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## Reducing Small-Volume Hazardous Materials and Wastes

### Introduction

Recommendations in this paper are intended to accelerate progress toward eliminating the risks associated with products containing hazardous substances. Specifically, this effort encompasses products and substances used at the household level and in relatively small quantities by businesses. The term *moderate-risk waste* (MRW) is used in Washington to classify hazardous wastes from these sources (households and businesses generating small quantities), although this term can be misleading because these wastes are not necessarily moderate in their risks to human health and the environment. Nonetheless, the term moderate-risk waste, or MRW, is familiar to many; it is, therefore, used throughout this section and other parts of the Beyond Waste Plan to refer to wastes as well as products or substances, before they actually become "wastes."

Additionally, the distinction between waste and product is artificial, as potential risks exist from the hazardous constituents regardless of whether a can of oven cleaner is a product (a full can), for example, or a waste (three-quarters empty, and destined for disposal). It is true, however, that disposal or recycling of a hazardous substance may pose additional risks that would not be present if someone used the substance as intended (for example, used the entire can of oven cleaner).

It is important to focus on moderate-risk wastes and materials as one of the keys to Beyond Waste for the reasons listed below:

- **MRW affects everyone.** Small volume hazardous materials and wastes are everywhere and people come into contact with them daily. Chronic and occasional exposure to chemicals in our homes and businesses can be a significant health risk as well as very costly to businesses and society due to increased costs associated with health care, environmental degradation, insurance and liability. In addition, acute exposures to chemicals in the home and businesses have increased as the sale and use of these products have increased (Tchobanoglous and Kreith, p. 10-3).
- **Our current management system is not affordable for the future.** The current management system for wastes from these local sources (households and businesses that generate small quantities) relies on taxes and fees. This system can not sustain itself over the long run. Most of the monies pay for special collection, treatment, and disposal of these wastes to keep them out of municipal solid waste landfills and incinerators. These collection programs also discourage the dumping of wastes down storm drains and household drains, and reduce the use of other illegal disposal methods. Yet these programs actually capture only a small percentage of all MRW generated (see page 4). It is difficult to foresee how the public sector can afford to provide the level of service for a

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## Background Paper for Beyond Waste Summary Document

truly effective system. The future needs to include product stewardship, waste reduction, recycling, and convenient collection/drop-off opportunities that do not rely primarily on public systems and finances.

- **Great strides are possible.** Many opportunities exist today to work toward reducing and eliminating the risks associated with these products and materials. Momentum is building for less harmful alternatives to be offered and used, and for more of these products and materials to be reused and recycled. Several regional and national initiatives are already underway and can be advanced through implementation of the Beyond Waste project. The Small-Volume Hazardous Materials Initiative recommendations will also contribute to reaching the goals in the Industries, Green Building, and Organic Materials Initiatives of this plan.

### Today's Reality

United States consumers have been encouraged by the marketplace to purchase an increasing variety and amount of specialty products to achieve the perfect, sparkling clean home and weed-free lawn. The result is a marked increase in hazardous household substances in our homes and in our waste streams. Our under-sink areas, basements and garages are filling up with the leftover products from this purchasing legacy. Household hazardous waste (HHW) collection programs are outlets for these unwanted chemicals. The proportion of HHW in the municipal solid waste (MSW) stream is small, estimated to be about one percent; however, HHW is easily the most toxic component of the municipal waste stream and therefore merits special handling (Tchobanoglous and Kreith, p. 10-3).

The existing MRW management system in Washington focuses on waste management. Little attention is given to hazardous materials themselves, unless they are used in very large quantities. Moderate-risk wastes are conditionally or categorically excluded from state *Dangerous Waste Regulations* (WAC 173-303-071 [3] [c]).

Moderate-risk waste comes from two sources: households and non-household generators of small quantities of hazardous waste. Household hazardous waste is any waste created by the discard of a hazardous household substance as listed by Ecology or identified by a local jurisdiction's hazardous waste plan. Hazardous household substances are defined by state statute (RCW 70.105.010[17]).

The broad categories of hazardous household substances are listed in the table below (WDOE 1994, pp. 24-25).

**Hazardous Household Substance Groups\***

Group Name	Example Hazardous Household Substances
Repair and Remodeling	Adhesives, oil-based paint, thinner, epoxy, paint stripper
Cleaning Agents	Oven cleaners, deck cleaners, degreasers, toilet cleaners
Pesticides	Wood preservatives, mole killer, herbicides, pesticides
Auto, Boat & Equip. Maintenance	Batteries, paint, gasoline, oil, antifreeze, solvents
Hobby and Recreation	Photo and pool chemicals, glaze, paint, white gas
Miscellaneous	Ammunitions, fireworks, asbestos

*\*Local jurisdictions may include additional hazardous substances as a result of local hazardous waste planning processes.*

The other portion of the moderate-risk waste stream comes from commercial generators of small quantities of wastes designated as hazardous through Chapter 173-303 WAC, the *Dangerous Waste Regulations*. Within the large group of commercial hazardous waste generators are conditionally exempt small quantity generators (CESQG) who generate less than 220 pounds per month or per batch for most hazardous wastes AND do not store more than 2,200 pounds of these hazardous wastes at one site.

CESQG wastes include these same waste types as well as some additional commercial wastes from small businesses that would be less likely to be found in households. Examples of CESQG-only wastes would be: commercial quantities of copier and photo processing wastes; high-strength cleaning and production chemicals; and strong oxidizers, acids, and bases.

### **Collection System**

MRW collection diverts hazardous materials from the municipal waste streams and provides numerous benefits. MRW collection provides an opportunity for waste reduction education, allows for the recovery of materials as resources, reduces the toxicity of solid waste landfills and wastewater systems, helps the public to avoid improper disposal practices, and protects waste processing equipment and handlers from exposure to hazardous materials.

Local MRW collection started in the early 1980s as HHW-only collection events or roundups, once or twice a year. In the late 1980s, permanent collection facilities started to replace the events because of a need for year-round collection, to serve a larger number of customers without long lines, to control costs, and to reuse and recycle larger quantities of MRW. Every county operates MRW collection programs that collect HHW (WDOE 2003, p. 125). In addition, twenty counties collected CESQG wastes in 2002 (WDOE 2003, p. 131).

In 2002, 24.1 million pounds of MRW (HHW and CESQG waste, combined) were collected in the publicly sponsored system. Of that, 22.7 million pounds was from households (WDOE 2003, p. 127). CESQG wastes collected in 2002 totaled 1.4 million pounds (WDOE 2003, p. 127).

A generally accepted estimate of the HHW universe is approximately 1 percent, by weight, of the total municipal solid waste stream, which totals over 7.2 million tons per year (WDOE 2003, p. 81). Using this estimate, Washington's 2002 volume of HHW would be about 72,000 tons (144 million pounds). Therefore, the state's MRW programs collected about 16 percent of the total HHW disposed of in 2002. The remaining 84 percent may have entered landfills, solid waste combustors, sanitary sewers, stormwater systems, or may have been dumped on the ground.

In 1990, Ecology estimated there were approximately 240,000 CESQGs in Washington (WDOE 1990, p. i). CESQG wastes are less well quantified than household hazardous wastes, but MRW professionals have estimated that the CESQG waste stream may be as large as or larger than the HHW waste stream. While the availability of hazardous household products and substances is relatively uniform from household to household, significant differences exist between the chemicals used by small businesses and the distribution of small business types across the state. Consequently, it is more difficult to precisely assess the magnitude and geographic distribution of CESQG waste statewide. However, if the CESQG waste stream is the same size as the household hazardous waste stream (144 million pounds), then

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## Background Paper for Beyond Waste Summary Document

the 1.4 million pounds of CESQG waste collected in 2002 represents only 1 percent of the total small quantity generator hazardous waste stream. Using these assumptions, the remaining 99 percent of CESQG wastes are not accounted for.

In 2003, 34 of the 39 Washington counties reported spending more than \$10 million (including grant funds) on their MRW programs (Solid Waste Policy Forum). At this rate, it is hard to imagine generating enough revenue to adequately manage the remaining 84 percent of household hazardous wastes generated every year. For the CESQG waste stream, most programs provide services for a fee and so some additional capacity might be available to serve this client base through the generation of fee-based revenues. Nonetheless, the current funding levels and infrastructure do not appear capable of supporting efforts to capture even half of the MRW universe.

In several communities, some of the materials collected are provided to others for reuse, through material exchanges. Used motor oils and antifreezes are generally recycled after collection (WDOE 2000, p. 93). The Kitsap County Solid Waste program Web site details how collected MRW materials are managed. Some latex paints are used as additives in cement manufacturing (costing Kitsap County residents \$32,000). Many oil-based paints, pesticides, and poisons are incinerated (at a yearly cost of about \$127,000). Household batteries, pool chemicals, and bleaches are stabilized and then sent to hazardous waste landfills for final disposal. Mercury from fluorescent tubes, thermometers, and other products is recycled. Corrosive products, including many household cleaners, are neutralized and then sent through the wastewater treatment plant or disposed of at landfills (KCPW).

The current method of funding the MRW collection and special handling system is primarily based on solid waste disposal fee surcharges and support from state grant funding (Solid Waste Policy Forum). While business owners typically pay fees to bring CESQG wastes to a collection facility, residents are not generally charged when they deliver HHW to a collection facility or collection event. They may not even be aware that part of their solid waste bill pays for the MRW programs. This system certainly does not provide incentives for HHW reduction. Furthermore, it is unlikely that the current primarily public system could manage all of the MRW generated, unless additional capacity and resources are committed.

### **Hazards**

From even a cursory examination of the product types listed as hazardous household substances, it is clear that there are many substances that would be poisonous and harmful if the products were to be misused. Some exposures to these types of chemicals cause immediate health effects, called acute effects, while other exposures over time cause longer-term, chronic health effects. There is increasing evidence that our endocrine systems are at risk from synthetic chemicals, which mimic or interfere with our human hormone systems (EPA 2003). In addition, for many decades there have been documented cases of chemical sensitivities, especially to synthetic compounds (mostly, these are chemicals that our species cannot metabolize) (Randolph). There is growing understanding that many of the products we use contain hazardous substances that pose a threat to human and environmental health. Examples include switches and fluorescent light bulbs (mercury); computers and other electronics (lead, mercury, and brominated flame-retardants); upholstery and mattresses (brominated flame-retardants).

Intentional and unintentional releases of automotive fluids and home pesticides have degraded the water quality of local streams in Washington. Wastewater treatment systems are designed for easily biodegraded waste decomposition and do not effectively treat many synthetic and metal bearing wastes.

Because of the increased stock of hazardous household substances in our homes, in the event of fire, fire fighters are at an increased risk of exposure to chemicals that often react to form highly-toxic gases when heated. These chemicals can also accelerate the fire itself, increasing risk to persons and property (Tchobanoglous and Kreith, p. 10-5).

In addition to the acute and chronic health hazards to families in the home, there are risks and potential impacts to waste workers, facilities, and equipment when MRW is disposed in water or in the municipal solid waste stream. The City of Tacoma has had a number of explosions in its refuse-derived-fuel processing facility, presumably from MRW in the municipal waste stream. These incidents have caused the system to shut down and have required costly repairs. A garbage collector in New York City was killed and his partner sent to the hospital due to exposure to hydrofluoric acid from the solid waste in their packer truck (Van Gelder).

### **Goals: What Washington will look like in 30 years**

Everyone wants to ensure a high quality of life for future generations. We have the opportunity today to build a future that will be vital, safe, and healthy for the people of Washington State. The preferred future envisions a time when products and materials offered in the marketplace do not pose risks to human health and the environment. This will result in healthier people, healthier buildings, and a healthier environment. The high quality of life and strong economy in Washington will make this state a desirable place to live and work.

Focused attention and commitment is needed in two important areas to create this preferred future. We must maintain and strengthen the MRW management system for as long as it is needed, recognizing that available resources can not support collection of all the HHW and CESQG wastes that are generated in the state. This system should prioritize the highest risk MRW materials through segregation and special collection, treatment, recycling, special disposal, regulatory oversight, technical assistance, and education. At the same time, we need to eliminate the hazards associated with products and services that generate moderate-risk wastes. Products that do not contain hazards, or where hazardous substances are kept in a closed loop of reuse and recycling, will reduce threats to human health and the environment, and will reduce the rapid depletion of natural resources. Reducing the toxicity and waste associated with products and services, and managing products at the end of their life, are solutions that need contributions from industry, manufacturers, retailers, and consumers.

The following are 30-year goals for the Small-Volume Hazardous Materials Initiative:

#### **■ Safer Products and Services**

Most threats to human health and the environment have been eliminated by minimizing chemical hazards associated with the life-cycles of products and services. Products and

services that are less toxic are available to meet consumer demand, and highly-hazardous products are generally unavailable.

### ■ **Efficient Materials Management**

Human health and the environment are well protected. Reuse and recycling are optimized for any remaining hazardous materials still in use as producers, retailers, government, consumers, the solid waste industry, and other sectors have collaboratively developed a system for safely and responsibly managing hazardous materials.

### ■ **Greater Economic Vitality**

Economic sectors in Washington thrive in the domestic and global marketplace as hazardous materials are systematically eliminated from products and services. New programs and technologies are developed to manage the remaining hazardous materials more effectively and efficiently. Consumer confidence has increased, risks and liabilities have decreased, and costs for managing wastes are reduced.

## **The Action Plan**

### **Shorter-Term Milestones**

To reach the thirty-year goals described above, considerable progress must be made in the short term. The following are milestones for the first five years of the Small-Volume Hazardous Materials Initiative.

- A consensus-based process is in place and has been used to rank priority substances that are high-risk, and the next set of substances to pursue has been identified.
- Sales of mercury-containing consumer retail products have significantly decreased in the state.
- A statewide strategy has been agreed to and is undergoing implementation to reduce threats posed by polybrominated diphenyl ethers (PBDE), used as flame-retardants.
- Industry has established a nationally based, effective product stewardship program for electronic products.
- An industry-led management system for leftover paint has been created, and there are at least as many collection locations to accept leftover paint across the state as there are used oil collection sites, with sites in each county.
- The growth trend in retail sales of high-risk non-agricultural pesticides has leveled off.
- All of state government and 80 percent of other entities that are members of the Washington State Purchasing Cooperative are using environmentally preferable purchasing for products and services in the following areas:
  1. Automotive products and vehicles (re-refined oil, alternative fuels and/or hybrid-fuel vehicles, and non-mercury switches).
  2. Products containing flame-retardants.
  3. Grounds maintenance (least-risk methods)/Integrated Pest Management (less toxic pesticides).
  4. Electronic products.

5. Building materials (including recycled-content paint, carpet, fixtures, and furnishings).
  6. Safer, least-risk cleaning products.
- Local hazardous waste plans are up to date and are being fully implemented.
  - All MRW facilities are in compliance with Chapter 173-350 WAC, and all treatment, storage and disposal facilities handling MRW are also in compliance with Chapter 173-303 WAC.

### **Overview of Proposed Strategies**

Ultimately, we need to move from a government-funded special diversion and disposal system for moderate-risk wastes to systematically eliminating hazards associated with these materials in partnership with the private sector. The amount of waste generated by the production and use of these products also needs to dramatically decrease, as managing this waste is costly, inefficient, and potentially harmful.

The priority recommendations included here focus on two areas:

- Managing the existing system with an eye toward the desired future.
- A strategic effort to eliminate priority MRW hazards by reducing toxins and reducing waste generation at the household and business level.

The ten priority recommendations summarized under the next heading represent a large, but realistic agenda for the next five years or so. Most of the recommendations build on programs and activities that are already underway. In addition, several are directly tied to recommended actions contained in the other key initiatives of the Beyond Waste Plan. In approaching these recommendations, the following strategies will be essential.

#### **■ Collaboration**

This action plan relies on collaboration among government, industry, and the nonprofit sectors to be successful. While Ecology can provide leadership for many of these activities, these actions yield tremendous results when undertaken together. As with the other key initiatives contained in this plan, partnerships will be the cornerstones of success in moving toward the Beyond Waste future.

#### **■ Prioritizing activities**

The reality of limited resources for MRW programs points to the need for a prioritized approach for the future. We need to focus our efforts on hazards that we can identify as priorities. Agreement on a process for identifying priority hazards is a vital component throughout the entire MRW action agenda.

#### **■ Focus on risks**

Efforts need to begin soon on the recommendation to redevelop the hazardous waste laws and regulations, as this task will take several years to accomplish. This component is essential to reaching the long-term goals for this initiative. Laws and regulations need to be protective; human health and environmental impacts have occurred as a result of households and small businesses improperly using and disposing of hazardous substances. This indicates that the regulations need to be changed to focus on the greatest

threats from hazardous substances, whether they are in wastes or products, and whether they are used by industry or by households.

### ■ **State government leading by example**

State government will lead by example through environmentally preferable purchasing programs that should influence large changes in the marketability and development of alternatives to products containing hazardous substances. This important economic lever will result in measurably less hazardous waste over time. Reuse and recycling opportunities for products should also increase through state purchases of recycled-content products.

### ■ **Product stewardship**

The recommendations on electronics and paint focus on product stewardship efforts to reduce waste and toxic substances and to share responsibility for products with special handling needs and hazards. Product stewardship is a term people commonly use for programs such as these. The Northwest Product Stewardship Council defines product stewardship as follows:

*“Product Stewardship is an environmental management strategy that means whoever designs, produces, sells, or uses a product takes responsibility for minimizing the product’s environmental impact throughout all stages of the product’s life-cycle. The greatest responsibility lies with whoever has the most ability to affect the life-cycle environmental impacts of the product.”* (NWPSC)

The goal of the product stewardship recommendations is to encourage manufacturers to develop products that are specifically designed to accomplish the following:

1. Have the ability to be disassembled (and reused and/or recycled).
2. Produce less waste.
3. Involve fewer toxins throughout the life-cycle of the product.
4. Contribute to worker productivity and health.
5. Support good indoor air quality.
6. Avoid the need for government-sponsored programs to manage end-of-life products.

## **Summary List of Recommendations**

The package of priority actions recommended below is intended to be undertaken during the next five years. An additional set of future recommendations, for beyond the five-year period, is included at the end of this section.

The recommendations appear below in two groups. The first eight recommendations are actions that will work toward eliminating hazardous substances from products and services for the future. In addition, these actions will relieve some of the current pressure felt across Washington State by the MRW collection network, which is financially unable to manage all of the MRW generated. The additional actions focus on strengthening the effectiveness of the existing MRW system, which provides numerous benefits throughout the state.

## Eliminating Hazards in the Future

Recommendation MRW1	Prioritize substances to pursue
Recommendation MRW2	Reduce threats from mercury
Recommendation MRW3	Reduce threats from PBDE
Recommendation MRW4	Develop an electronics product stewardship infrastructure
Recommendation MRW5	Ensure proper use of pesticides, including effective alternatives
Recommendation MRW6	Reduce and manage all architectural paint wastes
Recommendation MRW7	Lead by example in state government
Recommendation MRW8	Ensure MRW and hazardous substances are managed according to hazards, toxicity and risk

## Ensuring That the Existing MRW System Is Effective

Recommendation MRW9	Fully implement local hazardous waste plans
Recommendation MRW10	Ensure facilities handling MRW are in compliance with environmental laws and regulations

## Priority Recommendations

### Recommendation MRW1 - Prioritize substances to pursue

#### Statement of Action

Develop a prioritized approach to identify and eliminate MRW hazards that enter the municipal waste stream. Through collaboration with businesses and other organizations, establish a science-based process to identify hazardous substances that are high-risk and have potential widespread environmental threats. Work to address the threats posed by these substances will focus on one set of substances at a time.

The first proposed set of priority substances is:

1. Mercury (see Recommendation MRW2).
2. Polybrominated diphenyl ethers (PBDE) flame-retardants (see Recommendation MRW3).
3. Electronics (see Recommendation MRW4).
4. Selected pesticides (see Recommendation MRW5).
5. Architectural paints and coatings (see Recommendation MRW6).

#### Specific Steps

- Collaboratively establish a science-based process to rank high-risk priority substances.
- Using the agreed upon process, identify the next set of priority substances to pursue (after working on the first set). As a part of this effort, consider the following substances already identified as high concerns: lead, pharmaceuticals, and used oil.

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## Background Paper for Beyond Waste Summary Document

- Do this in conjunction with the establishment of criteria for identifying persistent, toxic chemicals that pose human health or environmental impacts in Washington, in accordance with Executive Order 04-01, issued by the Governor (Locke 2004).
- Align these efforts with establishment of a standard operating procedure (SOP) to clarify how sectors will be selected in the future for industrial sector campaign work. (Note that this is a recommendation contained in the Beyond Waste Industries Initiative.)

### **Background/Rationale**

This represents a shift from existing MRW collection programs, as the majority of local programs try to equally address a broad spectrum of wastes and materials. They do this not only in special collections, but also in their education and prevention activities. The recommended approach here is to specifically aim efforts toward a few of the highest priorities at a time. This should influence the focus of collection programs, including special initiatives and education and prevention efforts.

Too many existing and emerging MRW materials are being generated to effectively address all of them. Valiant efforts are being made, with some well-deserved accolades and successes, in reducing the risks from many moderate-risk wastes. We can and should make faster progress toward the ultimate goal of eliminating the risks posed by these materials, regardless of where they are in their life-cycles (feedstock or other manufacturing materials, products, or wastes). We can do this by pursuing those substances that pose the highest threats and offer the greatest opportunities for reduction. This prioritized approach offers great potential and we can accomplish much through strategic use of existing resources, programs, and infrastructure.

The first proposed set of priorities (mercury, PBDE, electronics, selected pesticides, and architectural paints and coatings) was the work of a group of MRW professionals using their experience, knowledge, and best professional judgment. In this effort, they coordinated with the workgroup developing the Industries Initiative section for the State Plans. These experts relied on knowledge about risk and toxicity; waste volumes; threats to human health and the environment; and existing efforts, momentum, and opportunities to achieve results.

Although the prioritization process was not strictly scientific, planning by other jurisdictions has resulted in similar priorities (Armstrong). A scientific process may be ideal to satisfy any dispute about the hazards chosen; however, such a process would likely take a great deal of time and a significant investment of resources. It is valuable to take the time to develop an agreed upon process for the long term. In the meantime, many actions to reduce risks posed by this first set of substances do not rely strictly on science, as we can accomplish a great deal through efforts based on logistics, education, and economics.

A strong working partnership of professionals throughout industry, government, and the non-profit sector should continue to guide this priority approach, as its success will rely on close coordination and integration of efforts at all levels. Several of these partnerships are already well established and have been quite successful, including the North American Hazardous Materials Management Association (NAHMMA) and the Northwest Product Stewardship Council.

## Recommendation MRW2 - Reduce threats from mercury

### Statement of Action

Help reduce and eliminate mercury by supporting and building on the Washington State Mercury Chemical Action Plan (WSMCAP). The WSMCAP, part of a statewide long-term strategy for eliminating persistent bioaccumulative toxins, or PBTs, includes a group of actions to decrease mercury from all sources. Some significant sources of mercury are in the moderate-risk waste arena, and addressing these is crucial to the success of the overall action plan (WDOE/DOH 2003).

### Specific Steps

- Provide mercury-reduction education and technical assistance to businesses that use mercury-containing materials and products.
  1. Develop and promote best management practices and/or environmental management systems (EMS) for managing mercury in street lamps and other mercury-containing traffic lights and signals. (For a description of EMS, see <http://enviro2.blr.com/topic.cfm/topic/174/state/155>.)
  2. Establish partnerships with medical and dental industry to voluntarily phase out use of mercury-containing medical equipment.
  3. Develop and promote best management practices for mercury management with auto recyclers; the heating, ventilation, and air conditioning (HVAC) industry; and the building and construction industry.
- Develop and carry out ongoing education programs for households and schools on:
  1. Mercury-containing products and alternatives
  2. Safe cleanup of mercury spills
  3. Fish advisories
  4. Mercury impacts on health and the environment
- Facilitate and support efforts to implement legislation requiring manufacturers of mercury-containing and mercury-added products to establish and fund a collection and recycling infrastructure for their products.
- Facilitate and support efforts to implement legislation requiring manufacturers to report mercury-containing or mercury-added consumer products sold in Washington.
- Support national efforts to establish a mercury repository.

### Background/Rationale

Mercury is a persistent bioaccumulative toxin (PBT) that affects the human nervous system. Public concern about mercury is high and important action has already been taken to reduce it. The Washington State Legislature enacted Engrossed Substitute House Bill 1002, the Mercury Reduction and Education Act, during its 2003 session. This legislation, which went into effect in July 2003, leverages the existing momentum around mercury to significantly reduce access to and use of mercury-containing products. The actions proposed here augment this legislation and help to carry forward the WSMCAP.

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## Background Paper for Beyond Waste Summary Document

Currently, about 3,900 to 5,000 pounds of the mercury released into Washington's environment each year comes from human sources within the state (WDOE/DOH, p. ix), including an estimated 1,666 to 2,023 pounds disposed of with solid waste, medical waste, and sewage (WDOE/DOH, p. 6).

Mercury is contained in numerous household and business products, including thermostats, thermometers, switches, gauges, and lamps. More than 70 percent of the mercury released into the atmosphere each year comes from coal-fired power plants, municipal waste incinerators, and commercial/industrial boilers. Natural sources, such as volcanoes and forest fires, cause about one-third of the mercury in the atmosphere. Atmospheric mercury falls back to earth in precipitation and binds with bacteria to form methylmercury, the most toxic form of mercury for humans, because it accumulates in the food chain and ends up in seafood eaten by humans.

The more toxic methylmercury in fish is completely absorbed by humans and can concentrate in the brain as well liver, spleen, kidneys, and bone. Mercury exposure can have numerous effects on adults, including disease of the cardiovascular and central nervous systems. Mercury exposure is more severe for infants and children. Mercury can be passed to nursing infants through breast milk and from mothers to their unborn fetuses. The National Academy of Sciences has found that up to 60,000 newborn children each year are put “at risk for adverse neurodevelopmental effects” because of mercury exposure (CLS/NAS, p. 325).

The long-term strategy for reducing health risks from exposure to mercury is to lower concentrations of methylmercury in fish that people eat—the primary route of human exposure.

Ecology should pursue the activities proposed in this recommendation in partnership with the Washington State Department of Health, local governmental health jurisdictions, local government MRW professionals, public road and street utilities, HVAC trade groups, building industry trade groups, medical and dental industry groups, and school districts and educational service districts.

### **Recommendation MRW3 - Reduce threats from PBDE**

#### **Statement of Action**

Participate in and support development of the statewide chemical action plan to reduce threats posed by flame-retardants called polybrominated diphenyl ethers (PBDE), found in products ranging from textiles to computers. Assist with implementing this plan as it relates to the moderate-risk waste stream.

#### **Specific Steps**

- Assist with the development of a statewide PBDE chemical action plan as it relates to household products and wastes.
- Assist with implementation of the PBDE chemical action plan.

### **Background/Rationale**

PBDE has been identified as a priority, and both the state Departments of Ecology and Health are developing a chemical action plan to reduce threats from the use of PBDE. Governor Locke issued Executive Order 04-01 containing this directive (Locke 2004). Because their use in flame-retardants is very widespread, PBDE are present in countless household products, from textiles to computers. In addition to state government (and possibly federal government) action on PBDE, local jurisdictions will undoubtedly be called upon to help carry out the chemical action plan to reduce PBDE in the MRW stream. It is essential that representatives from local governments and other organizations actively participate in developing the PBDE chemical action plan.

### **Recommendation MRW4 - Develop an electronics product stewardship infrastructure**

#### **Statement of Action**

Representatives from local government, Ecology, and environmental organizations should continue to work with the electronics industry on a comprehensive product stewardship system for electronic products. This system should provide materials management options for electronic products at the end of their useful lives. It should also build awareness of the hazards inherent in electronic products and wastes. With consultation from the State Solid Waste Advisory Committee (SWAC) and others, Ecology will research and develop recommendations to the state legislature for an electronic product collection, recycling, and reuse program, pursuant to legislative direction (ESHB 2488, a bill regarding electronic product management, passed March 10, 2004, and the Governor signed it into law on March 29, 2004).

#### **Specific Steps**

- Continue to participate in and support efforts to establish this infrastructure (through the Western Electronic Product Stewardship Initiative and the National Electronics Product Stewardship Initiative (NEPSI)). This electronics infrastructure needs to include:
  1. Accessible and effective take-back systems for electronic products.
  2. Electronics recycling that does not harm human health or the environment.
  3. Product redesign to eliminate hazardous components, ease disassembly and recycling, and lengthen life-span.
- Increase awareness of hazards of electronic products and wastes, and build demand for less toxic and less waste-producing alternatives, including consideration of additional right-to-know requirements.
- Conduct research and make recommendations on implementing and financing an electronic product collection, recycling, and reuse program, in accordance with legislative direction through ESHB 2488. This effort will include:
  - SW1. Identifying and evaluating existing projects, and encouraging new pilot projects that help obtain information on the viability of various approaches and other factors.
  - SW2. Compiling information on manufacturer programs, cost data, potential impacts on jobs, recycling infrastructure, and economic development.
  - SW3. Exploring state financial incentives for developing business opportunities and jobs.

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## Background Paper for Beyond Waste Summary Document

SW4. Evaluating stability of lined and unlined landfills.

SW5. Determining what could be accomplished voluntarily and what would require rule or legislation to implement.

SW6. Developing recommendations to address electronic-waste issues and financing options for charities, school districts, government agencies, and small businesses.

SW7. Considering possible ways to address the costs incurred by charitable organizations receiving unwanted electronic products.

### **Background/Rationale**

Electronic products have changed how today's society communicates and functions. Examples of electronic products include computers, televisions, VCRs, telephones, calculators, fax machines, and copiers.

Electronics are a concern because they often contain toxic materials such as lead, cadmium, chromium, barium, brominated flame-retardants, and mercury that can pose risks to human health and the environment. Although electronic products such as computer monitors, central processing units (CPUs), televisions, and cell phones are considered safe during use, the potential for release of their toxic ingredients can increase during storage, recycling, and disposal. Cathode ray tubes (CRTs) found in televisions and computer monitors contain enough lead (an average of four pounds each [EPA 2001]) to be classified as a hazardous waste.

Electronics are used and disposed of in extraordinarily high volumes. For example, households in northwest Washington counties were projected to generate about 1,286,000 waste computers, computer monitors, televisions, and cell phones in 2003, which equates to about 25,000 tons of waste (Cascadia and Sound, p. 1).

Currently, safe recycling of a CRT involves manual dismantling by separating the CRT from the rest of the steel and plastic. The design and production of the CRT have not traditionally included consideration for the need to dismantle them at the end of their useful lives. Consequently, it is relatively expensive to recycle these products. The existing design is one of the reasons that it is beneficial to work with manufacturers of electronic products. Ongoing commitment is needed to overcome both the challenge of decreasing toxic substances used in the products and the barriers to increasing recyclability. National negotiations are underway between the public and private sectors to change the way electronic products are designed and managed throughout the product life cycle.

Health impacts to workers in the computer manufacturing industry are not really known. However, workers in chip manufacturing are reporting cancer clusters and birth defects. Also, some evidence shows that computer recycling employees have high levels of dangerous chemicals in their blood (SVTC).

Capacity does not exist now to either collect or to safely recycle all of these items, and it is not realistic to expect that the public sector will ever be able to afford to do so. Additionally, community concern is growing about the fate of computers that are sent for recycling. Some computers have been sent to Asia for recycling in conditions that do not meet health and environmental standards in the United States.

## **Recommendation MRW5 - Ensure proper use of pesticides, including effective alternatives**

### **Statement of Action**

Through collaboration with the Washington State Department of Agriculture (WSDA), EPA, local government, pesticide applicators, environmental organizations, and others, develop criteria to identify high-risk pesticides used by households and in other small-quantity applications (both agricultural and non-agricultural). Develop a plan to ensure proper use of high-risk pesticides in households and other small, non-agricultural applications, to include promoting effective alternatives. Next, work with the WSDA and others to develop a long-term strategy for using effective alternatives to high-risk agricultural pesticides.

### **Specific Steps**

Actions to be taken should include:

- Convene a workgroup of experts to identify high-risk pesticides, both non-agricultural and agricultural, that should be pursued first.
- Develop a specific plan and timeline for actions on non-agricultural high-risk pesticides.
- Educate potential users of high-risk non-agricultural pesticides about alternatives and health and environmental risks.
- Partner with pesticide manufacturers to develop a take-back system for pesticides that are banned.
- Work with the WSDA and others to identify and understand barriers that prevent growers from using alternative products and methods.
- Develop a long-term strategy for using effective alternatives to high-risk agricultural pesticides.

### **Background/Rationale**

Pesticides are used prevalently throughout our society, from small applications in human living spaces and on individual lawns to larger applications on landscaped areas and commercially grown crops. These pesticides afford many benefits, but some can also pose significant threats to human health and to natural resources that we all depend on.

According to the Environmental Protection Agency (U.S. EPA), "By their very nature, most pesticides create some risk of harm - Pesticides can cause harm to humans, animals, or the environment because they are designed to kill or otherwise adversely affect living organisms." (EPA 2004)

Many pesticide products are found in households, which makes pesticides a relevant issue in the universe of MRW. According to the U.S. EPA, the following common products are considered pesticides (EPA 2004):

- Cockroach sprays and baits.
- Insect repellents for personal use.
- Rat and other rodent poisons.
- Flea and tick sprays, powders, and pet collars.

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## Background Paper for Beyond Waste Summary Document

- Kitchen, laundry, and bath disinfectants and sanitizers.
- Products that kill mold and mildew.
- Some lawn and garden products, such as weed killers.
- Some swimming pool chemicals.

Research from the U.S. Centers for Disease Control (CDC, pp. 160-172) indicates that at least one-half of the people in the United States have breakdown products (metabolites) of organophosphate (OP) pesticides in their urine. Organophosphate pesticides affect the nervous system by disrupting the enzyme that regulates acetylcholine, a neurotransmitter. Most organophosphates are insecticides. They were developed during the early 19th century, but their effects on insects, which are similar to their effects on humans, were discovered in 1932. Some are very poisonous (they were used in World War II as nerve agents). Organophosphate pesticides generally do not persist in the environment for long periods of time and do not build up in the body fat of humans and other animals. Therefore, the fact that these pesticides were found in such a high percentage of test subjects indicates that most people are exposed to these chemicals on a daily basis. According to Pesticide Action Network North America, “symptoms of exposure [to OP pesticides] include nausea, headaches, twitching, trembling, excessive salivation and tearing, inability to breathe because of paralysis of the diaphragm, convulsions, and at higher doses, death.” (PANNA)

In a 1998 study of preschool-aged children in the Seattle area, researchers found measurable levels of OP pesticide metabolites in urine samples from nearly all of the 110 children studied. Additionally, researchers reported that concentrations of OP pesticide metabolites were significantly higher in children whose parents reported pesticide use in the garden. The study concluded that exposure levels found in the children were not likely high enough to cause acute health impacts, but state that “the long-term health effects of such exposures are unknown.” (Lu) The authors of the study recommend that people avoid use of OP pesticides in areas where children are likely to play.

This recommendation directly supports the goal of improving the quality of organic materials for recycling, which is a critical component of the Organic Materials Initiative of the Beyond Waste Plan. Ensuring proper use of and alternatives to high-risk pesticides will result in cleaner organic residual materials for composting and other recycling. Moreover, it will also directly improve water quality for both surface and ground water bodies in Washington.

A collaborative partnership of a broad range of experts is needed for this recommendation to be successfully carried out. The experts asked to identify the list of high-risk pesticides should develop criteria for doing so that are based on existing university research and regulatory and/or peer-reviewed studies. One criterion should be the existence of safe and economically viable alternatives to the pesticides considered for attention.

People from the categories below should be included in collaboration and education efforts under this recommendation:

- Government grounds and buildings and their groundskeepers (schools, stadiums, parks)
- Homeowners

- Wholesale nurseries/plant growers/garden stores
- Retailers selling pesticides
- Landscape maintenance companies
- Pesticide applicators other than landscape
- Farmers and growers
- Property managers
- Noxious weed boards
- Mosquito district boards
- Office of Superintendent of Public Instruction

Potential incentives may be needed to see a substantial change in practices.

### **Recommendation MRW6 - Reduce and manage all architectural paint wastes**

#### **Statement of action**

Working with industry, establish a regional or national product stewardship infrastructure for architectural paints and coatings, including a manufacturer take-back network. Also, work to reduce architectural paint wastes and the use of toxics in such paints.

#### **Specific Steps**

- Continue to participate in the national efforts to partner with industry to create a product stewardship infrastructure (this should include, at a minimum, a take-back system).
- Educate paint users on waste and toxics reduction practices.
- Evaluate the effectiveness of these existing efforts to divert and recycle leftover paints in the Northwest. If needed, develop an alternate proposal which would likely involve regulatory requirements.

#### **Background/Rationale**

Architectural paints and coatings are typically used on building exteriors and interiors, and include a variety of different products, such as latex and oil-based paints, sealants, stains, varnishes, epoxies, and other common finishes.

Local MRW collection programs typically collect more paint than anything else (WDOE 2003, p. 128). This comprises a large portion of the cost to operate such a program. The volumes of paint wastes and the costs to collect and specially dispose of them have created a great deal of interest in pursuing alternatives to the current programs. To date, nearly the entire burden for management of this waste stream has been on the shoulders of local government. National discussions on the potential for establishing a product stewardship infrastructure for paint have begun between government representatives and the paint industry. Local and state governments in the Northwest are active participants in this national paint dialogue. The goal of these discussions is to share the responsibility of management of leftover paint with industry and to reduce volumes of leftover paint. The specific activities under this recommendation could expand over time as these discussions evolve.

Oil-based paints are designated as dangerous waste because of both flammability and toxicity. They contain 30-60 percent volatile organic compounds (VOCs) by volume (Kirk-Othmer, p. 1068). While latex (water-based) paints contain organic solvents, and sometimes VOCs and lead, they rarely designate as dangerous waste. Solvent vapors from both oil-based and latex paint may pose a special risk for pregnant women, young children, and individuals with respiratory ailments. However, paint vapors can be harmful to everyone exposed to them, even for short periods.

This recommendation directly supports the Green Building Initiative's goal of reducing toxins in and wastes from building materials. A large amount of paints and coatings are used in building construction and renovation, both commercial and residential. Paints and coatings also contain toxins that contribute to poor indoor air quality that can affect painters and building inhabitants.

### **Recommendation MRW7 - Lead by example in state government**

#### **Statement of Action**

State government will lead by example in reducing use and purchase of hazardous products and services.

#### **Specific Steps**

- Washington State government will develop and implement environmentally preferred purchasing (EPP) policies and practices for the following priority areas and products:
  1. Automotive products and vehicles (re-refined oil, alternative fuels and/or hybrid-fuel vehicles, non-mercury switches, antifreeze, and batteries)
  2. Grounds maintenance/Integrated Pest Management (less toxic pesticides)
  3. Electronic products
  4. Building materials (including paints, carpet, fixtures, furnishings)
  5. Cleaning products
  6. Flame-retardants
- Promote increased EPP by providing education and technical assistance (to both state and local government purchasing officials and other entities that purchase from Washington State contracts).
- Develop and promote best management practices for alternatives to products that contain hazardous substances, and for product reuse and recycling practices.
- Regularly strengthen and expand the products and services included in the EPP programs to further reduce government use of hazardous substances.

#### **Background/Rationale**

Collectively, state and local governments in the U.S. spent over \$385 billion on goods and services in 2000 (WDOE 2001, p. 7). This vast purchasing power holds tremendous potential to influence products offered in the marketplace, to stimulate the development of less hazardous alternative products and best management practices, and to increase

understanding and common acceptance that the risks posed by products and materials containing hazardous substances can and should be reduced.

Washington State government has already made great strides in purchasing and using environmentally preferable products, such as office paper that contains post-consumer recycled fibers and also is chlorine-free. This recommendation builds on and accelerates these efforts. It also helps to reach the goals developed in the Beyond Waste Plan for the Green Building, Organic Materials, and Industries Initiatives. Specifically, the campaign that the Industries Initiative recommends for the general government sector includes expanding environmentally preferable purchasing throughout state, local, and federal governments in Washington State. Additionally, Executive Order 02-03 directs state government agencies to implement sustainability practices, including environmentally preferable purchasing (Locke 2002). Finally, Executive Order 04-01 directs the Office of State Procurement to "make available for purchase and use by all state agencies equipment, supplies, and other products that do not contain persistent, toxic chemicals unless there is no feasible alternative" (Locke 2004).

### **Recommendation MRW8 - Ensure MRW and hazardous substances are managed according to hazards, toxicity and risk**

#### **Statement of Action**

Develop a long-term approach to evaluate and, if needed, modify environmental laws and regulations that govern MRW, looking into two main areas. First, consider a graduated regulatory system governing waste that is based less on quantity and more on other risk factors such as toxicity, mobility, persistence. These changes would be two-fold: to provide more incentive for the reduction of target risk factors, such as toxicity; and to ensure that wastes that exhibit these target risk factors are subject to the highest level of care the regulatory system affords, possibly regardless of quantity. Second, evaluate moving to a more comprehensive regulatory system that removes barriers and provides incentives to reduce the same target risk factors in hazardous substances and products that contain hazardous substances.

Over time, shift from a waste-centered regulatory perspective to a focus on hazardous substance use and handling in all processes and services, whether raw materials or wastes are used as feedstock. This approach changes the dynamic from pollution management to pollution prevention, and removes the artificial regulatory barrier between addressing hazards from wastes and hazards posed by management and use of raw materials. The transition to a regulatory framework based more on risks and toxicity represents a significant change and is likely to take many years to complete.

#### **Specific Steps**

- Evaluate the existing regulatory structure to identify strengths and successes.
- Building on the strengths of the existing system, develop a specific proposal for revising the state laws and regulations that directly govern solid wastes, including dangerous and extremely hazardous wastes.

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## Background Paper for Beyond Waste Summary Document

- Assess the need for and viability of changing other regulations and laws that affect hazardous substances (including those involving land use, such as fire codes, building codes, and zoning codes at the local government level).
- Develop a specific proposal for revising other laws, regulations, standards, and requirements that affect hazardous substances.
- Assess and revise requirements and guidelines that govern local jurisdiction hazardous waste plans to ensure that they incorporate and adequately plan for the risk-based regulatory system.
- As part of this effort, transition to a new term for the materials currently known as MRW, such as “local hazardous materials and wastes.”

### Background/Rationale

The evolution to a regulatory system based more on risk is a long-term endeavor that will entail multiple phases of transitions. For this reason, it is imperative that planning begin soon. This action will involve a working partnership group that includes key actors in both regulatory and regulated sectors. What is today classified as moderate-risk waste can sometimes be just as harmful as extremely hazardous or dangerous wastes. The regulatory assumption is that hazardous substances used by households or used in small volumes by businesses somehow pose lower threats to human health and the environment. While this may sometimes actually be the case, the assumption is invalid and the consequent regulatory exemptions afforded households and small quantity generators are not uniformly justifiable. Less risky wastes should be less regulated and more risky, toxic wastes should be more regulated regardless of quantity.

Ultimately, everyone’s objective should be for businesses and facilities in Washington to have little need for regulatory oversight. Today, when hazardous wastes are generated in larger quantities, there are more comprehensive and stringent management requirements and regulatory oversight. As businesses incorporate pollution prevention practices, several of them are able to ramp down to a lower level of regulatory oversight, such as changing from large-quantity hazardous waste generators to medium-quantity generators. Medium-quantity generators can become small-quantity generators, and many businesses and corporations are working toward “zero waste” goals that they have established.

While it will take time to restructure the existing regulatory system, a new structure based more on risk will actually provide important incentives for business and government to seriously reduce their use of hazardous substances and their generation of hazardous waste. This regulatory structure will provide for appropriate levels of requirements and oversight for the highest risks, which is as it should be. This will better protect public health and the environment and will also constitute a more efficient use of government regulatory resources.

In cooperation with local government, Ecology should consider establishing a land-use approach that would assist local governments in identifying high-risk industries (including recyclers and industrial users of MRW waste) and requiring that specific environmental protection measures be implemented before locating in an area, or requiring upgrades of existing facilities. An excellent example of this is the Clark County Groundwater Ordinance

model which requires strict controls on lands near groundwater well fields in an effort to prevent the release of hazardous substances from spills, leaks, or discharges (Clark, Chap. 13.70). An additional element of this approach could be provisions to protect sensitive areas from environmental hazards posed by industries. This siting approach would require that specific protective measures, such as structural containment or zero-discharge permits, would have to be in place before a high-risk industry could locate within a county. The overall objective would be to get such a program established in all counties to ensure a level playing field for businesses.

### **Recommendation MRW9 - Fully implement local hazardous waste plans**

#### **Statement of Action**

Ensure that all local jurisdictions have and continue to fully implement the five required elements of local hazardous waste plans.

#### **Specific Steps**

- Prepare a status report detailing the current status of implementation of hazardous waste plans statewide, including a statewide accounting of what has been implemented and accomplished.
- Develop a schedule and strategy for updating any out-of-date plans, and encourage integrated planning with local solid waste plans whenever possible.
- Project future infrastructure needs and use of the existing MRW collection infrastructure to support product stewardship and closed-loop recycling efforts.
- Revise the local hazardous waste planning guidelines to more completely reflect the Beyond Waste goals and vision for the future.
- Provide assistance to local jurisdictions for plan updates and implementation.
- Provide for regular review of the local hazardous waste programs.

A baseline needs to be established for the implementation status of the local MRW programs statewide. It has not been determined whether all local programs have met the original implementation intent of the statewide MRW management system. There are five required elements that must be implemented by every local planning area according to statute (RCW 70.105.220(8) (WDOE 1992, p. 17).

#### **Background/Rationale**

It is apparent that not all local jurisdictions have been able to fully implement their local hazardous waste plans. While every county has some level of HHW collection infrastructure available to their community, many counties have not taken the next step in providing the anticipated range of programs for their CESQG communities. This second half of the implementation of the local hazardous waste plans was to be accomplished at the same time the state and local governments were experiencing large drops in resources in the mid-1990s due to the loss of the Solid Waste Fee and other revenues.

The local hazardous waste programs are the baseline system for the other recommendations, above. This is analogous to the landfill facility being the basic infrastructure from which

higher waste management options are built. The local hazardous waste management system needs to be complete and functional in order to support the higher-order goals and recommendations.

In order to gauge where we are today, a statewide accounting of what has been accomplished and implemented based on the five common required elements for local hazardous waste programs needs to be performed (WDOE 1992, p. 17).

The five required implementation elements are:

1. Household and public education
2. HHW collection
3. CESQG technical assistance
4. CESQG collection assistance
5. Enforcement

Accomplishments and potential gaps or deficiencies need to be reviewed and addressed in a systematic process that levels the statewide playing field for local governments. In order to measure where we need to go next, it is necessary to find out what has been accomplished and where there may need to be supplemental baseline programs developed on a county-by-county basis. Local and state resources may be needed to create a relatively consistent local hazardous waste system. When this has been accomplished, the whole system needs to be supported on a continuing basis for as long as it is needed.

### **Recommendation MRW10 - Ensure facilities handling MRW are in compliance with environmental laws and regulations**

#### **Statement of Action**

Ensure that facilities handling hazardous residuals operate in compliance with environmental laws and regulations. This should include encouraging as much reuse and recycling of these materials as possible. This recommendation also involves evaluating the existing compliance strategy, and creating a plan for strengthening it.

#### **Specific Steps**

This recommendation involves a number of actions, including:

- Evaluate the effectiveness of the existing compliance strategy for facilities that handle moderate-risk wastes, including state-local agency partnerships, solid waste permitting delegation to local jurisdictional health authorities, technical assistance to facility operators, local hazardous waste plans, and grant funding for local jurisdictions. Include a review of reuse and recycling of MRW.
- Based on this evaluation, develop and implement a plan for strengthening the compliance strategy. This should include consideration of the following:
  1. Provide systems-wide technical assistance to facilities. (An example is Ecology's Technical Resources for Engineering Efficiency [TREE] program, offering technical assistance to small and mid-size businesses through research, process modeling and

engineering analysis. For more information, please visit the TREE Web site at <http://www.ecy.wa.gov/programs/hwtr/TREE/help.html>.)

2. Address the need for adequate financial assurance requirements for facilities and companies that handle hazardous substances
3. Increase Environmental Management Systems (EMS) principles for facilities that recycle or use MRW as feedstock for industrial processes. (Assess feasibility of legislative mandates and/or incentives.)
4. Ensure that compliance activities (permitting, enforcement, and assistance) are tied to and consistent with local hazardous waste plans.
5. Ensure that adequate local and/or state authority is in place to encourage recycling and reuse while maintaining protection of human health and the environment.
6. Provide for future regular evaluation and update of the compliance strategy, as needs will change over time, particularly when closed-loop recycling increases even more.

### **Background/Rationale**

The goal of this recommendation is to provide assurance that facilities handling moderate-risk waste residuals do not pose threats to human health and the environment and that they have adequate financial resources available to resolve any problems resulting from their operations. The current regulatory system of providing protection to human health and the environment is triggered only when a material becomes a "waste." The distinction between waste and product (or material) is artificial. As additional ways of reusing and recycling these materials continue to emerge, it is fundamental to have adequate controls in place to ensure responsible operation.

Compliance with environmental laws, and a focus on protecting human health and the environment while reducing waste disposal, is important, as Ecology has learned since the early days of waste management in this state. Uncontrolled landfill activity by industries at Western Processing, uncontrolled emissions at Cameron Yakima, and sudden economic failure of waste management at CleanCare (a treatment, storage and disposal (TSD) facility in Tacoma) were costly lessons. For example, removal of waste from the CleanCare site has cost over \$4.3 million in public monies to date (WDOE 2002, p. 3). Of the 105 hazardous waste management facilities operating in the state since 1980, 80 have some degree of cleanup obligation because of known or suspected contamination of soil and/or groundwater (WDOE 2002, p. 2).

These experiences point to the need to evaluate the effectiveness of the current system. Facilities that handle moderate-risk waste for treatment, storage or recycling, or that use waste for raw materials, pose a challenge for regulatory agencies in striking a balance between encouraging the use and reuse of wastes and the need for environmental controls. If we promote a closed-loop reuse and recycling system for hazardous materials that cannot be designed out of products and services, we must consider this issue.

An example of this difficulty is the used-oil industry. The re-refining of used lubricating oils back into lube stock is an admirable goal, and the technology exists to accomplish it. The costs of the equipment involved, the need for large quantities to make the initial investment

practical, and the fluctuating price of crude oil work against establishing a re-refinery in Washington State. Add to such considerations the need for regulatory controls requiring more capital investment (protections for soil, groundwater, and air) and the investment costs are higher.

Companies that fully implement EMS plans create working environments where pollution prevention becomes part of the company culture. Such companies, if fully committed to their EMS, put significant resources and energy into making environmental protection a priority. Emerald Services in Tacoma is an example of a hazardous waste recycler and TSD facility that is implementing an EMS.

Future strategies for facilities that treat, store, or recycle moderate-risk waste, and for industries that use waste as a substitute for raw materials, need to be designed to ensure compliance with environmental controls and at the same time do not discourage such activities altogether.

### Future Recommendations

In five years, an evaluation should be conducted to assess the progress made toward eliminating moderate-risk wastes and reducing their risks. The next phase of implementation for the moderate-risk waste action agenda should then be developed. The second phase of actions will include continuations and some expansions of activities conducted during the first five years, because many of the recommendations will take a long time to complete. As a part of that assessment, the additional recommended priority actions listed below should be considered and included, as appropriate, to make further progress toward the thirty-year goals.

- Based on assessments done in the first five years, develop specific plans and schedules for eliminating the next set of priority hazards (See Recommendation MRW1, above).
- If the second set of priorities includes lead, pharmaceuticals, or used oil, the following potential actions should be considered:

#### For lead

1. Consider a tariff or ban on imports of toys and china that contain lead.
2. Expand education to the public on hazards and sources of lead, especially related to children's health issues.
3. Education and partnerships with the following:
  - a) Pipe Fitters union on eradication of old plumbing containing lead.
  - b) Hobby industry (awareness).
  - c) Antique industry (awareness).
  - d) Furniture-refinishing industry (awareness).
  - e) Natural-food industry (awareness of lead in folk remedies).
  - f) HUD: on ensuring no lead paint/plumbing in low-income housing.

#### For pharmaceuticals

1. Research studies linking pharmaceutical residuals to human health, living resource health, wildlife health, and habitat/environmental issues.

2. Consider establishing a consortium to develop and implement a pharmaceutical take-back program that includes education to increase awareness and participation in the program.

### **For used oil**

1. Build on education programs that increase and improve proper used oil management and participation in collection programs.
2. Expansion of the used oil collection system for households.
3. Assess the benefits and feasibility of siting a used oil re-refinery in Washington.
4. Quantify and educate on the risks of burning adulterated used oil in space heaters (a widespread practice).
5. Provide technical assistance, education, and other tools to discourage mixing of used oil with hazardous waste.
6. Work toward removing contaminants from used oil so it is more amenable to re-refining into lube stock and emits fewer pollutants when burned.

## **Conclusion**

To date, enormous strides have been made in raising awareness about reducing the use of, and segregating, wastes that contain hazardous substances. Moderate-risk waste collection programs have served residents in every county. In addition to collecting these wastes from households, many of the programs also provide education and incentives for reducing the wastes. These programs and facilities are funded primarily through state and local government. Moreover, several jurisdictions have been incorporating programs aimed to recover and reduce special wastes that traditionally were not segregated, including fluorescent light tubes, mercury thermometers, and electronics.

Although large quantities of moderate-risk wastes are being segregated, collected, transported, and specially disposed of, this represents a small portion of the total that is actually being generated. At this point, it is virtually inconceivable that government funding could increase and be sustained at the level needed to collect most of these wastes, even if people were willing to segregate them. While the benefits of the present moderate-risk waste system can be debated, it is clear to most that the system is financially unsustainable for the long term and that an alternative approach is needed.

The obvious direction to pursue now is to work toward eliminating the hazards of these products, regardless of whether we are producing, using, recycling, or disposing of them. The products known as moderate-risk wastes directly affect every person in Washington. They pose a complex dilemma—how to maintain the benefits that we gain from their use, while eliminating the risks that come with those benefits. Because of this dichotomy and the vast numbers and volumes of these products, it is necessary to work on a few of them at a time in a comprehensive, and most importantly, a coordinated fashion.

Coordinated efforts need to focus on a few of the highest-priority substances at a time. This course of action will take time, will require intensive dedication and new partnerships, and

will involve a breadth of activities ranging from education and incentives to industry product stewardship partnerships and regulatory restructuring.

### **Implementation Plan for the Small-Volume Hazardous Materials Initiative**

The following table shows when the recommendations from this initiative will be undertaken. This table is an excerpt from the Beyond Waste Implementation Plan, which can be accessed at <http://www.ecy.wa.gov/biblio/0407034.html>

**Reducing Small-Volume Hazardous Materials and Wastes**

Recommendations to Begin in First Year	Approach for Implementation	Recommendations for Years 2-5
<p><b>MRW1 Prioritize substances to pursue</b></p> <ul style="list-style-type: none"> <li>In concert with IND3, workgroup will establish process for selecting future substances to prioritize.</li> </ul>	<p>Ecology will initiate this effort in close cooperation with local government, and several other entities.</p>	<p>MRW1. (Remainder) Select future priority substances</p>
<p><b>MRW2 Reduce threats from Mercury</b></p> <ul style="list-style-type: none"> <li>Education and technical assistance to businesses; develop and implement household and school education.</li> </ul>	<p>Ecology will initiate this effort in close cooperation with local government, and several other entities.</p>	<p>MRW5. Ensure proper use of pesticides, including effective alternatives</p>
<p><b>MRW3 Reduce threats from PBDEs</b></p> <ul style="list-style-type: none"> <li>Help implement PBDE Chemical Action Plan.</li> </ul>	<p>Ecology will initiate this effort in close cooperation with local government, and several other entities.</p>	<p>MRW8. (Remainder) Develop approach to address identified needs in environmental laws and regulations</p>
<p><b>MRW4 Develop an electronics product stewardship infrastructure</b></p> <ul style="list-style-type: none"> <li>Conduct study in accordance with ESHB 2488 and participate in national/regional dialogues.</li> </ul>	<p>Ecology will initiate this effort in close cooperation with local government, and several other entities. Ecology will work with national/regional product stewardship organizations and state SWAC on these efforts.</p>	
<p><b>MRW6 Reduce and manage all architectural paint wastes</b></p> <ul style="list-style-type: none"> <li>Continue participation in national Paint Dialogue; if not successful develop an alternative northwest approach.</li> </ul>	<p>Ecology will work with national/regional product stewardship organizations and state SWAC on these efforts.</p>	
<p><b>MRW7 Lead by example in State government</b></p> <ul style="list-style-type: none"> <li>Develop and implement environmentally preferable purchasing policies and promote to users of state contracts.</li> <li>Maximize use and purchase of environmentally preferable products and services in the following areas: automotive products, grounds maintenance, electronics, cleaning products and flame retardants.</li> </ul>	<p>Ecology will lead this effort at first, in close cooperation with GA, OFM and other entities.</p>	
<p><b>MRW8 Ensure MRW and hazardous substances are managed according to hazards, toxicity and risk</b></p> <ul style="list-style-type: none"> <li>Collect examples of problems and needs to address.</li> </ul>	<p>Ecology will lead regulatory review efforts in cooperation with local government and others.</p>	

## Background Paper for Beyond Waste Summary Document

Recommendations to Begin in First Year	Approach for Implementation	Recommendations for Years 2-5
<p><b>MRW9 Fully implement local hazardous waste plans</b></p> <ul style="list-style-type: none"> <li>• Provide assistance for MRW plan updates.</li> <li>• Produce status report of plans</li> <li>• Develop strategy for full implementation.</li> </ul>	<p>Ecology will coordinate these efforts in collaboration with local government.</p>	
<p><b>MRW10 Ensure facilities handling MRW are in compliance with environmental laws and regulations</b></p> <ul style="list-style-type: none"> <li>• Form partnership (Ecology, local govt. and TSDs) to evaluate the effectiveness of the existing compliance strategy (plans, grants, regulations, technical assistance).</li> <li>• Develop/implement a plan to strengthen compliance of TSDs, MRW recyclers, and other MRW facilities.</li> </ul>	<p>Ecology will lead this effort.</p>	

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