

● ● ● | 1. Introduction



- USEPA defines HHW as the leftover household products that contain;
 - corrosive,
 - toxic,
 - ignitable, or
 - reactive ingredients.
- Products, such as paints, cleaners, oils, batteries, and pesticides, that contain potentially hazardous ingredients require special care when you dispose of them.

3/37

● ● ● | 1. Introduction



- Improper disposal of HHW can include;
 - pouring down the drain,
 - spilling on the ground,
 - discharging into storm sewers or
 - putting out with the trash.
- The dangers of such disposal methods might not be immediately obvious, but improper disposal can pollute the environment and pose a threat to human health.

4/37



1. Introduction



- Special wastes sometimes categorized as HHW include;
 - fluorescent lamps,
 - CFC-12 (freon) recovered from white goods and
 - computer components (CPU, monitors, keyboards), televisions and other electronic equipment.
- Electronics wastes are an unusual HHW because they often contain both valuable (silver and gold) as well as very toxic (cadmium, lead, and other) heavy metals.

5/37



Reduction at home



Participate In Your Local Household Hazardous Waste Roundups

- Consider reducing the purchase of products that contain hazardous ingredients.
- Learn about the use of alternative methods or products-without hazardous ingredients-for some common household needs.
- To avoid the potential risks associated with HHWs, always monitor the use, storage, and disposal of products with potentially hazardous substances.

6/37



Reduction at home



- Use and store products containing hazardous substances carefully to prevent any accidents at home.
- Never store hazardous products in food containers; keep them in their original containers
- Never remove labels.
- Corroding containers require special handling.
- When leftovers remain, never mix HHW with other products

7/37



Reduction at home

Become a label reader
 Look for signal words on labels and choose the least hazardous product.

Signal words	Hazard level
Caution	mild/moderate hazard
Warning	moderate hazard
Danger	extremely flammable, corrosive or highly toxic
Poison	highly toxic

Less hazardous ↑ More hazardous

- Incompatible products might react, ignite or explode and contaminated HHW might become unrecyclable.
- Remember to follow any instructions for use and disposal provided on product labels.
- Call your local environmental, health or solid waste agency for instructions on proper use and disposal
- Learn local HHW drop off programs and upcoming collection days.

8/37

2. Problems of Household Hazardous Products (HHPs)

- HHPs pose risks to personal and environmental health
- through home use and storage, transport, and disposal.
- Adverse *health effects* are most likely to be caused by; pesticides, oil-based paints, solvents, adhesives, automotive products, pool chemicals, drugs, and corrosive cleaners.
- Adverse *environmental effects* are most likely to result from pesticides and fertilizers, automotive products, and solvent-containing products.

9/37

Video: <http://www.youtube.com/watch?v=v4SztV63V-s&feature=related>

Health risks



- Chemicals in HPs can enter the body and cause adverse health effects through ingestion, inhalation or absorption.
- Children are at a much higher risk than adults of being poisoned by accidental exposure to HHPs.
- The most common products to which children are exposed are cosmetics; cleaning products; pesticides; arts/craft/office supplies and antimicrobials.
- Chronic health effects may result from repeated, long-term exposure to highly toxic products.

10/37



Health risks

TABLE 10.1 Hazards of Typical Household Hazardous Products

Product type	Typical hazardous ingredients	Typical product hazards
Drain and oven cleaners	Lye, sulfuric acid	Extremely caustic, eye and skin damage, also reactive, toxic, may be flammable
Spot remover	Trichloroethane, ethylene dichloride, benzene, toluene	Skin and lung irritants, central nervous system depression, liver and kidney damage, flammable
Oil-based paint, paint remover	Petroleum distillates, methylene chloride, toluene, acetone, methanol	Eye, skin, and lung irritants; headaches, nausea, respiratory problems, muscle weakness, liver and kidney damage, flammable
Garden insecticides	Diazinon, acephate, malathion, chlorpyrifos	Skin, eye, and lung irritation; headache, dizziness, nausea, muscle cramps, coma, organ damage
Disinfectants	Chlorine, quats, pine oil, phenol	May be toxic, corrosive, or reactive
Rubber cement	Hexane, heptane, petroleum distillates	Skin and lung irritants, sensitizer, lethal in high concentrations, extremely flammable
Antifreeze	Ethylene glycol	Central nervous system depression, vomiting, drowsiness, respiratory failure, kidney damage

11/37

Source: Tchobanoglous & Kreith, 2002



Health risks

- Indoor air pollution from HHPs is more of a threat to human health than industrial pollution.
- Paints, dry cleaning solvents, home pesticides, air fresheners, particle board and glues create indoor air levels of toxic substances higher than outdoor levels (U.S. EPA, 1993).
- Indoor air pollutants are of particular concern because people spend most of their time indoors.
- Increase in asthma has been related to poor indoor air quality (Dickey et al., 1995).

12/37

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Environmental risks



- Depend on a particular product's characteristics:
 - its solubility and mobility
 - persistence and degradability
 - toxicity to nonhuman target species
 - potential for penetrating landfill liners and
 - potential for being broken down in STPs
- Chemicals that persist in the environment and bio-accumulate in the food chain are of particular concern.
- Hg, Pb and Cd build up in soils, water and animals.

13/37

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Environmental risks

- Storm water runoff is another leading cause of environmental pollution from HHPs.
- Rainfall picks up pesticides and fertilizers used in yards and antifreeze and motor oil spilled on driveways and washes them into local streams and rivers.
- Pesticides and fertilizers also leach into groundwater and can result in pollution of nearby water bodies and wells.
- Improper storage of HHPs can lead to accidental spills.
- HHP spill during a disaster (earthquake etc.) increases the hazard of fire, explosion and water contamination.

14/37



Fire risks



- In the heat of a house fire HHPs may combine and react.
- Cans of gasoline or kerosene or exploding aerosol cans that have been heated and contain butane or toluene may increase the intensity and spread-rate of the fire.
- Vaporized poisonous combustion products are a significant threat to firefighters.
- Certain plastics and products that contain pesticides or poisons may exacerbate the danger to firefighters.

15/37



HHW toxic loading and fate in MSW handling systems

- Using the following assumptions:
 - 1% HHW in MSW.
 - MSW generation rate = 1 kg/capita.day
 - Estimated population of Istanbul = 14 million
- The amount of HHW entering the MSW stream in Istanbul is calculated as:
 - 140 tons/day
 - 51.100 tons/year

16/37



HHW toxic loading and fate in MSW handling systems

- A few factors influence the generation of HHW:
 - lower-income households will generate more automotive product-related wastes
 - higher-income households with larger well-maintained properties will generate more yard chemical wastes and cleaners and less automotive-related wastes.
- Another factor is that the HHW brought into collection sites often average 6 to 10 years old.
- Citizens tend to collect and store HHW in the home before throwing it away or taking it to a facility.

17/37



HHW toxic loading and fate in MSW handling systems

- HHW may be diverted from MSW through
 - educational programs that change the behavior of households and
 - by collection of HHW at special events or permanent collection facilities.
- The removal of HHW from MSW stream results in significantly less toxic loading to the landfill leachate and volatile gases from solid waste disposal.

18/37



HHW in wastewater

- HHPs are not only of concern in solid waste planning; they also enter wastewater in a variety of ways.
- During use and disposal, HHP are washed down the drain into STPs or on-site sanitary systems.
- Local governments prohibit the discharge of HHW (petroleum products, antifreeze, metals, acids or alkalis, paints, degreasers, solvents & pesticides) to storm water drains
- The HHP most often disposed of was liquids in bottles and aerosols.

19/37



HHW in wastewater

- After conventional wastewater treatment a significant amount of hazardous materials stay in wastewater.
- Most metals stay in primary and secondary sludge.
- Volatile solvents may evaporate from aeration tanks and become air pollutants.
- In strong concentrations, solvents, acids, bases and poisons can cause problems with wastewater treatment plant effluent, worker safety and sludge.

20/37



4. Product Stewardship & Sustainability

- Product stewardship involves taking responsibility for the entire life cycle of a product.
- This includes all steps of a product, from resource extraction, through manufacturing and marketing, and finally to the user and disposal/reuse/recycling phase.
- A primary initial focus has been on end-of-life products that contain hazardous materials.
- For example; a personal computer is composed of plastics, silica and various metals.
- Metals include precious, commodity and toxic varieties

21/37



Product return



- Some manufacturers offer product return programs for cameras, computers, copiers and other complex and readily recyclable or recoverable products.
- Used models are returned to the manufacturer, and they are designed for easy demanufacturing and also have many parts that are interchangeable between models.
- In this way, companies internalizes resource conservation and design more sustainable products.
- The used machines also provide valuable performance feedback in the design of product line improvements.

22/37

Disposal bans




- Based on environmental concerns, landfilling of some HHWs have been banned in some countries.
- This is executed to encourage recycling & recovery.
- Similar laws are considered for other common solid wastes such as tires, automotive batteries, construction and demolition wastes and wood wastes.
- Disposal bans are a relatively easy and potentially effective administrative means to divert specified wastes from disposal.

23/37

5. Education and Outreach

- HHW education programs typically emphasize waste reduction, encouraging people to reduce the use of HHPs through product substitution.
- For products that do not have a less-toxic substitute, then reuse, recycling and proper disposal are advocated.
- Programs focus both on specific waste streams and specific audiences (school children, rural residents, gardeners, new residents and oil changers).
- A less-toxic MSW stream is one beneficial end-result.

24/37 Video: <http://www.youtube.com/watch?v=rCc3SRraeFg&feature=related>



Education program design



- HHW educators compete or work with marketing and media specialists to attract the eye and attention of message-saturated consumers.
- Written messages, such as brochures, may seem like the easiest way to get information across, but they do not necessarily bring about changes in behavior.
- Similarly, media (newspaper, radio, television, bus ads, and billboards) are useful to promote awareness; however, increased awareness is only a first step toward behavior change.

25/37



Education program design



- The seven steps for successful social marketing are to determine the ...
 1. Purpose (Why are you doing this?)
 2. Audience (Who are you trying to influence?)
 3. Objectives (What specifically do you want them to think or believe or do?)
 4. Audience position (How do they feel about the idea?)
 5. Strategy (What can you say or do that will persuade them?)
 6. Media (How will you reach them?)
 7. Evaluation (What happened?)

26/37



Education program design



- In the early years of a HHW education program, the focus is on raising awareness of collection opportunities and recognizing what is a HHW.
- Collection opportunities must be publicized to be effective.
- Publicity techniques include newspaper articles, radio announcements, flyers, newspaper inserts, banners, door-hangers and direct mail.
- Cosponsors can be sought by speaking at local service clubs and organizations.

27/37



Education program design



- Publicity materials instruct citizens to differentiate between hazardous and non-hazardous products.
- By learning what is accepted at HHW collection sites, residents learn what is improper to dispose of in garbage
- Perhaps they read the label more carefully when the next time they go to purchase or use a product.
- Increased consumer awareness leads to an increased demand for information on less-toxic products.
- Some companies have responded by formulating low-odor, solvent-free products (e.g. drain & oven cleaners).

28/37



6. Collection, Trends and Infrastructure



HHW collection events

- Collection events are the typical first entry into HHW collection for local communities.
- This collection method is typified by one or a few times yearly event held at a central location for few hours or days to collect HHW from local citizens.
- Usually relies heavily on a waste contracting firm to provide technical expertise and trained laborers.

29/37

Video: <http://vimeo.com/41313332>

HHW collection events

Advantages

- Requires less local staff expertise
- Often affords high visibility locations
- Reduces permitting requirements
- Provides an indication of community interest level over time
- Offers relatively low administrative overhead
- Provides a pilot program without long-term commitments
- Allows easily varying locations and timing of events.

30/37



HHW collection events

Disadvantages

- Potential to frustrate customers if lines create long waits
- Less control over waste processing and packaging efficiency
- Service may not be available to customers when needed (during moving, spring or fall cleaning)
- Lower levels of public participation than permanent program alternatives
- Limited control over variable waste handling cost and number customers served.

31/37



HHW collection events

SATURDAY-OCTOBER 6, 2012

PUTNAM COUNTY HOUSEHOLD HAZARDOUS

Waste Collection Day



Our Household Hazardous Waste program is partially financed with a grant from the NYS Department of Environmental Conservation.

Location:
Putnam County Department of Health
1 Geneva Road
Brewster, NY

Items Accepted: Drain/Oven cleaners, Rug & Upholstery cleaners, Polishes & waxes, Spot removers, Oil-based paints, Solvents, Thinners, Wood preservatives, Strippers, Mothballs, Rodent poisons, Insecticides, Herbicides, Flea powder, Antifreeze, Gasoline, Kerosene, Photo chemicals, Chemistry kits, Nail polish remover, Hair dyes, Hair sprays, Fluorescent bulbs, Propane tanks up to 20 pound size.

Items Not Accepted: Electronic waste (e-waste), Used oil, Latex paint, Lead-acid batteries, Plastic bags, Tires, Unlabeled/unidentified containers, *Batteries.

FOR MORE INFORMATION ABOUT GREEN PUTNAM, WASTE DISPOSAL OPTIONS, RECYCLING, AND MORE, PLEASE VISIT:
www.putnamcountyny.com/greenputnam
FOR BATTERY DISPOSAL OPTIONS REFER TO ENERGIZER.COM OR DURACELL.COM WEBSITES.

Event Time: 9:00am—12:00pm
Pre-Registration Required. Call (845) 808-1390 x 43150.
Putnam County Residents Only— No Commercial Establishments

32/37

HHW collection events



Household Hazardous Waste Collection

2nd Saturday of every month – 8:00am – 12:00pm - 1200 Marietta Way, Sparks, NV

Accepted materials and pricing:	
Paint (oil or latex) and Paint Related Material	\$1.50 per pound
High BTU Flammable Liquids (Gas, Oil, etc.)	\$1.50 per pound
Cleaners - (Aerosols; Adhesives; Pesticides; Insecticides; related acids and bases)	\$3.00 per pound
Fluorescent Tubes (4 foot)	\$2.00 each
Fluorescent Tubes (8 foot)	\$3.50 each
Mercury containing waste	\$15.00 per pound
Oxidizers; Road Flares; Red Phosphorous, Iodine	\$13.50 per pound
Household Batteries	\$1.50 per pound
E-Waste (TV; CPU; Monitors; etc.)	\$1.50 per pound

***Items NOT ACCEPTED:** Cylinders of any kind, "Red Bag" Medical Waste, Car batteries

No checks. Cash or credit cards only. Weekday appointments can be made on a limited basis.





CleanHarbors[®]
ENVIRONMENTAL SERVICES, INC.
1200 Marietta Way
Sparks, NV 89431



Please call Mark at (775) 624-8060 for more information.

33/37

Permanent facilities



- Permanent facilities collect HHW year-round.
- Unlike many other solid waste facilities, HHW collection facilities are often cited without opposition.
- Some of these facilities have exchange areas for unused or leftover paints, solvents, pesticides, cleaning and automotive products, and other materials.
- By taking advantage of these facilities, materials can be used by someone else, rather than being thrown away.

34/37

Video: <http://www.youtube.com/watch?v=Pk-A6HbfLEM&feature=related>

Permanent facilities

Types of hazardous household waste not accepted at HWRCs

- Liquid fuels such as petrol, diesel, paraffin and fuel by-products such as glycerine.
- Commercial hazardous waste.

Please see the information on alternative disposal methods, available in leaflet form from any HWRC or online at www.hants.gov.uk/recycling

- Ammunition and explosives – contact your local police station.
- Marine fires – the Solent Maritime Rescue Coordination Centre are able to accept small amounts. Call 023 9255 2100 for more information.
- Medicines – take back to your local dispensing chemist.

Contact us

For more information, call **0845 603 5634*** or visit www.hants.gov.uk/recycling.

* Calls will cost up to 4p per minute for BT customers. Calls made using other service providers or mobiles may cost more. Alternatively call 01329 225398 – standard and local call rates apply to this number.

recycle
for Hampshire

Acceptance of hazardous household waste at HWRCs

What is hazardous household waste?

Examples of hazardous household waste include:

• White spirit	• Oven cleaner
• Stain removers	• Pesticides
• Drain cleaners	• Wood fillers
• Household batteries*	• Fluorescent light tubes*
• Glues	• Energy saving light bulbs*
• Wood preservatives	• Antifreeze
• Brake fluid	

* Household batteries and light bulbs can be taken to any HWRC in Hampshire

Hampshire
County Council www.hants.gov.uk

Recognising hazardous household waste

The most hazardous products, such as pesticides and chemicals, are labelled with orange and black symbols, such as those below.

Electrical equipment

Under the Waste Electrical and Electronic Equipment (WEEE) Directive, household electrical items are also classed as hazardous waste.

For more information on the WEEE Directive, ask for a leaflet from any HWRC or visit: www.hants.gov.uk/recycling

How to dispose of hazardous household waste safely

Hazardous liquids such as chemicals and pesticides must be in a sealed, suitable container. Please contact a member of staff on arrival who will direct you to the appropriate storage areas.

A maximum of five litres of liquids per household per month will be accepted.

Where to take hazardous household waste

Hazardous household waste can be taken to any of the HWRCs shown on the map.

Household batteries, fluorescent lightbulbs and energy saving lightbulbs can be taken to any HWRC in Hampshire.

35/37

Permanent facilities

Advantages

- Increased control over the acceptance, sorting, packaging and consolidation of HHW.
- Better education opportunities for customers
- Lower unit disposal costs paid to HW contractors
- Safer operations
- Increased availability and convenience of HHW services
- Expansion of services to surrounding communities
- Increased levels of participation.

36/37



Other collection methods

Mobile collection

- Once or twice a year, a mobile system consisting of vans, staff, supplies and equipment is scheduled to visit small towns to collect HHWs.

Local business collection sites

- Certain HHWs may be dropped off at local businesses for recycling or proper disposal.
- Some local garages, for example, may accept used motor oil for recycling.

37/37