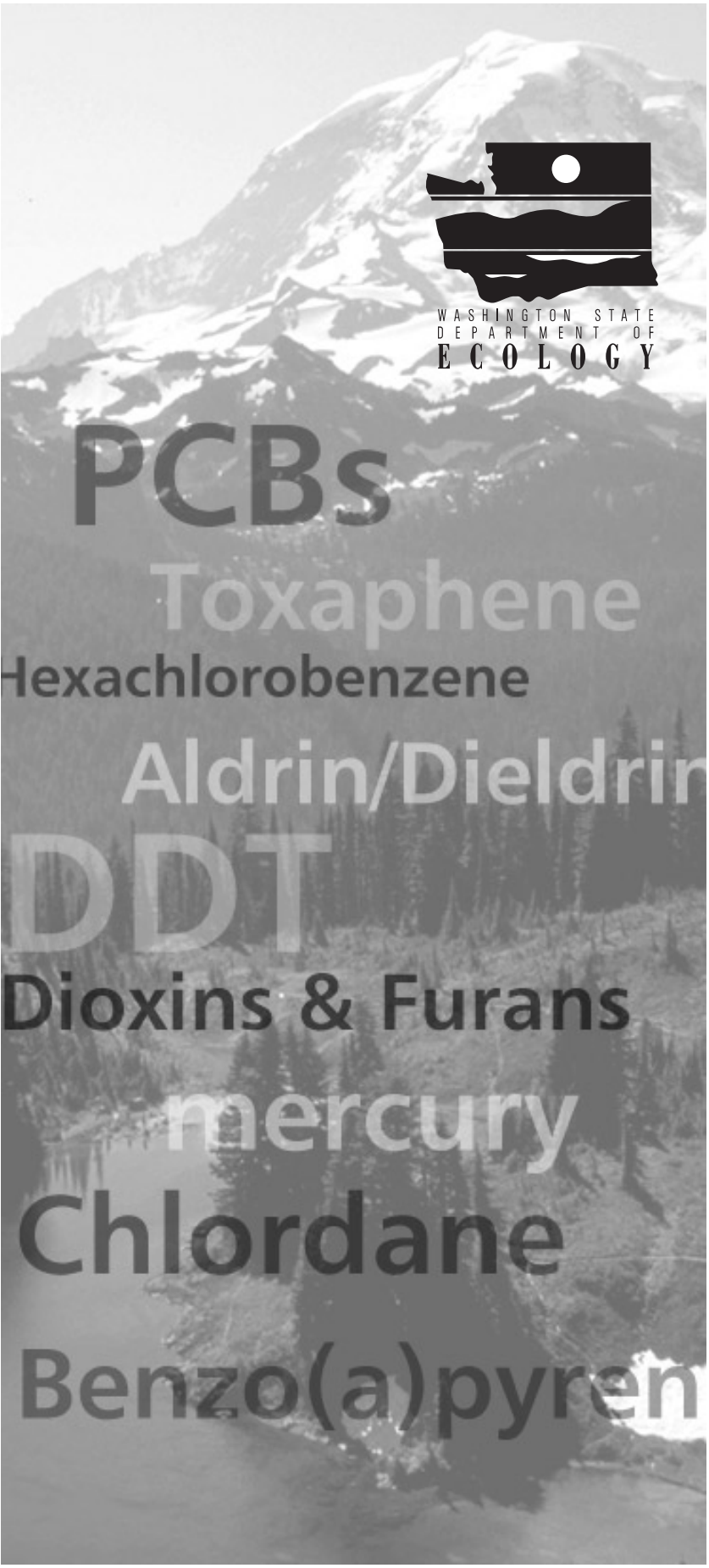

Draft Strategy to Continually Reduce Persistent, Bioaccumulative, Toxic Chemicals (PBTs) in Washington State

Publication #00-03-002

Draft Strategy
to Continually Reduce Persistent, Bioaccumulative, Toxic Chemicals (PBTs) in Washington State

By

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with contributions from the

Ecology PBT Technical Committee
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Persistent, Bioaccumulative, Toxic Chemicals: A Legacy We Can Do Without

"If policy-makers in the United States and Canada, including policy-makers in government, industry, and other walks of life, even slightly suspected that their child or grandchild might have learning difficulties, immune suppression, or reproductive deficiencies just because of what the policy-makers ate or where they lived or how they conducted their business, I am sure policy regarding the discharge of persistent substances would change immediately. I am convinced that this is true, but somehow that message is not being effectively communicated."

Gordon K. Durnil "The Making of a Conservative Environmentalist," p. 158

Durnil is the former United States Chairman of the International Joint Commission (1989-1994) and Indiana Republican Party State Chairman (1981-89).

Letter from the Director

I am pleased to provide you a draft strategy for how we want to address a distinct group of chemicals that threaten our health and the health of our environment. These chemicals are toxic, they last for a long time without breaking down into safer components, accumulate in our bodies and in the bodies of animals, and threaten the balance of an intricate and complex web of life. Thus, we refer to them as persistent, bioaccumulative, toxic chemicals (PBTs).

Every day we allow harmful chemicals to be discharged at low or non-detectable concentrations, expecting them to be diluted in the air or water. This treatment method is effective for many chemicals. However, chemicals that are persistent, bioaccumulative, and toxic slip through the safety net of this traditional dilution method. Even at very low discharge concentrations, they remain indefinitely in the environment. Because they tend to "stick" to organic material, they can accumulate in animals to higher and higher concentrations. As these same animals are eaten, the chemicals continue to accumulate and move through the food web.

PBTs are not just a problem for business and industry. Many of the everyday activities we do as individuals, such as driving cars, using wood stoves, using bleached paper products, and disposing of certain waste products and materials (e.g., fluorescent lights and household thermometers) factor into the equation. And even though a number of PBTs, such as DDT, toxaphene, and other pesticides have been banned for many years, they remain in the environment. In some cases, they're still being stored in our garages and sheds, where they are available for continued use.

Finding the solutions to our PBT problems will not be easy. It will take time, a concerted effort, and commitment by our state's residents to reduce and where possible, eliminate these chemicals from our environment. The challenge will be daunting, but is one we must tackle.

This proposed strategy will be controversial. Some believe we are going too far, while others believe we are not being bold enough. Ecology not only has the authority to address the environmental hazards posed by PBTs, we also have unequivocal mandate and responsibility to take action where human and environmental health are concerned.

But it's important that we tackle this issue in partnership with others, including our fellow state agencies and lawmakers, along with other states, the federal government and even other nations. Already, steps have been taken by the U.S. Environmental Protection Agency (EPA), Environment Canada, and the United Nations Environment Programme to address this challenge on the national and international levels. Likewise, the Department of Ecology will work closely with EPA to develop our own strategy. More importantly, I am asking for you to help us tailor our efforts, within our statutory framework, to specifically address the challenges facing the state of Washington.

We owe it to ourselves and to future generations to take deliberate steps now to reduce and where possible eliminate these chemicals from our environment and work to preserve the unique quality of life our state now enjoys. We can do no less. We invite you to join us in this effort.

Tom Fitzsimmons, Director
Washington State Department of Ecology
August 2000

Executive Summary

The Need for a Washington PBT Strategy

Persistent, bioaccumulative, toxic chemicals (PBTs) raise special challenges for our society and the environment because they share common properties:

- PBTs are durable and break down very slowly when released into the environment.
- Animals and people accumulate PBTs in their bodies, primarily from the food they eat. As these chemicals move up the food chain, they increase in concentration.
- Exposure to PBTs has been linked to a wide range of toxic effects in fish, wildlife, and humans, including effects on the nervous system, reproductive and developmental problems, immune-response suppression, cancer, and endocrine disruption.

In addition, some PBTs can be transported long distances on wind and water currents as air particulates or sediments.

A wide range of activities produces and releases PBTs into Washington's environment. These include highly visible sources (e.g., large industrial processes) that have been the traditional focus of pollution control strategies. However, there are also numerous other sources of PBTs that cumulatively may release an equal or greater amount of PBTs. Examples of these (often considered "non-point") sources are internal-combustion engines, various consumer products, and the past applications of agricultural and residential pesticides.

Releases from these sources (both ongoing and historical) have resulted in measurable levels of PBTs in the air, water, soils, and sediments throughout the state, as referenced by the state Department of Health's Fish and Shellfish Consumption Advisories and Washington's Clean Water Act Section 303(d) list *(See Appendices A and B)*.

State and federal regulatory programs have been in place for several years and have significantly reduced the uses, releases, and environmental concentrations of several PBTs. However, the present system is oriented toward implementing single-medium (air, land, or water-based) statutes that do not fully address the potential for the cross-media effects that PBTs present. The current, single-medium focus has produced a system that emphasizes treatment of pollution, rather than preventing pollution through process/product changes. Unfortunately, this contributes to PBT contamination because low levels of PBTs can escape detection and/or end-of-pipe treatment, and then can persist in the environment where they are able to accumulate in human and animal tissues to potentially harmful levels.

Members of the public and numerous public interest organizations have urged Ecology to take the lead on this issue. In addition, during the 2000 session of the Washington State Legislature, lawmakers adopted legislation directing Ecology to develop for review by the legislature: "…a proposed long-term strategy to address persistent, bioaccumulative, and toxic chemicals in the environment." The Department of Ecology is required to submit a proposed PBT strategy to the House Agriculture &

Ecology Committee and the Senate Environmental Quality & Water Resources Committee by December 30, 2000.

Vision and Goals of the Draft PBT Strategy

This draft strategy envisions continually reducing risks to human health and Washington's environment from exposures to PBTs, using the following goals:

- Reduce and phase-out existing sources of PBT chemicals.
- Clean up PBT chemicals from historical sources.
- Prevent new sources of PBT chemicals.
- Build partnerships to promote efforts to reduce and eliminate PBT chemicals.
- Ensure regulatory and non-regulatory approaches address cross-media (air, land, and water) impacts.
- Identify and prioritize additional PBT chemicals.
- Improve public awareness and understanding of PBT problems and solutions.
- Promote the development of information needed to make informed decisions on measures to reduce PBT chemicals.

Starter list of PBTs

- Aldrin/Dieldrin
- Benzo(a)pyrene
- Chlordane
- DDT (& DDD/DDE)
- Dioxins & Furans
- Hexachlorobenzene
- Mercury
- PCBs
- Toxaphene

Which PBT Chemicals will be the Initial Focus of this Strategy?

This draft strategy calls for focusing initial reduction efforts on the nine chemicals identified in the margin. This strategy includes a process for adding chemicals in the future (see figure 1).

Elements of the PBT Strategy

This draft strategy calls for reducing and, where possible, eliminating PBTs by the year 2020 through phasing out the use and production of these chemicals. Key actions include:

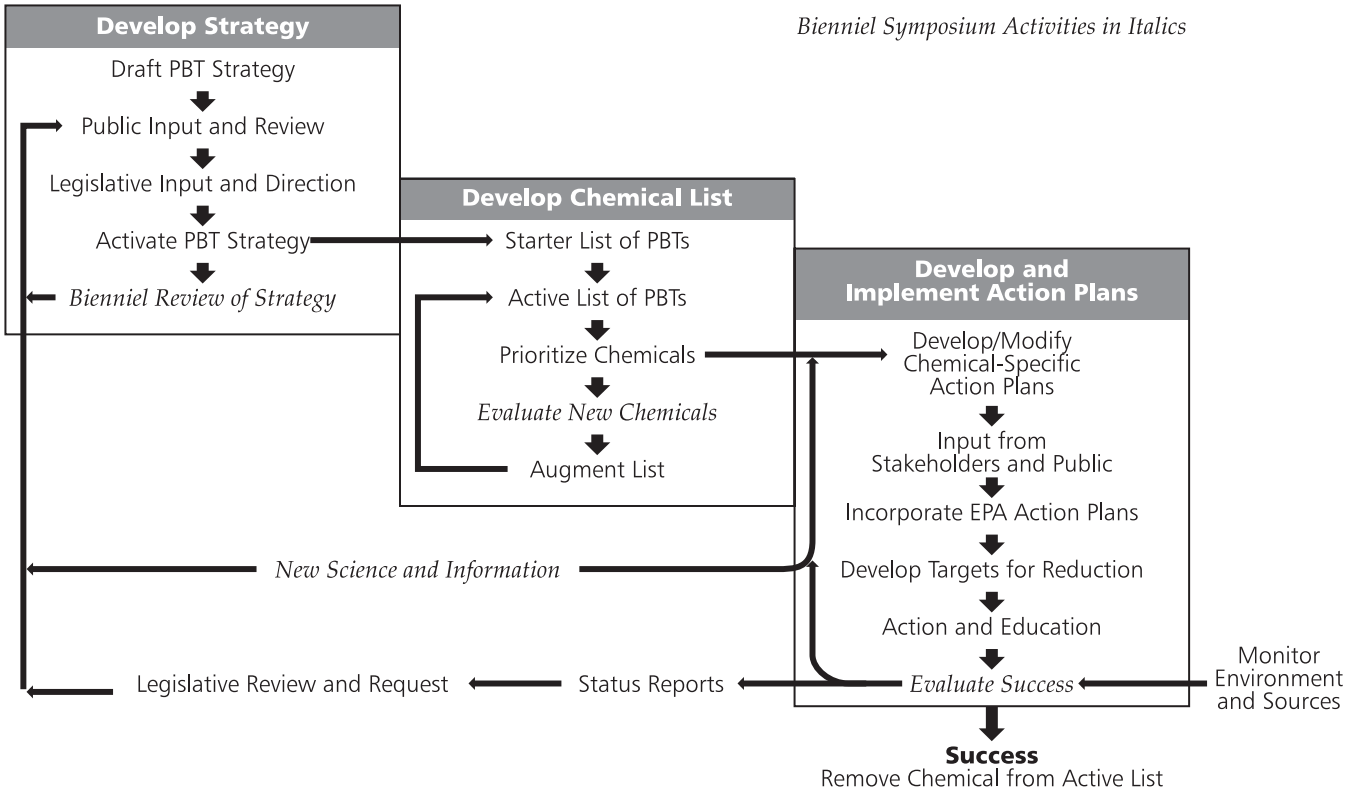
- Reduce and phase out existing sources of PBT chemicals.
- Clean up PBT chemicals from historical sources.
- Prevent new sources of PBT chemicals.

To achieve these actions over the next 20 years, the following steps or "building blocks" will need to be accomplished:

- Build partnerships to promote efforts to reduce and eliminate PBT chemicals.
- Ensure regulatory and non-regulatory approaches address cross-media (air, land, and water) impacts.
- Identify and prioritize additional PBT chemicals.
- Improve public awareness and understanding of PBT problems and solutions.
- Improve information needed to make informed decisions on measures to reduce PBT chemicals.

Figure "1" provides a description of how the proposed key actions and "building block" steps will work in unison over time.

Figure 1: Persistent, Bioaccumulative, and Toxic Chemical Strategy Implementation



Specific Activities

The Department of Ecology (Ecology) proposes to take the following actions during the current (1999-2001) and next (2001-03) bienniums to further implement this draft strategy. The first set of bulleted items would not require additional funding:

- Use the Environmental Protection Agency's (EPA) Waste Minimization Prioritization Tool (WMPT)* defining characteristics to add PBT chemicals in the future.
- Evaluate existing Ecology rules.
- Use the State Environmental Policy Act (SEPA)* process to ensure necessary public review and involvement.
- Coordinate among Ecology programs to ensure increased collaboration on cross-media effects.
- Work with EPA, other agencies, and interested parties.
- Continue to pursue grant opportunities from EPA.
- Coordinate existing indicators to track PBT-reduction successes and failures.

* *Please see the Glossary for more information.*

If funding is procured or additional resources become available, Ecology proposes to do the following, beginning July 1, 2001:

- Develop and implement chemical-specific action plans.
- Develop a public education program for PBTs.
- Provide grant opportunities for local governments to reduce PBTs.

"[Dr. Robin] Baird pointed out that the whales in the southern resident community have three to five times higher levels of polychlorinated biphenyls, or PCBs, than the northern residents, which live in the less polluted areas of Northern British Columbia and Alaska."

ABC News

"These killer whales can now be considered among the most contaminated marine mammals in the world."

Dr. Peter Ross, Institute of Ocean Sciences

- Coordinate with other Washington state agencies to identify and track PBT uses and reduction needs.
- Develop and implement a PBT Baseline Monitoring Program.
- Convene a biannual (every other year) symposium, starting in fall 2001.
- Establish new, measurable indicators to track PBT-reduction successes and failures.

Measuring Progress

To evaluate the overall success of this strategy in reducing PBT uses, releases and environmental concentrations, Ecology proposes to initially quantify and track the following measures:

- Number of pounds of PBTs released annually into Washington's environment, using EPA's Toxics Release Inventory.
- Number of hazardous-waste sites cleaned up where PBTs are known to be present.
- Number of PBT-contaminated waterway segments listed as impaired water bodies.
- Continued reduction of PBT concentrations recorded in the sediments deposited in key water bodies throughout the state.
- Continued reduction of PBT concentrations found in fish and shellfish in waters with consumption advisories. In addition, Ecology will establish meaningful performance measures to judge progress toward phasing out PBTs.

Ecology also proposes to establish a baseline monitoring program that will be used in combination with existing monitoring and reporting programs to measure progress in reducing PBT chemicals.

Next Steps

The Department of Ecology will hold a series of public meetings during the summer and fall of 2000 to discuss this draft PBT strategy. People who are interested in providing comments are encouraged to attend one or more of the meetings — planned for Bellingham, Seattle, Spokane, Vancouver and Kennewick. In addition or as an alternative, individuals and organizations may submit comments directly to Ecology via letter or e-mail by October 30, 2000.

Ecology staff will meet with small groups or organizations that are interested in the PBT strategy. These meetings will provide opportunities for more-focused discussions on specific issues and concerns important to those groups.

Ecology will review and evaluate all written and verbal comments and prepare responses describing how the department intends to address issues and concerns. Then, the proposed PBT Strategy will be submitted to the state Legislature by December 30, 2000.

Depending on legislative action in the 2001 session, Ecology will either proceed with the full proposed strategy or continue to work with EPA and its National PBT Strategy.

Introduction

What are Persistent, Bioaccumulative, Toxic Chemicals?

These are chemicals and/or pollutants that:

- remain in the environment for a long time (persist) without breaking down;
- accumulate in the environment and build up in the tissues of humans, fish and animals ("bioaccumulative"); and
- are toxic (causing cancer and other health problems) to living organisms, including humans.

The Department of Ecology (Ecology) is interested in these chemicals and pollutants because they act very differently than most chemicals we currently regulate. Unlike other chemicals we release into the environment, these do not dissipate or break down over time. They may even go undetected because the quantities are so small, yet they can build up to harmful levels in humans and the environment.

Over the years, huge strides have been made to reduce our exposure to these chemicals and to remove them from our environment. In the past 10 to 20 years, Washington's waters have become cleaner, our air clearer, and our land less polluted.

At the same time, our technology also has changed. So have the ways we operate our businesses, the distance we drive to work, and the products we purchase. We all contribute to the health – or "un-health" — of our environment, which is why we are interested in persistent, bioaccumulative, toxic chemicals.

Already, there are many state and federal regulations in place to help clean up areas where these and other types of contamination are found. But the way we approach these contaminants needs to change if we are to continue to provide a safe and healthy environment for the people of the state of Washington.

We can't do this alone. We need to work with the public, the business community and other agencies to find solutions so we can address these chemicals while meeting the needs of a changing society.

Background

In August 1998, the Department of Ecology (Ecology) released a Dioxin Source Assessment and announced plans to develop a long-term strategy to reduce and eliminate certain chemicals that accumulate in human and animal tissues.

As a starting point, Ecology proposed focusing on chemicals identified by the Province of Ontario's Ministry of Environment. Public comments on that proposal in early 1999 ranged from concerns about the applicability of the "Ontario List" for this state to questions about which pollutants to include or exclude from the list. Since then, Ecology has evaluated available information on defining characteristics of PBTs to use in developing a targeted list of chemicals for use in Washington State.

Based on that evaluation, Ecology is proposing to focus efforts on chemicals that have been: (1) identified in EPA's National PBT Strategy, (2) found in Washington, and (3) used or produced in this state.

Purpose of the Draft PBT Strategy

"In general, a strict prevention strategy means not using dangerous substances or their precursors since human factors can lead to accidental releases, or the processes cannot be completely controlled."

Geoffrey Thornburn, *International Joint Commission*

The mission of the Department of Ecology is to protect, preserve and enhance Washington's environment, and to promote the wise management of our air, land and water for the benefit of current and future generations. This mission reflects the goals and aspirations of Washington citizens, as expressed by the Washington State Legislature and voters themselves over the last 30 years. The department believes that reducing and phasing out PBT chemicals is consistent with Washington's environmental and health laws.

Identifying sustainable solutions to the problems posed by PBTs will require significant changes in the way we currently address these chemicals. While Ecology believes it must provide leadership on meeting those challenges, the department cannot unilaterally bring about all of the changes needed to reduce and eliminate PBTs. For example, Ecology does not regulate use or registration of pesticides applied to land, nor does it regulate chemicals used in most products purchased in Washington. For this endeavor to be successful, there must be partnerships among all affected agencies, interest groups, and citizens to bring about change.

Ecology believes this document will be useful only if it encourages discussion on key issues and inspires reduction efforts by citizens, businesses, and government agencies. This draft has been organized to achieve the following purposes:

- Describe the broad outlines of a long-term strategy to reduce and eliminate PBTs.
- Promote dialogue and debate on key environmental and economic issues associated with implementing a long-term strategy.
- Describe the process Ecology intends to use to prepare a revised strategy for discussion in the 2001 legislative session.
- Introduce an initial list of PBT chemicals for action in Washington state.

How can you be involved? Read this proposed strategy. The Next Steps section of this document focuses on the public comment process for this draft strategy, how long the comment period will last, who to submit comments to, and what will be submitted to the legislature at the end of the year per legislative direction. We welcome your comments and suggestions.

Need for a Washington PBT Strategy

Persistent, bioaccumulative, toxic chemicals (PBTs) are of concern to the Washington State Department of Ecology (Ecology) because of mounting evidence that PBTs cause long-term harm to human health and the environment.

A wide range of activities produce and release PBTs into Washington's environment. These include highly visible sources (e.g., large industrial processes) that have been the traditional focus of pollution control strategies. However, there are also numerous smaller sources of PBTs that cumulatively may release an equal or greater amount of PBTs. Examples of these smaller (and often "non-point") sources include automobiles, consumer products, and agricultural and home-use pesticides.

Although many chemicals can have toxic effects on humans and the environment, PBTs pose a regulatory challenge primarily because of their unique properties. When non-PBT chemicals are released into the environment under permit, the concentration of the chemicals decrease or dilute as they move away from the original source and are dispersed. They may also break down due to reactions with other chemicals or exposure to sunlight. By the time an individual may be exposed to the chemicals, the concentration is so diluted that it is well below any health concern.

PBT chemicals do not break down or react with other chemicals as easily as other chemicals (e.g., they are *persistent*). They also adhere to fatty tissues in living organisms. These two properties prevent PBTs from diluting as they move away from a source. In many cases, their concentration can actually increase in the environment. As PBTs are passed "up the food chain," their concentrations can also increase as they accumulate in fatty tissues of animals such as fish, poultry, and cows. This concept is illustrated in Figure 2.

Releases from these sources (both ongoing and historical) have resulted in measurable levels of PBTs in the air, water, soils, and sediments throughout Washington. For example, many PBT chemicals have accumulated in state waters, sediments and fish tissue to levels that require Ecology and the federal Environmental Protection Agency (EPA) to clean up these waters and prevent further degradation.

While scientists have yet to fully understand the long-term health effects associated with current levels of contamination, there is a growing body of scientific evidence supporting the need to take actions to reduce and, where possible, eliminate exposures to PBTs. For example, scientists have associated individual persistent, bioaccumulative, toxic chemicals with a wide range of adverse effects in animals in natural and laboratory situations. These include behavioral changes, mortality, reproductive failure, eggshell thinning, developmental abnormalities, impaired growth and development, altered blood chemistry, an increased rate of disease outbreaks, organ and central-nervous-system damage, and impaired immune-system response (Gilbertson, et al. 1991; Fox, 1992; Leatherland, 1992;

Variety of PBT Sources

Dioxins & Furans – pentachlorophenol-treated wood, municipal- and medical-waste incinerators, forest fires, cement kilns, coal burning, residential and industrial wood burning, residential waste burning, diesel and gasoline fuel combustion, bleached-chemical wood pulp and paper mills.

Mercury – Coal-fired power plants; disposal of fluorescent lamps, thermometers, thermostats, manometers, and switches; medical-waste incinerators.

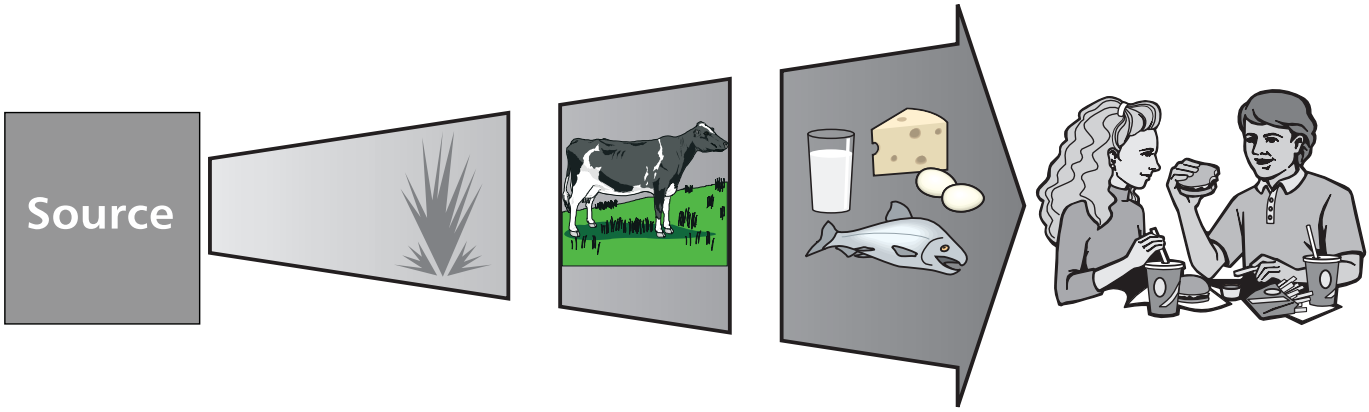
PCBs - Disposal of fluorescent lamp ballasts, older televisions, appliances, transformers, capacitors.

Benzo(a)pyrene - internal combustion engines (cars, buses, trucks, water craft, gasoline-powered lawn equipment), used motor oils, forest fires, residential wood and waste burning, residential and commercial cooking of meat products.

Hexachlorobenzene - Previously used as a pesticide. Currently manufactured as a by-product or impurity in the production of chlorinated solvents, pesticides and in other chlorination processes.

Aldrin/Dieldrin, Chlordane, DDT, Toxaphene - Former widely used pesticides, now banned for use in the U.S. Residual levels still present in soils, sediments, water, and fish tissue.

Figure 2: As PBTs move up the food chain, their concentrations can increase



Tillett et al. 1992, 1993; Anthony et al. 1993; Henny et al. 1996; U.S. Environmental Protection Agency 1997). Potential effects on human health involve the nervous system, reproductive and developmental problems, immune-response suppression, and cancer (USEPA, 1997; USEPA, 2000). Particular risks may be posed to a developing fetus or young child where important organs, such as the central nervous systems, are still under development (USEPA, 1997). Animals and people who eat large amounts of fish from contaminated areas are likely to be exposed to these chemicals at higher-than-average levels.

Ecology and other agencies currently implement a wide range of environmental programs to protect human health and the environment. These programs have been in place for many years and have produced significant reductions in the uses, releases, and environmental concentrations of several PBTs.

- Ecology and EPA have established pollution-control sources for all of the large to medium-sized industrial operations in Washington state. This has significantly reduced the amount of contaminants (including PBT chemicals) released to Washington's environment.

- Steps are being taken around the state to clean up contaminated sites. Nearly half (3,757) of these known sites have been cleaned up in the past decade. Many remaining cleanups still need to be completed, including sites with PBT chemicals.

- The federal Environmental Protection Agency and the Washington Department of Agriculture have limited and/or banned the use of high-risk pesticides, significantly reducing environmental concentrations in several cases. For example, DDT in body fat declined by almost 80 percent between 1970 and 1983 after EPA banned agricultural uses of the pesticide (Ecology, 1992). However, DDT levels in some Washigton waterbodies continue to exceed EPA water quality criteria due to historical practices (See Appendix B).

- Ecology and other state and federal agencies operate several monitoring programs to assess environmental conditions and evaluate the effectiveness of reduction efforts

Significant strides have been made to reduce and clean up pollution of PBT chemicals. Yet, new and growing information is showing that PBT chemicals remain in our environment and may pose a greater threat to our health and quality of life than previously believed. As Washington enters the 21st century, further progress on reducing and eliminating PBT chemicals needs to be made by changing how we do business and in some of our day-to-day activities. A strategy is needed to make these changes and achieve further reductions in PBT chemical uses and releases. The strategy also is needed to address the unique environmental and institutional problems posed by these chemicals.

In November 1998, EPA issued a draft National PBT Strategy and accepted public comment on it in 1999. EPA identified the need for a strategy as a way for "EPA to harness all of its agency's tools — voluntary, regulatory, international, enforcement, compliance, and research — and direct them at a set of priority pollutants of common concern to all EPA program offices." More information about EPA's national PBT strategy can be found at *www.epa.gov/pbt* or by calling the Pollution Prevention Information Clearinghouse at (202) 260-1023.

"With evidence of long-range transport of these substances to remote regions and the consequent threats they pose, many countries recognize that cooperative actions for the sound management of these substances are needed."

Dr. Andrew Gilman,
Health Canada

Breaking down barriers to further progress in reducing PBT chemicals

- **Cross-media focus for all environmental statutes:** Our present regulatory systems are oriented toward implementing laws that do not fully address the potential for cross-media transfer of chemicals after they are released. We need to pay more attention to what's going on collectively with the land, air, water, and sediments.

- **More emphasis on pollution prevention:** The current, single-media focus has produced a system that emphasizes treating pollution rather than preventing it from being generated. PBTs are a special problem because the initial release of these chemicals may be so small that we may not be able to measure or detect them until they've reached harmful levels. We need to focus efforts on preventing production of these chemicals.

- **Better methods to address all sources of pollution:** Our focus largely has been on large producers or dischargers of toxics, on regulating these chemicals in discharges, and focusing on large clean-up sites. This approach has been effective, but many sources still remain. We need to find ways to address all pollution sources, even ones that come from individual and "non-point" sources.

- **Better information:** Agencies, businesses, and individuals currently lack information (e.g., scientific, technical, economic, and environmental) needed to identify and implement sustainable measures to reduce and/or prevent PBT chemical uses, releases and/or exposures. We need to work in partnership with other entities to generate this information and make it available, so we can reduce and even prevent exposure to PBT chemicals and releases.

- **Precautionary approaches for addressing PBT chemicals:** Most regulatory programs currently embody approaches that require agencies to quantify the problems caused by low levels of toxic chemicals before taking action to prevent those effects. Consequently, reasonable preventive measures are often delayed when scientists are unable to precisely define all of the complex interactions between toxic releases and environmental damage. More precautionary approaches are needed to prevent the environmental harm associated with PBT chemicals.

- **More awareness and understanding of the problems and solutions:** Most people are unaware of how day-to-day activities generate or release PBT chemicals. PBTs come from activities that we all participate in every day, like driving a car or spilling oil on the road. We need to find a way to provide accessible public education so people can see how these everyday activities contribute PBTs in the environment, and what they can do to prevent it.

- **Integrate economic and environmental goals:** Our current regulations fail to systematically integrate economic and environmental goals. This approach leads to less integrated decision-making, and hinders our ability to regulate production and releases of PBT chemicals. Additionally, many of the PBT chemicals released into our environment come from daily activities we've become accustomed to and even rely on. We will all need to make intentional shifts in activities and even in the products we purchase.

Priority PBT Pollutants Identified by the U.S. Environmental Protection Agency

- Aldrin/Dieldrin
- Benzo(a)pyrene
- Chlordane
- DDT (and DDE, DDD)
- Hexachlorobenzene
- Alkyl-lead
- Mercury & compounds
- Mirex
- Octachlorostyrene
- PCBs
- Dioxins & Furans
- Toxaphene

EPA's national strategy to develop and implement PBT chemical action plans

In November 1998, the U.S. Environmental Protection Agency (EPA) announced a national strategy to address PBTs, the Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic (PBT) Pollutants. The EPA strategy has four main elements:

- Develop and implement national action plans to reduce priority pollutants, using the full range of EPA tools.
- Continue to screen and select more priority PBTs for action.
- Prevent new PBTs from entering the marketplace.
- Measure progress of these actions against the Government Performance and Results Act (GPRA) goals and national commitments.

The EPA has identified 12 Priority PBT Pollutants for its initial focus strategy and is developing national action plans for each of the pollutants. Each action plan is expected to provide background information on the pollutant, identify ongoing sources, identify actions to reduce or eliminate those sources, and identify measures for evaluating the success of those actions.

The Washington State Department of Ecology has reviewed and commented on EPA's national action plans. Ecology proposes to develop chemical action plans to address chemicals specific to Washington state. We also will coordinate with bordering states and provinces on issues related to PBTs.

Vision, Goals and Guiding Principles

This strategy expresses the intent of the Department of Ecology to change the way we look at PBT chemicals, including how we reduce their presence and potential harm. This is crucial in order to keep stride with the technological changes around us. This strategy is intended to challenge our thinking and modify the way we do business.

Vision of Change

Current Situation		Future
❍ Unacceptable levels of PBTs in the environment	→	❍ Steadily declining environmental levels
❍ Manage PBT chemical uses and releases	→	❍ PBT uses and releases have been phased out/prevented
❍ Heavy reliance on end-of-pipe treatment	→	❍ Sustainable operations with "life-cycle" practices
❍ Single-medium decisions (air, land, water and biota** separately)	→	❍ Multi-media decisions (air, land, water, and biota** combined)
❍ Heavy reliance on risk assessment	→	❍ Precautionary approaches for addressing PBTs
❍ Command-and-control approach, focused on medium-to-large industrial facilities	→	❍ Integrated approach (rules, incentives & information) for all sources of PBT chemicals
❍ Limited public awareness of PBT problems & solutions	→	❍ Public understands problems posed by PBT chemicals and is a full participant in solutions
❍ Large gaps in information needed to make informed decisions on measures to reduce PBT chemicals	→	❍ Information available to make informed decisions on measures to reduce & prevent PBT chemicals
❍ Healthy Washington economy	→	❍ Healthy and sustainable Washington economy and quality of life for all generations
❍ Lack of integrated economic and environmental goals	→	❍ Approaches to reduce/eliminate PBTs are effectively linked with Washington transportation, agricultural, energy, and economic strategies.

*** Biota: animal and plant life in a region.*

"In summary, large numbers of chemicals are widely used in consumer products and regularly discharged to the environment, resulting in widespread exposures. Our limited understanding of their full neurotoxic potential, has one particularly unsettling implication: What we already know about neuro-developmental toxic threats to children is likely to be only the tip of the iceberg."

In Harm's Way: Toxic Threats to Child Development, Greater Boston Physicians for Social Responsibility

Goals

To promote and sustain a healthy environment supporting human populations and ecosystems. This can happen if we:

- Reduce and phase out existing sources of PBT chemicals.
- Clean up PBT chemicals from historical sources.
- Prevent new sources of PBT chemicals.
- Build partnerships to promote reducing and eliminating PBT chemicals.
- Improve regulatory and non-regulatory approaches.
- Identify and prioritize additional PBT chemicals.
- Improve public awareness and understanding of PBT problems and solutions.
- Promote the development of information needed to make informed decisions on measures to reduce PBT chemicals.

Guiding Principles

- PBTs in the environment are a societal problem that consumers, agricultural sectors, businesses and industries, government agencies, transportation sectors, and utilities all contribute to, and must work together to solve.
- Strategies to phase out current uses and production of PBTs need to be sustainable and should be integrated with Washington's transportation, agricultural, energy, and economic plans.
- Meeting the needs of the present should not compromise the ability of future generations to meet their own needs. Individuals and organizations should take full responsibility for the environmental, economic, and social consequences of their actions.
- Regulatory agencies and programs working together can promote pollution prevention and multi-media approaches that consider emissions to air, discharges to water, and solid wastes.
- Long-term success depends on having a knowledgeable public with access to high-quality information about problems and solutions.
- Open public processes are important to implementing this strategy. We value meaningful opportunities for individuals, business, and communities to participate in decisions that affect them.
- Collaboration will be needed among all sectors and interest groups, as well as local, state, provincial, tribal, national, and appropriate foreign governments.
- Realistic transition periods, where necessary, are needed to effectively phase out existing products and technologies and phase in new products and technologies.
- Sound science and public-policy principles need to be used to develop and implement the PBT Strategy. Lack of scientific certainty should not delay reasonable measures to prevent environmental harm.
- Strategies to phase out PBTs need to be designed and implemented in ways that reduce disparities in environmental risk from one community or population to another (environmental justice).

Statutory Foundation for Washington's PBT Strategy

The Department of Ecology's statutory framework consists of laws that establish responsibilities and authorities for protecting human health and the environment. An approach to successfully reduce and, where possible, eliminate PBTs requires an innovative blend of these legal mandates and procedures to effectively integrate air, water, and waste requirements. Consequently, the foundation for the proposed PBT strategy is derived from state laws. These include:

- Washington Clean Air Act (Chapter 70.94 RCW)
- Water Pollution Control Act (Chapter 90.48 RCW)
- Pollution Disclosure Act of 1971 (Chapter 90.52)
- Hazardous Waste Management Act (Chapter 70.105 RCW)
- Pollution Prevention Planning Act (Chapter 70.95C RCW)
- Solid Waste Management Act (Chapter 70.105 RCW)
- Model Toxics Control Act (Chapter 70.105D RCW)
- State Environmental Policy Act (Chapter 43.21C RCW)
- Worker and Community Right to Know Act (Chapter 49.70 RCW)

These laws and the regulations derived from them, provide a sound basis for developing and implementing a comprehensive approach for addressing PBT chemicals. Amendments to individual statutes may be needed to implement specific elements of the strategy. As part of the effort to implement a final strategy, Ecology proposes to review key statutes and regulations to identify potential gaps (if any) and then work with the Governor's Office and the Legislature to develop solutions.

"Most environmental laws in the U.S. seek to control only the release of potentially dangerous wastes into the air and water, not the amount of contact people actually have with those pollutants… The result was that officials often focused on limiting pollution from the most important sources, such as automobiles and factories, while failing to address many other important but less obvious ones."

Wayne R. Ott and
John W. Roberts, Scientific American, November 1, 1999

Elements of the PBT Strategy

Elements of this PBT strategy include steps to address and meet each of the goals listed above. These elements include the following eight activities:

Strategic Framework

Actions to Reduce/Phase-out PBT Chemicals

- Phase out existing sources of PBT chemicals
- Clean up PBT chemicals
- Prevent new sources of PBT chemicals

Building Blocks for Success

- Build partnerships to promote efforts to reduce and eliminate PBT Chemicals
- Improve regulatory and non-regulatory approaches
- Identify and prioritize additional PBT chemicals
- Improve public awareness and understanding of PBT problems and solutions
- Improve information needed to make informed decisions on measures to reduce PBT chemicals

Actions to Reduce and Phase Out PBT Chemicals

1. Phase Out Existing Sources of PBT Chemicals

Federal and state regulatory programs have been in place for many years and have produced significant reductions in PBT chemical uses and releases from existing sources. Further reductions from existing sources are needed to prevent additional accumulation of these chemicals. Ecology's long-term goal is to reduce and, where possible, phase out current uses and production of these chemicals. The following measures are designed to meet this goal.

- *Develop and implement PBT chemical action plans.* Ecology proposes to develop and implement chemical-specific action plans for reducing and phasing out existing sources of PBT chemicals in Washington. The plans will build upon information and measures included in the national action plans prepared by the Environmental Protection Agency. Ecology intends to use a four-step process for preparing individual plans that is modeled upon the approach described in the Great Lakes Binational Toxics Strategy:

  — Compile information on sources and uses of each PBT chemical;

  — Analyze regulatory and non-regulatory mechanisms that affect current uses, releases, and management of PBT chemicals;

  — Identify cost-effective measures to achieve further reductions in PBT chemical sources and uses; and

  — Identify and implement regulatory and non-regulatory approaches to require and/or foster further reductions in PBT chemical sources and uses.

❍ *Phase out PBT chemicals in Washington.* A wide range of PBT chemicals are used and generated in this state. Sources include both large industrial processes and non-point origins (e.g., internal combustion engines, various consumer products, and the past applications of agricultural and residential pesticides). Examples of regulatory and non-regulatory approaches to require and/or foster further reductions in PBT chemical sources and uses:

— Identify and implement pollution prevention measures.

— Revise environmental standards.

— Lower emission limits.

— Develop operating restrictions/requirements.

— Restrict product content or uses.

— Require product labeling.

— Develop economic incentives.

— Update monitoring/reporting requirements.

— Promote energy conservation measures.

2. Clean Up PBT Chemicals

Ongoing and historic activities have created two distinctly different types of PBT chemical problems in Washington. One includes localized areas with high concentrations of PBT chemicals resulting from past operations and/or waste disposal. The other type includes large areas of low-level contamination resulting from the gradual migration and buildup of PBT chemicals in areas beyond the original source or waste-disposal boundaries (e.g., area-wide contamination). Many of these contamination problems are currently being investigated and cleaned up under the state Model Toxics Control Act (MTCA), the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and other state and federal programs. Ecology proposes the following measures to enhance current efforts to cleanup PBT chemicals.

❍ *Increase focus on PBT chemicals found at contaminated sites.* Ecology is proposing to give increased focus to sites that are known to be contaminated with PBT chemicals. Ecology also plans to take several steps to improve the agency's ability to address these types of problems:

— Develop clear technical approaches and policies needed to establish cleanup requirements for individual sites.

— Enhance the agency's geographic information system (GIS) capabilities to better support site-cleanup decision-making.

— Integrate cleanup measures for area-wide contamination problems with local land-use planning and permitting processes.

❍ *Enhance efforts to clean up mercury and other PBT chemicals at abandoned mining sites.* There are an estimated 3,500 abandoned mines in Washington. Available information shows that many of the state's watersheds have been contaminated by releases of mercury and other metals from these sites. Ecology plans to work with other agencies to identify abandoned mining sites, to evaluate the potential for releases of PBT chemicals and other hazardous substances, to take interim measures to prevent releases into downstream watersheds, and to oversee cleanup activities.

Washington Chemical-Specific Action Plans will contain:

✹ Current and historical use(s) of the chemical.

✹ Environmental effects.

✹ PBT emissions in Washington state.

✹ Potential exposure routes and health effects.

✹ Sources and sectors where the chemical is used.

✹ Sensitive sub-populations within geographic areas of use.

✹ Current regulations and programs in Washington affecting the chemical

✹ Goals and steps to reduce and, where possible, eliminate the chemical over time.

✹ Performance and completion schedules.

Examples of Potential Measures to Prevent Uses and Releases of PBT Chemicals

- Emission-based fees.
- Revenue-neutral tax shifts to encourage pollution prevention.
- Record-keeping/reporting requirements.
- Eliminate mixing zones for PBT chemicals for new sources (similar to the Great Lakes PBT Strategy).
- Reduce ASILs (Acceptable Source Impact Limit) for PBT chemicals to zero.
- Review/implement available pollution prevention measures.

- *Enhance efforts to clean up sediment contamination problems.* Ecology has identified more than 100 sites with sediments that are contaminated with PCBs, mercury and other PBT chemicals. The agency plans to place greater emphasis on establishing site-specific sediment-cleanup requirements to prevent harm to human health and the environment associated with the accumulation of PBT chemicals in the aquatic food web. Ecology also plans to better integrate sediment cleanup measures with source controls, dredging, and habitat protection projects through a variety of mechanisms, including bay-wide planning and water cleanup plans (total maximum daily loads, or TMDLs).

3. Prevent New Sources of PBT Chemicals

Regulatory policies and processes by state agencies should encourage the development of new and cleaner facilities, processes, and products that could replace current sources of PBT chemicals. In addition, they should be designed to minimize or prevent additions to the existing environmental burden of PBT chemicals in Washington. The following proposed measures are designed to navigate a path to achieve both.

- *Enhance efforts to prevent the use and release of PBT chemicals from new industrial and commercial sources.* Ecology and local air authorities currently review and establish requirements for new sources of air and water pollution. Ecology has identified several ways that current programs could be enhanced to prevent the use and release of PBT chemicals from new industrial and commercial facilities:

  — Create incentives/reduce barriers.

  — Revise regulations.

  — Provide information and technical assistance.

- *Work with EPA and the state Department of Agriculture to prevent registration of new pesticides that display PBT characteristics.* The federal Food Quality Protection Act of 1996 directs EPA to review current pesticide uses and tolerance levels for various food crops. Tolerances for several pesticides (e.g., chloropyifos) have been and/or are expected to be lowered or revoked by EPA. If a tolerance is revoked for a particular food crop, that pesticide can no longer be used on that crop. The Department of Ecology will coordinate with Department of Agriculture to ensure that substitutes for such pesticides do not exhibit PBT characteristics.

➲ *Encourage extended product responsibility for new sources and products.* The President's Council on Sustainable Development (1996) concluded that greater progress on resource conservation and pollution prevention can be achieved by adopting a "life cycle," or "extended product responsibility," approach. The council recommended adopting a voluntary system that ensures responsibility for environmental effects throughout a product's life-cycle by all those involved in the life cycle (e.g., designers, suppliers, manufacturers, distributors, users, and disposers). The Ecology Department plans to follow the council's recommended process to evaluate and, where appropriate, use this concept to encourage measures to prevent new uses and releases of PBT chemicals. Other concepts include:

— Form private/public partnerships to develop voluntary demonstration projects.

— Evaluate demonstration projects.

— Develop and adopt policies and practices that have been successfully demonstrated.

Building Blocks for Success

4. Build partnerships to promote efforts to reduce and eliminate PBTs

The Department of Ecology has researched other regional, national, and international initiatives and strategies. The resulting proposed strategy is based on EPA's PBT strategy, but is tailored to Washington's needs. Ecology's goal is to build and strengthen partnerships that promote efforts to reduce and eliminate PBT chemicals by:

➲ *Build upon existing partnerships with the Department of Agriculture and the agricultural community.* Ecology plans to continue coordinating with the state Department of Agriculture (Agriculture) and the agricultural community to enhance the success of Agriculture's pesticide collection program. In cases where other pesticide alternatives may be promoted or recommended, Ecology intends to coordinate with the Department of Agriculture and EPA to help ensure that alternative pesticides that become available do not exhibit PBT characteristics.

➲ *Organize a statewide network of individuals, interest groups, associations and governments to work together to educate citizens on PBT problems and solutions.* Ecology plans to develop a network of interested parties to educate constituents and supporters on the long-term environmental and human health problems that PBTs can pose and on solutions and alternatives.

Extended Product Responsibility

The President's Council on Sustainable Development identified several tools that could be used to help implement this concept:

- Product stewardship programs and public/private partnerships
- Take-back, buy-back, leasing or re-use/recycling
- Education/information and training
- Government subsidies, tax credits and procurement preferences
- Taxes/fees or deposit/refund systems

"The fish-eating river otters were studied to evaluate organochlorine pesticides, PCBs, dioxins, furans, and heavy metals in the Lower Columbia River. Baculums and testicles of young males were shorter or smaller than in animals of the same age class from non-polluted areas."

Dr. Charles J. Henny, National Biological Service

Waste Minimization Prioritization Tool (WMPT)

EPA developed a screening tool — the Waste Minimization Prioritization Tool (WMPT) — to assess the persistence, bioaccumulation and toxicity of individual chemicals. With this tool, available scientific data are used to assign scores for persistence, bioaccumulation and toxicity. When sufficient data are available, EPA develops separate scores based on human health and ecological protection.

EPA distributed revised versions of the chemical ranking approach and the WMPT in September 1998. When EPA's PBT strategy was released in December 1998, several concerns were raised regarding the applicability and relevance of the ranking methodology to other EPA programs. Since that time, EPA has reviewed and developed revisions to the ranking methodology. This may also include revisions for evaluating persistence in the PBT characteristics component. EPA is scheduled to distribute the revisions for public review in Summer 2000.

Ecology proposes to use the scoring method from the PBT portion of the Waste Minimization Prioritization Tool (WMPT) to identify chemicals with a high potential to persist and accumulate to harmful levels in humans and animals.

5. Improve Regulatory and Non-Regulatory Approaches

Over the long term, the continual reduction and long-term phase out of PBTs will require fundamental changes in business and agricultural practices, government agency operations, and a need for alternative products. Ecology expects this transition will take several years and believes that improvements in current regulatory and non-regulatory approaches can help speed that transition. To maximize the effectiveness of regulatory and non-regulatory approaches for reducing and phasing out the use and production of PBTs, key objectives include:

- *Improve collaboration among regulatory programs to ensure that cross-media effects are considered when making decisions about PBTs under media-specific regulations and statutes.* During the last several years, greater awareness has been given to the potential for contamination to spread between the media of land, air, and water. A variety of cross-media approaches are needed to reduce pollution and regulatory compliance costs among multiple agencies and programs. For the greatest success, we need to:
  - — Consider cross-media effects when making decisions where PBTs are involved.
  - — Promote greater use of pollution prevention approaches (as opposed to end-of-pipe treatment) to reduce and eliminate PBTs.
- *Improve regulatory and economic incentives for preventing pollution.* Economic and regulatory barriers and lack of information are frequently cited as reasons why business and industry do not more actively pursue pollution prevention measures or alternative approaches. Ecology will continue to explore and evaluate options that will improve existing or establish new economic or regulatory incentives that will encourage more pollution prevention, along with alternatives that move away from more-toxic chemical processes.
- *Provide increased access to technical information and assistance.* Ecology will increase the availability of relevant technical information such as the chemical-specific action plans (when completed) on Ecology's PBT Web page. Focus sheets, telephone lists of agency expertise, and Web page links to relevant sources will also be part of the site.

6. Identify and Prioritize Additional PBT Chemicals

Ecology has evaluated a wide range of regional, national and international approaches for identifying chemicals that are persistent, bioaccumulative, and toxic. Based on that evaluation, Ecology proposes to use the following approach to identify and add PBT chemicals to the initial list of nine chemicals.

Distinguishing Characteristics: Ecology has identified three tools to use to identify additional PBT chemicals, and to rank them for action.

- *PBT score.* This would involve using the scoring method from the PBT portion of EPA's "Waste Minimization Prioritization Tool (WMPT)" to identify chemicals with a high potential to persist and accumulate to harmful levels. EPA has compiled available scientific data to assign scores for approximately 200 chemicals. Ecology will review the chemicals with the highest scores for future additions to the initial Washington list.

- *Environmental presence.* Use available state and federal environmental databases to determine whether there is evidence that these chemicals are currently in Washington's air, water, biota, land, and/or sediments.

- *Evidence of use or production in Washington*. Review available state and federal environmental databases to determine whether there is evidence that these chemicals are used or produced in Washington state.

Public process for adding chemicals to the Washington PBT list: After the above evaluation is completed, Ecology will propose adding new chemicals to the initial list by distributing proposals for review and comment. Ecology will review comments and make a final determination on additional chemicals.

7. Improve Public Awareness and Understanding of PBT Problems and Solutions

Inform, build support, and involve the public, interested groups, and other organizations to take steps to continually reduce and phase out uses and releases of PBTs (see details at right). Objectives include:

- *Improve the public's understanding* and awareness of the problems caused by PBT chemicals and the sources of those chemicals.

- *Improve the ability of individuals and communities* to take steps to reduce PBT chemical uses, production and exposures.

- *Provide education and resources* so individuals and communities can make informed decisions.

8. Improve Information for Making Informed Decisions on Measures to Reduce PBTs

Accurate information is essential to sound decision-making. Under the current system, decision-makers often lack information (e.g., environmental levels, sources, engineering solutions, health or environmental impacts, economic effects, etc.) necessary to make effective decisions on reducing PBT chemicals. Ecology proposes two approaches to improve the information needed to make informed decisions on measures to reduce PBT chemicals.

- *Strengthen information on environmental concentrations and trends by integrating existing monitoring programs and databases.* Ecology proposes to develop a "baseline monitoring program" to determine concentrations of PBTs in the environment and to establish a basis to measure the success of PBT reductions with future monitoring. In addition, Ecology will continue to integrate existing monitoring programs and databases. Further integration will provide a more complete picture of the extent of environmental contamination by PBTs throughout the state.

- *Improve information on sources of PBT chemicals.* Chemical-specific action plans will include current and historical use(s) of the chemical, environmental effects, how exposure can occur, health effects, and where the chemical is used or was previously used.

Environmental Education Plan

If additional funding is received for this proposal, the Department of Ecology will develop and implement a public education program to provide a basic understanding of:

- Problems caused by PBTs,
- Measures individuals can take to reduce their exposures to PBTs, and
- Steps organizations can take to reduce their discharges of PBTs into the environment.

PBT Presentation
Ecology will prepare a program that will give an overview of PBT problems and examples of actions that individuals and organizations can take to reduce those problems.

PBT Web site
www.wa.gov/ecology/eils/bcc/bccfaq
Ecology will regularly update the PBT Web site to provide access to current information on PBTs, links to other information, and status of Ecology's efforts on the strategy.

Existing Education Programs
Where appropriate, PBT information will be integrated into Ecology's existing education programs.

Technical Assistance
Ecology will share information with individuals and organizations seeking to reduce or eliminate PBT releases and uses. Information will include "Focus" sheets related to the PBT strategy and related, as well as links to other sources. Much of this information will be available on Ecology's PBT Web site.

PBT Symposium
Ecology will host public symposiums focused on PBTs in Washington's environment. These symposiums will share new science and information about PBTs in Washington state, provide a forum to foster discussion, evaluate new chemicals, get feedback, and evaluate the success of the strategy along the way.

Two Views:

"The ecologically destructive path we are on is as if all of humanity is in a giant car heading at a brick wall at 100 miles per hour and everyone in it is arguing about where to sit. There are a few screaming to put on the brakes and turn the wheel, but they are locked in the trunk."

David Suzuki

"… many more people die each year from filthy air and dirty water than from asbestos, dioxin, electromagnetic radiation, nuclear wastes, PCBs, pesticide residues and ultraviolet rays — the sorts of ecological issues that obsess Western environmentalists."

Gregg Easterbrook

Current and Proposed Actions

Many of the Department of Ecology's ongoing activities are involved in the effort to improve the way PBTs are addressed. New activities have also been suggested in response to the challenges raised by this strategy. Examples of these ongoing and proposed actions are listed below (actions that have been implemented are marked with a ☑).

☑ Continue a vigorous pollution-prevention education and technical assistance effort that helps businesses reduce waste and pollution by preventing their initial production, as well as by encouraging the recycling and reuse of waste. Ecology is exploring ways to maximize pollution prevention efforts (including the use of alternative technologies and raw materials) by increasing emphasis on facilities that generate PBTs.

☑ Require pollution prevention plans in NPDES (discharge) permits that are issued to oil refineries. These plans will focus on opportunities to reduce or eliminate PBTs from process waste water and stormwater runoff.

⭘ Encourage the federal Department of Energy to adopt the PBT strategy at Hanford by including it in pollution prevention planning.

☑ Continue the Toxics Reduction Engineer Exchange (TREE) program which works with businesses to prevent pollution.

☑ Make steel-mill flue dust subject to the same standards as other hazardous wastes and waste-derived fertilizers applied to land. This waste contains dioxin, arsenic, cadmium, lead, and mercury, and was widely used in fertilizers in Washington until the state convinced EPA to reverse an exemption that encouraged its use in fertilizers.

☑ Develop a regulation to limit concentrations of metals (including mercury, lead, cadmium and arsenic) in fertilizers sold within Washington state.

☑ Enforce the reduction in dioxin discharges that has been mandated for wastewater permits issued to bleach pulp mills since 1991.

⭘ Implement final federal guidelines (adopted in April 1998) requiring new effluent limits at pulp and paper plants. These will further reduce dioxin and furan discharges by imposing final effluent limits for absorbable organic halides (AOX) and the bleach-plant effluent limits for certain dioxins and furans, chloroform, and 12 additional chlorinated phenolics.

⭘ Develop strategies to control dioxin discharges from wood-treating facilities.

⭘ Draft guidance for the proper disposal of building demolition materials that contain PBTs. These materials include thermostats (which can contain mercury), fluorescent lights, and light ballasts (which can contain PCBs), and treated wood (when burned, can produce dioxins).

⭘ Complete the analysis of the cross-media (i.e., air, land, water) effects of various "reasonably available control technologies" (RACTs) for wood-fired boilers. This analysis will address the generation and management of PBTs.

- Include persistence and bioaccumulation when ranking air contaminants and setting Air Quality Program priorities.

- Address the need to develop an understandable translation between human-health-based water quality criteria and effluent limits for waste water and storm water. Currently, there are challenges posed in translating Ecology's human-health-based, water-quality criteria for PBT chemicals into effluent limits for waste water and storm water. Concentrations in water and waste water are usually too low to measure, even when contamination is found in fish or shellfish. An "implementation plan" describing how Ecology will address these challenges is being re-evaluated. The purpose of this review is to make the translation from fish-tissue contamination to wastewater controls more effective.

☑ As part of EPA's National Study of Chemical Residues in Lake Fish Tissue, collect predator and bottom fish from selected Washington lakes for PBT analysis. Report results as they become available.

☑ Revise Ecology's open-burning rules to decrease generation and dispersal of PBTs (e.g., dioxins, furans and benzo(a)pyrene.).

- As decisions are made to clean up contaminated sites and tanks at Hanford, specifically evaluate the PBTs associated with these cleanup actions.

- Encourage the federal Department of Energy and its subcontractors to limit the use of persistent, bioaccumulative, toxic substances in controlling weeds and vegetation at the Hanford site.

- Implement water cleanup plans for rivers, lakes, and estuaries that are contaminated with PBT chemicals.

- For sites contaminated with PBTs, Ecology will emphasize remedies that address these pollutants.

- When Ecology ranks hazardous-waste sites for cleanup, toxicity of the contaminants on site (including PBTs) is a factor in scoring/ranking and priority setting of those sites.

- Ecology will establish site-specific sediment cleanup requirements designed to prevent harm to human health and the environment associated with the accumulation of PBT chemicals in the aquatic food web.

- If funding becomes available, the use of "mixing zones" will be reviewed in light of current state and federal regulations to determine whether stricter controls are needed on the use of dilution areas for PBTs. (Mixing zones are limited areas of dilution that are commonly used in regulatory programs to allow ambient air, water, or sediment to mix with pollutants in discharges. These areas are useful in attaining chemical concentrations in the environment that protect larger areas.)

Following the State Environmental Policy Act (SEPA)

A decision to adopt the PBT strategy would be an action under SEPA. While the strategy, in general, is designed to promote and enhance environmental quality, indirect or secondary adverse impacts may result. Since, at this time it is impossible to determine whether the full implementation of this strategy could result in significant environmental harm, Ecology has issued a determination of significance (DS) and initiated scoping. Scoping will run concurrently with public comment on the proposed strategy, and if it appears likely that significant environmental harm would result, Ecology will prepare an EIS. If further information and analysis indicates no likely effects, Ecology will consider withdrawing the DS and issuing a determination of nonsignificance.

Ecology Activities Specific to the PBT Strategy

There are several activities Department of Ecology can accomplish with current funding.

- Use EPA's Waste Minimization Prioritization Tool (WMPT — text box on page 20) defining characteristics to add more PBT chemicals to the strategy's starter list of nine PBT chemicals.
- Evaluate existing Ecology rules to identify gaps or barriers that prevent more-effective regulatory management of PBT chemicals.
- Use the State Environmental Policy Act (SEPA) process to ensure necessary public involvement in long-term decision-making.
- Coordinate among Ecology programs to ensure increased collaboration on regulatory decisions with cross-media effects.
- Work with EPA, other agencies, and interest groups.
- Continue to pursue grant opportunities from EPA.
- Coordinate existing indicators to track PBT reduction successes and failures.

If funding is procured or resources become available, Ecology proposes to do the following beginning July 1, 2001:

- Develop and implement chemical-specific action plans.
- Develop a PBT public education program.
- Provide grant opportunities for local governments to reduce PBTs.
- Coordinate with other state agencies to identify and track PBT uses and reduction needs.
- Develop and implement a PBT baseline monitoring program.
- Convene a biannual (every other year) symposium, starting in fall 2001.
- Establish new measurable indicators to track PBT reduction successes and failures.

Proposals for Measuring Progress

The Department of Ecology proposes to evaluate the overall success of this strategy toward reducing PBT uses, releases, and environmental concentrations. Ecology will prepare and report those evaluations at biannual PBT symposiums. Ecology proposes to initially quantify and track the following measures to gauge the success of this long-term strategy:

- Number of PBTs released annually into Washington's environment – using EPA's Toxics Release Inventory.
- Number of hazardous-waste sites cleaned up where PBTs are known to be present.
- Number of PBT-contaminated waterway segments listed as impaired water bodies.
- Continued reduction in the concentrations of PBTs recorded in the sediments deposited in key water bodies throughout the state.
- Continued reduction of PBT concentrations found in fish and shellfish in waters with consumption advisories. In addition, Ecology will establish meaningful performance measures to judge progress toward phasing out PBTs.

Ecology also proposes to establish a baseline monitoring program that will be used in combination with existing monitoring and reporting programs to measure progress in reducing PBT chemicals.

Next Steps

Public meetings

We welcome your thoughts and ideas about this proposed strategy.

The Department of Ecology will host public meetings around the state (see schedule below), and we also invite you to submit written comments until October 30, 2000. After that date, we will be reviewing all comments received and preparing a proposal to the Legislature.

All of the public meetings will begin by 7:00 pm. The dates and locations of the meetings are:

✹ **Bellingham**
Date: September 21, 2000
Location: Whatcom
County Council Chambers
311 Grand Avenue

✹ **Spokane**
Date: September 27, 2000
Location: Spokane Comm. College
Lair Auditorium, Bldg. 6
1810 N. Greene Street

✹ **Kennewick**
Date: September 28, 2000
Location: Kennewick High School
Fuller Auditorium
500 S. Dayton
(Corner of 6th and Dayton)

✹ **Vancouver**
Date: October 3, 2000
Location: Clark Comm. College
Foster Auditorium
1800 E. McLaughlin Blvd.

✹ **Seattle**
Date: October 12, 2000
Location: Town Hall
1119 8th Avenue
(Corner of 8th & Seneca)

Public meetings and comment periods

- People who are interested in hearing more about the proposed strategy are encouraged to attend one or more of the planned public meetings. Individuals and organizations may submit comments at the meetings or by letter or e-mail.

- Ecology will meet with small groups or organizations that are interested in the PBT strategy. These meetings will provide opportunities for more-focused discussions on specific issues and concerns important to those groups.

- Ecology will review, compile and evaluate written and verbal comments, and then prepare responses describing how the agency intends to address issues and concerns.

Preparing a Revised Strategy

Ecology anticipates that public discussions on the draft PBT strategy will raise numerous issues and concerns regarding the overall direction, content, and specific actions described in the draft document. After reviewing the comments on the initial draft, Ecology will post responses on the department's PBT Web site.

The department also will use the comments as guidance in developing a revised draft. As required by the 2000 Legislature, this revised PBT strategy will be submitted to the House Agriculture & Ecology Committee and the Senate Environmental Quality & Water Resources Committee by December 30, 2000. The revised strategy will also be posted on the Web site.

Depending on legislative action during the 2001 session, Ecology will either proceed with the full proposed strategy or continue to work with EPA and its national PBT strategy.

How to get further information:

- Answers to the most frequently asked questions,
- Focus Sheets about the Strategy
- Reference Information
- Links to additional information

Department of Ecology publications
You can view our publications on the internet at:
http://www.ecy.wa.gov/biblio/0003002.html

You also can call or write our Publications Distribution Office at:
Department of Ecology
Publications Distributions Office
P.O. Box 47600
Olympia, WA 98504-7600
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Appendices

Appendix A
Fish and Shellfish Consumption Advisories in Washington State Due to Chemical Contamination

Draft Washington State Department of Health Document
Contact: *Glen Patrick* (360-236-3177) *G.Patrick@doh.wa.gov*
Web Site: http://www.doh.wa.gov/ehp/default.htm.
This Web Site is continually updated.
This information is from August 8, 2000.

1.
Advisory Location: Budd Inlet
Nearest Community: Olympia
Chemicals of Concern: creosote, volatile organic compounds, pentachlorophenol, and dioxins
Species affected: all shellfish
Issued by: Thurston County Health Department
Advisory Method: Signs posted, Ecology fact sheets
Recommendations: That shellfish not be consumed from the south end of Budd Inlet near Eastbay Marina due to chemical contamination from the hazardous waste site known as Cascade Pole. The Health Department further recommends that shellfish not be consumed from any location in south Budd Inlet due to bacteriological contamination.
Contact: *Sue Davis*, Thurston County Health Department, and (360) 754-4111

2.
Advisory Location: Commencement Bay
Nearest Community: Tacoma
Chemicals of Concern: polychlorinated biphenyls (PCBs), diethylphthalates, tetrachloroethylene (TCE), and metals
Species affected: all bottom fish and all shellfish, including crab
Issued by: Tacoma-Pierce County Health Department
Advisory Method: Signs posted
Recommendations: That no consumption of fish or shellfish occurs from the waterways at the south end of Commencement Bay.
Contact: *Ray Hanowell*, Tacoma-Pierce County Health Dept, (253) 798-2845

3.
Advisory Location: Dogfish Bay
Nearest Community: Keyport
Chemicals of Concern: metals, vinylchloride
Species affected: all shellfish and all bottom fish
Issued by: Bremerton-Kitsap County Health District
Advisory Method: Unknown
Recommendations: Unknown
Contact: *Keith Grellner*, Bremerton-Kitsap County Health District, (360) 692-3611

4.
Advisory Location: Dyes Inlet
Nearest Community: Bremerton
Chemicals of Concern: Naval ordnance
Species affected: all shellfish, all bottom fish, including crab
Issued by: Bremerton County Health Department
Advisory Method: Signs posted
Recommendations: The Health Department recommends that no shellfish, fish, or crab be consumed from the west side of Ostrich Bay in Dyes Inlet in the vicinity of the Jackson Park housing development.
Contact: *Keith Grellner*, Bremerton-Kitsap County Health District, (360) 692-3611

5.
Advisory Location: Eagle Harbor
Nearest Community: Bainbridge Island
Chemicals of Concern: polycyclic aromatic hydrocarbon (PAHs), mercury
Species affected: all shellfish, all bottom fish and crab
Issued by: Bremerton-Kitsap County Health District
Advisory Method: Signs posted, notice in State fishing guide
Recommendations: The Health Department recommends that no seafood consumption occur within Eagle Harbor west of a line drawn between Wing Point south to creosote light # 1, then west to the shore of Bainbridge Island.
Contact: *Keith Grellner*, Bremerton-Kitsap County Health District, (360) 692-3611

6.
Advisory Location: Sinclair Inlet
Nearest Community: Bremerton
Chemicals of Concern: mercury, polycyclic aromatic hydrocarbons
Species affected: all shellfish including crab, and all bottom fish including rockfish
Issued by: Bremerton-Kitsap County Health District
Advisory Method: Signs posted
Recommendations: The Health Department recommends that no seafood consumption occur within Sinclair Inlet south of a line between the narrows entrance and the community of Gorst on the south shore.
Contact: *Keith Grellner*, Bremerton-Kitsap County Health District, (360) 692-3611

7.
Advisory Location: Manchester State Park
Nearest Community: Port Orchard
Chemicals of Concern: polychlorinated biphenyls (PCBs) and dioxins
Species affected: all shellfish
Issued by: Bremerton-Kitsap County Health District
Advisory Method: unknown
Recommendations: The Health Department recommends that no shellfish harvesting occur from beaches in Clam Bay identified by a line drawn from Middle Point to Orchard Point, which includes a portion of beaches within Manchester State Park.
Contact: *Keith Grellner*, Bremerton-Kitsap County Health District, (360) 692-3611

8.
Advisory Location: Indian Island
Nearest Community: Port Townsend
Chemicals of Concern: pesticides, metals
Species affected: shellfish
Issued by: U.S. Navy, Engineering Field Activities Northwest, Facilities Engineering Command, Poulsbo, WA
Advisory Method: Signs posted, most areas are off limits to non-military personnel in general
Recommendations: The Navy recommends that no consumption of shellfish occur from the north end of Indian Island in and around the Boggy Spit area.
Contact: *Larry Tucker*, Engineering Field Activities NW, Poulsbo, (360) 396-0053.

9.
Advisory Location: King County
Nearest Community: Seattle
Chemicals of Concern: general - historical industrial discharges
Species affected: all bottom fish, all shellfish including crab, and seaweed
Issued by: Seattle-King County Department of Public Health
Advisory Method: Signs posted
Recommendations: The Seattle-King County Department of Public Health recommends against the collection and consumption of bottom fish, shellfish, and seaweed from Puget Sound waters in King County, particularly where warning signs are posted.
Contact: *Wally Swafford*, Seattle-King County Department of Public Health, Chemical Physical Hazards Program, Seattle, (206) 296-4784

10.
Advisory Location: Lake Roosevelt
Nearest Community: Grand Coulee
Chemicals of Concern: dioxins, mercury
Species affected: walleye, whitefish, sturgeon
Issued by: Washington State Department of Health
Advisory Method: Signs posted, pamphlets, newspaper articles
Recommendations: DOH recommends that anglers consume no more than 20 fish meals per month of sport fish caught from Lake Roosevelt.
Contact: Washington State Dept of Health, Office of Assessments, 1-877-485-7316

11.
Advisory Location: Yakima River
Nearest Community: Yakima
Chemicals of Concern: DDT, DDE
Species affected: Mountain Whitefish, Common Carp and all bottom fish including Bridgelip Sucker
Issued by: Washington State Department of Health
Advisory Method: Pamphlets in English and Spanish
Recommendations: Anglers are recommended to limit their consumption of the above species to one meal per week and eat fish such as trout instead of bottom fish.
Contact: Washington State Dept of Health, Office of Assessments, 1-877-485-7316

Appendix B
303(d) Water Segments in Washington State where Persistent, Bioaccumulative, Toxic Chemicals have Exceeded (Violated) Surface Water Quality Criteria

WRIA*	Waterbody Name	Parameter	Medium
01	Bellingham Bay (Inner) and Whatcom Waterway	Mercury	Sediment
01	Bellingham Bay (Inner) and Whatcom Waterway	Benzo(a)pyrene	Sediment
01	Nooksack River	Mercury	Water
01	Strait of Georgia	Benzo(a)pyrene	Sediment
03	Padilla Bay, Fidalgo Bay, and Guemes Channel	PCB-1254	Tissue
07	Chain Lake	Mercury	Water
07	Port Gardner and Inner Everett Harbor	Mercury	Sediment
07	Port Gardner and Inner Everett Harbor	Benzo(a)pyrene	Sediment
07	Snohomish River	Dioxin	Tissue
07	Snohomish River	Mercury	Water
08	Bear-Evans Creeks	Mercury	Water
08	Kelsey Creek	Aldrin	Water
08	Kelsey Creek	Dieldrin	Water
08	Kelsey Creek	Chlordane	Water
08	Kelsey Creek	DDT	Water
08	Mercer Slough	4,4'-DDD	Water
08	Mercer Slough	DDT	Water
08	Mercer Slough	Dieldrin	Water
08	Union Lake / Lake Washington Ship Canal	Dieldrin	Tissue
09	Duwamish Waterway and River	PCB-1260	Tissue
09	Duwamish Waterway and River	Benzo(a)pyrene	Sediment
09	Duwamish Waterway and River	Mercury	Sediment
09	Duwamish Waterway and River	Hexachlorobenzene	Sediment
09	Duwamish Waterway and River	PCB-1254	Tissue
09	Elliott Bay	Mercury	Sediment
09	Elliott Bay	Benzo(a)pyrene	Sediment
09	Elliott Bay	Hexachlorobenzene	Sediment
09	Elliott Bay	Benzo(a)pyrene	Water
09	Green River	Mercury	Water
09	Green River	PCB-1242	Water

WRIA*	Waterbody Name	Parameter	Medium
09	Green River	PCB-1254	Water
09	Green River	Toxaphene	Water
09	Smay Creek	Dieldrin	Water
09	Soos Creek System	Mercury	Water
09	Springbrook (Mill) Creek	Mercury	Water
10	Commencement Bay (Inner)	Mercury	Sediment
10	Commencement Bay (Inner)	Benzo(a)pyrene	Sediment
10	Commencement Bay (Inner)	Hexachlorobenzene	Sediment
10	Commencement Bay (Inner)	Dioxin	Water
10	Commencement Bay (Inner)	Dieldrin	Tissue
10	Commencement Bay (Outer)	Mercury	Sediment
10	Commencement Bay (Outer)	Dioxin	Water
10	Thea Foss (City) Waterway	Benzo(a)pyrene	Sediment
10	Thea Foss (City) Waterway	PCB-1260	Tissue
10	Thea Foss (City) Waterway	PCB-1254	Tissue
10	Thea Foss (City) Waterway	Mercury	Sediment
10	White (Stuck) River	Mercury	Water
12	Chambers Creek	PCB-1254	Tissue
12	Chambers Creek	PCB-1260	Tissue
13	Budd Inlet (Inner)	Benzo(a)pyrene	Sediment
13	Budd Inlet (Inner)	PCB-1254	Tissue
13	Budd Inlet (Inner)	Mercury	Sediment
13	Deschutes River	Mercury	Water
13	Ward Lake	PCB-1260	Tissue
15	Dyes Inlet and Port Washington Narrows	Mercury	Sediment
15	Dyes Inlet and Port Washington Narrows	Mercury	Tissue
15	Eagle Harbor	Benzo(a)pyrene	Tissue
15	Eagle Harbor	PCB-1254	Tissue
15	Eagle Harbor	Mercury	Sediment
15	Eagle Harbor	Benzo(a)pyrene	Sediment
15	Port Gamble Bay	Dieldrin	Tissue
15	Quartermaster Harbor	Dieldrin	Tissue
15	Sinclair Inlet	Aldrin	Tissue
15	Sinclair Inlet	PCB-1260	Tissue
15	Sinclair Inlet	PCB-1254	Tissue

WRIA*	Waterbody Name	Parameter	Medium
15	Sinclair Inlet	Mercury	Sediment
15	Sinclair Inlet	Dieldrin	Tissue
18	Elwha River	PCB-1254	Water
22	Grays Harbor (Inner)	Dioxin	Tissue
23	Black River	Mercury	Water
23	Chehalis River	PCB-1254	Tissue
23	Chehalis River	PCB-1260	Tissue
25	Sacajawea Lake	Dieldrin	Tissue
25	Sacajawea Lake	Chlordane	Tissue
25	Sacajawea Lake	PCB-1254	Tissue
25	Sacajawea Lake	4,4'-DDE	Tissue
25	Sacajawea Lake	PCB-1260	Tissue
32	Walla Walla River	Dieldrin	Tissue
32	Walla Walla River	PCB-1260	Tissue
32	Walla Walla River	Hexachlorobenzene	Tissue
32	Walla Walla River	Chlordane	Tissue
32	Walla Walla River	4,4'-DDE	Tissue
32	Walla Walla River	4,4'-DDT	Tissue
33	Snake River	Dioxin	Tissue
34	Palouse River	PCB-1260	Tissue
34	Palouse River	4,4'-DDE	Tissue
34	Palouse River	Dieldrin	Tissue
35	Snake River	DDT	Water
35	Snake River	Aldrin	Water
35	Snake River	Dieldrin	Water
35	Snake River	Toxaphene	Water
35	Snake River	4,4'-DDD	Water
35	Snake River	PCB-1260	Water
35	Snake River	Dioxin	Tissue
35	Snake River	4,4'-DDE	Water
36	Esquatzel Coulee	Dieldrin	Water
37	Granger Drain	Dieldrin	Water
37	Granger Drain	DDT	Water
37	Granger Drain	4,4'-DDD	Water
37	Granger Drain	4,4'-DDE	Water
37	Marion Drain	4,4'-DDE	Water
37	Marion Drain	Dieldrin	Water

WRIA*	Waterbody Name	Parameter	Medium
37	Moxee (Birchfield) Drain	DDT	Water
37	Moxee (Birchfield) Drain	4,4'-DDD	Water
37	Snipes Creek	DDT	Water
37	Snipes Creek	Dieldrin	Water
37	Snipes Creek	4,4'-DDE	Water
37	Snipes Creek	4,4'-DDD	Water
37	Snipes Creek	Dieldrin	Water
37	Snipes Creek	4,4'-DDE	Water
37	Snipes Creek	4,4'-DDD	Water
37	Spring Creek	4,4'-DDE	Water
37	Spring Creek	DDT	Water
37	Spring Creek	4,4'-DDD	Water
37	Spring Creek	Dieldrin	Water
37	Status Creek	4,4'-DDE	Water
37	Status Creek	Dieldrin	Water
37	Sulphur Creek Wasteway	Dieldrin	Water
37	Sulphur Creek Wasteway	DDT	Water
37	Sulphur Creek Wasteway	4,4'-DDE	Water
37	Sulphur Creek Wasteway	4,4'-DDD	Water
37	Toppenish Creek	4,4'-DDE	Water
37	Toppenish Creek	Dieldrin	Water
37	Toppenish Creek	4,4'-DDD	Water
37	Toppenish Creek	DDT	Water
37	Wide Hollow Creek	4,4'-DDE	Water
37	Wide Hollow Creek	Dieldrin	Water
37	Wide Hollow Creek	DDT	Water
37	Wide Hollow Creek	4,4'-DDD	Water
37	Yakima River	Aldrin	Water
37	Yakima River	Dieldrin	Tissue
37	Yakima River	Mercury	Water
37	Yakima River	PCB-1260	Tissue
37	Yakima River	4,4'-DDE	Water
37	Yakima River	4,4'-DDE	Tissue
37	Yakima River	Dieldrin	Water
37	Yakima River	DDT	Water
37	Yakima River	DDT	Tissue
37	Yakima River	4,4'-DDD	Water

WRIA*	Waterbody Name	Parameter	Medium
37	Yakima River	Mercury	Tissue
37	Yakima River	PCB-1254	Tissue
39	Cherry Creek	4,4'-DDE	Water
39	Cherry Creek	Dieldrin	Water
39	Cherry Creek	DDT	Water
39	Wilson Creek	Dieldrin	Water
39	Yakima River	Dieldrin	Tissue
41	Crab Creek	Chlordane	Water
41	Crab Creek	4,4'-DDE	Water
41	Crab Creek	Dieldrin	Water
41	Crab Creek	PCB-1254	Tissue
41	Crab Creek	PCB-1260	Tissue
41	Crab Creek	DDT	Water
41	Goose, Lower Lake	Dieldrin	Water
41	Potholes Lake	Dieldrin	Tissue
41	Potholes Lake	Dieldrin	Water
45	Mission Creek	4,4'-DDE	Tissue
45	Mission Creek	4,4'-DDT	Tissue
45	Mission Creek	DDT	Water
47	Chelan Lake	PCB-1260	Tissue
47	Chelan Lake	4,4'-DDE	Tissue
47	Chelan Lake	PCB-1254	Tissue
47	Roses (Alkali) Lake	4,4'-DDE	Tissue
48	Andrews Creek	4,4'-DDE	Water
49	Ninemile Creek	DDT	Water
49	Okanogan River	Dieldrin	Water
49	Okanogan River	Aldrin	Water
49	Okanogan River	DDT	Water
49	Okanogan River	4,4'-DDE	Water
49	Okanogan River	PCB-1260	Tissue
49	Okanogan River	4,4'-DDD	Tissue
49	Okanogan River	4,4'-DDE	Tissue
49	Okanogan River	PCB-1254	Tissue
49	Okanogan River	4,4'-DDD	Water
49	Osoyoos Lake	4,4'-DDD	Water
49	Osoyoos Lake	4,4'-DDE	Water
49	Osoyoos Lake	Dieldrin	Water

WRIA*	Waterbody Name	Parameter	Medium
49	Osoyoos Lake	4,4'-DDE	Water
49	Osoyoos Lake	Aldrin	Water
49	Osoyoos Lake	DDT	Water
49	Similkameen River	Aldrin	Water
49	Similkameen River	Dieldrin	Water
49	Similkameen River	4,4'-DDE	Water
49	Similkameen River	DDT	Water
49	Similkameen River	4,4'-DDD	Water
49	Tallant Creek	DDT	Water
49	Unnamed Creek	DDT	Water
54	Long Lake (Reservoir)	DDT	Water
54	Long Lake (Reservoir)	Chlordane	Water
54	Long Lake (Reservoir)	PCB-1254	Tissue
54	Long Lake (Reservoir)	PCB-1260	Tissue
54	Long Lake (Reservoir)	PCB-1248	Tissue
54	Long Lake (Reservoir)	PCB-1254	Water
54	Long Lake (Reservoir)	Dieldrin	Water
54	Long Lake (Reservoir)	PCB-1242	Tissue
54	Long Lake (Reservoir)	4,4'-DDE	Water
54	Long Lake (Reservoir)	Aldrin	Water
54	Long Lake (Reservoir)	4,4'-DDD	Water
54	Spokane River	Dieldrin	Water
54	Spokane River	PCB-1260	Tissue
54	Spokane River	PCB-1254	Tissue
54	Spokane River	PCB-1248	Tissue
54	Spokane River	Mercury	Water
54	Spokane River	DDT	Water
54	Spokane River	PCB-1242	Tissue
54	Spokane River	4,4'-DDE	Water
55	Little Spokane River	PCB-1260	Tissue
55	Little Spokane River	PCB-1248	Tissue
55	Little Spokane River	PCB-1254	Tissue
56	Hangman Creek	4,4'-DDE	Water
56	Hangman Creek	Dieldrin	Water
62	Pend Oreille River	Aldrin	Tissue
62	Pend Oreille River	Aldrin	Water
62	Pend Oreille River	4,4'-DDE	Water

WRIA*	Waterbody Name	Parameter	Medium
62	Pend Oreille River	4,4'-DDD	Water
62	Pend Oreille River	DDT	Water
62	Pend Oreille River	Dieldrin	Water
CR	Columbia River	Benzo(a)pyrene	Water
CR	Columbia River	PCB-1254	Tissue
CR	Columbia River	Dioxin	Tissue
CR	Columbia River	Dioxin	Water
CR	Columbia River	Mercury	Water
CR	Columbia River	Aldrin	Water
CR	Columbia River	4,4'-DDE	Water
CR	Columbia River	Dieldrin	Water
CR	Columbia River	Chlordane	Water
CR	Columbia River	Hexachlorobenzene	Water
CR	Columbia River	Toxaphene	Water
CR	Columbia River	4,4'-DDE	Tissue
CR	Columbia River	Dieldrin	Tissue
CR	Columbia River	PCB-1248	Tissue
CR	Columbia River	PCB-1260	Tissue
CR	Franklin D. Roosevelt Lake	Mercury	Tissue
CR	Franklin D. Roosevelt Lake	Dioxin	Tissue
CR	Franklin D. Roosevelt Lake	Mercury	Water
CR	Franklin D. Roosevelt Lake	Dioxin	Water
PS	Hood Canal (North)	Mercury	Sediment
PS	Hood Canal (North)	Benzo(a)pyrene	Sediment
PS	Possession Sound (North)	4,4'-DDE	Water
PS	Possession Sound (North)	Dieldrin	Water
PS	Possession Sound (North)	Mercury	Sediment
PS	Puget Sound (Central)	Mercury	Sediment
PS	Puget Sound (Central)	Benzo(a)pyrene	Sediment
PS	Tacoma Narrows	Dieldrin	Tissue

* Water Resource Inventory Area

Appendix C
Uses and Health Effects of the PBTs Identified in this Strategy

Below is some previous use and health effects information about the PBTs in this strategy. This information came from the Federal Agency of Toxic Substances and Disease Registry (ATSDR) Web site. Most of the previous trade names came from Ecology's 1992 report on "Chemicals of Concern in Washington State." You can get more health related information by calling ATSDR at 888- 422-8737 or by viewing the organization's Web site at: *http://www.atsdr.cdc.gov/toxfaq.html*. Exposure to the chemicals listed below can happen through ingestion or diet, inhalation, or skin contact with the chemicals or by eating foods contaminated with these chemicals.

Aldrin/Dieldrin

Trade names: *Aldrin: Octalene, Aldrex, Aldrosol, Drinox, and Aldrite. Dieldrin: Octalox, Alvit, Quintox, Diedrex, Dieldrite, Panaram D-31, Illoxal, Dielmoth, Dorytox, Insectlack, Kombi-Alberta, Moth Snub D, Red Shield, SD 3417, and Termitox.*

Previous uses: Its use began in the 1950s as a pesticide. In 1974, the EPA banned all uses except termite control. In 1987, all uses were banned.

Known health effects (1): The central nervous system is mainly affected. Other symptoms from lower levels of exposure include headache, irritability, dizziness, vomiting, and loss of muscular coordination.

Benzo(a)pyrene

Trade names: none

Previous and current sources: Benzo(a)pyrene is part of a larger group of similar chemicals (polycyclic aromatic hydrocarbon – PAHs). It is usually found in the soot when gasoline, garbage, or plant/animal material is burned. It can also be found in creosote – which is a wood preservative.

Known health effects (1): Health effect studies are still incomplete, although the U.S. Department of Health and Human Service findings show it is likely a carcinogen.

Chlordane

Trade names: *Ortho-Klor (Chevron), Kow-Klor (Dow), Belt, Chlordan, Gamma Chlordan, Kypchlor, Corodane, Dowchlor, Oktaterr, Topichlor, Snyklor, Octacholor and Velsicol 1068.*

Previous uses: Chlordane was used as a pesticide from 1948 to 1988. EPA banned all uses in 1983 except to control termites. All uses were banned by 1988.

Known health effects (1) the central nervous system, digestive system, and the liver is affected by exposure to Chlordane. Other symptoms include vision problems, confusion, irritability, stomach cramps, vomiting, diarrhea, weakness, convulsions, headaches and jaundice.

Dioxins and Furans

Trade names: none

Previous and current sources: Dioxin does not have any commercial uses. It has been found in the environment, in the products and emissions of chemical plants manufacturing chlorinated phenols, and in the ash residues and emissions of municipal waste incinerators. Emissions may also occur from pulp and paper manufacturing plants, industrial accidents, combustion, and gasoline and diesel exhaust.

Known health effects (1), (2): The most noted health effect in people who have been exposed to large amounts of the form 2.3.7.8-TCDD is chloracne – a severe skin disease. Other symptoms include skin rashes, discoloration, and excessive body hair. There have also been reported changes in individuals' blood and urine that indicate liver damage.

DDT (and DDE, DDD)

Trade names: *Neocid, p,p-DDT, Anofex, Neocoid, Zerdane, Dinocide, Gespon, Gesarex, Guespon, Guesarol, Pentech, Arkotine, Gyron, Ixodex, and Gesarol.*

Previous uses: DDT was one of the most widely used agricultural pesticides in the U.S. and other countries from 1946 to 1972. It has been banned in the United States except for public health emergencies.

Known health effects (1): At high levels, it can damage the nervous system. The main symptoms include tremors, seizures, and excitability.

Hexachlorobenzene

Trade names: *Amatin, Anticaries, Bunt-cure, No-bunt, No Bunt 40, No Bunt Liquid, Sanocide, and Captan 40%.*

Previous uses: It was widely used as a pesticide until 1965. It was also used to make fireworks, ammunition, and synthetic rubber. It's also reported to be used as a fungicide, in dye manufacturing, as a solvent, a degreasing agent, and a cutting fluid.

Known health effects (1): Symptoms include skin sores, change in skin color, arthritis, and problems with the liver, nervous system, and stomach.

Mercury

Trade names: none

Previous uses: Mercury is used as a cleaning agent in some soaps and as a base for pesticides. It is also used in chemical production, batteries, dental fillings, thermometers, switches, and in pharmaceuticals.

Known health effects (1): The nervous system is very sensitive to all forms of mercury. Symptoms include irritability, shyness, tremors, changes in vision or hearing, and memory problems. Exposure to the vapors can cause effects such as lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

"To gain more insight into the effects that these chemicals have on reproduction and development, the nervous system, the immune system, the incidence of cancer, and other aspects of the biology of humans and wildlife, new studies should be conducted that follow groups of at-risk subjects from conception through adulthood."

The National Academy of Science Report on Hormonally Active Agents - August 3, 1999

PCBs

Trade names: *Aroclor, Dykanol, Noflamol, Chlorentol, Inerteen, Pyranol, Therminol, Chlorophen, Cholorextol, Clophen, Colphen, Fenclor, Kanachlor, Montar, Pyralene, Santotherm, Therminol FR.*

Previous uses: Commercial use began in 1929 and was widespread. Manufacturing of PCBs was stopped in 1977 (in the United States). Major uses of PCBs included insulation for electrical cables and wires, coolants and lubricants, and in the production of electrical condensers.

Known health effects (1): People who have been exposed to PCBs for a long time have problems such as irritation of the nose and lungs, and skin irritations consisting of acne and rashes.

Toxaphene

Trade names: *Phenatox.*

Previous uses: Toxaphene was used heavily as an insecticide until 1982, when EPA set restrictions on its use. All uses were banned in 1990. It was also used as a pesticide on cotton and other crops, to control pests on livestock, and to kill unwanted fish in lakes.

Known health effects (1): Symptoms include damage to the lungs, nervous system, and kidneys.

For more information (1):
call ATSDR at 1-800-422-8737 or view the Web site at:
http://www.atsdr.cdc.gov/toxfaq.html.

For more information (2):
view EPA's Web site at:
http://www.epa.gov/tri or www.epa.gov/ncea/dioxin.

Appendix D
Who Ecology's received comments from:

Ecology has received comments from representatives of the following groups. We are hoping to work with these and other interested individuals and organizations on the strategy in the future. The groups had diverse comments on PBT related issues, and we appreciated their effort in providing them to us.

Government Agencies:

- Agriculture (State)
- U.S. Environmental Protection Agency
- Fish and Wildlife (State)
- Health
- Labor & Industries
- Natural Resources
- Office of the Governor
- Puget Sound Water Quality Action Team
- Transportation (State)
- King County Hazardous Waste
- Clark County Hazardous Waste

Other organizations:

- Association of Earth Ministries
- Association of Washington Business
- Center for Environmental Health and Justice
- Chlorine Chemistry Council
- Community Coalition for Environmental Justice
- Edmonds Institute
- Gill-netters Association
- Institute for Children's Health
- League of Women Voters
- Lutheran Public Policy Council of Washington
- No Spray Zone Organization
- North Puget Sound Multiple Chemical Support Group
- Northwest Public Power Association Hazardous Materials Task Force
- Olympic Labor Council
- People for Puget Sound
- Physicians for Social Responsibility
- ReSources for Sustainable Communities
- Sierra Club
- Washington Association of Churches
- Washington Conservation Voters
- Washington Environmental Council
- Washington Toxics Coalition
- Western States Petroleum Association
- Washington Public Interest Research Group

"At the moment, there are more questions than answers about the impact of hormone disrupting chemicals on humans."

Dr. Theo Colburn,
Our Stolen Future, p. 196

Reference Information

For more information, call ATSDR at 800-422-8737 or view the agency's Web site at: *http://www.atsdr.cdc.gov/toxfaq.html*.

For more information, view EPA's Web site at: *www.epa.gov/tri or www.epa.gov/ncea/dioxin*.

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Glossary of Terms

Bioaccumulative: A chemical that accumulates when taken up by humans or animals at a rate faster than the human or animal can metabolize or eliminate it.

Cross-media Transfer of Chemicals: The movement of a chemical from one medium such as air, water, soil, or sediment, to another.

Endocrine Disrupters: Chemicals that can mimic the actions of hormones and have been associated with adverse reproductive and developmental effects in wildlife.

Media or Medium: A component of the environment (air, water, soil or sediment) in which a contaminant is measured, an organism lives its life, and from which an organism can accumulate contaminants.

Persistent: A chemical is persistent in the environment if it breaks down slowly or not at all, causing it to remain for long periods of time. Persistence is often measured by the "half-life" - the time it takes for half of the chemical to dissipate or break down.

State Environmental Policy Act (SEPA): State law which requires all state and local governments to use a systematic, interdisciplinary approach to insure integration of the natural and social sciences and environmental design in the planning and decision-making for projects or activities which may impact the environment. SEPA also ensures that environmental amenities and values will be given appropriate consideration along with economic and technical considerations when decisions are made.

TMDL: Section 303(d) of the federal Clean Water Act requires the states and EPA to establish Total Maximum Daily Loads (TMDLs) for all waterbodies that are not meeting water quality standards because of inadequate controls of point or nonpoint sources.

Toxic: A level of exposure to a chemical that causes adverse effects to the health of plants and/or animals (including humans).

Waste Minimization Prioritization Tool (WMPT): Screening tool developed by EPA to assess the persistence, bioaccumulation and toxicity of individual chemicals. With this tool, available scientific data is used to assign scores for persistence, bioaccumulation and toxicity. When sufficient data are available, EPA develops separate scores based on human health and ecological protection.

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