



Managing Chemicals of Concern and Designing Safer Products at Hewlett-Packard

Case Study for the Green Chemistry and Commerce Council (GC3)

Founded in 1939, Hewlett-Packard (HP) is the world's largest information technology (IT) company with revenue totaling almost \$120 billion in fiscal 2008. Headquartered in Palo Alto, California, HP operates in more than 170 countries around the world. The company is organized into three business groups.

1. The Personal Systems Group includes business and consumer PCS, mobile computing devices and workstations,
2. The Imaging and Printing Group includes inkjet and LaserJet technologies, commercial printing, printing suppliers and digital photography,
3. The Technology Solutions Group includes storage devices and servers, EDS, managed services and software.

HP has another distinction in the IT world: The company has been a leader in integrating environmental and human health concerns into the design of its products. In this case study, we describe how HP works to ensure that its products are free of toxic chemicals and how the company gathers chemical information from its complex supply chain to support these efforts.

HP'S SUPPLY CHAIN

HP has the IT industry's most extensive supply chain. Over 600 suppliers provide materials and contract manufacturing to produce the more than 1.3 million print cartridges, 110,000 printers, 75,000 PC systems and 3,500 servers shipped daily. HP's suppliers are located mainly in emerging and developing countries.

HP's supply chain configuration follows a direct procurement model; the company procures from its supply chain all items that are part of the finished product such as raw materials, components and parts. HP has contractual relationships with its first tier suppliers, with all terms and conditions spelled out in a contract between the parties. HP's

relationships with second, third and higher tier suppliers are indirect, with the expectation that first tier suppliers manage second tier suppliers, and so on. With regard to chemical information, first tier suppliers are expected to obtain information needed by HP from higher tiers, unless HP has a direct relationship with a second or third tier supplier.

In an effort to be more transparent about its business practices, the company was the first in the IT sector to take the step of publishing a list of its major suppliers, including commodity suppliers, manufacturers and service providers. This list of 103 major suppliers represents 95% of its procurement worldwide.

DESIGN FOR ENVIRONMENT AT HEWLETT-PACKARD

In 1992, Hewlett-Packard established a Design for Environment (DfE) program to reduce the environmental impact of its products. The three major elements of the DfE program are energy efficiency, materials innovation and design for recycling. Energy efficiency focuses on reducing the energy used in manufacturing and in product use. Materials innovation is focused on reducing materials use and using materials with less environmental impact and more value at end of life. Design for recyclability is focused on making products that can be easily upgraded or recycled. HP's product design guidelines include: participation of environmental stewards on each design team; reduce numbers and types of materials; standardize plastic resins; use molded-in colors and finishes instead of paints, coatings, plating where possible; minimize energy requirements in product use; increase use of recycled materials in packaging; use fewer packing materials; and design for disassembly and recyclability by avoiding glues and adhesives where possible and using common fasteners.

Hewlett-Packard participated in the development of EPEAT (Electronic Product Environmental Assessment Tool),

which is designed to help institutional purchasers compare computers, notebooks and monitors based on environmental attributes. EPEAT provides a clear set of performance criteria to encourage manufacturers to design environmentally sound products. Products are rated Gold, Silver, or Bronze according to three tiers of environmental performance. Many of Hewlett-Packard's products have been scored using EPEAT.

IDENTIFYING, PRIORITIZING AND EVALUATING CHEMICALS OF CONCERN

Beginning in the early 1990's, Hewlett-Packard began to set goals to restrict a range of substances for certain uses, such as PBB/PBDE flame retardants, ozone depleting substances, cadmium, mercury and lead. The company set a timeline for product materials restriction and substitution and updates milestones annually. HP has succeeded in eliminating many chemicals of concern from its products. However, some of the company's goals have proven difficult to meet because technically and economically viable alternatives are not yet available. This is the case for remaining uses of brominated flame retardants and PVC for computer cables.

The requirements for Hewlett-Packard brand products are specified in their General Specification for the Environment (GSE) standard. This standard includes a list of restricted materials, requirements for packaging and requirements for products subject to the European Union's RoHS Directive. These specifications are for all HP brand products including subassemblies, parts, materials, components, batteries and packaging that become part of HP brand products. The GSE is included in supplier contracts as part of standard terms and conditions.

The restricted materials listed in the GSE are mostly regulated chemicals, though some, such as PVC, have been included because of stakeholder and environmental, health and safety concerns. The GSE is updated annually. Hewlett-Packard has formed a team that meets bi-monthly to identify emerging regulations as well as chemicals of concern that may have been identified by stakeholders outside the regulatory process.

HP has added chemicals to the GSE with a future effective date to give suppliers time to comply. For example, the company is planning to add three phthalates to the GSE, which will be restricted as of 2012. These chemicals are likely to be added to an expanded list of restricted chemicals under the EU's RoHS⁴ Directive.

Hewlett-Packard is working to develop a method to screen chemicals of concern and compare these to alternatives that have been identified. The company wants to ensure that replacement substances have improved environmental and health profiles. This screening process will evaluate both the inherent hazard of chemicals and potential exposure routes.

Materials Restricted From HP Products

- Asbestos
- Cd, Hg, Pb in batteries
- Brominated flame retardants (BFRs)—PBBs, PBDEs including DecaBDE
- BFRs including TBBB-A in external case plastic parts of products
- Cadmium *
- Certain azo colorants
- Chlorinated hydrocarbons
- Chlorinated paraffins
- Formaldehyde
- Halogenated diphenyl methanes
- Hexavalent chromium
- Lead *
- Mercury
- Nickel
- Ozone depleting substances
- Perfluorooctane sulfonates *
- PCBs and PCTs
- Polychlorinated naphthalenes
- Polycyclic aromatic hydrocarbons (PAH)
- PVC (in external case or packaging)
- Radioactive substances
- Tributyl and triphenyl tin and tributyl tin oxide

* exemptions apply

COLLECTING CHEMICAL DATA AND COMMUNICATING WITH THE SUPPLY CHAIN

HP requires chemical data for many programs including regulatory compliance under the European Union's REACH² and RoHS Directives and other requirements specified in its GSE for development of MSDS's and green certification programs such as EPEAT and Blue Angel. At this point in time, Hewlett Packard does not ask for 100% disclosure of materials composition, but rather, focuses on collecting data on chemicals of concern in parts, components or products.

REACH Chemical Reporting. Under the EU's REACH Directive, HP must provide information to consumers on the presence of Substances of Very High Concern (SVHC) in specific products. HP's suppliers are required to provide information on the weight in grams of substances listed on the current³ Annex XIV candidate list of chemicals.⁴ Suppliers are given the option to indicate where the substances are used in the

product. These data are consolidated by Hewlett-Packard and used to prepare reports required under Article 33 of REACH.⁵

In addition to the Annex XIV chemicals, HP requests information from its suppliers on approximately 240 additional chemicals. This voluntary reporting list was narrowed from the 67/548/EEC (as amended) Annex 1, as well as other chemical regulatory lists that contain substances meeting the SVHC criteria, such as the Stockholm Convention (POP list) and the Rotterdam Convention (PIC list) list. It includes carcinogens, mutagens, reproductive toxins (CMRs), persistent, bioaccumulative and toxic chemicals (PBTs), and endocrine disruptors that HP determined as possibly used in electronics products. Suppliers are not required to report on these chemicals, but many companies do, and these data provide HP with information on where these chemicals are used in their supply chain should they become restricted in the future.

Suppliers must enter the required data on the 15 SVHC chemicals and 240 additional chemicals directly into HP's web-based supplier portal. Suppliers can also opt to send data via a customized form.

The request for voluntary reporting on a larger universe of chemicals has had mixed results. Some suppliers do report on the entire list; some report only on the 15 mandatory SVHC chemicals on the Annex XIV list. Overall, HP interviewees stated that they received more information than they initially anticipated.

Some of HP's first tier suppliers have had difficulty getting chemical information from their second and higher tier suppliers, particularly if those suppliers are small. Interviewees noted that some smaller suppliers find REACH requirements challenging to fulfill without a sophisticated system for data collection and reporting. HP has worked with some of these companies to help them provide the data needed. Cultural and language differences have acted as a barrier to getting chemical data in some cases.

Section 5 of the GSE describes chemical substance requirements for suppliers and applies to substances that are currently regulated or under consideration for regulation. This section was written to allow Hewlett-Packard to collect data from suppliers on a chemical that may be newly recognized as being of concern, including information on health or environmental hazards, requirements for safe use and packaging or labeling issues.

RoHS Reporting. As an electronics product manufacturer, HP must ensure that its products are in compliance with the EU's Restriction on Hazardous Substances (RoHS) Directive. HP requires its suppliers to provide chemical data and material or component testing upon request. Suppliers must sign a letter of RoHS compliance and submit it to HP

Verification of chemical data. Hewlett-Packard uses what they call an "active verification" process to ensure that suppliers and HP products are in compliance with the requirements of the GSE. There are four levels to verifying compliance.

Level 1—Suppliers must submit a signed letter as verification of RoHS compliance.

Level 2—Based on HP's long standing Supply Chain Social and Environmental Responsibility program,⁶ HP works with suppliers on a corrective action plan to correct deficiencies.

Level 3—Hewlett-Packard reviews information provided by suppliers and asks them to provide additional information such as analytical test results, as needed.

Level 4—Hewlett-Packard business units determine whether to initiate additional analytical testing. HP-initiated testing enables the company to react quickly if a problem arises.

LESSONS LEARNED

- **Obtaining chemical information from suppliers remains a challenge.** The difficulty lies in a number of factors, including: language and cultural barriers; difficulty faced by Tier 1 suppliers in getting information from Tier 2 and higher suppliers; system and process sophistication level; supply chain complexity level; and unclear requirements for information under regulatory or green procurement programs.
- **Providing an easy-to-use web-based portal for chemical data entry has facilitated data collection.** This system was developed internally by HP and uses the company's SAP/Environmental Health and Safety module to process the data.
- **Training of suppliers can assist in clarifying requirements for data collection.** HP has reached out directly to Tier 2 suppliers to clarify data requirements.
- **Collecting data on chemicals that are of emerging concern is valuable.** By asking suppliers to provide data on 240 additional chemicals that may be of concern in electronics, HP is building a database that points to where they occur in the supply chain. This will facilitate future efforts by HP to restrict those chemicals, either because of new regulation or a corporate decision, and to work with suppliers to find safer substitutes.
- **Patchwork of global chemical regulatory systems is inefficient and detracts from more proactive design for environment activities.** In HP's view, there is a lack of regulatory harmonization across regions and within some countries. Managing the proliferation of variations

to existing regulations, such as RoHS, can take considerable effort even when the same set of substances is restricted. Interviewees stated that harmonization of regulations would allow this global company to more efficiently track and conduct regulatory compliance programs, freeing up resources to advance green chemistry and Design for Environment opportunities.

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SOURCES

Information for this case study was gathered from the following sources:

- 1 Interviews with Hewlett-Packard personnel.
- 2 www.hp.com

ENDNOTES

- 1 RoHS, or Restriction of Hazardous Substances (2002/95/EC) is an EU Directive restricting the use of hazardous substances in electrical and electric equipment.
- 2 REACH, or Registration, Evaluation, Authorization and Restriction of Chemicals (Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006), is a new European Union law addressing the production and use of chemical substances and their potential impacts on both human health and the environment. REACH replaces numerous EU laws related to chemicals.
- 3 Current as of June 1, 2009.
- 4 The list can be viewed at http://echa.europa.eu/chem_data/candidate_list_table_en.asp
- 5 See for example http://www.hp.com/hpinfo/globalcitizenship/environment/productdata/reachdesktop-pc.html?jumpid=reg_R1002_USEN
- 6 <http://www.hp.com/hpinfo/globalcitizenship/supplychain/compliance.html>



GC³ Green Chemistry &
Commerce Council

Chemicals, alone or in combination, are the platform upon which key elements of the global economy have been built, and have been incorporated into millions of products used every day. Many chemicals may have inherently harmful characteristics that can impact ecological and human systems as they are used throughout supply chains. A growing number of companies are discovering that the approaches of green chemistry and Design for Environment (DfE) allow for a transition to safer alternatives. The Green Chemistry and Commerce Council provides open conversation about the challenges to and opportunities for this successful transition. The GC3 is a project of the Lowell Center for Sustainable Production at the University of Massachusetts Lowell.

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