be made of recycled material. Packing material should be reused for subsequent operations if possible.

b. Generally, recyclable plastic products are made of high density polyethylene (HDPE), which includes items such as milk jugs; low density polyethylene (LDPE), including items such as polyethylene film and plastic bags; or polyethylene terephthalate (PET), including items such as soft drink bottles and clam-shell packaging.

c. The American Plastics Council maintains a nationwide list of plastics recyclers. They can be reached at (202) 974-5400 (Toll Free, 800-243-5790). In addition, planners should check with state recycling programs for information regarding recycling opportunities. Any recycling service shall be procured in accordance with Federal Acquisition Regulations.

d. Note that geomembranes and geonets used in landfills should typically not be made from recycled materials owing to the long life required by the geosynthetics. It is acceptable, however, to use regrind material in the manufacture of geomembranes and geonets. Regrind material is composed of the material created while trimming geomembranes during the manufacturing process. Some geotextiles are manufactured using recycled material. This material may be used in some non-critical applications (such as erosion control) for construction.

4-11. Occupational Health and Safety Program: Personal Protective Equipment Management

a. Recycling and reuse of materials are the primary viable Green Building opportunities for management of Personal Protective Equipment (PPE). To ensure use of Green Building technology opportunities, Green Building management practices should be specified in the Site Safety and Health Plan that is required in USACE ER 385-1-92 for all HTRW site investigation and remediation work.

b. Items such as hardhats and boots are routinely reused. Other items of PPE, such as Tyvek coveralls, gloves, and respirator cartridges, are routinely discarded. PPE waste streams are usually of low volume at HTRW sites, so sales of bulk quantities of materials to recyclers are

unlikely. Recycling may still be possible by sending materials directly to a nearby recycler. DuPont has established a network of 80 recyclers across the U.S. who currently accept uncoated Tyvek and a network of 28 recyclers who accept coated Tyvek. A listing can be obtained by calling 1-800-44-TYVEK. Recycled Tyvek is suitable for applications such as plastic lumber, toys, construction fencing, park benches, and mud flaps. A barrier to recycling PPE is contamination, which may necessitate decontamination prior to recycling.

c. In addition to recycling and reuse, waste can be saved by not using more PPE than is required. For example, where site conditions permit, washable cotton and cotton/polyester blend coveralls may be used instead of disposable Tyvek coveralls. Launderable coveralls in many cases provide adequate protection in addition to reducing the PPE waste stream and associated costs. An added occupational health benefit of using launderable coveralls is the reduced heat load and heat stress for the worker because of the inherent moisture permeability of the cotton coveralls (see Chapter 5, Success Stories, Paragraph 5-4, Use of Cotton Coveralls Instead of Tyvek).

4-12. Efficient and Properly Sized Electrical Motors and Blowers

a. The selection and use of electrical equipment, including motors and blowers for USACE applications, is governed by CEGS Section 16415, Electrical Work Interior. Some rationale for using efficient electrical systems include the following.

b. Use of efficient and properly sized electric motors for blowers, pumps, and mixers can reduce energy requirements for remediation systems and building systems such as heating and air conditioning. For example, oversized blowers have to be throttled or have dilution air added. Throttling results in direct energy consumption. Dilution reduces the efficiency of subsequent off-gas treatment processes, such as activated carbon adsorption, thereby requiring more carbon to be used, or if off-gas is burned, more fuel is required to bring the dilution air to the combustion temperature, and the inherent fuel value of the off-gas is reduced.

c. Efficient electrical equipment may require a higher capital cost than standard motors. However, energy-efficient equipment saves money through using less energy, and it benefits the environment by using less electricity and consequently causing less air pollution from electrical generation.

4-13. Activated Carbon Management

a. Spent activated carbon can be disposed of in an appropriate waste facility, regenerated on-site, or returned to the supplier for regeneration. The choice between disposal and regeneration will depend primarily on the volumes involved and on the waste treated. Disposal results in a loss of activated carbon and no destruction of contaminants. Thermal regeneration

saves activated carbon and destroys organic contaminants but requires energy. Steam regeneration allows reuse of the activated carbon, but it does not destroy contaminants. Activated carbon is more likely to be regenerated if a specialty contractor is used to bring it on-site and to pick up the expended carbon when it needs to be replaced. Note that the cost of regeneration may be lower than the cost of disposal if the regeneration facility is close enough to keep transportation costs low.

b. The need for exhaust air treatment depends on factors such as the type of contaminants present, concentrations, and local air regulations. Up-front discussions with regulatory agencies, and perhaps air pathway modeling, should be conducted to weigh the environmental impacts associated with treating the exhaust air compared to discharging it to the atmosphere.

c. Rather than using activated carbon to adsorb contaminants in exhaust gas, resulting in carbon waste which needs disposal or regeneration, the exhaust gas could be thermally or chemically oxidized to destroy organic contaminants. This alternative will likely require higher capital costs and use more energy than activated carbon with disposal. However, energy use may be comparable to that necessary to regenerate activated carbon.

4-14. Process Optimization

a. It may be possible to save energy by optimizing the way remediation systems operate based on factors such as spacing and orientation of injection and pumping wells and injection and pumping rates for groundwater remediation. Locating treatment units (e.g., incinerators) near the waste sources can minimize fuel use for transporting contaminated media to the treatment unit and treated media to disposal sites.

b. Energy can be conserved by staging operations to minimize handling and transporting contaminated media.

c. Wastes, such as plastic sheeting, can be saved by optimizing the size of treatment units, such as decontamination pads. The components used to construct a decontamination pad should also be reviewed to ensure that the pad is not more complicated than necessary.

d. Oxygen monitoring can be used to optimize air flow rates at bioventing, biopile, and composting operations, and it can be used to ensure that adequate oxygen is present for biological activity. Oxygen concentrations beyond these levels do not significantly enhance the biological activity. The efficiency of technologies such as bioventing can often be improved if the process is designed to treat contaminants in-situ, thus avoiding the need for ex-situ treatment.

e. Energy can be saved at soil vapor extraction sites by minimizing flow rates or by cycling pumps after the removal of contaminants has become diffusion-limited. Using air

injection methods rather than extraction/injection methods where possible can save energy and resources. In addition, the use of dilution air to control vacuum should be avoided.

f. Matching the requirements of solidified waste with the use of solidification amendments could save resources such as cement or could encourage use of waste materials such as fly ash. For example, arbitrarily high unconfined compressive strength requirements should be avoided in non-critical applications. Also, using specialized solidification reagents such as phosphates or silicates may reduce the amount of cement needed to solidify contaminated soils.

g. Investigation costs and wastes can be minimized by optimizing analytical needs. Only chemical testing that is required to meet the needs of the project should be done. For example, if it is known that petroleum hydrocarbons are the chemicals of concern at a site, it may not be necessary to test for unrelated chemicals, such as pesticides. In addition, it generally is not necessary to specify detection limits that are more stringent than those required to make site remediation decisions (e.g., risk-based levels).

h. Remediation system efficiency should be periodically evaluated in accordance with the Remediation System Evaluation (RSE) Instruction Guide available to USACE personnel at http://w3.environmental.usace.army.mil/library/guidance/remcheck/remcheck.html. Use of the USACE EM 200-1-2 Technical Project Planning guidance can be helpful to ensure that site activities are efficiently planned and carried out.

4-15. Piping/Process Equipment Recycling/Reuse

a. Piping and electrical wiring from process equipment may be recyclable. Process tanks and other equipment may also be able to be recycled or reused. Electrical and control equipment can often be salvaged and reused. When designing remediation process equipment, consideration should be given to using materials with recycled content and to using materials that can be reused or recycled. This could include piping, tanks, and plastic liners. Materials and equipment that have come into contact with contamination may need to be decontaminated before recycling or reuse.

b. There is a fact sheet at the HTRW CX homepage on how to manage scrap metal that may be sent for recycling. The fact sheet can be accessed at: http://www.environmental.usace.army.mil/info/technical/comply/complys/complys.html#guidance.

4-16. Use of Packaged or Skid-Mounted Treatment Vessels

a. Where possible, packaged treatment vessels or remediation equipment should be used so that they can be reused after treatment is finished. This will eliminate the need for trying to recycle parts of the reactors and disposing of parts that can’t be recycled.

b. As an example, Corps of Engineers Guide Specification CEGS 11225 discusses the requirements for the use of modular (packaged) treatment vessels for treatment with activated carbon. The CEGS states that, "Transportable units should be considered for units containing less that 900 kg (2,000 pounds) of activated carbon...," and that, "Modular units need not be new if pressure rating and all other requirements of this section are met."

4-17. Plant Tissue Residue Management

a. It may be possible to find beneficial uses for plant tissue derived from processes such as phytoremediation or from brush clearing rather than disposing of them in a hazardous waste facility. For example, it may be possible to burn these materials for energy (e.g., as firewood, in cement kilns, or in incinerators). The materials may be shredded and used for mulch or soil amendments (e.g., for composting operations or pretreatment materials for soils requiring incineration). Woody vegetation may be used for paper pulp, firewood, or construction material, rather than being disposed of in a hazardous waste facility. The use of these materials likely depends on the level and types of contaminants present.

b. State or local requirements may require management of the plant tissue as hazardous waste, if regulatory threshold concentrations are exceeded. Even if the wastes are not defined as hazardous, they may be defined as "special" or industrial solid wastes, with more restrictive management and disposal requirements than municipal solid waste. Therefore, up-front discussions with regulatory agencies are needed in the project planning.

4-18. Resource Recovery From Treatment Sludges

Depending on the contaminants that are present (e.g., precious metals) and on the volumes of waste generated, it may be feasible to further concentrate the contaminants and to use another technology (e.g., mining technologies) to recover them for recycling. This is likely to be practical only where one principal contaminant is recovered and where that contaminant has a relatively high resale value (see Chapter 5, Success Stories, Paragraph 5-3, Ashland 2 FUSRAP Site: Recycling Uranium Tailings).

4-19. Reuse of Treated Soils and Soil Residues

a. Where treated soil cannot be replaced in the original excavations, consideration should be given to using the treated soil for beneficial purposes, such as construction fill, landfill cover material, or asphalt additive.

b. Stabilizing reagents from local waste streams, such as fly ash, should be considered for soil stabilization. If treated soil can be used for beneficial purposes, it may be possible to leave the excavation unfilled and use it for aquatic or wetland habitat (see Chapter 5, Success

Stories, Paragraph 5-6, IAAP: Innovative Use of excavations and Dredged Material). If the stabilized soil can be used for beneficial purposes, it may be possible to recover some of the cost of the stabilization process.

c. Up-front partnering with regulatory agencies may be useful in obtaining permission for final disposal solutions (e.g., using stabilized soil for construction fill and using the unfilled excavation for aquatic habitat). In addition, up-front discussions about the engineering properties (e.g., compressive strength) of the treated soils may result in more optimum use of resources and waste materials.

4-20. Stormwater Management

Limiting the quantity of precipitation and resulting stormwater that contact contaminated media (e.g., excavations with residual contamination, soil stockpiles, bioremediation piles) will conserve energy and treatment resources, such as activated carbon, by limiting the amount of water that needs to be treated. Stormwater can be managed by use of covers, liners, and flow diversion ditches and berms.

4-21. Use of Waste Organic Materials and Agricultural Wastes

Local waste material (e.g., agricultural waste such as corn cobs, feedlot bedding) should be considered as soil amendments for composting or pretreatment before incineration.

4-22. Use of Excavations For Aquatic Habitat

If treated soil can be used for beneficial purposes such as construction fill or landfill cover, it may be possible to leave excavations unfilled and use them for aquatic or wetland habitat (see Chapter 5, Success Stories, Paragraph 5-6, IAAP: Innovative Use of excavations and Dredged Material). Care must be taken, however, when residual contamination (especially bioaccumulating contamination) remains in the excavations. In addition, it may be necessary to obtain a CWA 404 Dredge and Fill Permit from the USACE when creating or altering a wetland.

4-23. Use of Incinerators For Waste to Energy Processors

Depending on the planned operation schedule, the location of the treatment facility, and on the media and contamination to be incinerated, it may be possible to use incinerators or other thermal processors in a waste-to-energy operation. Wastes that could be used for energy might include used tires, wood, recovered fuels, or recovered solvents (see Chapter 5, Success Stories, Paragraph 5-2, Holloman Air Force Base: Waste to Fuel). In addition, the fuel value of extracted gasses (e.g., from landfills) should be considered.

4-24. Use of Dredged Material/Lake Rehabilitation

When topsoil is needed for a site, it may be possible to get it by dredging a local water body. This can provide excellent topsoil, while removing unwanted sediment from the water body (see Chapter 5, Success Stories, Paragraph 5-6: IAAP: Innovative Use of Excavations and Dredged Material). The dredging should be done with the oversight of local wildlife agencies so that it improves aquatic habitat in the water body. Note that it is necessary to obtain a 404 Permit from the USACE when dredging from a water body identified as "waters of the United States."

4-25. Building and Building Material Management

a. Where possible, use of existing buildings at or near the HTRW site should be considered. This will eliminate significant amounts of building materials and wastes if buildings need to be dismantled. If existing buildings cannot be used, it may be possible to construct a building that will have a use after HTRW activities are finished. The buildings could be sold or transferred as appropriate. This will reduce waste because demolition will not be necessary.

b. When planning building construction, prefabricated buildings should be considered because they typically create less waste than buildings constructed on-site. When planning and constructing buildings that will be dismantled after HTRW activities are finished, the potential recycling and reuse of building components should be considered. For example, concrete rubble may be used as fill, or crushed and used in new concrete, or used directly as road cover. Electrical equipment, heating equipment, plumbing and fixtures, and ventilation blowers can be salvaged and reused. Sheet metal can be recycled. Wood sheeting and dimensional lumber can be salvaged and reused, or used as fuel. Windows and doors can be salvaged and reused (see Chapter 5, Success Stories, Paragraph 5-1, Mead Army Ammunition Plant: Use of Concrete Rubble for Construction).

c. Insulation should be made of recycled materials. For example, cellulose insulation is made from recycled paper or cotton waste. Managers should stipulate that no CFCs be used as the propellant when blowing insulation into building spaces.

d. Consideration should be given to the "embodied energy" of materials selected for construction of HTRW buildings. Embodied energy is the energy required to extract, transport, process, install, and dispose of or recycle the materials. As examples, the embodied energy ratings of several materials are as follows: concrete is 1.2 – 2, lumber is 4 – 7, particle board is 14 – 20, and steel is 25 – 39 (Cole and Rousseau, 1992). More information can be found on the Federal Energy Management Program's (FEMP) web site (http://www.eren.doe.gov/femp/greenfed/).

e. USACE criteria for Sustainable Design for Military Facilities provides guidance to

designers of new Army facilities, as well as the rehabilitation/renovation of existing facilities (see Paragraph 3-1 for more details). In addition, the NIST computer program, BEES (Building for Environmental and Economic Sustainability), provides planners a PC-based life-cycle assessment tool to help them select building materials that are both environmentally friendly and cost effective.

f. Economic analysis (and decision analysis) tools for energy-saving Green Building technologies can be found in the FEMP web page. The FEMP web page provides access to the National Institute of Standards and Technology's "Building Life-Cycle Cost" computer program, which helps evaluate costs and benefits of energy conservation projects in facilities. The program can calculate annual and life cycle CO_2, SO_x, and NO_x emissions for building energy systems. While this program is intended for permanent facilities, the information could be useful for selecting equipment for HTRW facilities as well. The site also provides access to the NIST life cycle analysis program (BEES). Another web page that provides useful information regarding energy-efficient motors can be found at: http://energy.copper.org/motorad.html.

Chapter 5
Success Stories

5-1. Mead Army Ammunition Plant: Concrete Rubble for Construction

a. Part of a remediation plan at the Mead Army Ammunition Plant near Mead, Nebraska, required demolition, removal, and disposal of concrete structures at the site. This plan was modified to allow reuse of about 70 million kg (77,000 tons) of broken concrete containing trace amounts of explosives (RDX). The concrete is currently stockpiled by the Clear Creek Drainage District in Nebraska for use as rip-rap along Salt Creek, and by Saunders County, Nebraska, for use as road base.

b. By treating this material as a resource, rather than a waste, the costs associated with disposal of the material, such as hauling expenses and landfill tipping fees, were avoided. In addition, energy use was minimized in several ways: by reusing the material near the point of generation, less energy was expended than in transporting the material to a remote landfill, and no energy was expended at a landfill to place and cover the material. The energy to be expended by the drainage district and the county in reusing the broken concrete would have been expended in using material from another source; in fact, their energy usage was minimized by providing them with a nearby source of rip-rap and road base.

5-2. Holloman Air Force Base: Waste to Fuel

a. A free product recovery system at Holloman Air Force Base was designed to remove JP-4 jet fuel from the water table aquifer, where approximately 2.3 million liters (600,000 gallons) was present as free product. During the design, the problem of how to dispose of the recovered JP-4 became a significant issue because of anticipated high recovery volumes. Designers determined, through pre-design sampling, that the JP-4 was of sufficient quality (following reclamation) to be used as fuel for an on-site thermal oxidizer that was used to treat fuel vapors extracted from the groundwater and vadose zone. The JP-4 recovered from the treatment system was first processed through an oil/water separator and then filtered before being reused as fuel for the thermal oxidizer. Although backup fuel was available, the majority of the time the thermal oxidizer was being powered by the JP-4 reclaimed from the water table.

b. The designers for this project showed ingenuity in the area of pollution prevention. Not only did they avoid costs and regulatory issues associated with the transportation and disposal of potentially hazardous materials/wastes, they also found a way to significantly reduce the cost of fuels required to complete site cleanup.

5-3. Ashland 2 FUSRAP Site: Recycling of Uranium Tailings

a. The Ashland 2 Formerly Utilized Sites Remedial Action Program (FUSRAP) Site in Tonawanda, New York is contaminated with low levels of radium, uranium, and thorium. The contamination is a result of work done as part of the nation's early atomic energy program, when uranium ores were processed at the former Linde Products Division of Union Carbide. From 1944 to 1946, uranium processing wastes were transported from Linde to a 4 hectare (10-acre) area, known then as the Haist property, now called Ashland 1. Subsequent activities in the 1970s resulted in some of the material being transported to an area now known as Ashland 2.

b. Recycling of radioactive contaminated soils involved shipping the material to the International Uranium Corporation (IUC) Mill in Utah. Since the Nuclear Regulatory Commission licenses the facility, an amendment to their license was required to accept the Ashland material. Previously, the Department of Energy had shipped this type of material exclusively to another facility in Utah. Opening up the disposal/recycling market for this type of material not only benefitted the Ashland project, but other FUSRAP projects, as well.

c. The initial cost savings for recycling were estimated at about \$40/m^3 (\$30/cy), which equates to about \$1.5 million for the 34,000 m^3 (45,000 cy). However, the actual costs avoided turned out to be in excess of \$16 million. This is because IUC was able to accept materials for which other facilities would have charged higher rates, such as debris and petroleum contaminated soil, for the same low unit price. The streamlined manifesting procedures and more flexible acceptance criteria for water content also resulted in cost savings.

d. The more flexible acceptance criteria at IUC resulted in significant savings in time. The biggest factor was that IUC did not have the strict water content limitations that some other facilities mandate. This allowed the material to be excavated and shipped "as is" without requiring treatment to meet a specific water content standard. Additionally, rail car turn-around times were quicker than have been historically reported using other disposal facilities.

e. In addition to the noted savings in time and money, recycling of the material at IUC offered other important benefits. From a public relations standpoint, it was a success story to be able to explain that at least some of the material that was being removed from the site would be recycled. This not only resulted in recovery of an important resource, but also resulted in the material ultimately put in the ground being less contaminated. Overall, recycling of the material at IUC resulted in significant savings and fostered a positive image of the Corps as steward of both the environment and taxpayers' money.

5-4. Use of Cotton Coveralls Instead of Tyvek

a. The contractor at the Weldon Spring munitions facility has begun waste reduction by using cotton coveralls instead of Tyvek suits for workers' dermal protection in non-critical situations. The Weldon Spring site, near St. Louis, Missouri, is an abandoned munitions manufacturing facility where soils and other media are contaminated with explosives (primarily TNT). The remedial action at the site is primarily incineration of soils. Many of the site workers are engaged in activities that do not require high levels of dermal protection (i.e., cotton coveralls provide adequate dermal protection). The cotton coveralls are initially more expensive than Tyvek suits. However, the cost of the cotton coveralls and their laundering is less than the cost of several hundred Tyvek suits per day for several months.

b. In addition to saving money, the use of the cotton coveralls saves a significant amount of solid waste at the site. Since an estimated 120 workers are involved with the program, an estimate of nearly 300 Tyvek suits would have been used per day for several months of site activities.

5-5. Grand Forks Air Force Base: Multimedia Inspection

a. Under Section 6002 of the Resource Conservation and Recovery Act (RCRA), state regulatory agencies are empowered to evaluate adherence to Federal Procurement Guidelines for Federal facilities and activities. During a RCRA audit at the Grand Forks Air Force Base in Grand Forks, North Dakota, the state regulatory agency found that the base had proper procurement procedures in place and was adhering to the procurement policies.

b. In addition to evaluating day-to-day procurement procedures for the base, the state evaluated the USACE procurement procedures for the military construction activities that it oversees there. The Corps personnel were able to refer to the CEGS, which have been revised to meet sustainable design requirements.

c. Because the base and the USACE personnel involved with base military construction had proper procurement procedures in place and were following the procedures, the audit found no deficiencies, and the inspection can be considered a success. However, the experience points out that these audits can and will be made, and that Federal Procurement Guidance must be followed.

5-6. Iowa Army Ammunition Plant: Innovative Use of Excavations And Dredged Material

a. The Iowa Army Ammunition Plant (IAAP) is an active munitions manufacturing facility in southeastern Iowa. Historical activities at the plant contaminated the soil, surface

water, and groundwater with explosives. The site soils are being remediated through excavation and thermal desorption of the explosives. Since the site is large, significant quantities of soils have been excavated. These excavations would typically require refilling with clean soils at considerable expense (estimated in excess of a million dollars). At IAAP, partnering with regulatory agencies allowed the excavations to remain unfilled and converted to small lakes and wetland areas. Residual contamination that leaches into the water bodies from the soils surrounding the excavations is then treated via phytoremediation processes by the aquatic plants.

b. In addition to the creation of surface water resources from excavations, IAAP developed an innovative use for dredged material from a local small lake. The lake, located on the IAAP facility, suffered from significant sedimentation problems, and the aquatic habitat was seriously degraded. The planners for the remedial activities at IAAP, in cooperation with the appropriate wildlife agencies, drained the lake and excavated sediment from the lake bottom. By excavating the lake bottom in a specific manner, aquatic habitat could be restored in the lake. This renovated the lake, restored its aquatic habitat, and provided IAAP with large quantities of high quality topsoil for regrading at remediation sites.

c. The program at IAAP not only was successful in saving significant tax dollars, but the created water bodies provide aquatic habitat for local wildlife and recreational opportunities for local residents.

Appendix A
References

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Executive Order 13101 (1998). "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition." Office of the President. Federal Register, 16 September 1998.

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USACE Engineering Manual 200-1-2. "Technical Project Planning Process."

USACE Guide Specification 16415. "Electrical Work, Interior."

USACE Guide Specification 11225. "Downflow Liquid Activated Carbon Adsorption Units."

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USACE "Report on Treatment, Storage, and Disposal Facilities for Hazardous, Toxic, and Radioactive Waste." U.S. Army Corps of Engineers, HTRW Center of Expertise. Omaha, NE.

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USEPA (1995). "Ground Water Issue: Low-Flow (Minimal Drawdown) Ground-water Sampling Procedures." Robert W. Puls and Michael J. Barcelona, eds. EPA/540/S-95/504. U.S. Environmental Protection Agency. Washington, D.C.

Cole, R.J. and D. Rousseau (1992). "Environmental Auditing for Building Construction: Energy and Air Pollution Indices for Building Materials." *Building and Environment*, Vol. 27, pp 23-30.

Appendix B
Annotated Bibliography of Information Sources and Internet Sites

These internet sources provide information on Green Building and pollution prevention opportunities and HTRW remediation activities. They are divided somewhat arbitrarily, into the following categories: Green Building Sites; HTRW Sites; Pollution Prevention Sites; and General Environmental Sites. Many of the sites, however, contain information dealing with more than one category.

B-1. Green Building Sites

Office of the Federal Environmental Executive gives the text of Executive Order 13101 and discusses recycling efforts and other Green Building opportunities in the government.
http://www.ofee.gov/

Federal Energy Management Program: Greening Federal Facilities
Greening Federal Facilities is a resource guide for Federal facility managers to assist them in reducing energy consumption and costs, improving the working environment of the facilities they manage, and reducing the environmental impacts of their operations.

FEMP's Financing Team provides policy guidance and technical and contracting assistance related to private sector funding for Federal energy efficiency, renewable energy, and water conservation projects. This section contains guidance on how agencies can fund these projects.
http://www.eren.doe.gov/femp/greenfed/

High Efficiency Copper-wound Motors mean Energy and Dollar Savings. This site discusses the energy and cost savings (e.g., payback period) for energy efficient versus standard electrical motors of various sizes.
http://energy.copper.org/motorad.html

United States Green Building Council provides many opportunities for use of Green Building technologies in building construction.
http://www.usgbc.org/resource/index.htm

EPA's Comprehensive Procurement Guidelines (CPGs) and Recovered Materials Advisory Notices (RMANs) are available at:
http://www.epa.gov/epaoswer/non-hw/procure.htm

EPA/DOE's "Energy Star" is an incentive program that provides information on and acknowledgment of products that are both economical and energy efficient.
http://www.epa.gov/energystar

The Defense Logistics Agency homepage for Environmental Products provides information on possible alternative products as well as technical information and prices.
http://www.dscr.dla.mil/products/epa/eppcat.htm

City of Austin Green Builder Program: Sustainable Building Sourcebook

The Sustainable Building Sourcebook was developed to complement the efforts of the Green Builder Program to foster the implementation of environmentally responsible practices in home building. The Green Builder Program presents specific and general recommendations for homes that can be considered environmentally friendly. Many of the recommendations may also be relevant to some types of commercial development. The Sourcebook provides the practical information needed to better understand and implement these options.
http://www.greenbuilder.com/sourcebook/contents.html

Green Building Concepts

Green Building Concepts periodic newsletter features guest authors, how-to lessons in energy efficiency, product listings and reviews, and many links to new web sites as they become available, as well as tools to build a more energy and resource efficient home. It is a source of reports, guides, and references for sustainable, energy efficient, healthy, renewable, comfortable, and affordable building techniques, products, and ideas.
http://www.greenconcepts.com/Contact.shtml

James Dulley's $ensible Home

James Dulley writes a periodic newspaper column called "The $ensible Home." He gives detailed specifications on many product categories from heat pumps to skylights. He offers ready-made projects and has many answers to tough questions.
http://www.dulley.com/

Home Energy magazine is published by a non-profit organization whose mission is to provide objective and practical information on residential energy conservation. The magazine emphasizes a whole-building approach — comfort, health and safety, energy efficiency, durability, and affordability in its coverage of heating and cooling systems, appliances, the building envelope, materials, new technologies, and best practices. *Home Energy* has published a series of **Consumer Guides**, for lighting, windows, insulation, and more.
http://www.homeenergy.org/

USDA's Biobased Products Council list of biobased products is to be published on the USDA Procurement web page.
http://www.usda.gov/da/procure.html

B-2. HTRW Sites

Guide to documenting and managing cost and performance information for remediation projects, Federal Remediation Technology Roundtable.
http://www.frtr.gov/cost/

Safety and Occupational Health Document Requirements for HTRW and Ordinance and Explosives including personnel protection equipment policies and decontamination programs.
http://www.usace.army.mil/inet/usace-docs/eng-regs/er385-1-92/toc.htm

Remediation Technology Screening Matrix and Reference Guide: Federal Remediation Technologies Round Table. This reference guide is the product of a cooperative effort among the member agencies of the Federal Remediation Technologies Roundtable (FRTR). These include the Environmental Protection Agency (USEPA), Department of Defense (DOD), Department of Energy (DOE), Department of the Air Force (USAF), Department of the Interior (DOI), Department of the Navy (USN), and Department of the Army. The FRTR was established in 1991 as an interagency committee to exchange information and to provide a forum for joint action regarding the development and demonstration of innovative technologies for hazardous waste remediation. This reference includes appendices on Vendor Information System for Innovative Treatment Technologies (VISITT), DOE Site Remediation Technologies by Waste Containment Matrix and Completed Site Demonstration Program Projects as of October 1996, Factors Affecting Treatment Cost and Performance, and Federal Data Bases and Additional Information Sources.

http://www.frtr.gov/matrix2/section1/toc.html

Hazardous, Toxic and Radioactive Waste Center of Expertise**:** US Army Corps of Engineers

The Hazardous, Toxic and Radioactive Waste Center of Expertise (HTRW CX) supports the Army Corps of Engineers environmental restoration program by providing technical oversight, review coordination, and expert technical assistance to Corps divisions, districts, and other Federal agencies. The HTRW CX has extensive expertise in site investigation, risk assessment, alternative selection, design, and site remediation.

http://www.environmental.usace.army.mil/

USACE Remediation System Evaluation Instruction Guide is available to USACE personnel.

http://w3.environmental.usace.army.mil/library/guidance/remcheck/remcheck/.html

B-3. Pollution Prevention Sites

Recycler's World. Recycler's World was established as a worldwide trading site for information related to secondary or recyclable commodities, by-products, and used and surplus items, or materials. This site contains opportunities for recycling many types of materials and includes publications and listings of recycling companies and recycling equipment.

http://www.recycle.net

Global Recycling Network details recycling opportunities and provides recycling centers.

http://grn.com

West Virginia Solid Waste Management Board has a link at the bottom of its "Materials Exchange" site to a list of materials exchanges throughout North America.

http://www.state.wv.us/swmb

Environmental Protection Agency: Waste Minimization/Pollution Prevention Resource Directory.

This resource directory was developed with the Waste Minimization Branch, Office of Solid Waste, USEPA and is divided into 4 sections: Internet Resources, Journals/Newsletters that Focus on Waste Minimization/Pollution Prevention**,** USEPA Voluntary Programs that Focus on Waste Minimization/Prevention, and Individuals Representing Federal Agencies at the Pollution Prevention Roundtable**.** The internet resource has links to just about every pollution prevention web page possible.

http://www.epa.gov/epaoswer/hazwaste/minimize/p2.htm

Ohio Pollution Prevention and Waste Minimization Planning Guidance Manual (Ohio EPA)

This guidance manual is a general overview of how Ohio businesses and government facilities can develop and implement a pollution prevention program. The manual uses the pollution prevention program steps (with limited modifications) outlined in USEPA's 1992 publication, *Facility Pollution Prevention Guide* (EPA/600/R-92/088). These steps include planning and organization, assessment, feasibility analysis, implementation, and

measuring progress. The manual also uses substantial portions of the text from the Illinois Hazardous Waste Research and Information Center's 1993 publication, *Pollution Prevention: A Guide to Program Implementation*.

http://www.epa.ohio.gov/opp/guide/p2ptoc.html

Ohio Environmental Protection Agency: Pollution Prevention

Pollution Prevention- Getting Started: Dictates the development of a pollution prevention program for any department.

http://www.epa.state.oh.us/opp/planning/fact5.html

Environmental Protection Agency: Office of Pollution Prevention and Toxics

Pollution Prevention – Setting up a pollution prevention program.

http://www.epa.gov/opptintr/p2home/p2setup.htm

Pollution Prevention Program of the Federal Programs Division of Environment Canada, Ontario Region explains the basic components and definition of a pollution prevention program. It gives the tools for developing a model for pollution prevention in any situation.

http://www.cciw.ca/glimr/data/federal-programs-division/pollution-prevent-fact-sheet/in_ppfs2.html#1

Joint Service Pollution Prevention (P2) Technical Library

Includes the P2 Opportunity Handbook, the P2 Equipment Book, Environmental Products Catalog, and Technical Reports. The Joint Service P2 Opportunity Handbook was designed to identify available "off-the-shelf" P2 technologies, management practices, and process changes that will reduce the amount of hazardous waste and solid waste being generated at joint service industrial facilities. The Pollution Prevention Equipment Program (PPEP), provides another valuable resource of information, and contacts, to assist activities in making intelligent equipment decisions for installations. The Environmental Products Catalog is a user-friendly publication that suggests alternative products or processes that may be non-ozone depleting, less toxic, or promote recycling and waste minimization. Any or all of these products may be downloaded from the site.

http://enviro.nfesc.navy.mil/p2library/

B-4. General Environmental Sites

Index of U.S. government information sites and home pages.

http://www.nttc.edu/gov_res.html

Listing of new technologies developed for licensing and environmental cleanup by United States Geological Survey (USGS).

http://www.usgs.gov/tech-transfer/licenseopp.html

Environmental programs provides plans and strategies for the DOC, DOD, DOE, DOI, USEPA, NASA, and various interagency programs.

http://www.nttc.edu/env/env_pps.html

USEPA Enviro$ense is a home page that includes various ways to cut waste and save money in the process.

http://www.epa.gov/envirosense/

USEPA's public information server. The United States Environmental Protection Agency's home page includes information on regulations and law, projects and programs, databases and software, resources and publications, and has the ability to search a topic on any subject in the database. The mission of the EPA is to protect human health and to safeguard the natural environment – air, water, and land – upon which life depends.

http://www.epa.gov

OSHA's home page. The OSHA home page includes information on regulations, provides a library with numerous resources, and allows for interaction with the public. The mission of the Occupational Safety and Health Administration (OSHA) is to save lives, prevent injuries, and protect the health of America's workers. To accomplish this, Federal and state governments must work in partnership with the more than 100 million working men and women and their six and a half million employers who are covered by the Occupational Safety and Health Act of 1970.

http://www.osha.gov

Environmental Professionals Homepage gives links to regulation references, legislation, and health and safety issues.

http://www.clay.net

Renovation World online magazine.

This online magazine features information and tips on home improvement, repair, construction and building. It contains links to web sites and pages with listings of services and products from companies for everything from windows to plumbing.

http://www.renovationsworld.com/

Appendix C
Abbreviations and Acronyms

AOC	Area of Contamination
ARAR	Applicable or Relevant and Appropriate Requirement
BEES	Building for Environmental and Economic Sustainability
CAA	Clean Air Act
CEGS	Corps Engineering Guide Specification
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CPG	Comprehensive Procurement Guidelines
CWA	Clean Water Act
CX	Center of Expertise
DENIX	Defense Environmental Network and Information Exchange
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
DO	Data Quality Objective
E.O.	Executive Order
EP	Engineering Pamphlet
ECL	Engineering Technical Letter
FAR	Federal Acquisition Regulation
FEMP	Federal Energy Management Progam
FOA	Field Operating Activities
FUSRAP	Formerly Utilized Sites Remedial Action Program
GB	Green Building
HAP	Hazardous Air Pollutant
HDPE	High Density Polyethylene
HQUSACE	Headquarters U.S. Army Corps of Engineers
HTRW	Hazardous, Toxic, and Radioactive Waste

HVAC	Heating, Ventilation, and Air Conditioning
IAAP	Iowa Army Ammunition Plant
IDW	Investigation Derived Waste
IUC	International Uranium Corporation
LDPE	Low Density Polyethylene
LIF	Laser Induced Fluorescence
MSC	Major Subordinate Command
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautical and Space Administration
NIST	National Institute of Standards and Technology
NOx	Nitrogen Oxides
NPDES	National Pollution Discharge Elimination System
OSHA	Occupational Safety and Health Administration
P2	Pollution Prevention
PARC	Principle Assistant Responsible for Contracting
PET	Polyethylene Terephthalate
PIL	PARC Instruction Letter
POL	Petroleum, Oil, and Lubricant
POTW	Publicly Owned Treatment Works
PPA	Pollution Prevention Act
PPE	Personal Protection Equipment
RCRA	Resource Conservation and Recovery Act
RMAN	Recovered Materials Advisory Notices
SARA	Superfund Amendments and Reauthorization Act
SCAPS	Site Characterization and Analysis Penetrometer System
SOx	Sulfur Oxides
TCLP	Toxicity Characteristic Leaching Procedure
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USAE	U.S. Army Engineer
USEPA	United States Environmental Protection Agency

USGS	United States Geological Survey
VISITT	Vendor Information System for Innovative Treatment Technologies
VOC	Volatile Organic Compound

Appendix D

Executive Order 13101

September 14, 1998

EXECUTIVE ORDER 13101

GREENING THE GOVERNMENT THROUGH WASTE

PREVENTION, RECYCLING, AND FEDERAL ACQUISITION

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Solid Waste Disposal Act, Public Law 89-272, 79 Stat. 997, as amended by the Resource Conservation and Recovery Act (RCRA), Public Law 94-580, 90 Stat. 2795, as amended (42 U.S.C. 6901-6907),section 301 of title 3, United States Code, and in order to improve the Federal Government's use of recycled products and environmentally preferable products and services, it is hereby ordered as follows:

PART 1 - PREAMBLE

Section 101. Consistent with the demands of efficiency and cost effectiveness, the head of each executive agency shall incorporate waste prevention and recycling in the agency's daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products. It is the national policy to prefer pollution prevention, whenever feasible. Pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should be employed only as a last resort.

Sec. 102. Consistent with policies established by the Office of Federal Procurement Policy (OFPP) Policy Letter 92-4, agencies shall comply with executive branch policies for the acquisition and use of environmentally preferable products and services and implement cost-effective procurement preference programs favoring the purchase of these products and services.

Sec. 103. This order creates a Steering Committee, a Federal Environmental Executive (FEE), and a Task Force, and establishes Agency Environmental Executive (AEE) positions within each agency, to be responsible for ensuring the implementation of this order. The FEE, AEEs, and members of the Steering Committee and Task Force shall be full-time Federal Government employees.

PART 2 - DEFINITIONS

For purposes of this order:

Sec. 201. "Environmentally preferable" means products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

Sec. 202. "Executive agency" or "agency" means an executive agency as defined in 5 U.S.C. 105. For the purpose of this order, military departments, as defined in 5 U.S.C. 102, are covered under the auspices of the Department of Defense.

Sec. 203. "Postconsumer material" means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. "Postconsumer material" is a part of the broader category of "recovered material."

Sec. 204. "Acquisition" means the acquiring by contract with appropriated funds for supplies or services (including construction) by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated, and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract.

Sec. 205. "Recovered materials" means waste materials and by-products that have been recovered or diverted from solid waste, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process (42 U.S.C. 6903 (19)).

Sec. 206. "Recyclability" means the ability of a product or material to be recovered from, or otherwise diverted from, the solid waste stream for the purpose of recycling.

Sec. 207. "Recycling" means the series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

Sec. 208. "Waste prevention" means any change in the design, manufacturing, purchase, or use of materials or products (including packaging) to reduce their amount or toxicity before they are discarded. Waste prevention also refers to the reuse of products or materials.

Sec. 209. "Waste reduction" means preventing or decreasing the amount of waste being generated through waste prevention, recycling, or purchasing recycled and environmentally preferable products.

Sec. 210. "Life cycle cost" means the amortized annual cost of a product, including capital costs, installation costs, operating costs, maintenance costs, and disposal costs dis-counted over the lifetime of the product.

Sec. 211. "Life cycle assessment" means the comprehensive examination of a product's environmental and economic aspects and potential impacts throughout its lifetime, including raw material extraction, transportation, manufacturing, use, and disposal.

Sec. 212. "Pollution prevention" means "source reduction" as defined in the Pollution Prevention Act of 1990 (42 U.S.C. 13102), and other practices that reduce or eliminate the creation of pollutants through: (a) increased efficiency in the use of raw materials, energy, water, or other resources; or (b) protection of natural resources by conservation.

Sec. 213. "Biobased product" means a commercial or industrial product (other than food or feed) that utilizes biological products or renewable domestic agricultural (plant, animal, and marine) or forestry materials.

Sec. 214. "Major procuring agencies" shall include any executive agency that procures over $50 million per year of goods and services.

PART 3 - THE ROLES AND DUTIES OF THE STEERING COMMITTEE, FEDERAL ENVIRONMENTAL EXECUTIVE, TASK FORCE, AND AGENCY ENVIRONMENTAL EXECUTIVES

Sec. 301. Committees, Executives, and Task Force. (a) Steering Committee. There is hereby established a Steering Committee on Greening the Government through Waste Prevention and Recycling ("Steering Committee"). The Steering Committee shall be composed of the Chair of the Council on Environmental Quality (CEQ), the Federal Environmental Executive (FEE), and the Administrator for Federal Procurement Policy (OFPP). The Steering Committee, which shall be chaired by the Chair of the CEQ, is directed to charter a Task Force to facilitate implementation of this order, and shall provide the Task Force with policy direction in such implementation.

(b) Federal Environmental Executive. A Federal Environmental Executive, Environmental Protection Agency, shall be designated by the President. The FEE shall chair the Task Force described in subsection (c), take all actions necessary to ensure that the agencies comply with the requirements of this order, and generate a biennial report to the President.

(c) Task Force. The Steering Committee shall charter a Task Force on Greening the Government through Waste Prevention and Recycling ("Task Force"), which shall be chaired by the FEE and composed of staff from the major procuring agencies. The Steering Committee, in consultation with the agencies, shall determine the necessary staffing and resources for the Task Force. The major procuring agencies shall provide, to the extent practicable and permitted by law, resources and support to the Task Force and the FEE, upon request from the Steering Committee. The Task Force shall have the duty of assisting the FEE and the agencies in implementing this order, subject to policy direction provided by the Steering Committee. The Task Force shall report through the FEE to the Chair of the Steering Committee.

(d) Agency Environmental Executives (AEEs). Within 90 days after the date of this order, the head of each major procuring agency shall designate an AEE from among his or her staff, who serves at a level no lower than the Assistant Secretary level or equivalent, and shall notify the Chair of CEQ and the FEE of such designation.

Sec. 302. Duties. (a) The Federal Environmental Executive. The FEE, working through the Task Force, and in consultation with the AEEs, shall:

(1) Develop a Government-wide Waste Prevention and Recycling Strategic Plan ("Strategic Plan") to further implement this order. The Strategic Plan should be initially developed within 180 days of the date of this order and revised as necessary thereafter. The Strategic Plan should include, but is not limited to, the following elements:

(a) direction and initiatives for acquisition of recycled and recyclable products and environmentally preferable products and services;

(b) development of affirmative procurement programs;

(c) review and revision of standards and product specifications;

(d) assessment and evaluation of compliance;

(e) reporting requirements;

(f) outreach programs to promote adoption of practices endorsed in this order; and

(g) development and implementation of new technologies that are of environmental significance.

(2) Prepare a biennial report to the President on the actions taken by the agencies to comply with this order. The report also may incorporate information from existing agency reports regarding Government-wide progress in implementing the following Executive Orders: 12843, Procurement Requirements and Policies for Federal Agencies for Ozone Depleting Substances; 13031, Federal Alternative Fueled Vehicle Leadership; 12845, Requiring Agencies to Purchase Energy Efficient Computer Equipment; 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements; 12902, Energy Efficiency and Water Conservation at Federal Facilities; and 12969, Federal Acquisition and Community Right-to-Know.

(3) In coordination with the Office of Federal Procurement Policy, the Environmental Protection Agency (EPA), the General Services Administration (GSA), and the Department of Agriculture (USDA), convene a group of acquisition/procurement managers and environmental State, and local government managers to work with State and local governments to improve the Federal, State, and local governments' use of recycled products and environmentally preferable products and services.

(4) Coordinate appropriate Government-wide education and training programs for agencies.

(5) Establish committees and work groups, as needed, to identify, assess, and recommend actions to be taken to fulfill the goals, responsibilities, and initiatives of the FEE. As these committees and work groups are created, agencies are requested to designate appropriate personnel in the areas of procurement and acquisition, standards and specifications, electronic commerce, facilities management, pollution prevention, waste prevention, recycling, and others as needed to staff and work on these initiatives. An initial group shall be established to develop recommendations for tracking and reporting requirements, taking into account the costs and benefits of such tracking and reporting. The Steering Committee shall consult with the AEEs before approving these recommendations.

(b) Agency Environmental Executives. The AEEs shall:

(1) translate the Government-wide Strategic Plan into specific agency and service plans;

(2) implement the specific agency and service plans;

(3) report to the FEE on the progress of plan implementation;

(4) work with the FEE and the Task Force in furthering implementation of this order; and

(5) track agencies' purchases of EPA-designated guideline items and report agencies' purchases of such guideline items to the FEE per the recommendations developed in subsection 302(a)(5) of this order. Agency acquisition and procurement personnel shall justify in writing to the file and to the AEE the rationale for not purchasing such items, above the micropurchase threshold (as set out in the Office of Federal Procurement Policy Act at 41 U.S.C. 428), and submit a plan and timetable for increasing agency purchases of the designated item(s).

(6) one year after a product is placed on the USDA Biobased Products List, estimate agencies' purchases of products on the list and report agencies' estimated purchases of such products to the Secretary of Agriculture.

PART 4 - ACQUISITION PLANNING, AFFIRMATIVE PROCUREMENT PROGRAMS, AND FEDERAL FACILITY COMPLIANCE

Sec. 401. Acquisition Planning. In developing plans, drawings, work statements,

specifications, or other product descriptions, agencies shall consider, as appropriate, a broad range of factors including: elimination of virgin material requirements; use of biobased products; use of recovered materials; reuse of product; life cycle cost; recyclability; use of environmentally preferable products; waste prevention (including toxicity reduction or elimination); and ultimate disposal. These factors should be considered in acquisition planning for all procurement and in the evaluation and award of contracts, as appropriate. Program and acquisition managers should take an active role in these activities.

Sec. 402. Affirmative Procurement Programs. (a) The head of each executive agency shall develop and implement affirmative procurement programs in accordance with section 6002 of RCRA (42 U.S.C. 6962) and this order and consider use of the procurement tools and methods described in 7 U.S.C. 5909. Agencies shall ensure that responsibilities for preparation, implementation, and monitoring of affirmative procurement programs are shared between the program personnel and acquisition and procurement personnel. For the purposes of all purchases made pursuant to this order, EPA, in consultation with such other executive agencies as appropriate, shall endeavor to maximize environmental benefits, consistent with price, performance, and availability considerations, and constraints imposed by law, and shall adjust solicitation guidelines as necessary in order to accomplish this goal.

(b) Agencies shall establish affirmative procurement programs for all EPA-designated guideline items purchased by their agency. For newly designated items, agencies shall revise their internal programs within 1 year from the date the EPA designated the new items.

(c) Exclusive of the biobased products described in section 504, for the EPA-designated guideline items, which are contained in 40 CFR part 247, and for all future designated guideline items, agencies shall ensure that their affirmative procurement programs require 100 percent of their purchases of products to meet or exceed the EPA guideline unless written justification is provided that a product is not available competitively within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price. Written justification is not required for purchases below the micropurchase threshold. For micropurchases, agencies shall provide guidance regarding purchase of EPA-designated guideline items. This guidance should encourage consideration of aggregating purchases when this method would promote economy and efficiency.

(d) Within 90 days after the date of this order, the head of each executive agency that has not implemented an affirmative procurement program shall ensure that the affirmative procurement program has been established and is being implemented to the maximum extent practicable.

Sec. 403. Federal Facility Compliance. (a) Within 6 months of the date of this order, the Administrator of the EPA shall, in consultation with the Federal Environmental Executive, prepare guidance for use in determining Federal facility compliance with section 6002 of RCRA and the related requirements of this order.

(b) EPA inspections of Federal facilities conducted pursuant to RCRA and the Federal Facility Compliance Act and EPA "multi-media" inspections carried out at Federal facilities will include, where appropriate, evaluation of facility compliance with section 6002 of RCRA and any implementing guidance.

(c) Where inspections of Federal facilities are carried out by authorized States pursuant to RCRA and the Federal Facility Compliance Act, the Administrator of the EPA will encourage those States to include evaluation of facility compliance with section 6002 of RCRA in light of EPA guidance prepared pursuant to subsection (a), where appropriate, similar to inspections performed by the EPA. The EPA may provide information and technical assistance to the States to enable them to include such considerations in their inspection.

(d) The EPA shall report annually to the Federal Environmental Executive on the results of inspections performed by the EPA to determine Federal facility compliance with section 6002 of RCRA not later than February 1st for those inspections conducted during the previous fiscal year.

PART 5 - STANDARDS, SPECIFICATIONS, AND DESIGNATION OF ITEMS

Sec. 501. Specifications, Product Descriptions, and Standards. When developing, reviewing, or revising Federal and military specifications, product descriptions (including commercial item descriptions), and standards, executive agencies shall consider recovered materials and any environmentally preferable purchasing criteria developed by the EPA, and ensure the criteria are complied with in developing or revising standards.

Agencies shall report annually to the FEE on their compliance with this section for incorporation into the biennial report to the President referred to in section 302(a)(2) of this order. (a) If an inconsistency with section 6002 of RCRA or this order is identified in a specification, standard, or product description, the FEE shall request that the Environmental Executive of the pertinent agency advise the FEE as to why the specification cannot be revised or submit a plan for revising it within 60 days.

(b) If an agency is able to revise an inconsistent specification but cannot do so within 60 days, it is the responsibility of that AEE to monitor and implement the plan for revising it.

Sec. 502. Designation of Items that Contain Recovered Materials. In order to expedite the process of designating items that are or can be made with recovered materials, the EPA shall use the following process for designating these items in accordance with section 6002(e) of RCRA. (a) The EPA shall designate items that are or can be made with recovered material, by promulgating amendments to the Comprehensive Procurement Guideline (CPG). The CPG shall be updated every 2 years or as appropriate after an opportunity for public comment.

(b) Concurrent with the issuance of the CPG, the EPA shall publish for comment in the Federal Register Recovered Materials Advisory Notices that present the range of recovered materials content levels within which the designated items are currently available. These levels shall be updated periodically, after opportunity for public comment, to reflect changes in market conditions.

(c) Once items containing recovered materials have been designated by the EPA in the CPG, agencies shall modify their affirmative procurement programs to require that, to the maximum extent practicable, their purchases of products meet or exceed the EPA guidelines unless written justification is provided that a product is not available competitively, not available within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price.

Sec. 503. Guidance on Acquisition of Environmentally Preferable Products and Services. (a) The EPA shall develop guidance within 90 days from the date of this order to address environmentally preferable purchasing. The guidance may be based on the EPA's September 1995 Proposed Guidance on the Acquisition of Environmentally Preferable Products and Services and comments received thereon. The guidance should be designed for Government-wide use and targeted towards products and services that have the most effect. The guidance may also address the issues of use of the technical expertise of non-governmental entities and tools such as life cycle assessment in decisions on environmentally preferable purchasing. The EPA shall update this guidance every 2 years, or as appropriate.

(b) Agencies are encouraged to immediately test and evaluate the principles and concepts contained in the EPA's Guidance on the Acquisition of Environmentally Preferable Products and Services through pilot projects to provide practical information to the EPA for further updating of the guidance. Specifically:

(1) These pilot projects shall be focused around those product and service categories, including printing, that have wide use within the Federal Government. Priorities regarding which product and service categories to pilot shall be developed by the individual agencies and the

EPA, in consultation with the OFPP, the FEE, and the appropriate agency procurement executives. Any policy disagreements shall be resolved by the Steering Committee.

(2) Agencies are encouraged to use all of the options available to them to determine the environmentally preferable attributes of products and services in their pilot and demonstration projects, including the use of technical expertise of nongovernmental entities such as labeling, certification, or standards-developing organizations, as well as using the expertise of the National Institute of Standards and Technology.

(3) Upon request and to the extent practicable, the EPA shall assist executive agencies in designing, implementing, and documenting the results of these pilot and demonstration projects.

(4) The EPA, in coordination with other executive agencies, shall develop a database of information about these projects, including, but not limited to, the number and status of pilot projects, examples of agencies' policy directives, revisions to specifications, solicitation procedures, and grant/contract policies that facilitate adoption of environmentally preferable purchasing practices, to be integrated on a commonly available electronic medium (e.g., Internet Web site). These data are to be reported to the FEE.

(c) Executive agencies shall use the principles and concepts in the EPA Guidance on Acquisition of Environmentally Preferable Products and Services, in addition to the lessons from the pilot and demonstration projects, to the maximum extent practicable, in identifying and purchasing environmentally preferable products and services and shall modify their procurement programs as appropriate.

Sec. 504. Designation of Biobased Items by the USDA. The USDA Biobased Products Coordination Council shall, in consultation with the FEE, issue a Biobased Products List. (a) The Biobased Products List shall be published in the Federal Register by the USDA within 180 days after the date of this order and shall be updated biannually after publication to include additional items.

(b) Once the Biobased Products List has been published, agencies are encouraged to modify their affirmative procurement program to give consideration to those products.

Sec. 505. Minimum Content Standard for Printing and Writing Paper. Executive agency heads shall ensure that their agencies meet or exceed the following minimum materials content

standards when purchasing or causing the purchase of printing and writing paper: (a) For high speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white wove envelopes, writing and office paper, book paper, cotton fiber paper, and cover stock, the minimum content standard shall be no less than 30 percent postconsumer materials beginning December 31, 1998. If paper containing 30 percent postconsumer material is not reasonably available, does not meet reasonable performance requirements, or is only available at an unreasonable price, then the agency shall purchase paper containing no less than 20 percent postconsumer material. The Steering Committee, in consultation with the AEEs, may revise these levels if necessary.

(b) As an alternative to meeting the standards in sections 505(a), for all printing and writing papers, the minimum content standard shall be no less than 50 percent recovered materials that are a waste material byproduct of a finished product other than a paper or textile product that would otherwise be disposed of in a landfill, as determined by the State in which the facility is located.

(c) Effective January 1, 1999, no executive branch agency shall purchase, sell, or arrange for the purchase of, printing and writing paper that fails to meet the minimum requirements of this section.

Sec. 506. Revision of Brightness Specifications and Standards. The GSA and other executive agencies are directed to identify, evaluate, and revise or eliminate any standards or specifications unrelated to performance that present barriers to the purchase of paper or paper products made by production processes that minimize emissions of harmful byproducts. This evaluation shall include a review of unnecessary brightness and stock clause provisions, such as lignin content and chemical pulp requirements. The GSA shall complete the review and revision of such specifications within 6 months after the date of this order, and shall consult closely with the Joint Committee on Printing during such process. The GSA shall also compile any information or market studies that may be necessary to accomplish the objectives of this provision.

Sec. 507. Procurement of Re-refined Lubricating Oil and Retread Tires. (a) Agencies shall implement the EPA procurement guidelines for re-refined lubricating oil and retread tires. Fleet and commodity managers shall take immediate steps, as appropriate, to procure these items in accordance with section 6002 of RCRA. This provision does not preclude the acquisition of biobased (e.g., vegetable) oils.

(b) The FEE shall work to educate executive agencies about the new Department of

Defense Cooperative Tire Qualification Program, including the Cooperative Approval Tire List and Cooperative Plant Qualification Program, as they apply to retread tires.

PART 6 - AGENCY GOALS AND REPORTING REQUIREMENTS

Sec. 601. Agency Goals. (a)(1) Each agency shall establish either a goal for solid waste prevention and a goal for recycling or a goal for solid waste diversion to be achieved by January 1, 2000. Each agency shall further ensure that the established goals include long-range goals to be achieved by the years 2005 and 2010. These goals shall be submitted to the FEE within 180 days after the date of this order. (2) In addition to white paper, mixed paper/cardboard, aluminum, plastic, and glass, agencies should incorporate into their recycling programs efforts to recycle, reuse, or refurbish pallets and collect toner cartridges for remanufacturing. Agencies should also include programs to reduce or recycle, as appropriate, batteries, scrap metal, and fluorescent lamps and ballasts.

(b) Agencies shall set goals to increase the procurement of products that are made with recovered materials, in order to maximize the number of recycled products purchased, relative to non-recycled alternatives.

(c) Each agency shall set a goal for increasing the use of environmentally preferable products and services for those products and services for which the agency has completed a pilot program.

(d) Agencies are encouraged to incorporate into their Government Performance Results Act annual performance plans the goals listed in subsections (a), (b), and © above, starting with the submittal to the Office of Management and Budget of the plan accompanying the FY 2001 budget.

(e) Progress on attaining these goals should be reported by the agencies to the FEE for the biennial report specified in section 302(a)(2) of this order.

PART 7 - APPLICABILITY AND OTHER REQUIREMENTS

Sec. 701. Contractor Applicability. Contracts that provide for contractor operation of a Government-owned or -leased facility and/or contracts that provide for contractor or other support services at Government-owned or -operated facilities awarded by executive agencies

after the date of this order, shall include provisions that obligate the contractor to comply with the requirements of this order within the scope of its operations.

Sec. 702. Real Property Acquisition and Management. Within 90 days after the date of this order, and to the extent permitted by law and where economically feasible, executive agencies shall ensure compliance with the provisions of this order in the acquisition and management of Federally owned and leased space. The GSA and other executive agencies shall also include environmental and recycling provisions in the acquisition and management of all leased space and in the construction of new Federal buildings.

Sec. 703. Retention of Funds. (a) The Administrator of General Services shall continue with the program that retains for the agencies the proceeds from the sale of materials recovered through recycling or waste prevention programs and specifying the eligibility requirements for the materials being recycled.

(b) Agencies in non-GSA managed facilities, to the extent permitted by law, should develop a plan to retain the proceeds from the sale of materials recovered through recycling or waste prevention programs.

Sec. 704. Model Facility Programs. Each executive agency shall establish a model demonstration program incorporating some or all of the following elements as appropriate. Agencies are encouraged to demonstrate and test new and innovative approaches such as incorporating environmentally preferable and bio-based products; increasing the quantity and types of products containing recovered materials; expanding collection programs; implementing source reduction programs; composting organic materials when feasible; and exploring public/private partnerships to develop markets for recovered materials.

Sec. 705. Recycling Programs. (a)(1) Each executive agency that has not already done so shall initiate a program to promote cost-effective waste prevention and recycling of reusable materials in all of its facilities. The recycling programs implemented pursuant to this section must be compatible with applicable State and local recycling requirements.

(2) Agencies shall designate a recycling coordinator for each facility or installation. The recycling coordinator shall implement or maintain waste prevention and recycling programs in the agencies' action plans.

(b) Executive agencies shall also consider cooperative ventures with State and local governments to promote recycling and waste reduction in the community.

Sec. 706. Review of Implementation. The President's Council on Integrity and Efficiency shall request that the Inspectors General periodically review agencies' implementation of this order.

PART 8 - AWARENESS

Sec. 801. Training. (a) Within 180 days of the date of this order, the FEE and OFPP should evaluate the training courses provided by the Federal Acquisition Institute and the Defense Acquisition University and recommend any appropriate curriculum changes to ensure that procurement officials are aware of the requirements of this order.

(b) Executive agencies shall provide training to program management and requesting activities as needed to ensure awareness of the requirements of this order.

Sec. 802. Internal Agency Awards Programs. Each agency shall develop an internal agency-wide awards program, as appropriate, to reward its most innovative environmental programs. Among others, winners of agency-wide awards will be eligible for the White House Awards Program.

Sec. 803. White House Awards Program. A Government-wide award will be presented annually by the White House to the best, most innovative programs implementing the objectives of this order to give greater visibility to these efforts so that they can be incorporated Government-wide. The White House Awards Program will be administered jointly by the FEE and the CEQ.

PART 9 - REVOCATION, LIMITATION, AND IMPLEMENTATION

Sec. 901. Executive Order 12873 of October 20, 1993, is hereby revoked.

Sec. 902. This order is intended only to improve the internal management of the executive branch and is not intended to create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law by a party against the United States, its agencies, its officers, or

any other person.

Sec. 903. The policies and direction expressed in the EPA guidance to be developed pursuant to section 503 of this order shall be implemented and incorporated in the Federal Acquisition Regulation within 180 days after issuance of the guidance.

WILLIAM J. CLINTON

THE WHITE HOUSE,

September 14, 1998

Appendix E
USEPA's Preferred Products and USDA's Biobased Products Lists

E-1. USEPA's Preferred Products List from the "Comprehensive Guideline for Procurement of Products Containing Recovered Materials" (40 CFR 247)

a. Paper and Paper Products.

b. Vehicular Products.

(1) Engine Coolants.

(2) Re-refined lubricating oils.

(3) Retread tires.

c. Construction Products.

(1) Structural fiberboard.

(2) Laminated paperboard.

(3) Carpet.

(4) Floor tiles.

(5) Patio blocks.

(6) Building insulation products.

(7) Cement and concrete containing coal fly ash.

(8) Cement and concrete containing ground granulated blast furnace slag.

d. Transportation Products.

(1) Traffic control cones.

(2) Traffic barricades.

e. Park and Recreation Products.

(1) Playground surfaces.

(2) Running tracks.

f. Landscaping Products.

(1) Hydraulic mulch.

(2) Yard trimmings compost.

g. Non-Paper Office Products.

(1) Office recycling containers.

(2) Office waste receptacles.

(3) Plastic desktop accessories.

(4) Toner cartridges.

(5) Binders.

(6) Plastic trash bags.

E-2. USDA Biobased Products Council's List of Biobased Products

The list will be published on the U.S. Department of Agriculture procurement web page: http://www.usda.gov/da/procure.html

Appendix F
PARC Instruction Letter 99-2

This appendix contains a copy of the contents of the Primary Assistant Responsible for Contracting (PARC) Instruction Letter detailing how USACE personnel should meet FAR Provisions 52.223-4 and 52.223-9.

DEPARTMENT OF THE ARMY

U.S. Army Corps of Engineers

WASHINGTON, D.C. 20314-1000

CEPR-P (715)

MEMORANDUM FOR COMMANDER/DIRECTORS, ALL USACE COMMANDS,

ATTN: DIRECTOR/CHIEF OF CONTRACTING

SUBJECT: PARC Instruction letter 99-2, FAR Provision 52.223-4, Recovered Material Certification, and FAR Clause 52.223-9, Certification and Estimate of Percentage of Recovered Material Content for EPA Designated Items

1. References:
   a. FAR 23.402 and 23.403.
   b. FAR 23.404(b)(2) and (3).
   c. DFARS 223.404(b)(3) and (4).
   c. FAR 23.405(a) and (b).

2. The purpose of this PIL is to provide interim guidance on Environmental Protection Agency (EPA) designated items and recovered material.

3. FAR 23.402 defines an EPA designated item as an item that is or can be made with recovered materials and is listed by EPA in a procurement guideline.

4. FAR 23.403 states the Government's policy is to acquire, in a cost-effective manner, items composed of the highest percentage of recovered materials practicable consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements of exposing suppliers' employees to undue hazards from the recovered materials.

5. FAR 23.404(b)(2) states that agencies shall establish an affirmative procurement program for EPA designated items and sets forth the minimum for such programs.

6. FAR 23.404(b)(3) states that acquisition of EPA designated items that do not meet the EPA minimum recovered material standards shall be approved by an official designated by the agency head based on a written determination that the items:

a. Are not available within a reasonable period of time;

b. Are available only at unreasonable prices;

c. Are not available from a sufficient number of sources to maintain a satisfactory level of competition; or

d. Based on technical verification, fail to meet performance standards in the specifications.

7. DFARS 223.404(b)(3) states that a contract for an EPA designated item that does not meet the EPA minimum recovered material standards shall not be awarded before approval of the written determination required by FAR 23.404(b)(3). The approving official shall be:

a. A general or flag officer, or a member of the Senior Executive Service, of the requiring activity; or

b. For requiring activities without a general or flag officer or member of the Senior Executive Service, the commander of the activity.

8. DFARS 223.404(b)(4) states that departments and agencies shall centrally collect information submitted in accordance with the clause at FAR 52.223-9 for reporting to the Office of the Secretary of Defense.

9. FAR 23.405(a) requires the contracting officer to insert the provision at 52.223-4, Recovered Material Certification, in solicitations that are for, or specify the use of, recovered materials. This provision states that the offeror certifies, by signing the offer, that the percentage of recovered materials to be used in the performance of the contract will be at least the amount required by the applicable contract specifications.

10. FAR 23.405(b) requires the contracting officer to insert the clause at 52.223-9, Certification and Estimate of Percentage of Recovered Material Content in EPA Designated Items, in contracts exceeding the simplified acquisition threshold that are for, or specify the use of, an EPA designated item. This clause requires contractors to certify the percentage of recovered material content for EPA Designated Items was at least the amount required by the contract. Additionally the contractor is required to estimate the percentage of recovered materials actually used in the performance of the contract.

11. This office has been notified that a draft Army Audit report on the implementation of the affirmative procurement program states that several Army contracting offices (including USACE) did not insert the subject provision in solicitations nor the subject clause in contracts which required their use. Additionally, none of the contracting offices had obtained certifications from vendors nor had they obtained waivers to buy designated items that did not meet minimum levels for recovered material content.

12. The Army has not issued supplemental guidance to implement requirements for this program. However, it is expected that Army will issue guidance at a later date. For this reason, the PARC, in coordination and concurrence with Engineering and Construction Division (CEMP-E), is issuing the following interim guidance. Contracting officers shall:

a. Ensure that designers using EPA designated items specify products that contain the required percentage of recovered materials. The following USACE Guide Specifications (CEGS) have been revised to include EPA designated items:

(1) carpet, CEGS - 09680*

(2) playground equipment, CEGS - 02882

(3) site furnishings, CEGS - 02870

(4) exterior planting, CEGS - 02930

(5) playground protective surfacing, CEGS - 02971

(6) concrete/fly ash, CEGS - 02753, 02754, 02755, 02770, 03300

b. Ensure waivers are obtained from appropriate approving officials to purchase items that do not meet the EPA's standard for minimum recovered content material. If the designer does not specify a product that contains recovered materials, for those CEGS listed in 12a above, they are responsible for providing a justification and requesting a waiver,

c. Insert the provision at 52.223-4, Recovered Material Certification, in solicitations that are for, or specify the use of, recovered materials and meets the other requirements of FAR 23.404(a),

d. Insert the clause at 52.223-9, Certification and Estimate of Percentage of Recovered Material Content for EPA Designated Items, in contracts that exceed the simplified acquisition, threshold that are for, or specify the use of, an EPA designated item and meets the other requirements of FAR 23.404(a),

e. Obtain contractor's certifications after contracts are completed, take appropriate actions against contractors if certifications are not provided or properly completed with the required information, and

f. Maintain files for the reported data on completed contracts. We suggest that a separate file be maintained for contracts completed in any specific calendar year. The reported information will eventually be collected and upward reported when instructions are received from the Army.

13. Our point of contact is Mr. Roger Adams, CEPR-P, 202-761-5221.

FOR THE COMMANDER:

BUNNATINE H. GREENHOUSE
Principal Assistant Responsible
for Contracting

CF: Directors and Chiefs
of Separate Offices, HQUSACE

For the Commander:

_____
Colonel, Corps of Engineers
Chief of Staff