

***Toolkit for Greener Practices***  
**Showcase of Ideas**  
**Option 2-5: Design for the Environment**

**Minnesota Office of Environmental Assistance Workbook**

**Site conditions:**

A remediation project being conducted by a company with an ongoing operation there or elsewhere in the country may consider implementing Design for Environment (DfE) methods. Especially important for companies marketing to Asia and Europe, where customers are demanding greener products. The result may be reduced expenses, improved designs, improved market position, reduced regulatory concerns, reduced future liability, improved environmental performance, reduced manufacturing cycle times (fewer parts, fewer steps = shorter manufacturing cycle time = more product output). Minnesota regulatory staff can promote this methodology among its customers and provide references to assistance agencies.

**Preventive activity description:**

Minnesota businesses that have participated in DfE pilots coordinated by MPCA's sister agency, the Minnesota Office of Environmental Assistance (MOEA), include IBM and Medtronics. Medtronics saved \$125,000 a year from design changes that reduced air emissions and hazardous material purchasing and disposal. No doubt, environmental liability, including cleanups at these companies' national facilities, provides an incentive for their participation.

DfE promotes more environmentally sound results from the design, manufacture and disposal of the product. DfE may involve:

- using snaps, darts and screws instead of adhesives (joining technology)
- minimizing the need for disposable batteries, cartridges, etc.
- using screws of similar head technology so the consumer can disassemble the product for recycling
- minimizing the diversity of materials used (includes fillers, colors and additives) to optimize the recyclability of a material
- minimizing the use of hazardous chemicals in the product and in the manufacturing (TCE at glass lens manufacturer, alternatives to bromated flame retardants)
- avoiding painting recyclable parts
- using modular architecture (Dell computer, disassembly)
- leasing of products for take back/reuse (Xerox)
- tools for integrating DfE into a product-design process: checklists (questions about environmental attributes), software programs, materials avoidance lists.

DfE tools are typically designed to help users plan product design with less environmental impacts. Typically, a tool presents questions with a built-in scoring

system to reflect weaknesses and strengths in the manufacturing system. Some DfE tools are formatted as checklists or present questions that require yes/no answers. Many tools help collect information, but are not very helpful with decision-making. The MOEA toolkit presents open-ended questions that help users formulate or make decisions about a solution, not just identify a weakness. It also provides a matrix in which the scores for the different areas of concern are easily compared. This helps users make decisions about where to focus or target their DfE efforts.

MOEA DfE staff believes that no one tool is perfect. Typically, a company will customize one or two general tools to fit its culture and product line, and link the customized general tool to specific tools. For example, there is software that can be used to help with materials selection, one area of DfE.

**Benefits realized through the Pollution Prevention/Sustainability approach:**

- Environmental attributes are incorporated into the design of a product.
- The most powerful point of leverage for addressing environmental concerns is at the design stage since decisions at this stage determine the waste streams and fix the environmental attributes of the product.
- Business and community concerns over environmental liabilities, including increased solid waste volumes and toxicity of chemicals used to make products, is reduced.
- Reduced regulatory burden

**Keys to Success**

- Embracing a new paradigm
- Consideration of entire life cycle of a product: parts and materials selection; manufacture; packaging, distribution; use, maintenance; and waste management

**Regulatory administrative/legal tools:**

- The *Design for the Environment Toolkit*, developed by the MOEA, promotes product design and manufacturing processes that use low-toxicity materials and conservative resources, or end-of-life take-back or materials reuse.
- Bully pulpit: remediation staff can refer companies to technical assistance agencies and provide regulatory assistance themselves.

**Recognition:** Fran Kurk, MOEA, DfE Power Point Presentation