Ecology Responses to Public Comments Received on the Draft PBT Strategy

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For a copy of *Proposed Strategy to Continually Reduce Persistent, Bioaccumulative Toxins (PBTs) in Washington State* (December 2000), refer to Publication Number 00-03-054.

Ecology Responses to Public Comments Received on the Draft PBT Strategy

by
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Table of Contents

Acronyms

The following is a list of acronyms used in *Ecology Responses to Public Comments Received on the Draft PBT Strategy* and their meanings.

Acronym	Meaning
ASIL	acceptable source impact level
B(a)P	benzo(a)pyrene
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFC	Chlorofluorocarbons
DDT	1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane
DNS	Determination of Non-Significance
DOH	Department of Health
DS	Determination of Significance
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
GMA	Growth Management Act
GP	Georgia-Pacific
L&I	Labor and Industries
MTCA	Model Toxics Control Act
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
PAH	polycyclic aromatic hydrocarbons
PBT	persistent, bioaccumulative toxins
PCBs	polychlorinated biphenyls
PCP	pentachlorophenol
PM	particulate matter
POM	polycyclic organic matter
RACT	reasonably available control technology
RCRA	Resource Conservation and Recovery Act
SEPA	State Environmental Protection Act
SWAPCA	Southwest Air Pollution Control Authority
TCP	Toxics Clean-up Program
TRI	Toxic Release Inventory
USDOE	United States Department of Energy
USGS	United States Geologic Survey
WMPT	Waste Minimization Prioritization Tool

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Introduction

Persistent, bioaccumulative toxins (PBTs) raise special challenges for our society and the environment for several reasons:

- PBTs are durable; they 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 nervous system, reproductive and developmental problems, immune-response suppression, cancer, and endocrine disruption.
- Some PBTs can be transported long distances as particles on the wind or in the water.

Many activities produce and release PBTs into Washington's environment. These include highly visible sources such as large industrial processes. These *point* sources have been the traditional focus of pollution control strategies. However, there are many other sources of PBTs such as internal-combustion engines, various consumer products and past applications of agricultural and residential pesticides. Cumulatively, these *nonpoint* sources also may release significant amounts of PBTs into Washington's environment.

Both ongoing and historical releases from point and nonpoint sources have left measurable levels of PBTs in the air, water, soils and sediments throughout Washington State. The federal Clean Water Act Section 303(d) list for Washington and the state Department of Health's Fish and Shellfish Consumption Advisories illustrate the scope of this PBT contamination.

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 towards implementing statutes addressing a *single-medium* such as air, land or water. These statutes do not fully address the potential of PBTs for the *cross-media*, cumulative or synergistic effects. The current, single-medium focus has also produced a system that emphasizes *treating* pollution rather than *preventing* it. Unfortunately, this contributes to continued contamination since PBTs at low levels can escape detection or treatment can reach toxic concentrations over time.

Members of the public as well as many public-interest organizations have urged the Washington State Department of Ecology (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*.

On August 22, 2000, Ecology released the *Draft Strategy to Continually Reduce Persistent, Bioaccumulative, Toxic Chemicals (PBTs) in Washington State*. At that time, the agency also announced a public comment period, through October 30, 2000, and followed with five public

meetings to explain the draft PBT Strategy and gather comments. These meetings took place in Bellingham, Spokane, Kennewick, Vancouver, and Seattle between September 21 and October 12.

During this 70-day public comment period, Ecology received several hundred comments. These included:

- more than 600 comments heard during public meetings.
- 27 letters from various agriculture, business, industry, and related stakeholders.
- 5 letters from government agencies.
- 21 letters from environmental and public interest groups.
- 73 letters from individual citizens.
- 317 e-mailed comments.
- 10,620 postcards from individual citizens.

The e-mails and post cards submitted to Ecology all conveyed similar comments, while individual comment letters each contained numerous specific comments.

Ecology staff evaluated each of the comments, incorporating many of them into the *Proposed Strategy to Continually Reduce Persistent, Bioaccumulative Toxins (PBTs) in Washington State*, submitted to the Washington State Legislature in January 2001.

Who Ecology Received Comments From

Ecology received comments from representatives of the following groups and also from several thousand individuals. These groups and individuals offered diverse opinion on PBT-related issues. We appreciate the time and effort each took to review the draft PBT Strategy, develop comments, and submit them.

Agriculture/Business/Industry/Related Organizations

1. American Chemistry Council – *Arlington, VA*
2. Association of Washington Business – *Olympia*
3. Avista Corporation – *Spokane*
4. Boise Cascade Corporation – *Boise, ID*
5. General Plastics Manufacturing Company – *Tacoma*
6. Goldendale Aluminum Company – *Goldendale*
7. Heller Ehrman White & McAuliffe – *Seattle*
8. Hop Growers of Washington – *Yakima*
9. King and Spalding – *Washington, D.C.* (on behalf of the Lead Industries Association)
10. Murray Chemical Supply – *Spokane*
11. National Electrical Manufacturers Association – *Washington, D.C.*
12. Northwest Pulp & Paper Association – *Bellevue*
13. Pentachlorophenol Task Force – *unknown* (via email)
14. Peter Hildebrandt – *Olympia* (on behalf of the Primary Aluminum and Magnesium Facilities in Washington)
15. Reynolds Metals Company – *Longview*
16. Schnitzer Steel Products Company – *Portland, OR*
17. Snohomish County PUD – *Everett*
18. Taylor Enterprises – *Mansfield*
19. Tesoro Northwest Company – *Anacortes*
20. The Boeing Company – *Seattle*
21. Tosco Refining Company – *Ferndale*
22. TreeSource Industries, Inc. – *Portland, OR*
23. Washington Friends of Farms and Forest – *Olympia*
24. Washington State Dental Association – *Seattle*
25. Western States Petroleum Association – *Seattle*
26. Western Wood Preservers Institute – *Vancouver*
27. Weyerhaeuser – *Federal Way*

Government Agencies

1. City of Seattle – *Seattle*
2. King County Department of Natural Resources –*Seattle*
3. NOAA Office of Exxon Valdez Oil Spill Research and Restoration – *Juneau, AK*
4. Puget Sound Clean Air Agency – *Seattle*
5. Representative Kelli Linville – *Bellingham*

Environmental and Public Interest Organizations

1. Center for Environment, Health and Justice – *Falls Church, VA*
2. Coalition for Environmentally Safe Schools – *Bainbridge Island*
3. Columbia River Keeper – *Bingen*
4. Don't Waste Michigan – *Grand Rapids, MI*
5. Heart of America Northwest – *Seattle*
6. League of Women Voters – *Seattle*
7. Northwest Coalition for Alternatives to Pesticides – *Eugene, OR*
8. Olympic Environmental Council – *Port Townsend*
9. Olympic Labor Council – *Olympia*
10. Oregon Environmental Council – *Portland, OR*
11. PCC Natural Markets (Puget Consumers Co-op) – *Seattle*
12. People for Environmental Action and Children's Health (PEACH) – *Spokane*
13. People for Puget Sound – *Seattle*
14. Puget Soundkeeper Alliance – *Seattle*
15. ReSources – *Bellingham*
16. The Coalition for Clean Air in Washington – *Seattle*
17. The Edmonds Institute – *Edmonds*
18. Washington Environmental Council – *Seattle*
19. Washington Physicians for Social Responsibility – *Seattle*
20. Washington Toxics Coalition – *Seattle*
21. WashPIRG – *Seattle*

Individuals

1. Audrey Adams – *Renton*
2. Rudy Adams – *Renton*
3. Deidre Allen – *Mead*
4. Karey Baker – *Bellingham*
5. Rick Barrett
6. Robert Baxter – *Bellingham*
7. Gary and Deborah Bornzin – *Bellingham*
8. Greg Bowers
9. Sheree Bransen – *Gig Harbor*
10. Roger Bull – *Bellingham*
11. Corinne Carey – *Grand Rapids, MI*
12. Pauline Carpenter – *Bellingham*
13. Ana Charvelle – *Friday Harbor*
14. Pat Collier – *Vashon Island*
15. Eric Conn – *Bellingham*
16. Mary Beth DeHamer – *Bellingham*
17. Jennifer Dold – *Seattle*
18. Jamie Donatuto – *Bellingham*
19. Mahlene D'Orazio
20. David Adam Edelstein – *Seattle*
21. Joline El-Hai – *Seattle*
22. Dr. Roy B. Farrell – *Seattle*
23. Keith Fredrikson – *Sumas*
24. Shannon Gates
25. Sharon Genasci – *Portland, OR*
26. Patty and Bob Gray – *Issaquah*
27. Carolyn Hoover – *Vashon*
28. Cassandra Howe – *Bellingham*
29. Ann O. Jackson – *Bellevue*
30. Cindy Jackson – *Bellingham*
31. E A Keeble
32. Jayne Kim
33. Sandra King – *Bellingham*
34. Helen Kirk – *Bellingham*
35. Bruce Kraig – *Bellingham*
36. Jeff Kraus – *Bellingham*
37. Dr. Paul Lindholt
38. Sherri Lynd – *Bellingham*
39. Christine Manfred
40. Patricia Anne Martin
41. Maria M. Mason – *Bainbridge Island*
42. Gail McCormick – *Seattle*
43 Judy Urquhart – McKee and Alvin McKee – *Bellingham*
44. Beth Meshke – *Seattle*
45. Bonnie Miller – *Seattle*
46. Sara Morris – *Bellingham*
47. Lin Nelson
48. Mary Ann Newell – *Vancouver*
49. Rafael Ojeda – *Tacoma*
50. Mike Collins and Sharon O'Reilly – *Bellingham*
51. Jane Palmieri – *Bellingham*
52. Kathy Parker – *Burien*
53. Julian Powers – *Spokane*
54. Thea L. Pyle – *Grays River*
55. Doreen Randal
56. Ashley Rawhouser – *Bellingham*
57. Meredith Redmon – *Bellingham*
58. Therese Rickenan – *Bellingham*
59. Abraham L. Role – *Bellingham*
60. Paul Rubin – *Seattle*
61. Morrie Schneider
62. Janelle Spain – *Rice*
63. Don Steinke – *Vancouver*
64. Douglas Tolchin – *Bellingham*
65. Chris Jones
66. Ruth Yarrow – *Seattle*
67. Dr. Philip R. Vandeman – *Olympia*
68. Maire Walsh – *Kendell*
69. Mark Ward – *Bellingham*
70. Wilhelm Welzenbach – *Seattle*
71. Craig P. Werner – *Spokane*
72. Esther Witte – *Chehalis*
73. James R. Zito – *Bellingham*

Plus

- **317 e-mails**

Example:

Washington State Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Polluters are poisoning us with toxic chemicals like dioxin, mercury and lead and creating a toxic legacy for our children.

To protect ourselves and our children, we must stop polluters from releasing these dangerous chemicals into the environment. I am pleased to hear that the Department of Ecology is moving forward with a plan to phase out these types of persistent poisons. Please ensure that the plan contains the following elements:

- Immediately prohibit the release of these chemicals from new sources;
- Establish a deadline of 2010 for ending releases from existing sources and toxic sites;
- Address all 27 chemicals Ecology has identified as persistent bioaccumulative toxics;
- Reinforce the ban by including phase-out language in all other statewide pollution limits overseen by your department

Please stand strong against polluter pressure and move forward immediately with this crucial plan.

I look forward to hearing where you stand on this issue.

Sincerely,

- **10,620 post cards**

Example:

Dear Director Fitzsimmons:

Polluters are poisoning us with toxic chemicals like dioxin, mercury and lead—and creating a toxic legacy for our children.

To protect ourselves and our children, we must stop polluters from releasing these dangerous chemicals into the environment. I strongly support phasing out these types of persistent poisons. Please direct your department to:

- Immediately prohibit the release of these chemicals from new sources;
- Establish a deadline of 2010 for ending releases from existing sources and toxic sites;
- Address all 27 chemicals Ecology has identified as persistent bioaccumulative toxics; and
- Reinforce the ban by including phase-out language in all other statewide pollution limits overseen by your department.

(please print legibly)

Name_____

Street_____

City_____State_____ ZIP_____

E-Mail_____@_____

Phone ( )_____ ☐ Volunteer? ☐ Student?

Summary Total of Comment-related Documents

27..... Agriculture, Business, Industry, & related Stakeholders
5..... Government agencies
21..... Environmental and Public Interest Organizations
73..... Individual Citizens (via mail)
317..... Individual Citizens (via e-mail)
10,620..... Post cards (developed and distributed by WashPIRG)
11,063

Need for a Washington PBT Strategy

Persistent, bioaccumulative toxins (PBTs) raise special challenges for our society and the environment because they share certain, common properties. PBTs are durable and break down very slowly in the environment. Animals and people accumulate PBTs in their bodies, primarily from the food they eat. And, 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 nervous system, reproductive and developmental problems, immune-response suppression, cancer and endocrine disruption. In addition, PBTs can be transported long distances in wind, water and sediments.

Many activities produce and release PBTs into Washington's environment. These activities include highly visible sources, such as large industrial processes. These *point* sources have been the traditional focus of pollution control strategies. However, there are many other sources of PBTs such as internal-combustion engines, various consumer products and the past applications of agricultural and residential pesticide. Cumulatively, these *non-point* sources, though dispersed, may release significant amount of PBTs as well.

State and federal regulatory programs have been in place for several years and have significantly reduced use, release and environmental concentration of several PBTs. Our present system, however, is oriented toward reliance on statutes addressing a *single-medium:* either air, land or water. These statute do not fully address the potential for the cross-media effects of PBTs. This single-medium focus also produced a system that emphasizes *treatment* rather than *prevention* of pollution. Unfortunately, this contributes to continued PBT contamination since low-level PBTs can escape detection or treatment and, over time, accumulate to harmful levels.

Ecology received several comments about the need for a PBT Strategy and assigned them to the following categories:

- Comments related to children
- Comments related to food
- Comments related to cancer
- Comments related to endocrine disrupters
- Comments related to synergistics
- Comments related to fertilizers
- Comments related to pesticides

Ecology's evaluation and response to these comments follows.

Comments Related to Children

The Draft Strategy

Ecology's draft strategy recognizes the association of PBTs with a wide range of health effects in humans. Young children and developing fetuses were particularly susceptible because important organs, such as their central nervous systems, are still developing. At the same time, there are large gaps in available information about such health effects. Ecology's decision to develop a Washington PBT Strategy stems, in part, from both health concerns and these data gaps.

Public Comments

We heard many comments from groups representing children's health protection interests. Their concerns ranged from the increased exposure and sensitivity to hazardous substances among children to the need for more emphasis on how exposure affects developing fetuses. The organization Physicians for Social Responsibility concluded that government has failed to protect children's health.

Several individuals and organizations cited specific health trends and suggested these trends support the need for stepped-up efforts to reduce and eliminate PBTs. For example:

- One person expressed the opinion that autism is the "miner's canary" for children whose systems are the most sensitive to toxic substances and the least capable of getting rid of it. He expressed the opinion that we are in the middle of an autism epidemic because this disease now affects 1 in 200 children. He noted that more developed countries have had greater increases in autism.
- One person noted that during the period from 1973 to 1975, 78 percent of the reported cases of ovarian cancer involved female teens.
- One person noted that 17 percent of children under 17 currently suffer from learning disabilities due to toxin exposures.
- One person noted that one in 11 children has lead poisoning.

Several individuals and organizations provided examples of particular chemicals or products that currently pose health threats to children. Examples include:

- Mercury in children's vaccinations.
- Chemicals in fertilizers have been identified as potential causes of birth defects.
- Mercury amalgam fillings. One person described an experience 15 years ago in which she became very sick, was tested and was found to have heavy metals in her body from mercury amalgam fillings. Her children don't have these fillings. However, they also became sick and were found to have the same metals in their bodies.
- Scotchgard (which is full of arsenic) is used in day cares and shouldn't be.

- One person stated that one spoonful of Gerber Baby Food contains toxic chemicals at levels that are 100 times greater than levels generally considered safe or acceptable for small children.

Ecology's Review and Evaluation of Public Comments

Young children are generally considered to face greater risks from hazardous substances than older children and adults. Factors contributing to this greater potential include:

- A tendency to inadvertently consume more hazardous substances because of their hand-to-mouth behavior and play habits
- A higher ratio of surface area to body weight than adults, which aggravates the affect of dosages children receive through their skin.
- A tendency to more efficiently absorb substances through their digestive tract than adults.
- An increased sensitivity to hazardous substances exposure.

Scientific panels have long recognized children's increased susceptibility to hazardous chemicals.[1] Based in part on recommendations from these groups, prevention of unacceptable health threats to children has become the objective of most state and federal regulatory programs. For example, clean-up standards established under state and federal superfund programs are generally based on thresholds designed to protect small children.

Ecology's Conclusions

Children are often more susceptible than adults to the effects of exposure to PBTs. This increased vulnerability is explicitly considered when establishing requirements under current environmental programs. As Ecology implements the PBT Strategy, we intend to design and undertake chemical-specific action plans with this information in mind.

[1] NRC, 1993; NRC, 1994; NRC, 2000

Comments Related to Food

The Draft Strategy

The bioaccumulative nature of PBTs makes contamination of the food chain a particular concern. Ecology's strategy recognizes PBT concentrations can increase *up the food chain* and accumulate *in fatty tissues of animals such as fish, poultry and cattle.* Appendix A of the strategy summarizes fish and shellfish consumption advisories issued in Washington due to chemical contamination of fish and shellfish.

Public Comments

Public testimony and letters raised the following issues in connection with PBT contamination of the food chain:

- potential increased risks to children caused by PBTs in food and breast milk.
- inadequacy of PBT-monitoring in foods, especially imported foods.
- potential for increased cancer risks from natural substances in food.
- anecdotes about individual changes in personal eating habits generated by reading or hearing about PBT or pesticide contamination in foods.
- requests that government agencies provide additional information on contaminants in food and provide recommendations on what to avoid.
- one suggestion Ecology ask schools to offer an organic lunch program.
- one suggestion Ecology provide the public with information on benzo(a)pyrene (B(a)P) in 'commonly prepared foods.'

Ecology's Review and Analysis of Public Comments

Food represents the most important route for most PBT exposures; one study (Wild *et al*, 1994) estimates that food accounts for 99.96 percent of background human exposure to dioxins. PBTs' tendency to persist and accumulate in fatty tissue ensures that humans and other animals high on the food chain will amass relatively large concentrations of PBTs during a lifetime. And, concentrations will increase in proportion to the amount of meat and high-fat food in their diet. Steak, pork, certain fish, milk, eggs and cream are among foods likely to contain high concentrations of PBTs.

Children are especially vulnerable to PBT exposure. Ecology's proposed strategy recognizes that *particular risks may be posed to a developing fetus or young child where important organs, such as the central nervous system, are still under development.* An infant's dependence on mother's milk, which is high in fat and often contaminated with PBTs, can increase this vulnerability.

On April 12, 2001, high mercury residues in tuna prompted the Washington State Department of Health (DOH) to advise that women of child-bearing age and children under 6 not eat tuna steaks and limit the amount of canned tuna they eat. Similar warnings were issued by the U.S. Food and Drug Administration (FDA) for several species of ocean fish. And, based on mercury levels measured by Ecology, the DOH cautioned against consuming smallmouth bass from Lake Whatcom in Bellingham or walleye from Roosevelt Lake. Like the advisories summarized in Appendix A of the draft strategy, these recent warnings provide examples of cooperative efforts by agencies like the DOH, Ecology, the FDA, the U.S. Geological Survey and the U.S. Environmental Protection Agency (EPA) to publicize the risk of food-related PBT contamination.

The Washington State Department of Agriculture supports similar activities. For example, the agency publishes an annual report to the Legislature with results from pesticide testing of Washington fruits, grains and vegetables, both conventionally and organically grown. Much of this produce testing is done in concert with the FDA, which examines both domestic and imported foods for pesticides.

Despite these efforts, only a small percentage of the food consumed in Washington has been tested for PBTs or other chemicals. And what information is available can be difficult to locate. Consumers deserves ready access to the latest information available on food contaminants. The references cited at the end of this section provide information on contaminants in fish collected by Ecology in Washington State. Information on these and other Ecology studies are available at www.ecy.wa.gov/pubs.shtm.

Although naturally occurring substances in food also can have negative health impacts, animals have had sufficient time to adapt to the long-standing presence of these toxins by developing a natural ability to metabolize or neutralize them. This is not true of newly synthesized chemicals or metals such as mercury. These toxins do not degrade or they degrade slowly, and animals, including humans, have not developed natural defenses against them.

The decision to offer organic lunches rests with local school boards and school administrators and is beyond the scope of Ecology's authority. Perhaps discussions of this issue ought to be between parents, local citizens, school boards and school administrators.

Information on B(a)P, like other PBT residues in foods, ought to be tracked and publicized. Some B(a)P residues are the result of cooking methods such as barbecuing or smoking meats, while others are environmental and come from sources such as cigarette smoke, coal tar, automobiles exhaust or wood smoke. We believe informed behavior is enlightened behavior and seek to clearly communicate information to the public.

Ecology's Conclusions

Accurate, timely and relevant information is critical to enlightened decision-making. Ecology is committed to collecting and disseminating accurate, useful information about PBT residues in food, as well, as in our water, air, waste, soil and sediments. The Washington Department of

Health maintains a public web site with current information on *Fish and Shellfish Consumption Advisories Due to Chemical Contamination.* The web address is www.doh.wa.gov/ehp/oehas/EHA_fish_adv.htm.

We have several opportunities to improve the quantity, quality and accessibility of information about PBTs in food. The agency will consider these opportunities as it evaluates programs to monitor toxic substances in fish and shellfish throughout the state. As part of the new Washington State Toxics Monitoring Program, we recently began collecting fish in lakes and rivers that have not been tested before, but for which contamination is suspected or possible. We also hope to develop web sites where interested citizens can check out contamination of the fish in their local watersheds. And, as action plans for individual PBTs and PBT groups take shape, they may provide another good opportunity to collect, summarize and distribute information on PBTs in food.

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Serdar, D. and D. Davis, 1999. Lake Whatcom Watershed Cooperative Drinking Water Protection Project: Results of 1998 Water, Sediment and Fish Tissue Sampling. Ecology Publication 99-337.

Wild, S.R., S.J. Harrod, and K.C. Jones, 1994. *Influence of sewage sludge applications to agricultural land on human exposure to polychlorinated dibenzo-p-dioxins (PCDDs) and furans (PCDFs).* Environmental Pollution, 83:357-369.

Comments Related to Cancer

The Draft Strategy

PBTs are associated with a wide range of human health effects, including cancer. At the same time, there are large gaps in available information about such health effects. Ecology's decision to develop a Washington PBT Strategy stems, in part, from both health concerns and these data gaps.

Public Comments

The majority of individuals who support our efforts to develop a PBT Strategy cited concerns about cancer effects and felt that cancer risk is an important reason for moving forward on this issue. Several individuals pointed to particular cancer rates or trends. For example:

- Approximately 1.2 million new cancer diagnoses are expected in United States during 2000.
- Spokane cancer rates are above the national average.
- Teen-age women accounted for 78 percent of all case of ovarian cancer in 1973-1975.
- Cancer is now the number one disease for children.
- The annual incidence of breast cancer in Whatcom County increased 146 percent (from 58 to 143 cancers) between 1990 and 1998 according to St. Joseph's Hospital Cancer Committee 1999 Annual Report.
- According to the same report, the annual incidence of cancers of all kinds in Whatcom County rose 58 percent (from 487 to 828 cancers) between 1990 and 1998.

One person urged Ecology to look more closely at information related to the causes of cancer. Other individuals provided facts and opinions on about possible causes of cancer. For example:

- Only 20 percent of cancer are hereditary; 80 percent are due to environmental factors.
- Everyday activities such as diet and smoking cigarettes can increase cancer risks.
- There may be a correlation between incinerators and cancer rates.
- Increased rates of lymphoma and leukemia are due to Scotchgard, Diazinon and DDT.
- Do you think that one or more of these cancers in the last ten years would not have occurred if Georgia-Pacific (GP) had been totally chlorine free during the past 40 years, with the associated dramatic reduction in PBT emissions?

Finally, one person raised an equity question:

"How many extra women and children do you consider it to be *acceptable* to have contract cancer, going forward, so that Georgia-Pacific can continue to maximize its profits by using and emitting chlorinated compounds (PBTs) such as dioxins, furans, chlorophenols, etc?"

Ecology's Review and Analysis of Public Comments

After review of the comments we heard related to cancer rates and cancer risk, it's clear most people's concerns revolve around four important issues related to the scope and direction of Ecology's PBT Strategy:

- Cancer rates and trends in Washington State.
- Role of PBTs in promoting cancer.
- Opportunities for preventing cancer.
- Acceptable cancer risks.

Cancer is essentially the uncontrolled growth and spread of abnormal cells. There were 28,382 new cancer diagnoses and 10,270 cancer deaths in Washington during 1998, according to DOH, which estimates one in three Washingtonians will develop some form of cancer during their lifetime.

Washington's experience with cancer mirrors the United States. The National Cancer Institute estimates that approximately 2.5 million new cancer cases are being diagnosed each year. As other causes of disease have declined in frequency, cancer has increased in importance and is now the second most frequent cause of death in both Washington and the United States.[2] And, cancer, as a percentage of all deaths, has been steadily increasing since 1900.

The National Institutes of Health estimates that overall annual costs for cancer are approximately $107 billion. This includes $37 billion in direct medical costs, $11 billion associated with lost productivity due to illness and $59 billion for indirect mortality costs (cost of lost productivity due to premature death). Despite enormous expenditures on research and treatment, survival rates for patients with most major types of cancers have improved little in past 20 years. Consequently, about 40 percent of those who contract cancer die within 5 years, often after expensive, painful and distressing illnesses.

In general, scientists now believe cancer is an "environmental disease" in the sense that the incidence of cancer shows wide geographic variation and can be correlated with such variables as diet, lifestyle choices and exposure to chemicals and radiation. The proportion of cancers associated with various non-hereditary factors may range as high as 90 percent.

The issue of environmental pollutants and toxic chemicals as contributing factors in the rates of cancer incidence and deaths remains highly controversial despite extensive debate over the last 30 years. However, available estimates of the portion of cancer related to environmental pollutants generally range from 1 to 10 percent.[3]

The decision to proceed with plans to reduce PBTs does not revolve around settling the debate over cancer causes. The PBT Strategy is not predicated on an assumption that PBTs are responsible for any certain percentage of cancers. Indeed, with the common understanding that

[2] In 1998, cancer (all types combined) was the most common cause of death among Washington adults (ages 45-74).
[3] Doll, 1981; OTA, 1995; Higginson .

most cancers are caused by multiple factors, it is scientifically incorrect to argue that certain trends in mortality are attributable exclusively to any single factor.[4]

Ecology's Conclusions

Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. The disease is responsible for a significant number of deaths among Washington residents (approximately one in four deaths during 1998). Researchers remain uncertain about PBTs' contribution to current cancer rates. However, given that most cancers have multiple causes, with more than one factor contributing to cancer risk, Ecology believes it is prudent public policy to take advantage of all opportunities for preventing exposures to known or potential carcinogens.

[4] A classic example of this erroneously attributing cancer rates to single causes is illustrated by the increase in asbestos-related cancer in smokers and non-smokers.

Comments Related to Hormonally Active Substances

The Draft Strategy

Some PBTs have been identified as having hormonally active properties. The National Academy of Sciences has reviewed much of the currently available data and has concluded that there is as yet insufficient knowledge about mechanisms of action of various suspect agents to tie them to specific human health effects. Researchers at an EPA workshop on such chemicals reached similar conclusions. Ecology will continue to monitor developments on potential hormonal effects from exposure to such substances. The Agency bases some its concern regarding PBTs on the potential of some PBTs to have hormonal effects that influence health.

Public Comments

Comments about hormonally active chemicals related to concerns that such qualities of some PBTs be considered in Ecology's strategy. The following are comments related to this topic:

- Chemicals masquerade as hormones and affect children as they enter into puberty.
- Diethyl phthalates –are hormonally active substances.
- PBTs are associated with birth defects and are hormonally active.
- One person, a toxicologist had concerns about a–a'97 law that could affect research. He was specifically concerned about a toxicant (dibromopropane ddcp) for which he is seeking dollars to be able to study. He urges the Agency not to tie the hands of scientists wishing to do research.

Hormonally active chemicals detected in the environment have been implicated in a number of developmental and other problems in wildlife. Individual chemicals that have been studied affect hormone-related functions variably in different species, as well as tissues within a particular organism. As yet the mechanism by which such chemicals act like hormones is not yet clear. Whether or not, or to what extent hormonally active substances affect human health remains to be clarified. Ecology will continue to monitor research as it develops and will consider human health endpoints in implementing its PBT strategy.

Ecology's Review and Analysis of Public Comments

Ecology has been monitoring research literature on hormonally active substances, and is aware that some PBTs have some limited evidence that they may be implicated in hormonal function changes, particularly in wildlife. Ecology will continue to track the research literature on this topic and will incorporate information related to concerns about hormone active properties of PBTs in its strategy.

Ecology's Conclusions

Ecology is continuing to monitor research on the topic of hormonally active compounds and their relation to potential health effects. At the present time both the National Academy of Sciences and EPA have concluded that information relating hormonally active compounds to specific human health effects is not strong. Some researchers have implicated some PBTs as having hormonally active qualities. Some have been implicated in various developmental and other effects in wildlife. However, researchers comparing effects of the same chemical in different animal species, as well as in different tissues within the same and different species, have concluded that results found in a particular animal species cannot be extrapolated to other species, including humans. Ecology will consider hormonal effects from PBTs in its strategy, if data linking such effects in humans is developed. Much more knowledge about the mechanisms by which various suspected chemicals affect hormone function needs to be developed through research before definitive links to human health effects can be established.

Comments Related to Synergistics (Chemical Mixtures)

The Draft Strategy

The draft strategy summarizes available scientific information suggesting that a wide range of PBTs are present in Washington's environment and that they are associated with many harmful health effects. However, the draft strategy does not explicitly discuss the potential synergistic, antagonistic or additive interactions associated with exposure to PBTs.

Public Comments

Testimony and written comments suggest that Ecology give greater attention to the potential synergistic interactions of contaminants. However, people who commented also are aware of the lack of available data regarding the effects of specific combinations of chemicals. One person requested that Ecology provide additional information on what is known about synergistic interactions and who is currently researching the issue.

Ecology's Review and Analysis of Public Comments

Most diseases are complex and can involve a wide range of factors. Consequently, scientists and regulators have great interest in chemical combinations and the potential interactive effects of exposure to them. These interactions typically fall into one of four categories:

1. Synergistic – When the toxic effect of combining two or more chemical compounds is greater than the sum of their individual toxic effects.

2. Potentiation – When one substance does not have a toxic effect on a certain organ or system, but when added to a second chemical it makes the latter much more toxic.

3. Antagonistic – When one chemical compound interferes with the physiological action of another. In the case of toxic chemicals, exposure to the combination of two might be less toxic than their individual effects suggest.

4. Additive – When one toxic chemical compound added in small amounts to another strengthens its effect.

There have been few studies of these interactive effects. However, over the last 25 years, the need to address chemical mixtures has generated several reviews of issues and examples of potential toxic interactions.[5] More recently, EPA has compiled available studies involving two or more substances. Most of the studies focus on the effects of acute or short-term, high-level exposure rather than chronic or lifetime exposures. Less than 3 percent of the studies reported clear evidence of a synergistic interaction. EPA concluded that …*given the quantity and quality*

[5] See National Research Council. 1989. Drinking Water and Health. Selected Issues in Risk Assessment; EPA. 1987. Risk Assessment Guidelines of 1986; Calabrese, E.J. 1991. Multiple Chemical Interactions. Lewis Publishers; Goldstein, R.S., W.R. Hewitt, and J.B. Hooks. 1990. Toxic Interactions. Academic Press, San Diego CA.

of the available data on chemical interactions, few generalizations can be made on the likelihood, nature and magnitude of interactions…[6] .

Sources of information on specific chemicals and combinations of chemicals include:

- Toxicological profiles for individual hazardous substances prepared by the Agency for Toxic Substances and Disease Registry.
- National Research Council reports on hazardous substances.
- Specific health assessment documents prepared by EPA.

Scientists are not currently able to evaluate the wide range of combinations and potential interactions of contaminants found in Washington's environment. However, there are several ongoing research projects designed to do so.

Ecology's Conclusions

Most diseases involve complex processes influenced by a wide range of factors. Consequently, it is not surprising that exposures to chemical mixtures results in complex interactions. The limited available research findings suggest that doses of different chemicals can be treated as roughly additive in terms of their health effects. Nonetheless, the ability to predict the effects of chemical interactions is fraught with uncertainty. Recent development of the precautionary principle is, in part, a response to these scientific uncertainties.

[6] EPA 1988 as summarized in NRC 1994.

Comments Related to Fertilizers

The Draft Strategy

The draft PBT Strategy addresses fertilizers only in its *Current and Proposed Actions* section (page 22). Ecology was successful in convincing EPA to propose a reversal to an exemption encouraging agricultural applications of steel mill flue dust, which contains dioxins, arsenic, cadmium, lead and mercury . In addition, the draft strategy indirectly addresses fertilizers through its visions and goals statement. The Hazardous Waste and Toxics Reduction Program continues to seek ways to reduce and eliminate hazardous components, often unwanted industrial byproducts of fertilizers and soil amendments, such as arsenic, lead and dioxins.

Public Comments

Many people urged prohibitions on PBTs and PBT-tainted industrial wastes in fertilizers. Someone asked that fertilizers be addressed at the federal level. Another person requested that steel mill flue dust be subject to the same standards as other hazardous wastes and waste-derived fertilizers. This person also suggested that a regulation be developed to limit certain metals in fertilizers. There also was some discussion of dioxins.

Specific comments included:

- Prohibit use of PBTs in fertilizers.
- Farmers fear of confrontation with chemical company.
- Industrial waste in fertilizer – Ecology should take stronger stand regarding any PBT in fertilizer – “ban outright”.
- Can Ecology offer to work with groups about education – the Washington Tilth organization is willing to work on fertilizer issues?
- Chemical company sold a farmer a product with chemical that is harmful.
- Afraid of lawsuits.
- Chemical companies sell chemicals to farmers and they’re expensive.
- How will you advise growers to rid themselves of toxic chemicals?
- Can farmers be reimbursed for loss of chemicals which cannot be used?
- Farmers are trying to do their job; it is hard for them.
- Phosphate fertilizers have a lot of uranium – where does half life of uranium fall into PBT?
- Fertilizer company – Sound scientific research needed.
- Fertilizer company – Need to base actions on sound scientific research.
- Supportive of Ecology’s stand on PBTs disposed as fertilizer on food crops.
- Limit of PBTs in fertilizers should be zero.
- PBTs in fertilizers are a potential cause of birth defects.
- Issue of fertilizers needs to be addressed at the federal level.

- Washington uses 2.4 billion pounds of fertilizers per year.
- Look at the commercial fertilizer act of 1998.
- Dioxin – the average American exposure produces a 1-in-100 to 1-in-1,000 risk of cancer.
- Over 90 percent of dioxin exposure comes from food.
- Even if all PBTs were prohibited today, they would still show up in food – this makes it difficult for organic farmers.
- New York passed a law to alert the public when pesticides are going to be used, so that the public can take necessary precautions.
- Prohibit the use of PBTs in fertilizer.
- Adopt regulations that prohibit industrial wastes laden with dioxins and other PBTs from being made into fertilizers.
- Make steel-mill flue dust subject to the same standards as other hazardous wastes and waste-derived fertilizers applied to the land.
- Develop a regulation to limit concentrations of metals (including mercury, lead, cadmium and arsenic) in fertilizers sold in Washington State.
- Strengthen the language of Ecology's draft plan to prohibit, not just to limit, PBT contamination in fertilizer.
- A major loophole in the clean-up process remains unaddressed: off loading contaminated material from historic sources into fertilizers, topsoil and other products. Such off-loading is to stop if the state is to have a credible PBT Strategy.
- Please prohibit industrial wastes laden with dioxins and other PBTs from being made into fertilizers.
- Ecology should move quickly to stop the use of PBT contaminated material in fertilizers.
- Incinerator ash should be prohibited from use as fertilizer and be classified as hazardous waste.

Ecology's Review and Analysis of Public Comments

A majority of those who wrote or attended public meetings favor a prohibition on PBTs in fertilizers. Many of the concerns people expressed have already been addressed through research Ecology has conducted in the past few years. Low but measurable levels of dioxins, mercury and cadmium can be found in virtually all fertilizers, including organic types such as manure. Total elimination of these residual PBTs is probably not a realistic goal, however, Ecology is looking at the levels of dioxin in fertilizer and wood ash to determine if this should be regulated.
In June of 2000, the agency amended the *Dangerous Waste Regulations*, thus closing a loophole allowing the continued use of steel mill flue dust as fertilizer and making it subject to the same requirements as other wastes used upon the land.

The state Fertilizer Regulation Act of 1998 limits the amount of nine metals that can be added to the land via fertilizer. This limit, based on both metal concentrations in the fertilizer and the maximum fertilizer application rate, provides a good measure for regulating the addition of metals to Washington's soils. Agricultural soil in Washington appears to contain much less dioxin than EPA's published national average.

Based on public comments, there appears to be some fear of chemical and fertilizer companies among farmers, who alluded to confrontations and lawsuits initiated against them by chemical companies.

Ecology's Conclusions

Many of the concerns raised in letters and at public meetings have already been addressed. For example, a loophole in regulations allowing less stringent standards for steel mill flue dust has been closed. And, Ecology's Hazardous Waste and Toxics Reduction Program will continue to monitor the level of inert industrial by-products found in fertilizers used in Washington.

Comments Related to Pesticides

The Draft Strategy

The draft PBT Strategy mentions several pesticides, including some previously banned. It also addresses pesticides through clean up, use reduction and education about alternatives. The draft strategy acknowledges that a wide range of PBTs are present in Washington's environment and that they are associated with a wide range of harmful health effects.

Public Comments

Many comments made at the public meetings were *informational* and addressed specific pesticides. Several people asked about disposal of pesticides, and farmers expressed concerns about pesticide companies. Several people also questioned why the proposed strategy lists banned pesticides.

Comments included:

- DDT was outlawed in 1972, but still shows up in vegetables.
- Endosulfan is still in use and is found in 121 of the 717 tomatoes handled by the Department of Agriculture. DDT shows up in carrots – as does lead.
- Diazinon was used as a nerve gas by Hitler in World War II.
- How can we advise farmers on disposing of these chemicals.
- Afraid to make waves – farmers feel stuck.
- Is there 2-4D in weed/feed?
- Chemical companies sell chemicals to farmers (alters DNA – these chemicals in products).
- Can farmers be reimbursed for loss of chemicals that cannot be used?
- Farmers fear of confrontation with chemical company.
- Benzene single largest pesticide used.
- Dedicate funds to evaluate natural methods of pesticides, so farmers can know what's in them.
- Good nutrients in soils require less pesticides-sustainable crops and also address economics to farmers.
- Require labeling on pesticides similar to warning on cigarettes: "This product may cause birth defects, cancer, or major disability."
- Where will blame and responsibility ultimately end up with fertilizers, pesticides… and the things that end up in the water?
- No integrated pest management in countries such as China.
- Promoting a video tape on mercury and pesticides issues.
- Dursban – expose – what to do with extra product. FDA allows sale until gone – should not happen. When banned, should be immediately banned.

- Plant nurseries are encouraged to buy up Dursban because it's going to be banned.
- When Dursban banned, Diazinon also should been banned.
- Diazinon/Dursban already persistent on fields.
- Scotchgard has arsenic.
- Diazinon attacks and collects in the brain, prostate, breast – it has been banned but remaining supplies are still for sale.
- Of the nine chemicals identified, six are pesticides that were banned by the federal government 10 to 20 years ago. Listing these chemicals is sensationalistic. Because their production, sales and use have been illegal for so long, there should be no new introductions into the environment. Listing them as PBTs implies that Ecology has a method of reducing their residues in the environment. This is misleading the public.
- Although each of the pesticides listed as a PBT was phased out years ago and formally banned by EPA, the draft strategy appears to presume that more pesticides will be identified as PBTs. What is the basis for this assumption?

Ecology's Review and Analysis of Public Comments

There are several reasons for including banned pesticides on Washington's list of priority PBTs. These pesticides continue to be found in old stockpiles and storage areas. They also are very persistent; although banned from domestic use or production for more than 20 years, they remain detectable in samples routinely collected statewide from fish tissue, sediment and water. Approximately 57 percent of the waterbodies listed in Appendix B of the draft PBT Strategy exceed water quality limits for banned pesticides mentioned in the strategy. Listing calls attention to the fact that they remain in our environment and may need attention. Listing also prioritizes them so when clean-up opportunities arise, areas contaminated with these pesticides can be handled faster. However, solutions to the problem of ridding agricultural and residential soils of these residual pesticides are few and costly. Continued collection of unused or prohibited pesticides and more effective erosion control measures are necessary to further reduce the potential for toxic release into state waters.

Ecology's Conclusions

Many of the concerns raised at public meetings and in writing are about pesticides currently in use rather than those that are banned or banned and stockpiled. Ecology's regulatory authority does not extend to pesticides allowed under federal and state regulations. However, the agency will continue to study both project-specific and area-wide pesticide releases and inform both clients and the public of its findings. Ecology also plans to cooperate with agricultural extension offices and other agencies to better inform farmers about improved erosion-control practices and to help urban residents reduce their use of any gardening products that may contain PBTs.

Vision, Goals and Guiding Principles

The draft PBT Strategy articulates the need to continually reducing risks to human health and Washington's environment from exposures to PBTs. It includes the following goals:

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

The draft strategy expresses the intent of Ecology to change the way we look at PBTs, 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.

The agency received several comments about the PBT Strategy's vision, goals and guiding principles. We assigned them to the following categories:

- Comments related to point and nonpoint equitability.
- Comments related to environmental justice.
- Comments related to the *precautionary principle*.
- Comments related to economics.
- Comments related to labor.

Ecology's evaluation and response to these comments follows.

Comments Related to Point and Nonpoint Equitability

The Draft Strategy

Activities that produce and release PBTs include both highly visible *point* sources, such as large industrial sites, and smaller *nonpoint* sources, such as outdoor burning, motor vehicles and disposal of consumer products. Point sources have been the traditional focus of pollution control strategies. In addition, *historic* activities and sources have left PBTs in Washington's environment. Combined releases from ongoing and historical sources have resulted in measurable levels of PBTs in the air, water, soils and sediments throughout the state. Therefore, Ecology feels it is essential that the PBT Strategy give equal attention to both point and nonpoint sources.

Public Comments

Ecology heard a variety of comments about point and nonpoint source equitability. Examples include:

- How much pollution is attributable to industry vs. individual?
- Difficult to isolate contributor(s).
- Larger industry problem greater than individual acts – wrong for industry to continue.
- Air quality engineer – All concerned about issue – if public thinks industry and Ecology are going to hand this to us – we're wrong – each of us needs to make changes in our decisions.
- Easy to say ban industry – but we use products.
- Choices to make – cars, etc – can make choices for ourselves.
- Need to find common ground and common solutions.
- Industry has clean-ups – automobile pollution continues to rise.
- Easier to go after industry and not individuals, but problem is also individuals.
- Further improvements can be made – there are costs – barbecuing , driving .
- Make common goals and choices – it's easy to point at industry, Ecology can't regulate the citizenry.
- All sources of PBTs, including individual and nonpoint sources, must be addressed equitably with whatever specific preventive and corrective measures that may be required.
- The vast majority of action items in the *Potential Measures to Prevent Uses and Releases of PBTs* section in the draft strategy are oriented at business and industry, which are the sources where most of the pollution reduction has occurred to date.
- PBTs are equitably addressed in action plans, progress assessments and informational activities.
- If Ecology is to address PBTs, then all sources must be dealt with. The business and agricultural communities should not be singled out for more onerous restrictions. Society's contributions to PBTs in the environment must be addressed and regulated.

- The implementation of any regulatory program(s) addressing PBTs should apply in an equitable manner to all known contributors and inventories. Statutory authority to address public sector releases may be necessary.
- It is critical that the state not merely duplicate the regulatory requirements being considered at the federal level and in international negotiations. List of various efforts. "We recommend that the state carefully review these existing initiatives to ID opportunities to avoid unnecessary duplication of efforts and focus its resources on the priority issues specific to Washington." Focus on clean-up.
- There is no evidence for contaminant reductions in non-regulated sectors of society…..must identify and quantify non-regulated or nonpoint sources. Only then will data correctly reflect the extent of the potential PBT problem. Only then can data be available for assessment of risk to equitably and cost effectively address point and nonpoint sources in potential chemical-specific action plans.
- The draft strategy only briefly mentions emissions from residential wood burning, backyard trash burning and vehicle emissions. If a balanced and accurate representation of the policy's implications is to be achieved, Ecology must clearly describe the types of source reductions that will be required of nearly all Washington citizens.
- Even though the draft strategy acknowledges the broad universe of PBT sources, the Proposed Actions list is almost entirely skewed toward additional controls on industrial point sources. The draft strategy must be modified to include concrete proposals for the management of PBTs from both nonpoint and non-industrial sources.
- Specifics are lacking on key elements such as addressing many nonpoint sources. While the strategy provides examples of approaches to dealing with point sources such as discharges, it contains too few ideas for dealing with more dispersed sources like automobiles and other B(a)P sources.
- Ecology will need to equally address individual, industry and nonpoint source PBT contributions. Data need to be generated or summarized that can accurately reflect the total contribution of PBTs to the environment. Action plans can then effectively target key areas where PBT reduction can realistically be achieved.
- A PBT Strategy must address all sources. Association of Washington Business (AWB) commends the Department for addressing all sources of PBTs, including those which originate from sources other than industry. Businesses are already highly regulated with regard to environmental policies in Washington State. Future regulations should focus on all sources equitably.
- Global sources must also be considered. We cannot discount the introduction of PBTs from other countries via air and water mediums. For instance, PCB levels found in salmon are still high, even though the U.S. no longer produces PCBs. The same is not true for Asia or Russia.
- PBTs are not easily controlled by regulatory means in the current environment. Ecology cannot regulate salmon returning to their home waters with a 0.7 ppm body burden of PCBs accumulated while in the Pacific Ocean. Regulatory bans are already in place on DDT, DDE, Aldrin, Dieldrin and PCBs, yet these materials are found throughout the environment. Mercury and polycyclic aromatic hydrocarbons (PAH) are by-products of transportation and power generation – sources that society values so highly as to preclude any discussion of a ban.

Ecology's Review and Analysis of Public Comments

The comments in this category reflect several views, however, most suggest that Ecology equally address industry, individual and nonpoint sources of PBTs. The agency clarified this point in the proposed PBT Strategy submitted to the state Legislature in January 2001.

We recognize that further reduction of nonpoint PBT sources will take several years and require consistent public education, readily available alternatives, and a public willing to use those alternatives.

Ecology's Conclusions

Ecology considers the PBT environmental challenge to be a *societal* problem. Sources of PBTs include both *point* and *nonpoint* sources. Evolution from "command and control" regulation, focused solely on point sources, towards effective management of nonpoint sources will require increased awareness, as a society, of the long-term consequences of our individual activities and their contribution to PBTs in our environment. And, we must be willing to seek and use alternatives products if we are to ensure nonpoint releases of PBTs are effectively and measurably reduced over time.

Comments Related to Environmental Justice

The Draft Strategy

The draft PBT Strategy does not specifically speak to environmental justice per se. However, environmental justice is a fundamental operating principle of Ecology and is, therefore, implicit in the PBT Strategy.

Our awareness and regard for environmental justice have influenced the PBT Strategy from the outset. A basic premise of environmental justice is prevention of demographic or geographic discrimination. In the PBT Strategy, the agency has targeted the worst of the PBTs, regardless of demographics or location. The PBT Strategy will be sensitive to community, cultural and economic values, and chemical action plans will pay particular attention to the potential for exposure as the strategy is carried out.

Public Comments

Ecology received comments related to environmental justice:

- The release of PBTs is 'totally indiscriminate genocide and it's legal.'
- Businesses and industry move their pollution into low-income neighborhoods where the residents can't afford to live elsewhere.
- The public doesn't have the information on how much an individual company pollutes – could take company to court if the information were available.

Ecology's Review and Analysis of Public Comments

Although these comments do not offer suggestions for the PBT Strategy, they do show serious concern for public health and PBTs. They also imply support of increased legal restrictions on PBT releases. These concerns can inform the strategy; Ecology must be sensitive to strategy impacts upon poorer communities and communities of color. Legal restrictions or protections must be equitably crafted, applied, and enforced statewide.

The third comment suggests that information about the pollution a company releases is not publicly available. In fact, considerable information is available – from Ecology, EPA and other regulatory agencies. Government agencies are required by law to make their information available to the public. For example, Ecology reports annually on permitted releases and on enforcement and penalties levied against those who exceed release limits.

Ecology's Conclusion

Ecology will heed the precepts of environmental justice as it develops and carries out the PBT Strategy. We will work with local communities, governments, tribes, businesses and individuals to ensure environmental justice is part of every action plan's framework. In the context of environmental justice, the agency will do everything possible to ensure broad public participation and open dialogue with all stakeholders.

Comments Related to the Precautionary Principle

The Draft Strategy

The precautionary principle is designed to promote a *better-safe-than-sorry* approach to potentially hazardous technologies. In its original form, it includes several key features:

1. Places the burden on proponents of hazardous activities to demonstrate that the activity is safe.
2. Requires zero discharge of hazardous substances.
3. Emphasizes pollution prevention rather than control and reclamation.

Ecology did not include explicit references to the precautionary principle in the draft PBT Strategy. However, the strategy does contain several provisions that imply the agency will use the precautionary principle as a guideline. For example:

- The draft document summarizes the present situation as one in which *"…most regulatory approaches 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 PBTs."*
- The draft's *Vision of Change* proposes moving from *"heavy reliance on risk assessment"* to *"precautionary approaches for addressing PBTs."*
- Among the *Guiding Principles* of the draft PBT Strategy is the proposition that *"…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…"*

Public Comments

Several individuals requested greater clarity about Ecology's intention to use the precautionary principle as a guideline in executing the PBT Strategy. For example:

The report suggests moving PBT control from heavy reliance on risk assessment to precautionary approaches. It is unclear what these precautionary approaches are and how the Department of Ecology suggests they differ from a risk assessment approach. The Department needs to clarify its use of risk assessment and precaution.

Other individuals and organizations encouraged Ecology to explicitly include the principle in the Washington PBT Strategy. Several lines of reasoning were used to support these recommendations:

- Adopting the precautionary principle is critical to making progress because the current system is not working.
- The precautionary principle acknowledges the limitations of current scientific knowledge and the inability to identify safe levels of exposure.
- A new book on risk assessment should be used to counter the "jobs vs. environment" argument.
- The precautionary principle places the burden of proof on polluters and this is a more ethical/moral approach than our current systems.
- The precautionary principle encourages prevention which is preferable to spending lots of money for cleanup or to treat health problems caused by PBTs.
- The precautionary principle appears in several international treaties applicable to activities in the United States.

However, many individuals and organizations argued Ecology should not incorporate the precautionary principle into the strategy. They gave the following reasons:

- The precautionary principle is highly subjective and does not provide an intelligible principle to guide decision-makers.
- Application of the precautionary principle is inconsistent with most state and federal laws and regulations.
- Application of the precautionary principle would create significant societal impacts and would prevent consideration of costs, technical feasibility and environmental impacts associated with substitutes and benefits of the PBT chemical or activity.
- The precautionary principle results in requirements being based on emotion – not sound science.

Ecology's Review and Analysis of Public Comments

Ecology believes that the precautionary principle should be a key feature of Washington's PBT Strategy. However, comments we received raise several important questions:

- To what extent does the precautionary principle represent a significant shift in environmental policy that may be inconsistent with existing state and federal laws?

- Will reliance on the precautionary principle in decision making prevent consideration of technical feasibility, costs, net environmental impacts and the benefits associated with particular substances or activities?

- Is the precautionary principle scientifically credible?

The precautionary principle originated in Europe in the early 1970s and now appears in over a dozen international treaties, including the Great Lakes Bi-National Toxics Strategy and the 1992 Rio Declaration on the Environment and Development. The precautionary principle also is identified as a guiding principle in a report and recommendations prepared by the President's Sustainability Commission.

While state and federal laws do not include explicit references to the precautionary principle, precaution in the face of scientific uncertainty is built into most current regulatory programs. This precautionary approach is reflected in the following ways:

- Conservative default risk assessment parameters and assumptions which stress environmental and human health protection.
- Regulations that ban or phase out hazardous substances or activities.NOTE:
- New-source review programs.
- Pollution-prevention programs.

The PBT Strategy, including the precautionary principle, is presently being reviewed by the Washington Legislature. The future of Washington's PBT Strategy will be determined by the outcome of the review and subsequent funding decisions.

A number of individuals challenged the precautionary principle for lack scientific integrity, charging that it promotes decisions based on emotion rather than sound science. For example:

- A PBT Strategy must be based on science-based human health risk assessment. Ecology should not base their strategy on the "precautionary principle". The Department should not set state policy based on unquantified potential impacts of these substances.
- Ecology's proposal to discard dispassionate scientific analysis threatens the credibility of the entire PBT Strategy.
- The PBT Strategy should focus on the virtual elimination of risk from the chemical and not elimination of the chemical itself…the science of toxicology and risk assessment can be used to determine acceptable exposure levels to the PBTs identified.
- Use of the "precautionary principle" precludes scientific risk assessment. Because it is scientifically impossible to prove "no harm", we halt all advances.
- The consideration of an element or chemical compound for special regulatory attention (hereafter, a "PBT") should be based on credible scientific information detailing the real and quantifiable ecological or human health impacts associated with the element of chemical compound.

NOTE: There are numerous situations where agencies have acted to ban or phase out the use of hazardous substances/activities. These include (1) phasing out leaded gasoline, most uses of PCBs, and use of CFCs under the Toxic Substances Control Act; (2) banning certain chlorinated pesticides such as DDT, heptachlor/chlordane, and aldrin/dieldrin; and (3) establishing land disposal bans/restrictions under state and federal hazardous waste management laws. More recently, EPA has proposed to phase out mixing zones for PBTs in the Great Lakes.

- Any Washington State strategy should be based on risk-based analysis and risk management evaluations, not simply the elimination or zero discharge of PBTs.
- Concerned about the explicit effort to replace science and risk assessment with a "precautionary" approach that apparently ignores the role of science and risk.
- It is essential that Ecology continue to apply supportable scientific assumptions to the regulations of PBTs.

We agree that the PBT Strategy ought to be based on sound scientific information. We also recognize that there exists a tension between the availability of scientific information and the need to preempt apparent threats to environmental or human health. A shortage of scientific information may give rise to uncertainty, but it does not necessarily free us from responsibility to act. In its summary of the statewide salmon strategy, the Governor's Salmon Recovery Team alluded to the precautionary principle and acknowledged the need to sometimes act in the face of uncertainty:

> "It is important to emphasize that science is not a panacea for salmon recovery. Science can help provide direction and answer some key questions, but should not be expected to solve all problems. Science may simply not be able to answer some questions; in some cases suitable technologies may not exist, and in others, results from needed scientific investigations may take too long to be of help with current problems. Uncertainty will always be a part of natural resource management… In the context of the strategy [best available science] means that the best scientific information available on a subject will be used to inform public policy decisions."[7]

The International Joint Commission grappled with the same issue when developing its strategy for persistent toxics in the Great Lakes basin. They, too, opted for a precautionary stance:

> "The commission recognizes that scientific data are open to interpretation and that, not withstanding the confirmed cause-effect link in some cases, unequivocal conclusions may be difficult to reach in others, especially if individual studies are considered in isolation. With low contaminant concentrations, subtle effects and potentially confounding factors, equivocal evidence of injury to humans by persistent toxic substances may be difficult or impossible to obtain. However, at some point, the emerging mass of data and information must be accepted as sufficient to prompt or, in the case of the Agreement, ratify action against environmental contaminants. Therefore, the commission has adopted a weight of evidence approach. Taking the many studies that indicate injury or the likelihood of injury together, we conclude that the evidence is sufficient that many persistent toxic substances are indeed causally involved, and there can be no defensible alternative: their input to the Great Lakes must be stopped. The urgent need is for effective programs to achieve virtual elimination."[8]

[7] Governor's Salmon Recovery Office. 1999. Extinction is Not An Option: Statewide Strategy to Recover Salmon (Summary Report). September 1999. (p. 31)
[8] International Joint Commission. 1992. The Sixth Biennial Report on Great Lakes Water Quality. Ottawa and Washington DC.

Judgments on the quality of science need to take into account that most environmental laws and regulations are intended to *prevent* damage to environmental and human health. Agencies have recognized that in order to prevent environmental hazards, it is often necessary to take regulatory action when there is some evidence of hazard – but well before that evidence is what scientists would universally regard as conclusive. This precautionary approach toward potentially hazardous activities is generally supported by the public,[9] has been upheld by the courts,[10] is reflected in recommendation by expert scientific review panels[11] and appears in numerous international treaties[12].

It's also important to recognize that environmental or human health policy is rarely based purely on science. Those who make public policy decisions – elected officials and stakeholders – also must consider a host of other questions, including social, legal, ethical, technical and economic questions. These other arenas, too, can become a source of contention over environmental and public health policy. Occasionally, opposition to policies carried out by Ecology has masqueraded behind debate over "good" science versus "bad" science[13]. Gordon K. Durnil, former U.S. Chairman of the International Joint Commission, made the following observations on that particular controversy: [14]

> "Now I really don't want to spend a lot of time here attempting to distinguish good science from bad. I will say that you do need to put faith in experts who have no ax to grind, whether in agreement or disagreement with the prevailing views, and you

[9] With respect to environmental problems, the public generally expresses the opinion that it is "better to be safe than sorry". For example, the Harvard Center for Risk Analysis surveyed public attitudes toward risk assessment and regulatory agencies' use of such assessments. People were asked whether they agree with the statement "When scientists are unsure about how harmful pollution is, environmental regulations should be designed to err on the side of safety, even if that makes regulations more expensive". Over three-quarters of those surveyed indicated they strongly agreed (20%) or agreed (56%) with the statement. (Graham, J.D. and S. Putnam. Does the Public Support Risk Analysis? Risk in Perspective (January, 1994), Volume 2, Number 1)

[10] For example, in affirming EPA's limits on lead in gasoline, Judge Skelly Wright of the D.C. Circuit Court of Appeals wrote "…[w]here a statute is precautionary in nature, the evidence is difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge, the regulations designed to protect public health, and the decision that of an expert administrator, we will not demand vigorous step-by-step proof of cause and effect. Such proof may be impossible to obtain if the precautionary purpose of the statute is to be served….

[11] For example, the National Research Council's Committee on Environmental Epidemiology concluded that "…public health policy requires that decisions be made despite incomplete evidence, with the aim of protecting public health in the future…" (National Research Council. 1991.

[12] For example: (1) Principle 15 of the 1992 Declaration on Environment and Development states "…where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation…" (2) 1992 Framework Convention on Climate Change states "…parties should take precautionary measures to anticipate, prevent, or minimize the causes of climate change and mitigate its adverse effects…" (the Framework also rejects "lack of full scientific certainty" as a reason for postponing preventive measures.)

[13] Landy et. al. have criticized EPA for translating public policy choices into narrow technical choices. They concluded that "…[d]etermining how much protection to provide, and to whom, is thus not a purely technical choice. Yet EPA repeatedly treated "safety" as if it were a scientific notion definable by experts, rather than a social construct necessarily based on values as well as science…" (p. 279) [Landy, M.K., Roberts, M.J. and S.R. Thomas. 1990. The Environmental Protection Agency: Asking the Wrong Questions. Oxford University Press. New York and Oxford].

[14] Durnil, G.K. 1995. The Making of a Conservative Environmentalist. Indiana University Press. Bloomington, Indiana.

> obviously need confidence in your underlying science. Think about it. Who would want to make a decision based on bad science? I would just very briefly offer here what seem to be the definitions most often used by those who bring up the subject:
>
> Good science: When the conclusions match those of the reader, the reader is sure the report was based on good science.
>
> Bad science: When the conclusions disagree with the conclusions of the reader, obviously bad science has been applied.
>
> Point of view seems to be the determining factor in this debate. …The good science/bad science debate is too often very much a dilatory tactic being deliberately practiced…"(Durnil, pp. 95-96).

Measures to address environmental problems must have a sound scientific and policy basis, but respect for the limits of our scientific knowledge means that the inability precisely define risk should not be used as a reason to postpone measures to prevent threats of serious, cumulative or irreversible environmental damage.

Ecology's Conclusions

The precautionary principle is one of ten guiding principles that Ecology identified to help guide the PBT Strategy. The agency heard opinions both supporting and opposing use of the precautionary principle in the revised strategy. We continue to believe it should be included as one of the strategy's guiding principles. However, based on that review, there are several points about practical application of the principle that require clarification.

- **Consistency with Current Laws and Regulations:** Most state and federal laws are based upon precautionary or preventive approaches to environmental problems. Consequently, we believe that application of the precautionary principle is consistent with current laws.

- **Practical Considerations Associated with Phasing-Out PBTs:** Once a substance has been identified as a PBT, a full range of responses are possible. Options include control, prevention, use reduction and phase-out. Consistent with many current environmental laws, application of the precautionary principle creates a preference for the use of safer alternatives, in this case, prevention. However, that presumption can be overcome based on consideration of the technical, economic, and social circumstances surrounding the specific activity. With respect to the cleanup of historical releases of PBTs, the situation is somewhat more complex. In these situations, the agency must consider the environmental threats posed by these contaminants as well as threats posed by the cleanup measures themselves. Consequently, efforts to cleanup historical releases will continue to be guided by risk assessment/risk management concepts.

- **Role of Scientific Information:** Measures to address environmental problems must have a sound scientific and policy basis. Application of the precautionary principle will not create a system driven by emotion rather than science. Substances that are candidates for may the

priority list of PBTs will undergo a rigorous scientific review. However, respect for the limits of our scientific knowledge means that the inability to assess risk precisely should not be used as a reason to postpone measures to prevent threats of serious, cumulative, and/or irreversible environmental damage.

Comments Related to Economics

The Draft Strategy

The PBT Strategy draft leaves no question that economic factors will be considered in its implementation. And, short-term impacts to businesses and workers are equally important. At the same time, we have not attempted to project the actual costs and savings related to a PBT Strategy; it is simply too early.

The draft suggests a range of economic incentives likely will be necessary. These might include tax or fiscal rewards for removing waste, installing pollution prevention equipment or switching to less toxic alternatives. The strategy also calls for better accounting of related costs, such as life-cycle costing for industry, avoided public health costs, avoided environmental clean-up costs, compliance costs and waste management costs. Moreover, the strategy will engender new efforts to assess the economic implications of PBT clean-up, reduction and replacement.

Public Comments

Many people urged Ecology to carefully consider all the economic implications of the PBT Strategy before making any decisions. Reducing negative fiscal impacts to businesses and workers was a common theme, as was the potential to use tax and other fiscal incentives. Others expressed concern that fees or taxes could be attached to chemicals targeted by the PBT Strategy.

Business owners worried a ban in Washington on chemicals legal elsewhere could put them at a competitive disadvantage in domestic and world markets, while others pointed out that prevention up front could alleviate significant public health and environmental clean-up costs down the road.

Comments included:

- Consider fiscal incentives.
- Ecology is commended for spending funds on the PBT issues.
- Danger of chemical vs. economic worth.
- Consider buy-back program.
- Economic impact on business and families should be considered.
- It seems that the more toxic something is, the less it costs – The safer it is, the more it costs!
- Allow funds to do more research.
- Zero impact increases costs of products 500-600 percent.
- These chemicals are used in other countries, U.S. is being punished for compliance.
- Puts burden on food producers, puts them out of business.
- Economics and environment are intertwined.
- Industry – how the public's health can be put second to economics. If an individual did that to their own home, they'd be in prison – yet industry is allowed to put harmful pollutants into air.

- Other costs – cutting down on driving and barbecuing.
- Paper Industry – we're at 95 percent pure – getting the added 5 percent would be cost prohibitive.
- Paper Industry – economic costs and lifestyle changes need to be considered.
- Labor – we don't want to lose jobs, nor do we want to pollute the environment.
- Consider tax incentives.

Ecology's Review and Analysis of Public Comments

The PBT Strategy has spawned a range of economic concerns. The agency is uncertain of all the economic implications of the strategy. Until further study is undertaken, this uncertainty makes economic projection unprofitable. However, we are committed to further analysis of costs and benefits as the PBT Strategy unfolds in the coming years.

As the agency develops chemical action plans, we will consider economic factors. Action plans will address economics in detail and only after ample time for dialogue with stakeholders. In addition, we will subject chemical action plans to State Environmental Policy Act (SEPA) review, which requires consideration of adverse impacts, including economic ones.

Ecology's Conclusions

Ecology shares concerns about the economics of the PBT Strategy with those who wrote and attended public meetings. We expect economic questions will be candidly posed and unequivocally addressed once chemical action plans are initiated, but doing so requires adequate funding for comprehensive economic assessments.

Examining the economics of our PBT Strategy is both necessary and challenging. The true costs of PBT reduction and elimination are unclear at this time. While some factors are easily identifiable, others remain elusive. We can, to a certain extent, project the availability of appropriate technology, the probability of Legislative funding and the direct and indirect costs of PBT management and disposal. The long-term price of harm to human health, contaminated groundwater, lost habitat, poisoned breast milk and toxic shellfish are less predicable.

We are determined to make the PBT Strategy work and to do so with fiscal responsibility. Costs will be fairly shared among those who contribute to PBT impacts and those who benefit from PBT reduction and elimination. The strategy will include creative, appropriate and fair fiscal incentives, and it will recognize and speak to both short- and long-term costs.

Comments Related to Labor

The Draft Strategy

There is only one direct reference to labor in the draft PBT Strategy: Ecology's collaboration with other state agencies, including the Department of Labor and Industries in *Walking Our Talk* (page 21). Although we recognized labor has an interest in the PBT Strategy, their interest has been enumerated with that of others who also are subject to frequent PBT exposure.

Public Comments

At public meetings, Ecology heard a consistent message about PBTs and labor: include labor to carryout the PBT Strategy. Not only do workers often have greater PBT exposure, according to testimony, they also have considerable experience in handling PBTs. None of the labor-related comments were opposed to the PBT Strategy.

Comments included:

- Make workers' health a priority.
- There are serious occupational health PBT hazards.
- There's a generational impact – workers take the chemicals home and expose their family members.
- Encourage industries to protect the environment and the workers.
- It's crucial that Washington labor be involved to identify 'just' transition issues.
- Labor needs to be at the table, transitioning safely and economically.
- Regarding agriculture, labor and the environment, justice demands that research not obstruct action.
- Workers have special information to bring to the discussion.
- Labor has the right and responsibility to be at the table.
- Workers' health is hardly mentioned. This is a huge oversight. Much of what is known about the dangers posed by these chemicals is based on occupational health research.
- Labor should not have been omitted from the strategy.
- Welcome the labor community – workers have real concerns and information.
- Labor wants a 'just transition.'
- As a labor movement, we don't want to lose jobs, but we also don't want to pollute the environment.
- Labor has been at the table, but not with Ecology. The technology is there, but government offers to create a corporate welfare program that discounts the safety and welfare of workers.
- Washington workers and their unions have a right to know about impacts and alternatives and a right to fully participate in the public process when it comes to planning PBT phase-outs. There's a lot at stake and a lot to contribute.

Ecology's Review and Analysis of Public Comments

Washington's Department of Labor and Industries (L&I) has been part of a network of state agencies routinely briefed on our progress with the PBT Strategy.

However, Ecology has little experience working directly with labor groups on major environmental policies. Typically, the agency has left labor-related issues to L&I and others. Likewise, labor has infrequently approached us with specific issues. However, we have come to recognize that the PBT Strategy is an issue of mutual interest to both labor and Ecology, and we welcome labor's collaboration. Nationwide, it has become increasingly common for labor interests to take up environmental issues. Ecology welcomes this in Washington.

Organized labor and labor in general is one of several sectors in Washington with an interest in PBT issues and successful strategies to reduce and eliminate them. Parents, farm workers, business owners, drivers, consumers, the educational system and industry, as well as local, state and federal governments and public health officials are but a few examples of others with standing in the PBT debate. Clearly, Ecology must successfully engage all stakeholders, including labor.

Ecology's Conclusions

Labor is a critical player in the PBT effort. They recognize this as an opportunity to work constructively with Ecology, L&I and management for mutual benefit. For its part, the agency plans to take advantage this opportunity to work with labor and enlist their resources in the PBT effort.

We understand the need to collaborate with labor, unions and L&I. And at the same time, the agency is committed to working with business toward workable transitions necessitated by the PBT Strategy and its chemical action plans.

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Statutory Foundation for the Washington PBT Strategy

Ecology's statutory framework consists of laws that establish its responsibility and authority to protect human health and the environment in Washington. Successfully reducing and, where possible, eliminating PBTs requires an innovative blend of these laws along with policies that effectively integrate air, water and waste requirements. The foundation for the proposed PBT Strategy is derived from several 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 provide the basis for developing and implementing a comprehensive approach for addressing PBTs.

Ecology received several comments about the statutory basis for developing a PBT Strategy and assigned them to the following categories:

- Comments related to Ecology's authority and business practices
- Comments related to government in general
- Comments related to the Legislature
- Comments related to funding
- Comments related to SEPA

Ecology's evaluation and response to these comments follows.

Comments Related to Ecology's Authority and Business Practices

The Draft Strategy

Although the proposed PBT Strategy does not describe Ecology's current business practices, it does identify statutes that form the foundation for the strategy. The strategy explains why PBTs are a problem and then proposes an approach to finding solutions. What is perhaps most important to note about the strategy is that it does not rely on unilateral actions; it requires cooperation not only among agencies, but also business, government and individuals. Without cooperation, the strategy cannot succeed.

Public Comments

Comments pertaining to Ecology's authority and business practices were varied and, in many cases, overlapping. Some comments expressed a desire for Ecology to show more leadership, while others asked how the public could support the agency's efforts. There were numerous comments about Ecology's authority to develop and implement a PBT Strategy, as well as comments about the agency's use of available laws and regulations. Some people asserted that the agency has adequate authority to implement a PBT Strategy; others questioned why the agency was not acting more aggressively based on the authority it has. A selection of excerpted comments follows here.

- Ecology needs to act in more of a leadership capacity so we can chose to back or not back.
- Walking the talk - the State should set an example and phase PBTs out of their operations.
- I think the PBT framework needs to be made a fully imbedded feature of the daily work and authority of Ecology. Permitting and standard setting activities should be fully guided by the PBT mission you have developed.
- How can the public back Ecology (what can we do)?
- How will the department change current programs to "better integrate statutory programs" to address PBTs?
- Are you working with other agencies? Need to merge with other governments.
- The Director said Ecology has the authority and responsibility in his letter.
- Use existing laws now to address PBTs.
- The plan identifies existing air, water, waste, toxic site clean-up, pollution prevention, worker and community right-to-know laws and regulations that provide ample authority for ending PBT releases.
- Stronger regulations.
- Ecology is not strong enough about enforcing current laws.
- Ecology should turn the ship around.
- Serve the public – don't appease industry.

- Authority from the public – take action.
- Hold polluters accountable.
- Would you stand for Ecology prohibiting driving, barbecuing, etc?
- Concerned that there are only voluntary measures for companies. Need to have strict regulations.
- Industry reduction of PBT production should not be optional, but rather mandatory.
- PBT strategies should be implemented at Hanford; should be mandatory not voluntary.
- Why is Ecology concerned about "going beyond their authority?"
- What exactly do we want - authorities and changes in legislation? What will they be?
- Ecology and EPA have programs already in place that are working to further reduce such emissions into our environment. Ecology should continue its current efforts and not create another layer of business regulations.
- The legal authority Ecology cites in the strategy does not set forth a requirement to develop a PBT Strategy.
- I am concerned that your department appears to be operating outside the authority of the Legislature concerning this issue. I am also concerned about the draft's statement that there could be fundamental changes in agricultural practices.
- Any Washington State strategy should be based on clear statutory authority and expressed legislative intent. The adoption of any implementing regulations must comply with the "significant legislative rule" criteria in 34.05 RCW. A State Environmental Policy Act Review, 43.21 RCW, should be completed for a PBT Strategy involving non-traditional implementation of existing regulatory programs or the development of new regulations.
- PBT Strategy should be subject to the same regulatory reform principles as required of regulations.
- Ecology oversteps its bounds by stating an intent to prevent pesticide registrations. Ecology lacks the legal authority, knowledge of existing regulations and overall expertise to plan such intervention. Registration decisions are made by EPA following stringent protocol based on extensive data.

Ecology's Review and Analysis of Public Comments

A review of the comments reveals a full range of opinions about both the agency's authority to act and exercise of that authority. Some of these opinions are diametrically opposed. These kinds of opposing perspectives are, of course, to be expected. The course of action proposed in the strategy represents Ecology's best judgment of the latitude granted by existing regulations and other authorities. Comments bracketing both sides of this issue imply that this judgment is generally appropriate.

It is accurate to say the agency must take a leadership role in reducing and eliminating of PBTs. We believe that Ecology is doing that. For more than two years, the agency has had one person dedicated solely to the PBT strategy, as well as staff members drafted from other programs to contribute to the strategy. We have made this a highly visible process, beginning with a symposium in the winter of 1998 and following with several statewide public meetings.

We also believe business, government agencies and individuals must be part of the effort to reduce PBTs into our environment and secure a high quality of life for the present and future generations. Concerned citizens can further participate by letting their elected representatives and policymakers know they desire elimination of PBTs in Washington's environment.

Director Fitzsimmons, in his preface to the strategy, asserts not only Ecology's authority but its "*unequivocal mandate and responsibility* [and] *partnership with others….*"

Ecology does, in fact, have considerable authority, imparted by an assortment of laws forged by the State Legislature. These laws direct the agency to execute public environmental policy and programs, including those seeking to regulate PBTs in Washington's air, water and land. The same laws also limit its authority.

The PBT strategy proposes neither new agency authority nor actions inconsistent with Ecology's existing authority. It is merely an instrument for evaluating changes necessary to eliminate and reduce PBTs. At the present time Ecology is not seeking changes in its regulatory or statutory authority in connection to PBTs. We do anticipate, however, that some proposals for new regulations may emerge as the strategy is carried out. Having said that, we remain committed to a full public airing and review of any such proposals and to working with elected officials and stakeholders to affect desirable modifications in our legal authority. Moreover, any such regulatory changes are subject to SEPA review.

The agency heard a number of opinions opposing another layer of agricultural or business regulation; current programs, they say, seem adequate. We concur, in part. There are programs in place to reduce emissions into our environment, and these programs have reduced the use, release and environmental concentration of several PBTs. But we believe a more concerted effort is called for, an effort directed at cross-media effects on air, land and water rather than single-media effects.

The vision and guiding principles for the strategy propose that phasing out current uses and production of PBTs be sustainable and be integrated with long-term planning for transportation, agricultural, energy and economics. Ecology is working with other state agencies such as the departments of Agriculture, Corrections, Fish and Wildlife, General Administration, Health, Labor and Industries, Natural Resources and Transportation to promote PBT reduction and reduction of other toxic chemicals within Washington State government.

Ecology's Conclusions

In response to comments and letters about the agency's authority and its business practices, Ecology wishes to emphasize the following points: First, we believe there is public support for pursuing PBT Strategy goals. Second, we acknowledge the concerns of business and agriculture over possible impacts of the strategy. Finally, individuals will play an important role in reducing PBTs.

Ecology remains committed to a leadership role, “walking its talk” and promoting successful alternatives in the effort to reduce PBTs in our state’s air, water and land. We continue to believe that, overall, a collaborative approach is best in implementing a long-term strategy.

Comments Related to Government in General

The Draft Strategy

The draft PBT Strategy summarizes several state and federal environmental regulatory programs. These programs have been in place for many years, and they have significantly reduced use, release and concentrations of PBTs in the environment. However, they generally rely on statutes aimed at a single medium, either air, soil or water. Consequently, they do not fully address the cross-media effects of PBTs. Furthermore, the single-medium approach emphasizes pollution treatment rather than prevention. Many members of the public and a number of public interest organizations are urging Ecology to take the lead in reframing the policy approach to dealing with PBTs and PBT contamination.

Public Comments

Ecology received a variety of public comments related to the practices and policies of government in general. These comments include:

- Physicians for Social Responsibility – government has failed to protect children's health.
- Government ethics to put public health over business economics.
- Ecology needs to be at various county, health dept, etc, meetings.
- Some chemicals on the list are already being taken care of via other agencies, etc.
- Start with chemicals that need attention – support this.
- The issue of fertilizers needs to be addressed at the federal level.
- Franklin County Farm Bureau – not just state policy – federal pressure (from EPA, WA, D.C.) to implement policy.
- Ask Department of Education to put material about PBTs and the environment on state tests.
- All need to get involved – many sources of pollution – sources need to be on local maps and in the Growth Management Act (GMA).
- We are all environmental violators – want to be more environment friendly – but sometimes government structure prohibits. For example, difficult to purchase unbleached paper and it doesn't always work well in computers. Should also look at product life cycles.
- Job of government is to provide for the general welfare of the public – need to have safe foods to eat.
- Projects proposed in Clark County – developments on landfills – frightening – people need to be able to see where problems are.
- Government might consider other similar health issues – as a state of emergency, why not PBTs?

Ecology's Review and Analysis of Public Comments

Ecology received a variety of comments across a wide range of issues related to government practices and policies. Some testimony charges that government has failed to adequately protect the public health. Some suggest the need for more national effort to address chemicals in fertilizer and to educate school children about PBTs. Still others suggest mapping PBTs sources and including them in GMA plans, looking at product life cycles or declaring PBT contamination an emergency, as has been done with other health issues. And, there have been recommendations that government encourage the use of environmentally friendly products and alternatives. Sometimes, however, government can hinder, rather than promote, alternatives.

Ecology's Conclusions

We believe solutions contained in the proposed PBT Strategy will lead to significant reductions in PBTs, but only after several years and only after the government agencies involved reach some sort of consensus on their goals. The situation right now is often one of conflicting agency missions. For example, a utility whose mission is to treat municipal wastewater, and do so in the most cost-effective and environmentally sound way, may not support a discharge permit prohibiting a mixing zone for any PBT releases; the cost to ratepayers of installing the necessary technology is prohibitive. The mission of an environmental agency, on the other hand, is to protect the environment, and consequently, they find themselves in conflict with the utility. How can the conflicting missions be reconciled? One of the purposes of Ecology's PBT Strategy is to promote the need to prevent releases of PBTs before they even reach wastewater treatment facilities.

Comments Related to the Legislature

The Draft Strategy

The 2000 Legislative Session directed 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 shall submit its proposal to the appropriate legislative committees by December 30, 2000."

As part of that directive, Ecology developed a draft PBT reduction strategy for public comment in August 2000 and held a 70-day public comment period.

Public Comments

The draft PBT Strategy generated several comments related to the Legislature and to the legislative process. These comments included:

- The public needs to pressure the Legislature.
- How much public discussion going on with the Legislature – how can the public get in the door?
- Should this issue and strategy be presented to the Legislature, if they don't adopt – will Ecology try to promulgate rules without specific legislative funding? And, if so, that too would involve the public?
- The Legislature should direct the formation of a science advisory board to provide science-based information on the ecological or human health risks of PBTs.
- Must have authority from Legislature before moving forward. Criteria should be based on sound science….full justification must be given before going beyond federal requirements…. phase-out of mixing zones for water discharges and setting air toxic acceptable source impact levels (ASILs) to zero for PBTs is not appropriate.
- Ecology should not implement the strategy without specific legislation.
- Ecology misled the public when it said the Legislature had required a strategy by the end of 2000. The Legislature only requested a report, not a strategy.
- Ecology should not seek legislation to mandate a state PBT program. Instead Ecology should adapt the EPA strategy to meet state needs.
- The Legislature must authorize and direct Ecology. All efforts by Ecology to develop policies and implement regulations based on a PBT Strategy, including any expenditure of funds, should be directed by the Legislature. Future regulations and the use of current regulations should be consistent with legislative intent and address only those issues unique to Washington State.

Ecology's Review and Analysis of Public Comments

Ecology, as directed by the 2000 Legislature, submitted a proposed PBT Strategy to the House Agriculture and Ecology Committee and the Senate Environment, Energy and Water Committee in January 2001. In addition, the Proposed 2001-2003 Budget and Policy Highlights, submitted by the Office of the Governor, requested $1.2 million from the State Toxics Control Account to implement the proposed PBT Strategy.

Many comments suggest Ecology should seek authority from the Legislature. As the state agency responsible for protecting Washington's environment, Ecology currently has the authority to undertake the proposed PBT Strategy. That does not mean, however, the Legislature would not provide direction to the agency. We recognize that many people with a stake in this issue are anxious about the implications of this potentially far-reaching strategy, and we are actively addressing these concerns; the agency is following three steps as it develops and carries out the strategy:

1. Ecology is following SEPA. In the draft strategy, we conclude that it is *"impossible to determine whether full implementation of this strategy could result in significant environmental harm, Ecology has issued a Determination of Significance (DS)"*. We initiated SEPA scoping at the same time we publicly released the draft PBT Strategy, in August 2000.
2. From the start, Ecology has defined the PBT issue as a *societal* problem; the demands of our society are the prime mover of PBTs into Washington's environment, and only society can solve problems associated with PBTs. Furthermore, neither major industry, government nor agricultural are solely responsible for PBT releases; many everyday, individual activities contribute significantly to PBTs in the environment.
3. We cannot use this strategy as a mechanism to usurp or over-ride existing authorities, statutes or rules. Rather, we are using the strategy as a tool to encourage *cross-media* awareness and identify pollution-prevention solutions for the long-term.

One person asserted Ecology "misled the public when it said the Legislature had required a strategy by 12/30/00. The Legislature only requested a report, not a strategy." In response, we call your attention to language in the 2000 legislative budget: Ecology is to *"…develop for review by the Legislature a proposed long-term strategy to address persistent, bioaccumulative and toxic chemicals…"*. We have said from the outset that this is merely a proposed long-term PBT Strategy, just as the Legislature directed; the Legislature did not request a report.

As a result of testimony suggesting it is inappropriate for Ecology to "…phase out mixing zones for water discharges and set air toxic ASILs to zero for PBTs…", we have modified that particular language in the proposed strategy.

One person suggested "Ecology should not seek legislation to mandate a state PBT program. Instead Ecology should adapt the EPA strategy to meet state needs." In response, while we disagree with the idea of simply adopting EPA's national strategy, we do plan to follow the national PBT reduction strategy as a model. Both Ecology's and EPA's PBT strategies share some common goals:

- Increasing coordination among agency programs.
- Developing and implementing chemical action plans for certain high-priority chemicals.
- Preventing introduction of new PBTs.
- Screening and selecting high-priority PBTs for future action.
- Measuring progress.

However, there also are significant differences between the Ecology and the EPA PBT strategies:

- Ecology plans to develop and carry-out an objective, science-based public education effort to inform Washington citizens about PBTs. EPA's national strategy does not have a broad public education component.
- The agency plans to screen and prioritize PBTs using EPA's tool but Washington's data. We want to focus on those PBTs that are clearly a high priority for Washington, not simply mirror EPA's priority list.
- Like EPA, Washington plans to develop and implement chemical-specific strategies or action plans. However, while EPA chemical action plans are developed largely within the agency by agency staff, Ecology plans to keep stakeholder, interest groups and citizens informed throughout the process.
- EPA chemical action plans focus primarily on the activities of industry and related stakeholders. Ecology plans also to emphasize societal and individual activities that release or generate PBTs.
- Both EPA and Ecology regard pollution prevention as the most cost-effective way of reducing PBTs. Right now, EPA regions have limited resources to conduct PBT-related pollution-prevention activities or provide technical assistance. Furthermore, the national PBT strategy relies heavily on voluntary stakeholder implementation. Ecology, on the other hand, regularly provides pollution prevention technical assistance and could easily emphasize PBT-related pollution prevention in the future.
- Both EPA and Ecology seek to measure the progress of PBT reduction efforts over time. In addition, Ecology proposes to establish a baseline with which to compare future PBT measurements. No such approach is planned by EPA.

Ecology's goal is to build on EPA's PBT strategy model while focusing on the PBT reductions most needed in Washington; high priority PBTs in our state may not be the same as those in other states or nationally.

Ecology's Conclusions

Ecology does have the authority to implement this strategy, if given adequate resources by the Legislature. In addition, the Legislature could certainly direct the agency in implementing the proposed strategy. We understand the unease many stakeholders feel with this potentially far-reaching strategy, and we are actively addressing their concerns by:

- Following SEPA.

- Framing the PBT issue as a *societal* problem, recognizing that society's demands are the prime mover of PBTs, and only society can solve problems associated with them.
- Emphasizing that the strategy is not an attempt to usurp or override existing authorities, statutes or rules.

Comments Related to Funding

The Draft Strategy

The draft PBT Strategy lays out a long-term plan to reduce or eliminate PBTs in Washington's environment. When the draft was released in August 2000, the agency estimated funding for it at approximately $1.5 million for the 2001-2003 Biennium. As we further refined PBT funding needs and incorporated them into the overall agency budget request to the state Office of Financial Management, funding for the PBT Strategy was reduced to $1.2 million. This revised figure was included in the Proposed 2001-2003 Budget submitted by the Office of the Governor. Under Ecology's proposal, funding would come from the State Toxics Control Account.

Public Comments

Ecology received several public comments related to the funding of the draft PBT Strategy:

- Existing state and federal resources, programs and activities must be evaluated to determine if they are sufficient to manage a PBT Strategy. Additional funding should be requested for a PBT program only after these existing resources are shown to be inadequate.
- As a legislator, or citizen of Washington, I would be interested in the costs associated with this program – especially the costs associated with each activity and the total costs.
- Local entities will need state money to pursue PBT actions and enforcement.
- Planned actions (especially Action Plans) more than 3 years out are premised on procuring additional funding. This sounds like a recipe for failure of the strategy.
- Address the funding issue in the final PBT Strategy.
- The PBT Strategy is a potentially large, long-term program for which sources of funding have not been identified. Ecology should acknowledge and attempt to estimate the considerable funding requirements which will likely be required over the next 20 years to further develop and implement the proposed strategy.
- Ecology's proposed funding request appears excessive. Ecology has stated that it intends to request funding of $1.5 million over the next biennium and intends to hire 6.5 new FTEs – four of which will be assigned to develop chemical action plans. AWB members believe that given EPA's current efforts to develop chemical action plans of its own, Ecology would better serve the public by postponing efforts to develop these plans. A more prudent and cost-effective approach would include a review of EPA's completed plans and amending them where necessary to address unique requirements for Washington State.

Ecology's Review and Analysis of Public Comments

Ecology Senior Management evaluated existing state and federal resources, programs and activities and concluded they are not adequate to implement a PBT Strategy. Consequently, they have requested additional funding for this purpose. In addition, we believe the most effective way to manage the PBT Strategy and achieve effective cross-media coordination is to avoid incorporating it into an implementing program such as Hazardous Waste or Water Quality.

The agency views the PBT Strategy as long-term commitment, requiring resources to support it beyond the 2001-2003 Biennium. We also recognize future funding is premised on measurable PBT-strategy results during the current biennium.

EPA funding opportunities are limited. Since its inception, in 1998, EPA's national PBT strategy has provided only $400,000 in grant funds, to be divided among many competing state and local programs. In 1999, we submitted four grant proposals and were unsuccessful in securing any grant funding. In 2000, the agency did not seek grant funding because the resources to do so were diverted to developing the PBT Strategy, as the Legislature directed. In 2001, however, Ecology submitted three EPA-grant requests to augment proposed PBT Strategy activities. Again, our proposals failed to receive EPA funding.

Ecology's Conclusions

Ecology has received $800,000 from the Legislature to implement the proposed strategy. In addition, Ecology will continue to apply for grants from EPA to augment funding for what we hope to accomplish during the 2001-2003 Biennium.

Comments Related to the State Environmental Policy Act (SEPA)

The Draft Strategy

Ecology proposes to use the SEPA process to ensure public involvement in long-term decision-making about the PBT Strategy. To facilitate that involvement, Ecology issued a Determination of Significance (DS) and initiated scoping at the same time the draft PBT Strategy was distributed for public review. In the scoping notice, the agency identified several broad categories of issues that might be discussed in an Environmental Impact Statement (EIS):

- Need for a Washington PBT Strategy
- Universe of PBTs
- Strategic framework
- Potential environmental, economic and social equity impacts.

While the strategy is designed to promote and enhance environmental quality, actions taken to reduce PBTs may also have indirect or secondary adverse impacts. The agency decided to initiate scoping because, prior to the strategy's execution, it is impossible to determine if it will entail significant adverse environmental impacts. However, if further information and analysis suggests no likely significant adverse impacts, we will consider withdrawing the DS and issuing a Determination of Non-Significance (DNS). If on the other hand, it appears significant adverse impacts are likely, Ecology will prepare an EIS as required by SEPA.

Public Comments

Some individuals and organizations questioned Ecology's decision to issue a DS and prepare an EIS. The most frequently voiced argument against this approach was based on the opinion that the PBT Strategy is unlikely to create significant adverse environmental impacts and, consequently, preparation of an EIS would only delay needed actions.

However, Ecology also received a large number of comments supporting the agency's decision to issue a DS. Several lines of reasoning are used to support this position:

- The PBT Strategy is extremely broad, with enormous implications for many people in Washington State and considerable potential for creating adverse environmental impacts. Under these circumstances, Ecology is legally required to prepare an EIS;
- Preparation of an EIS will make possible full consideration of the environmental impacts of alternatives to the current uses, technologies, and practices that lead to PBT problems.
- Preparation of an EIS will promote partnerships with stakeholders that are integral to the success of the PBT Strategy.
- Preparation of an EIS will prompt discussion of key issues and public involvement in the decision-making process.

Several individuals and organizations also recommended Ecology prepare an EIS when proposing to add substances to the PBT list and when preparing chemical-specific action plans.

Ecology's Review and Analysis of Public Comments

Ecology heard a range comments about the use and application of SEPA. Some people were of the opinion that the agency ought to compete an EIS, while others felt a DNS was appropriate. While the PBT Strategy is designed to promote and enhance environmental quality, long-term actions to reduce PBTs also may have indirect or secondary adverse impacts. Therefore, Ecology has decided to keep its options open regarding SEPA.

Ecology's Conclusions

In March 1999, Ecology decided to use the SEPA process to ensure public involvement in long-term decision-making about the PBT Strategy. The agency completed an environmental impact checklist for the project, and a DS and SEPA scoping notice for a non-project action were issued in August 2000. At this point, we plan to continue the SEPA process of updating the environmental checklist when appropriate where there is enough information to update the non-project review form.

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Elements of the PBT Strategy

Actions to Reduce and Phase Out PBTs

Phase Out Existing Sources of PBTs

Reducing existing sources will help is prevent additional PBT accumulation. Ecology's long-term goal is to reduce and, where possible, phase out current uses and production of PBTs, with initial focus on those chemicals highest on the agency's priority PBT list. Achieving this goal requires a strategy enabling agencies, businesses and citizens to systematically integrate environmental choices with business, consumer and agricultural decisions.

Ecology's PBT Strategy includes the following measures designed to promote integration.

- Collaboratively develop and implement chemical-specific action plans to reduce and, where possible, phase out existing sources of PBTs in Washington. These plans will elaborate on the national action plans prepared by EPA and will address both point and nonpoint sources of PBTs in Washington.

- Phasing out the wide range of PBTs used and generated in this state will take many years. Sources include large and small industrial processes, government activities, transportation, energy production, and use of consumer products.

Ecology received several comments about phasing out existing sources of PBTs and assigned them to the following categories:

- Comments related to chemical action plans
- Comments related to incinerators

Ecology's evaluation and response to these comments follows.

Comments Related to Chemical Action Plans

The Draft Strategy

Chemical-specific action plans are a key element of the draft PBT Strategy. We will develop an action plan for each high priority PBT. Each plan will lay out the steps necessary to reduce or eliminate a particular PBT in the environment. Furthermore, these action plans will be developed in cooperation with stakeholders, interest organizations and the public.

Public Comments

Ecology received the following public comments related to chemical action plans:

- Reuse of chemicals? (possible)
- Ecology should recognize where local governments can be most effective and work directly with them to prioritize the PBTs they address.
- Final plan should outline the elements of chemical-specific action plans and provide a timetable for action plan development and implementation. Ecology should identify the major public health goal for each listed chemical, including the nature of the public health risk as well as the specific reduction strategy (e.g., clean-up for banned chemicals or source elimination for currently produced chemicals).
- Determining which PBT materials actually need to be phased out rather than reduced is a complex issue requiring Ecology to apply local knowledge to EPA information and data.
- Ecology proposes to develop chemical-specific action plans. Within these plans, however, we believe you will need to develop sector specific components because use of PBTs, at least mercury, is different for different sectors.
- Provide clear statement of program objectives, balanced and scientifically accurate information on PBT sources and reduction opportunities, a pragmatic assessment of costs and benefits and the timing to implement actions. Significant regulatory and voluntary actions which have led to reductions in PBT releases, or which are scheduled to occur, should be included.
- Provide alternatives to PBTs.
- Historical and current efforts to address PBTs – educate public on progress that has been made.
- Do individual sources provide a major contribution?
- Place PBT associated risks in perspective with other risks in society.

Ecology's Review and Analysis of Public Comments

Local governments can be instrumental in creating and guiding programs to reduce PBTs. For example, they can develop household fever thermometer collection programs, develop disposal locations for fluorescent light tubes and enforce local outdoor burning restrictions.

Ecology's PBT Strategy includes provisions for creating a timetable for fashioning and initiating chemical action plans. In addition, each action plan will include a review of public health risks. Also, sector-specific components will be incorporated for those PBTs serving a variety of uses, such as mercury which has widespread application in medicine and industry.

Ecology's Conclusions

Chemical-specific action plans for the high priority PBTs are a necessary component of a successful PBT Strategy. Since PBTs are known to move readily between air, land and water, they are better addressed through a chemical-specific approach rather than a media-specific approach.

Comments Related to Incinerators

The Draft Strategy

Combustion is a frequent and ongoing source of PBT releases in Washington. Combustion sources range from forest fires and backyard burning to fireplaces, auto exhaust and permitted municipal solid-waste incinerators. At the present time, there are only three solid waste incinerators in Washington permitted to operate under local air quality and Ecology regulations: Tacoma Steam Plant #2; the Spokane Incinerator; and the Fort Lewis Incinerator. There are no medical waste incinerators operating in the state at this time. Incineration is discussed in the draft PBT Strategy as one among several sources of dioxin and B(a)P releases.

Public Comments

Ecology received the following comments about incinerators:

- Comment from Spokane: Municipal incinerators – why not on list?
- Ban the burning of chlorinated wastes at incinerators and boilers.
- You need to ban the burning of chlorinated wastes.
- Incinerators (hogged fuel boilers, municipal and medical waste and cement kilns) need to be phased out by 2003.
- Incinerator ash needs to be regulated as hazardous waste.
- PBTs ought to be burned in hazardous waste incinerators only.
- Set timelines for phasing out the policy of incineration altogether.

Ecology's Review and Analysis of Public Comments

Over the next several years, the agency will develop chemical action plans for PBTs placed on its list of priority PBTs. Furthermore, in response to federal Clean Air Act amendments, EPA issued new rules in 1997 affecting emissions from large municipal waste incinerators.[15] These rules require technological and process changes that, when fully implemented, are expected to reduce dioxin emissions from large municipal incinerators by approximately 99 percent and mercury emissions by more than 90 percent. EPA estimates municipal incinerators will account for less than 1 percent of the known sources of dioxins and less than 3 percent of mercury sources.[16]

[15] 40 Code of Federal Regulations. Part 60. ***Emission Standards for Existing Sources and Standards of Performance for New Stationary Sources: Large Municipal Waste Combustor Units***: Final Rule. August 25, 1997.
[16] EPA, 1998. ***Fact Sheet: Federal Plan for Large Existing Municipal Waste Combustors***. October 30, 1998.

Similar rules have been finalized by EPA for smaller municipal waste incinerators. This regulation establishes emission limits that, when fully implemented, will reduce PBTs such as mercury and dioxins by between 90 and 99 percent[17,18, 19]

We recognize emission reductions from these types of control technologies can be enhanced with recycling programs and bans on incineration of some types of waste. An integral part of the proposed PBT Strategy is pollution prevention and non-regulatory encouragement of recycling, re-use and alternatives to incineration. The PBT Strategy focuses on enhancing and expanding these types of non-regulatory programs, as opposed to bans or further "command and control" approaches.

Ecology's Conclusions

Incineration by municipal or private operations is carried out under the scrutiny of local air quality authorities and Ecology. These operations are subject to public permitting, continued monitoring and periodic regulation updates reflecting needed pollution control and permit modifications. Incinerator operations in the Tacoma area and Spokane continue to be bound by these requirements.

Ecology and local air quality and health authorities are, however, becoming increasingly concerned about individual, and very often unpermitted, incineration such as backyard fires, indoor fires, wood stoves, campfires and barbecuing. Little is known about the aggregate, cumulative affect of these myriad, small PBT releases.

[17] 40 Code of Federal Regulations Part 60. ***New Source Performance Standards for New Small Municipal Waste Combustion Units: Final Rule***. U.S. Environmental Protection Agency. December 6th, 2000.
[18] EPA, 2000. Fact Sheet: EPA Re-issues Air Toxics Rules for Small Municipal Waste Combustors. U.S. Environmental Protection Agency. November 3.
[19] EPA, 2000. ***Small Municipal Waste Combustor Units: Background Information Document for New Source Performance Standards and Emission Guidelines. Public Comment and Responses***. U.S. Environmental Protection Agency. EPA-453/R-00-001. June.

Clean Up PBTs

Ongoing and historic activities have created two distinctly different types of PBT problems in Washington.

- Localized areas with high concentrations of PBTs left by past operations or disposal.
- Large areas of low-level contamination caused by gradual migration and buildup of PBTs in areas beyond their original, high-concentration source.

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 to enhance these efforts with additional measures:

- Increase attention to sites known to be contaminated with PBTs.

- Enhance efforts to clean up mercury and other PBTs at abandoned mining sites. An estimated 3,500 abandoned mines in Washington have contaminated many of the state's watersheds with mercury and other metals. Ecology plans to work with other agencies to identify abandoned mining sites, evaluate the potential for releases of PBTs and other hazardous substances, take interim measures to prevent releases into downstream watersheds and oversee clean-up activities.

- Enhance efforts to clean up sediment contamination. Ecology has identified more than 100 sites where sediments are contaminated with PCBs, mercury and other PBTs. We plan to establish site-specific, sediment clean-up requirements to alleviate accumulation of PBTs in the aquatic food chain. We also plan to better integrate sediment clean-up with source controls, dredging and habitat protection projects through such things as bay-wide planning and water clean-up plans.

Ecology received several comments about the clean up of PBTs and assigned them to the following three categories:

- Comments related to nuclear waste
- Comments related to site clean-up of historical contamination
- Comments related to Bellingham Bay

Ecology's evaluation and response to these comments follow.

Comments Related to Nuclear Waste

The Draft Strategy

The draft PBT Strategy does not identify nuclear waste as a PBT. Radioactive materials are not regulated under the federal Resource Conservation and Recovery Act (RCRA) regulations or state hazardous waste laws. Past use of pesticides and PCB-insulated electrical equipment has resulted in some environmental impacts at the Hanford facility, in Eastern Washington.

Public Comments

- Hanford is not mentioned. Ecology, EPA and the U.S. Department of Energy (USDOE) need to characterize this waste before it can address how to clean it up. Also, PBTs must be banned in these very clean-up actions and in controlling weeds and other vegetation at Hanford site.
- Please include radioactive nuclear hazards – which Washington State has lots of.

Ecology's Review and Analysis of Public Comments

The Hanford site is referred to in the *Current and Proposed Actions* section of the draft strategy. Ecology, EPA and USDOE are evaluating PBTs as decisions about Hanford clean-up, treatment and disposal are made. For example, the three parties signed *Framework Agreement for Management of Polychlorinated Biphenyls (PCBs) in Hanford Tank Waste* last year. This agreement outlines the regulatory, policy and technical issues for a joint PCB remediation program at Hanford. Ecology is encouraging USDOE and its subcontractors to limit use of PBTs for weed control at the Hanford site.

Radioactive substances were considered for the PBT Strategy but are not regulated under the federal RCRA regulations or state hazardous waste laws. The agency is committed to address clean-up of radioactive materials in the future under the state Model Toxics Control Act. Also, the *Hanford Federal Facility Agreement and Consent Order*, signed by Ecology, EPA and USDOE, describes how radioactive wastes are to be managed during compliance and clean-up activities at Hanford.

Ecology's Conclusions

Commercial, low-level radioactive waste from universities, hospitals and nuclear reactors is managed under the federal *Low-level Radioactive Waste Policy Act and Amendments of 1985*. In Washington, this waste is managed by the *Northwest Interstate Compact*.

Comments Related to Clean-up of Historical Contamination

The Draft Strategy

PBT clean-up at historic sites is one of eight general goals outlined in the draft PBT Strategy. Historic activities have produced both localized areas with high concentrations of PBTs and larger areas of low-to-moderate levels of contamination which may include PBTs.

Many of these problems are currently being investigated and cleaned up under the state MTCA, the federal CERCLA and other state and federal programs. Ecology has proposed several measures designed to extend current PBT clean-up efforts. These include:

- Improve the ways PBTs are dealt with at contaminated sites.
- Strengthen efforts to clean up mercury and other PBTs at abandoned mining sites.
- Enhance efforts to clean up sediment PBT contamination.

Public Comments

Public comments received about contamination at historic sites fall in five categories.

Several people expressed concern about the presence of PBTs or other hazardous substances at specific sites, including the Lynden/Bellingham area and Seattle's Gas Works Park.

Some individuals and organizations expressed concerns that clean-up efforts might actually result in secondary contamination and risk caused by excavation, treatment, transportation and disposal efforts.

One person expressed concerns about the land use decisions, such as allowing new-home construction on former landfills, that have resulted in increased exposure and health risks.

Another brought up the challenge of PBT-tainted asphalt commonly used in the past to pave roads. Much of the older pavement in the state contains low levels of PCBs and PAHs that can contaminate storm water runoff and sediments.

Several others questioned the feasibility of virtual zero clean-up in the absence of technology capable of achieving that goal.

Ecology's Review and Analysis of Public Comments

People are concerned about past releases of PBTs. As a society, we have become increasingly aware of the ways our past practices threaten the environment and human health. In the recent past, many contaminated sites have been cleaned up, and the effort continues. Ecology's Toxics

Clean-up Program (TCP) has been addressing this problem since 1988. In that time, more than half of the states roughly 9,000 hazardous-waste sites have been cleaned up. The TCP tackles a wider array of chemicals than the PBT Strategy, which by definition, is aimed at persistent, bioaccumulative toxins. At this time, the TCP is focusing on cleaning up specific sites. The program has received funding to look at area-wide contamination problems associated with historic use of arsenic in agricultural pesticides, as well as point sources in both western and eastern Washington.

At Gas Works Park, clean-up work continues. Soil clean-up has been completed and groundwater treatment is ongoing. Contaminants near the ground surface have been replaced with clean soil and new playfields built over the top. Any contaminants left at the park are 10 to 20 feet or more below the surface.

In Lynden, Whatcom County, ethylene dibromide was found in drinking water wells in 1984. In 1986, Ecology initiated a bottled water program for affected households and, two years later, connected many to municipal water lines. Those too far from water lines continue to receive bottled water. Since then, additional contaminants have been identified and the extent of contamination defined. To prevent skin and inhalation contamination, the agency has contracted to have showerhead filters installed in households still served by wells. Efforts are ongoing to provide residents a permanent solution.

Net environmental impacts are an important consideration when selecting clean-up measures. Calculation of net environmental impact involves gauging primary effects from contaminants as well secondary effects attributable to clean-up efforts. For example, clean-up decisions about contaminated marine and freshwater sediments involve evaluation of the environmental risk from dredging versus that from leaving contaminated sediments in place.

How feasible or appropriate is it to establish virtual zero clean-up standards, reducing contaminants to undetectable or ambient levels, in the absence of technology capable of achieving that goal? Clean-up standards for individual sites are currently established using a risk-based approach. One goal of this approach is to reduce contaminants to levels that minimize their known or probable human health and environmental risks to whatever acceptable level is achievable with current scientific information or technology. Ecology has established clean-up standards designed to protect human health and environment under a wide range of circumstances. These standards reflect several important policy decisions about acceptable risk, taken only after extensive public review and comment.

Furthermore, application of the precautionary principle creates a presumed preference for using safer alternatives, that is, for prevention. However, we believe that presumption can be overcome based on consideration of the technical, economic and social circumstances. In many cases, virtual zero may be neither necessary nor desirable. Moreover, virtual zero, in many cases, is not achievable with the tools now available to us. Ecology, therefore, does not have any current plans to apply virtual zero standards. The agency, however, does have the capability of modifying clean-up standards to make them more or less stringent, based on new scientific information, land use or site-specific variations in potential exposure risk.

Ecology's Conclusions

Ecology's PBT Strategy does not address historic hotspots such as contamination of groundwater in a specific geographic area, any zoning that allows the building of homes on former landfills or any removal of contaminated road surfaces. It is by definition a plan to undertake long-term, continual reduction of PBTs in Washington's environment. Site-specific efforts fall more into the tactical realm of programs and actions carried out on a smaller and, possibly, shorter-term scale. The PBT Strategy, on the other hand, spans 20 years and involves engaging a broad range of stakeholders in an ongoing, coordinated, and cooperative effort to reduce historic PBT contamination, phase out existing PBT sources and prevent new PBT pollution.

With respect to cleaning up historical releases of PBTs, the agency must consider net environmental impact, that is, primary environmental threats posed by contaminants, as well as secondary threats posed by the clean-up measures. Consequently, risk assessment/risk management concepts are likely to continue guiding efforts to clean up historical releases.

Comments Related to Bellingham Bay

The Draft Strategy

The draft PBT Strategy does not identify specific hot spots for PBTs in Washington. The draft strategy does, however, identify specific waterbodies where fish and shellfish consumption advisories are posted, as well as waterbodies or streams where PBTs have exceeded surface-water quality criteria. Bellingham Bay is listed for mercury and B(a)P. The purpose for including this information in the draft PBT Strategy is to illustrate how widespread problems with PBTs are in Washington.

Public Comments

Several people provided comments about the GP pulp mill in Bellingham Bay:

- Not OK with GP Mill poisoning community day after day.
- GP must shut down the four hog fuel boilers.
- The agency has neglected to include the removal of the toxic incinerator of the GP mill here in Bellingham.
- GP is a beast of a polluter here in Bellingham that affects our health daily and the survival of the surrounding marine ecosystems. Please take action by issuing water pollution permits for pulp mills such as GP who value money over environment.
- Is it true that GP burns chlorinated clarifier sludge in its hog fuel incinerators and that doing so exponentially increases the amount of dioxin and furan emissions?
- Is it true that the *1989 EPA/Paper Industry Cooperative Dioxin and Furan Study* showed that GP's furan emissions were generally 5 to 97 times higher than other Washington State pulp and paper mills?
- If GP, for whatever reason, were to go totally chlorine free, by approximately what percentage would its emissions of dioxins and furans and chlorinated phenolics be reduced? We think that "more than 90 percent" is the right answer.

Ecology's Review and Analysis of Public Comments

The situation with GP's pulp mill in Bellingham has changed since the draft strategy was released; the pulp mill and the by-products facility have been closed. The only portion of the mill currently open is the tissue mill, which plans to purchase what pulp it needs. The facility will not be using chlorine in future production. It will be necessary to modified a permit recently issued to the facility to reflect changes in its operating status. Since the facility will no longer be a pulp mill, responsibility to regulate air quality will pass from Ecology to the Northwest Air Pollution Authority, the local air jurisdiction.

Ecology's Conclusions

Many of the issues concerning the GP facility were eliminated when the pulp mill closed. There will be clean-up issues, permitting issues for the remaining tissue mill and a transfer of air regulatory authority from Ecology to local jurisdiction. The clean-up process will be a public process. A site assessment will precede any work on a site-closure plan for the disused portion of the mill.

Prevent New Sources of PBTs

The draft PBT Strategy discusses how state regulatory policies and activities ought to encourage new and cleaner facilities, processes and products to replace those that lead to PBT problems. Furthermore, policies should be designed to minimize or avoid aggravating existing the environmental burden of PBTs in Washington. The following proposed measures are designed to achieve both:

- Enhance efforts to prevent the use and release of PBTs from new industrial and commercial sources. Ecology and local air authorities currently review and establish requirements for new sources of air and water pollution. In the draft strategy, we have identified several ways that current programs could be improved to prevent use and release of PBTs from new industrial and commercial facilities.

- 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.

Ecology received comments about preventing new sources of PBTs and assigned them to the following category:

- Comments related to pollution prevention and preventing new sources of PBTs

Ecology's evaluation and response to these comments follows.

Comments Related to Pollution Prevention and Preventing New Sources of PBTs

The Draft Strategy

The draft PBT strategy emphasizes the need to prevent new sources of PBTs, especially since the *"current, single-media focus of reducing pollution has produced a system that emphasizes "treating pollution rather than preventing it from being generated."* The three overarching goals enumerated in the draft PBT strategy are "*Phase Out Existing Sources of PBTs,*" "*Clean Up (historical releases of) PBTs"* and "*Prevent New Sources of PBTs"*. Preventing the use or generation of PBTs is fundamental to the overall PBT Strategy.

Public Comments

Many people who wrote or attended public meetings favored pollution prevention, particularly with regard to a ban on PBTs or processes that use PBTs:

- Prevent pollution at source.
- I would like to ask that you put some stringent controls in industry in order to stop the flow of persistent pollutants at their source.
- WashPIRG agrees with call to ban PBT products/processes – Canvassing during past five months indicates public support for banning PBTs (petitions).
- There should be a screening process for new industries.
- Want stronger regulatory agency – ability to review chemicals for safety. If not, then add ban. Ethics – public health and safety above bureaucratic and public pressures.
- Ban new sources.
- Ban releases of PBTs.
- Reinforce ban by including phase-out language in all pollution limits overseen by Ecology.

Ecology's Review and Analysis of Public Comments

The prevailing opinion favored pollution prevention activities, including more stringent controls and permit requirements, screening new businesses, banning some or all PBTs and banning all chemicals which have not been proven safe. In the long-term, the PBT Strategy may lead to changes in permit or regulatory requirements, and in some cases, it may drive efforts to find acceptable substitutes for current uses of PBTs.

Tens of thousands of chemical compounds are in use today, and not all are considered a significant risk to human health or the environment; many are believed to be relatively safe, at least in the context in which they are used. But the simple truth is that we, society as a whole, know very little about the majority of these chemicals. Most work has focused on a handful of

chemicals with a well established level of risk and probability of causing damage. Nonetheless, an outright ban on every chemical known or thought to be harmful is impractical, if not impossible.

The draft strategy does not contain a provision for screening new businesses, but this is a suggestion worth further consideration. New businesses identified as significant generators or users of pollutants on the PBT list could be offered assistance to evaluate of their processes. However, the idea presents several potential problems:

- Lack of a mechanism for identifying new businesses.
- Businesses must be receptive to Ecology's presence.
- Such a program requires additional staff and funding.

Ecology's Conclusions

Ecology will continue to emphasize the central role of pollution prevention as the PBT Strategy is implemented. Additionally, the agency will continue to stress the importance of pollution prevention as it relates to appropriate, existing programs in Ecology. However, none of this is meant to suggest that we are in a position to declare outright bans on chemicals or PBTs. In the case of PBTs, many already are ubiquitous in Washington's environment. The long-term goal of the PBT Strategy is to use and promote pollution prevention measures to achieve additional, future PBT reductions.

Building Blocks for Success

Build Partnerships to Promote Efforts to Reduce and Eliminate PBTs

Ecology has researched other regional, national and international initiatives and strategies. The resulting proposed strategy is largely based on EPA's PBT strategy but is tailored to Washington's needs.

Our goal is to build and strengthen partnerships that promote efforts to reduce and eliminate PBTs by:

- Building upon existing partnerships with the state Department of Agriculture and the agricultural community to enhance the success of the department's pesticide collection program.

- Organizing a statewide network of individuals, interest groups, associations and governments in a public education effort to inform people about long-term environmental and health problems posed by PBTs, possible solutions and product alternatives to PBTs.

Ecology received comments about the need to work with other governments, stakeholders and interest organizations to build partnerships in implementing the PBT Strategy. We assigned these comments to the following category:

- Comments related coordination with federal programs
- Comments related to support and non-support of the PBT Strategy

Ecology's evaluation and response to these comments follows.

Comments Related to Coordination with Federal Programs

The Draft Strategy

In August 1998, when Ecology first announced its intent to develop a state PBT Strategy, the general understanding was that EPA was not addressing PBTs at the national level. However, later that year, EPA released its *Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic (PBT) Pollutants*. Public and stakeholder feedback on our proposal strongly suggests that we coordinate with EPA to avoid any conflict between the state and the national PBT strategies.

Ecology's draft PBT Strategy proposes that the agency continue to coordinate closely with EPA as it finishes the draft *Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic (PBT) Pollutants*. We do not know at this time when EPA will declare its draft national strategy complete. In addition, given the cross-border implications of PBTs, we plan to work with other states and provinces that are interested in developing similar strategies.

Public Comments

- How does the Ecology strategy relate to EPA national strategy?
- Justification is provided for any differences from the federal program.
- Any Washington State strategy should be consistent with the substantive requirements and timing of EPA's initiative on PBTs
- Should follow EPA plan.
- Should work with EPA to determine standards for equipment that can reduce sources of PBTs such as mercury amalgam traps on dental chairs.
- PBT Strategy is redundant of programs already addressing PBTs. Strategy should support existing efforts and be used as a management plan to fill in the gaps which other programs, regulations and processes do not address or which are singular to Washington.
- It appears Ecology has not properly researched this issue, and I would request that you put your proposal on hold until you can coordinate it with the federal effort.
- …committing to coordinate the state strategy with the federal PBTs
- We believe it is vital that Washington State adopt a policy that is consistent with the federal strategy. In that regard, the only significant differences which should be considered between the federal and Washington State strategies are those driven by conditions that are clearly specific to Washington State.
- Let EPA take the lead role on PBTs. Given that EPA is currently developing a strategy to address PBTs, the question which must be asked is: Why does Washington State need to develop a strategy at all? Ecology should focus on reviewing the EPA strategy after it is complete and then consider which components of EPA's strategy should be implemented in Washington State.

Ecology's Review and Analysis of Public Comments

It makes sense to draft Washington's PBT strategy with EPA's strategy in mind, and Ecology has done so throughout this process, closely reviewing the national plan as we develop our own state strategy. At the same time, it is important for our strategy to concentrate on certain areas that the EPA strategy does not.

The intent of both strategies is further reduction of the risks to human health and the environment posed by exposure to PBTs. The two strategies share these common goals:

- Increasing coordination among agency programs.
- Developing and implementing chemical action plans for certain high-priority chemicals.
- Preventing introduction of new PBTs.
- Screening and selecting high-priority PBTs for future action.
- Measuring progress.

However, Ecology's draft PBT Strategy stresses the following areas:

- Our goal is to build on EPA's PBT strategy model, while focusing on the PBT reductions most needed in Washington.
- In addition to the focus areas identified above, we plan to develop and carry-out an objective, science-based public education effort to inform Washington citizens about PBTs. EPA's national strategy does not address the need for broad public education.
- Ecology, like EPA, intends to improve coordination among programs in connection with PBT reduction.
- The agency plans to screen and prioritize PBTs using EPA's tool, but we will use Washington's data. We want to focus on those PBTs that are clearly a high priority for Washington, not simply mirror EPA's priority list.
- Like EPA, Ecology plans to develop and implement chemical-specific strategies or action plans. However, while EPA chemical action plans are developed largely within the agency by agency staff, we intend to involve stakeholder, interest groups and citizens throughout the process.
- EPA chemical action plans focus primarily on the activities of industry and related stakeholders. Ecology plans add emphasis on societal and individual activities that release or generate PBTs.
- Both EPA and Ecology regard pollution prevention as the most cost-effective way of reducing PBTs. Right now, EPA regions have limited resources to conduct PBT-related pollution-prevention activities or provide technical assistance, and the national PBT strategy relies heavily on voluntary stakeholder implementation. Ecology, on the other hand, regularly provides pollution prevention technical assistance and could easily emphasize PBT-related pollution prevention in the future.

- Both EPA and Ecology seek to measure the progress of PBT reduction efforts over time. In addition, we propose to establish a baseline with which to compare future PBT measurements. No such approach is planned by EPA.

Ecology's goal is to build on EPA's PBT strategy model while focusing on the PBT reductions most needed in Washington; high priority PBTs in our state are not necessarily the same as those in other states or nationally.

Ecology's Conclusions

Ecology is proposing a strategy designed for Washington State which addresses individual, societal, industrial, business, governmental and past agricultural PBT sources. The strategy will emphasize public education, prevention and improved cross-media solutions to reduce PBTs in Washington. We will continue to coordinate with EPA and other agencies as we undertake the state PBT Strategy.

Comments Related to Support and Non-Support of the PBT Strategy

The Draft Strategy

In mid-1988, when Ecology first announced its intent to develop a PBT Strategy, the agency received strong support from several public interest and environmental organizations. The strategy also received support from many individual citizens concerned about PBTs. In December 1998, about 250 people attended an agency-sponsored symposium on PBT-related issues. The object was to find out what this issue is about, how PBTs are being addressed internationally and nationally and what we know about their regional impacts.

In early 1999, Ecology held a series of meetings to gather public opinion about its intent to craft a PBT Strategy. Although there was strong vocal support for a deliberate strategy, there also was skepticism about the agency's authority and responsibility to move in that direction. The state Legislature directed Ecology to prepare and submit a proposed PBT reduction strategy by December 2000. The proposed strategy evolved from a draft PBT Strategy and was shaped, in part, by public review and comment.

Public Comments

Ecology received many comments from individuals, stakeholders, and public interest organizations indicating support for the need for a PBT Strategy. Responses to the draft included support for the direction that the agency proposes to move on PBT issues and affirmation of the need to address PBTs as a serious environmental issue. The agency also received a few comments expressing concern that the strategy may duplicate EPA's national PBT effort or may result in burdensome regulations, higher costs, lower product quality, and less public health protection.

Comments included the following:

- Individuals have power to choose products, make decisions.
- We have the power to change in less than 20 years – America is the most consumptive country in world.
- A good start – an unique opportunity to began to address the PBT issue.
- Has changed diet – I am furious because of PBTs in food. If Ecology does this, I am willing to lobby the Legislature for more dollars
- Glad Ecology is moving in this direction
- Program might look good
- Other countries are watching Washington State

- Thrilled Ecology is acknowledging this problem
- Cheered to see Ecology initiating this strategy
- Excellent start
- Supports ban of PBTs
- Don't wimp out
- Country is watching – hoping it is a good model and goes forward
- Physicians for Social Responsibility commends Ecology for spending the dollars to look at this public health problem
- Supportive of Ecology
- Support to continue
- Puget Sound Orcas are the most contaminated marine mammals in the world – PCBs.
- Tremendous cross-generation ethic.
- Avoid "us vs. them" – find common ground – choices can be made by individuals.
- Let EPA take the lead role on PBTs
- I am all for preserving our natural resources and the environment but not at the expenses of lives and health of the general population.
- Important to take action at this time – Washington is taking the lead position on the PBT issue
- Sierra Club applauds Ecology's efforts and offers to take action in support of Ecology's strategy
- Over the past 20 years I have seen a lot of regulations imposed on our industry. Financially this has created hardships on small businesses in order to comply with the rules and regulations.
- Has talked to thousands of folks – all supported this strategy except a handful
- There is much national and international discussion going on about PBTs
- Glad we are moving in the right direction
- I like the guiding principles in the plan
- Why does Washington State need to develop a strategy at all?
- Commends Ecology for recommending transparent processes, stakeholder participation and non-regulatory and voluntary approaches as alternatives to regulatory decisions.
- To launch a major agency management and regulatory effort, as is proposed, will necessitate significant duplication of the federal programs and would be based on an Ecology management philosophy or determination that the federal programs being developed to address PBTs are inadequate.
- With further regulations imposed on our chemicals, we are facing reduced product quality.

Ecology's Review and Analysis of Public Comments

A careful evaluation of comments reveals that supporters of the strategy generally recognize the need for additional actions to reduce PBTs, especially in connection with food, public health and the environment. At the same time, there were legitimate concerns expressed about duplicating EPA's efforts and about additional, burdensome layers of regulation.

Ecology's Conclusions

Ecology has clearly stated the need for a long-term PBT reduction strategy. The draft and proposed strategies point out the *"mounting evidence that PBTs cause long-term harm to human health and the environment."*
Among other things, the strategy aims to expand on the traditional focus of pollution control – point sources of PBTs – to include dispersed, non-point sources of pollution that *cumulatively may be releasing significant amounts of PBTs into Washington's environment as well.* The PBT Strategy reflects the premise that *"[r]eleases from these sources (both ongoing and historical) have resulted in measurable levels of PBTs being found in the air, water, soils, and sediments throughout Washington."*

While we believe strongly in the need for a state PBT Strategy, the agency also recognizes that there are concerns about additional regulatory burdens and duplication of effort. We will pursue both non-regulatory and regulatory approaches to reducing PBTs. In our judgement, the most successful PBT reduction strategy is one that can be achieved at the state and local levels, rather than relying on a national program.

Improve Regulatory and Non-Regulatory Approaches

The draft PBT Strategy recognizes that continually reducing and phasing out PBTs requires fundamental changes in business and agricultural practices and government operations, as well as creation of practicable alternatives to PBTs. We expect this transition to take several years and believe that improvements in current regulatory and non-regulatory approaches can help speed that transition. The strategy identifies several objectives that are key to optimizing this effort. These objectives include:

- Improve collaboration among regulatory programs to ensure that cross-media effects are considered when making decisions about media-specific PBT regulations and statutes. The last several years have seen increasing awareness of the potential for contamination to move between land, air and water. To achieve the greatest reduction in pollution and regulatory costs we must:
  - Consider cross-media effects when making decisions about PBTs.
  - Promote greater reliance on pollution-prevention to reduce and eliminate PBTs.

- Improve regulatory and economic incentives for preventing pollution. Business and industry frequently cite economics, regulatory burden and lack of information as reasons for not pursuing pollution prevention measures. We will continue to explore ways to improve and augment existing economic or regulatory incentives that encourage pollution prevention.

- Provide increased access to technical information and assistance. Ecology will increase the availability of technical information, such as the chemical-specific action plans, on the agency's web page. Focus sheets, telephone listings for agency experts and web page links to other PBT resources also will be included.

Ecology received comments about the need to improve both regulatory and non-regulatory approaches to achieve PBT reductions. We assigned them to the following category:

- Comments related to regulatory and non-regulatory approaches

Ecology's evaluation and response to these comments follows.

Comments Related to Regulatory and non-Regulatory Approaches

The Draft Strategy

Over the long term, continual reducing and phasing out PBTs will require fundamental changes in business and agricultural practices and government operations, as well creation of alternates to PBTs. We anticipate that this transition will take several years. In our judgement, improvements in current regulatory and non-regulatory approaches can help speed the transition.

Several key objectives in the strategy are intended to optimize regulatory and non-regulatory approaches to reducing and phasing out use and production of PBTs. They include:

- Improve collaboration among regulatory programs to ensure that cross-media effects are considered when making decisions about media-specific regulations and statutes.
- Consider cross-media effects when making decisions involving PBTs.
- Promote greater use of pollution prevention to reduce and eliminate PBTs.
- Improve regulatory and economic incentives for preventing pollution.
- Improve access to technical information and assistance.

Public Comments

Ecology received many comments from individuals, stakeholders, and public interest organizations about the need for both regulatory and non-regulatory approaches to reducing PBTs in Washington's environment.

Comments included the following:

- Commends Ecology for recommending transparent processes, stakeholder participation and non-regulatory and voluntary approaches as alternatives to regulatory decisions
- Personal choices make the difference
- We need to think about what we are doing, choosing and buying
- Activities in Washington are moving in the right direction
- Would you stand for Ecology prohibiting driving, barbecuing, etc?
- Citizens need to work toward institutional and structural change
- Don't let our own shortcomings keep us from acting on the issues
- We cannot live in this society without heavy industry
- It's easy to point at industry, but we each make choices that affect the environment
- Avoid "us" versus "them." find common ground. Choices can be made by individuals

- Industry won't fix it; Ecology can't fix it – we're all responsible.
- A PBT Strategy must address all sources of PBTs.

Ecology's Review and Analysis of Public Comments

Business and industry frequently cite economics, regulatory burden and lack of information as reasons for not more actively pursuing pollution prevention. Lack of alternative consumer products is often cited as a reason individuals do not actively try alternative approaches.

The agency will continue to explore ways to improve and augment existing economic or regulatory incentives to encourage pollution prevention. In addition, we plan to increase the availability of technical information such as the chemical-specific action plans on our PBT web page. Focus sheets, telephone lists of agency experts and web page links to PBT resources also will be part of the site.

Ecology's Conclusions

Ecology considers successful execution of the PBT Strategy to be a long-term, multi-year effort requiring on-going public support. Continual reductions and phasing out of PBTs can only be accomplished if business, agriculture and government practices undergo fundamental changes. Practicable alternatives to PBTs also are essential. We anticipate that this transition will take several years and believe that improving both regulatory and non-regulatory solutions will help speed this effort.

Identify and Prioritize Additional PBTs

Ecology has evaluated a wide range of regional, national and international models for identifying persistent, bioaccumulative toxic chemicals. The agency is basing its proposals for identifying and adding to the strategy's initial list of nine PBTs on that evaluation.

To identify priority PBTs for Washington, we propose to use the chemical scoring system from the PBT section of the EPA's Waste Minimization Prioritization Tool (WMPT). The tool will be applied to potential PBTs that have been detected in water, soil, air, tissue or sediments in Washington. Consequently, our approach will be consistent with the EPA's but will be better suited to conditions in our state.

Evaluation is currently underway, and we expect to release a draft priority list of PBTs for Washington in the near future. Once evaluation is complete, Ecology will distribute the list of priority PBTs for public review. We will then consider those comments and determine which chemicals will be earmarked for chemical action plans, program-specific priorities or program opportunities.

Ecology received several comments about the need to identify and prioritize additional PBTs. We assigned them to the following categories:

- Comments related to the PBTs on the list and adding PBTs to the list
- Comments related to pentachlorophenol

Ecology's evaluation and response to these comments follows.

Comments Related to the PBTs on the List and Adding PBTs to the List

The Draft Strategy

In the draft strategy, Ecology identifies a starter list of nine PBTs and outlines a process for adding to the list. In mid-1998, when the agency first proposed a PBT strategy, we used a list created by the Ontario Ministry of Environment. Subsequently, we learned that the Ontario list was never used by the provincial government.

Later in 1998, EPA announced a national PBT strategy listing 12 priority chemicals. As Ecology collected public comment on its draft strategy in 1999, we heard many people suggest that the state strategy ought to be more consistent with the national strategy in terms of its list of priority PBTs.

In the agency's draft state strategy, we started our priority list with nine PBTs from the EPA list that also are know to be present in Washington's environment. We relied on the following sources to identify which of the 12 EPA chemicals met the second criterion:

- Fish and Shellfish Consumption Advisories in Washington State Due to Chemical Contamination
- 303(d) Water Segments in Washington State where PBTs have Exceeded (Violated) Surface Water Quality Criteria.

Public Comments

Ecology received several comments suggesting that we return to the list originally proposed in August 1998. Others suggest adding lead and pentachlorophenol (PCP) to our PBT starter list. Still others point out that five of the nine listed PBTs – Aldrin/Dieldrin, chlordane, DDT, PCBs and toxaphene – are already banned from production.

Other comments included:

- Nine chemicals are now on the list. The number is inadequate and most are already banned. Go back to at least original list of 27.
- Ecology is focusing on chemicals that are banned and not actively being used –why?
- Are nine chemicals enough? Do we oppose Ecology to get more chemicals on the list or do we back Ecology to get it going.
- Pentachlorophenol – no one denies it's a PBT – why isn't it on the list?
- EPA's list – Ecology's list – how/why was list chosen.
- Why does Ecology need to base their list on what other people have done – why not be leaders in state and take more initiative.

- Pentachlorophenol – did Ecology get a backlash from the Legislature for proposing to have it added to the list?
- Aldrin and B(a)P on preliminary list as a hazard to workers.
- Dieldrin – see written handout for outline of chemicals and issues
- Some of nine already banned
- Ban Diazinon
- Levels of PCBs in sediment as low as 200 parts-per-billion (ppb) can harm young salmon
- Dioxins are more poisonous now than they were 20 years ago
- How will we exist on this planet in the future with all these chemicals?
- Address all PBTs, including PCP and the other 26 PBTs on the original list from 2 years ago.
- The number of chemicals which Ecology has listed are inadequate. Why aren't chemicals such as PCP, cadmium and lead on the list?
- B(a)P does not biomagnify and should not be included as a PBT.
- The strategy fails to recognize that PAHs, including B(a)P, might be present in different forms, some of which are not bio-available.
- Remove banned chemicals from list and let clean-up program deal with them.
- Prioritizing chemicals on the list – where can Ecology realize the most benefit for dollars spent?
- Why does Ecology no longer use the original "Ontario List" of PBTs?
- It needs to address more chemicals than the mere nine in this strategy.
- The Toxic Release Inventory (TRI) is a poor way of monitoring PBTs released. The reporting thresholds are high and therefore leave out many potential releases. Using the TRI is contrary to the concept that these chemicals often enter our environment at low concentrations from dispersed sources.

Ecology's Review and Analysis of Public Comments

For chemicals and pollutants to be classified as PBTs, they must possess very specific characteristics. These characteristics include persistence, bioaccumulation and toxicity, as defined in EPA's draft WMPT. To be included on Ecology's state PBT Strategy list, chemicals must possess all three characteristics above and must occur in Washington's environment. Some chemicals suggested for addition to the list — fluoride, arsenic, chlorine and products like Dursban and Diazinon — do not meet this definition of PBTs.

Ecology also reviewed the comments submitted to EPA during its public comment period on the proposed WMPT. We anticipate that the definition of PBTs developed by EPA in 1998 will not change significantly in the future. If it does, we will make corresponding adjustments to our PBT listing process.

Ecology's Conclusions

Ecology believes it is best to start the list of priority PBTs with those known to exist in Washington. Furthermore, we will screen and prioritize additions to the list based on the definition of PBTs used by EPA in the 1998 draft of its WMPT.

Comments Related to Pentachlorophenol

The Draft Strategy

The August 2000 draft strategy does not identify PCP as a PBT, although the proposed action to *"develop strategies to control dioxin discharges from wood-treating facilities"* might include actions related to PCP since dioxin is a trace contaminant of PCP. In addition, disposal practices for PCP-treated wood may be affected by the strategy.

Public Comments

At both public meetings and through the mail, many people expressed concern about continued use of PCP. Ecology heard recommendations that we ban PCP by 2003, that PCP-treated products should be treated as a dangerous waste, that the agency should work with the state Department of Agriculture to cancel PCP's status as a registered pesticide and that we propose phasing out PCP in favor of cleaner wood treatment processes and products.

Specific comments included the following:

- Phase out PCP and end all discharges of the chemical by 2003.
- Regulate PCP treated products as dangerous wastes.
- Propose phasing out PCP and phasing in cleaner processes and alternative products for wood treating – which do exist.
- Ban the use of PCP and end all discharges of this chemical by 2003.
- The release of PCP should be discontinued within the state. The people deserve these measures. Ban by 2003. 26 other countries have already banned.
- Regulate PCP treated products as dangerous wastes.
- Work with the state Department of Agriculture to secure cancellation of PCP's registration.
- Ban the use of PCP and end all discharges of this chemical by 2003.

Ecology's Review and Analysis of the Public Comments

PCP is currently used at two wood treating facilities in Washington and is a contaminant at several sites. PCP is currently approved by the EPA for use as an antimicrobial. PCP is among PBTs initially identified in the proposed strategy for further evaluation and prioritization. Ecology will determine the eventual status and priority ranking of PCP as it develops the Washington PBT list.

Ecology Response

Those chemicals that rank high on the agency's priority PBT list are likely to be early targets of chemical action plans. Ranking also is likely to provide a rough guide to the resources that will be devoted to any single PBT. If PCP is ranked highly, the agency will work with the public to determine strategies for additional control. If dioxin is ranked highly, PCP might be a focus of controls related to dioxin since dioxin a trace contaminant in PCP. No determination has yet been made about the status of either of these chemicals.

Improve Public Awareness and Understanding of PBT Problems and Solutions

Ecology needs to engage, inform, and nurture the support of the public, stakeholders, and public interest organizations as part of the effort to reduce and phase out uses and releases of PBTs. Identified objectives include:

- Improve the public's understanding and awareness of the sources of PBTs and the problems they cause.
- Improve the ability of individuals and communities to reduce individual PBT use, production, and exposure.
- Provide education and access to current information so individuals and communities can make informed decisions about PBTs.

During the comment period, the agency heard several recommendations for environmental education. We will consider these recommendations as public education plans takes shape. Suggestions included:

- Discuss natural processes that create PBTs, past and current environmental levels and known risk posed by PBTs relative to other health risks.
- Provide information about PBTs associated with such activities as barbecuing, smoking food, cigarette smoking, engine exhaust, wood stove emissions and outdoor burning.
- Discuss the barriers to achieving to zero PBTs in the global environment.
- Provide balanced and scientifically accurate information on sources, reduction opportunities, and human and environmental health benefits.
- Develop a public information campaign about the issues.
- Acknowledge significant reductions made to date.
- Expand the audience to include individuals, government, business, industry, and the Legislature.

Ecology received several comments about the statutory basis for developing a PBT Strategy and assigned them to the following category:

- Comments related to the need for education

Ecology's evaluation and response to these comments follows.

Comments Related to the Need for Education

The Draft Strategy

One of the key elements of the draft PBT Strategy is the need to *"improve public awareness and understanding of PBT problems and solutions."* Ecology has proposed to develop and implement a public education and outreach effort to inform, build support and involve the public, interested groups and other stakeholders in efforts to continually reduce and phase out use and release of PBTs. The steps needed to meet these objectives include the following:

- Improve the public's understanding and awareness of the problems associated with PBTs and the sources of those chemicals.
- Improve the ability of individuals and communities to reduce individual PBT use, production, and exposure.
- Provide education and access to current information so individuals and communities can make informed decisions.

Public Comments

Public education was the subject of several letters, e-mails and comments at public meeting during the comment period. A sample of these comments is included below:

- Education needs to go to the public and be a big part of the budget.
- It's everybody's job to educate the public and we need it in communities.
- Elected and local officials need to know the issues and be more educated about PBTs.
- There is a need for accurate information – we have concerns about media slants on facts and persuasions by corporations.
- Strongest role Ecology can take is an educational role – stay out of the jobs versus environment argument.
- Ecology needs to bring the PBT issue to every conference/focus/meeting.
- Education is vital concerning both point and nonpoint sources of PBTs. Will a flyer be sent to everyone in Washington?
- Thermometers are an issue – nonpoint sources are an issue – education is critical.
- Failure to properly educate the public will result in unreasonable expectations that can never be satisfied by Ecology through a PBT program.
- Ecology and DOH have an obligation to present factual information on PBTs. Information should be based on sound science and presented in a consistent and equitable way.
- We agree with Ecology's efforts to educate the public on the personal responsibility and, in some cases, personal sacrifices that will be needed for the success of any PBT program.

Several letters suggest topics for a public education curriculum. They include:

- A public information campaign on PBTs should include a clear statement of program objectives, balanced and scientifically accurate information on PBT sources and reduction opportunities, a pragmatic assessment of costs and benefits and the timing to implement actions.
- Significant regulatory and voluntary actions which have led to reductions in PBT releases, or which are scheduled to occur, should be included in a public communication package.
- Strategy is almost completely lacking in any discussion of alternatives to PBTs. Part of the public education effort proposed by Ecology should include information about these alternatives.
- Provide an understanding that everyone contributes to the problem, which will require everyone to work and pay to limit PBT risks.
- Place PBT-associated risks in perspective with other risks in society.

Several people asked that the agency provide information on how individual choice can contributes to increase or reduction of environmental PBTs:

- Government needs to communicate what individuals can do to address PBTs.
- The public needs to understand that some of the listed substances are the result of common, everyday lifestyles such as vehicle emissions, outdoor burning, and residential wood burning.
- In order to accomplish meaningful reductions of PBTs in the environment, Ecology must help the public understand that a plan to reduce PBTs includes sources which will require changes to personal lifestyles.
- Do individual sources of PBTs such as residential pesticide use or private vehicles collectively represent a significant contribution?

Ecology's Review and Analysis of Public Comments

From the comments the agency received, it is clear that most people understand the importance of public education underpinned with thorough, accurate information.

Some of those who commented felt that the focus of public education ought to be on major contributors and other point sources of PBT pollution, while some felt public education ought to begin with individuals and other nonpoint sources of PBT that derive from everyday activities such as driving a car and outdoor burning. Both viewpoints provoked passionate discussions among those attending the public meetings.

Several people suggested topics that Ecology ought to address, and several commentors stressed the importance of sound, scientific information. Others were concerned about alarming the public.

Many people were interested in what they could do as individuals and in their communities to reduce PBTs. Others wanted to know what progress has already been made in the reduction and elimination of PBTs. Some suggested publicizing the strides government and industry have made in cleaning up historical PBT contamination and addressing contemporary PBT problems.

Ecology's Conclusions

- Education is critical component of the long-term PBT Strategy. Depending on funding, the agency plans to develop a public education program that will, at a minimum, provide basic understanding of:
- Problems caused by PBTs.
- Steps individuals can take to reduce PBTs.
- Steps organizations can take to reduce PBTs.

Components of a public education program might include:

- Presentations
- PBT-related information
- Links to Ecology's PBT web page.
- Existing education programs
- Technical assistance
- Regularly scheduled symposia on PBTs in Washington's environment.

Educational efforts might target user of certain products or communities especially affected by PBTs or individuals at high risk for exposure. Educational content might include information about outdoor burning, PBT pollution from motor vehicles and other combustion engines, pesticides and their use or lawn and garden products.

We plan to develop educational material in cooperation with other agencies, making certain that information is as up-to-date and accurate as possible. Chemical action plans will provide another important avenue for public information. Plans will focus on PBTs and PBT groups, providing detailed information such as assessment of costs and benefits, timing and PBT alternatives. Existing information sources also will play a role. For example, EPA maintains a publicly available list of industrial pollution releases by state, called the TRI. Still other agencies offer air pollution data for specific areas in the Washington.

Improve Information Needed to Make Informed Decisions on Measures to Reduce PBTs

Accurate information is essential to sound decision-making. Under the current system, decision-makers often lack information about PBTs such as environmental levels, sources, engineering solutions, health or environmental effects and economic effects. Ecology proposes two approaches to improve the availability of this critical information.

- Better track and depict environmental PBT concentrations and trends by merging existing monitoring programs and databases. The agency also proposes to create a baseline monitoring program to measure current PBT contamination and gauge subsequent changes in PBT concentrations.

- Improve information on sources of PBTs through chemical-specific action plans with background on current and historical use of the chemical, its environmental effects, how exposure can occur, and probable health effects.

Ecology received several comments about the importance of information necessary to make informed decisions and assigned them to the following category:

- Comments related to the need for monitoring

Ecology's evaluation and response to these comments follows.

Comments Related to Monitoring

The Draft Strategy

The draft strategy refers to monitoring in several contexts.

Measuring Progress – The goal of the proposed strategy is to reduce and, where possible, phase out existing sources of PBTs, therefore, indicators are necessary to evaluate its successes or failures. A PBT *baseline monitoring program* will establish past and current levels against which changes in PBT levels can be compared. These changes will be the environmental indicators that will measure the success of the PBT strategy. At present, there is no such program in Washington.

In the interim, the draft strategy proposes to track PBT-reduction progress by relying on existing indicators. These include EPA's Toxic Release Inventory; numbers of hazardous waste sites cleaned up where PBTs are known to be present; numbers of PBT-contaminated waterways listed as impaired; PBT concentrations recorded through ongoing sediment testing in state waters; PBT concentrations found during ongoing testing of fish and shellfish in state waters.

Screening and Prioritizing New PBTs – Historical monitoring data will be used to screen and prioritize new PBTs. These data will be used to help determine if a chemical occurs in Washington's air, water, land, fish or sediments.

Chemical Action Plans and Reducing Discharges to the Environment – The strategy suggests compiling information on sources of individual PBTs as part of the chemical-specific action plans. These data will come, in large part, from previous monitoring of PBT sources. Since these data are, in many cases sparse, the agency may propose updating monitoring and reporting requirements for permitted facilities.

Public Comments

Several people suggested additional data collection and evaluation, either before or after the strategy is finalized. The nature of this data collection was not always specified. Two letters suggested that we assess available information on PBT trends in Washington State by using data from dated sediment cores collected from Puget Sound. One suggested preparing a baseline document assessing PBT problems in Washington State, while another stated that any Washington strategy should include "measurement and reporting tools for detailing trends in the releases and inventories of PBTs into the environment."

One person questioned the agency's choice of methods for tracking strategy successes and failures, noting that PBT sources from outside the state would not be reflected in Ecology's source inventories. This person suggested that "the state measure what it can address."

Finally, one person asked that we consider the costs and benefits of monitoring and raised a number of pertinent questions: Are there existing programs for monitoring? Who pays for it? Can local governments have liability protection to encourage participation if monitoring is expected of municipalities?

Ecology's Review and Analysis of Public Comments

Information allowing Ecology to measure PBTs in and PBT discharges to Washington's environment is a key component of the PBT Strategy. Over the years, a several studies have gathered and analyzed this kind of information. You can see a list of these studies and reports on the web at www.ecy.wa.gov/biblio/pbts.html.

We believe that consistent, accurate environmental monitoring is necessary to effectively track long-term PBT trends and fairly evaluate progress in reducing and phasing out PBTs in Washington. Although the agency has less influence over out-of-state PBT sources, we believe it is our responsibility to address PBTs in Washington whatever their source. It also is Ecology's responsibility to reduce the state's export of PBTs. Tracking PBT trends Washington's environment may be the best single measure of our success.

It is worth noting that, because of Washington's location at the upwind edge of the continent, we may be a net exporter of air toxics. The reverse is probably true for PBTs discharged to surface waters; although several rivers enter Washington from outside the state or share common borders with adjacent states or provinces, no rivers permanently leave Washington for other states or provinces.

In general, PBTs are difficult to detect and quantify in air and water. Because they are usually fat-soluble and adhere to particles, they are most readily measured in animal tissue, soil and sediment. Over the years there have been several monitoring efforts by Ecology, the state Department of Fish and Wildlife, EPA, the United States Geological Survey (USGS) and local entities that track PBTs in fish, shellfish, soil or sediment. These efforts vary enough from one another to make combining results and evaluating trends from them unfeasible. As several people suggested, sediments cores, which are gathered and analyzed using a single set of field and laboratory methods, may overcome some of these difficulties. A review of scientific literature and information on dated sediment cores (Yake, 2001) is available at www.ecy.wa.gov/biblio/ 0103001.html.

Monitoring costs for PBTs can be high. While monitoring data are critical to the progress and credibility of the PBT Strategy, we recognize the importance of efficiency in designing and coordinating PBT monitoring programs. We will continue to modify and coordinate existing monitoring efforts to incorporate PBTs where appropriate. Ecology's present work to develop a Toxics Monitoring Strategy for water and fish tissue is one example of these efforts. Ecology is evaluating affordable PBT monitoring options and may focus solely on mercury this biennium given current funding levels. Chemical-specific action plans may provide an opportunity to develop more detailed and comprehensive information on a chemical-by-chemical basis.

Monitoring data also will be used to screen and prioritize new PBTs. The agency will use its Environmental Information Management System and Sediment Quality Database to determine which PBTs are present at elevated or problem-causing concentrations.

Ecology's Conclusions

Monitoring of PBTs, both in the environment and in potential sources, is a critical component of this effort. We believe tracking PBT residues in the environment may provide the best single indicator of the success or failure of the PBT Strategy, although other measures, including source inventories and PBT releases, also are important and necessary. In addition to tracking the success of the overall PBT effort, monitoring data are central to evaluating the relative importance of various potential PBT sources, screening candidate PBTs and creating chemical action plans.

Citations

Yake, W. E, 2001. The Use of Sediment Cores to Track Persistent Pollutants in Washington State: A Review. Publication No. 01-03-001. 44 pp.

Yake, B., S. Singleton and K. Erickson, 1998. Washington State Dioxin Source Assessment. In Dioxin 2000: 20th International Symposium on Halogenated Environmental Organic Pollutants & POPS, Monterey, CA, August 13-17, 2000. Volume 46, 2000, pp. 291-294.

Yake, B., S. Singleton and K. Erickson, 1998. Washington State Dioxin Source Assessment. Publication No. 98-320. 61 pp. + appendices.

Current and Proposed Actions

Many of Ecology's ongoing activities contribute to the PBT effort. Some examples are listed below. Actions that have been undertaken are marked with a check.

- ✓ Continue a vigorous education and technical-assistance program to help businesses reduce waste and pollution by stressing prevention, recycling and re-use of waste. The emphasis of these programs is on facilities that generate PBTs.
- Require pollution prevention plans in National Pollutant Discharge Elimination System (NPDES) permits issued to oil refineries, emphasizing opportunities to reduce or eliminate PBTs from process wastewater and stormwater runoff.
- Encourage the federal USDOE to adopt the PBT Strategy at Hanford by including it in pollution prevention planning.
- ✓ Continue the Toxics Reduction Engineer Exchange program.
- ✓ Make steel-mill flue dust subject to the same regulations as other hazardous wastes and waste-derived fertilizers. Steel-mill flue dust contains dioxin, arsenic, cadmium, lead and mercury and was widely used in fertilizer in Washington. The state has been successful in convincing EPA to eliminate an exemption that encouraged this practice.
- ✓ Develop regulations to limit concentrations of metals, including mercury, lead, cadmium and arsenic, in fertilizers sold in Washington.
- Implement final federal guidelines, adopted in April 1998 and requiring new effluent limits at pulp and paper plants. These will further reduce dioxin and furan discharges.
- Develop strategies to control dioxin discharges from wood-treating facilities.
- Draft guidelines for proper disposal of PBT-tainted building demolition materials, including thermostats, which contain mercury, fluorescent lights and light ballasts, which contain PCBs, and treated wood, which produces dioxin when burned.
- Complete the analysis of the cross-media – air, land, water – effects of various "reasonably available control technologies" 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.
- More effectively translate fish-tissue contamination into wastewater control and human-health-based water quality criteria. Concentrations in water and wastewater are usually too low to measure, even when contamination is found in fish or shellfish. An existing plan describing how Ecology will address this issue is being re-evaluated 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: dioxins, furans and B(a)P.
- As decisions are made to clean up contaminated sites and tanks at Hanford, evaluate PBTs associated with these clean-up 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 clean-up plans for rivers, lakes and estuaries that are contaminated with PBTs.
- For sites contaminated with PBTs, emphasize remedies that address these pollutants.
- Use toxicity of site contaminants as a factor when ranking and prioritizing clean-up of hazardous-waste sites.
- Establish site-specific sediment clean-up requirements designed to prevent accumulation of PBTs in the aquatic food chain.
- During the next triennial review of the water quality standards, evaluate and prioritize policy and technical updates to the standards. 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 commonly used in regulatory programs to allow ambient air, water, or sediment to mix with pollutants in discharges. These areas are used to attain chemical concentrations in the environment that protect larger areas.

Ecology received several comments about the current and proposed agency actions to reduce PBTs and improve the way PBTs are addressed by the agency. We assigned these comments to the following categories:

- Comments related to air quality
- Comments related to hazardous waste
- Comments related to solid waste and biosolids
- Comments related to water quality
- Comments related to pulp and paper – general comments
- Comments related to pulp and paper – public health and safety
- Comments related to pulp and paper – Georgia-Pacific, Bellingham
- Comments related to pulp and paper – Rayonier, Port Angeles
- Comments related to other industries

Ecology's evaluation and response to these comments follows.

Comments Related to Air Quality

The Draft Strategy

The draft strategy discusses air as both a PBT receptor and transporter. One of the troubling aspects of PBTs is their ability to travel in the air many miles from their point of origin. PBTs also have the ability to re-enter the atmosphere after being deposited in soils or sediments and continue to travel. The draft strategy contains several current and proposed actions associated with air quality. At the same time, our priorities consider air emissions that can affect land, water and sediment quality.

One of the biggest challenges we face in the effort to reduce PBTs is non-point source pollution. Everyday activities such as indoor fires, outdoor burning, operating a motor vehicle and the use of gasoline-powered tools and equipment all release measurable and potentially significant quantities of PBTs into the environment.

In addition, it is imperative that sources now allowed and permitted to release PBTs to the air continue to improve pollution-prevention measures, convert to alternatives and take advantage of improved technology as it becomes available. The agency considers air to be the media most in need of attention if we are to achieve PBT reductions over the long term.

Public Comments

Ecology received a variety of comments about the releases or emissions of PBTs into the air. These comments included:

- The Great Lakes Bi-National Toxics Program has identified backyard trash and residential wood combustion as top priorities for reductions. Pulp and paper was not a high priority. Ecology should do the same.
- Expand yard waste and garbage pickup services in rural areas and prohibit outdoor burning in these areas as soon as these services are in place.
- Develop programs to encourage the removal of wood burning stoves and fireplaces at the time of sale of a residence and replacement with natural gas or propane.
- Spokane has serious air pollution problems.
- More than one-third of businesses violated the clean air standards.
- Located in the center of my community are four hog burners (wood-waste boilers). They emit large amounts of dioxin into the air and pose a human health threat.
- Concerned about bioaccumulation of toxins -- Especially concerned about air pollutants.
- Discuss the aerial transport of PBTs from outside Washington.
- Regarding the Centralia Power Plant: How do the emissions of B(a)P, mercury and dioxins/furans rank with other point sources?
- Regarding the Centralia Power Plant: Does the PBT plan call for state support of actions eliminating PBT emissions?

- Regarding the Centralia Power Plant: Dioxin measures are not available or required of the plant. How will the PBT plan ensure that releases from this major source are measured?
- Focusing attention on emissions using the 1995 emissions base would be very different than using projected 2005 emissions estimate. These data also suggest fewer opportunities for cost-effective reductions than might be assumed.
- Tighten the current Inspection and Maintenance program requirements for diesel motor vehicles. Develop programs to retrofit diesel school and transit buses with particulate control equipment.
- Develop infrastructure for and promote the use of clean fuel motor vehicles, construction equipment, marine engines and airport ground support equipment.
- This PBT initiative could be the most significant work Ecology has ever undertaken because it is directed at the areas of greatest remaining public health risk.

Ecology's Review and Analysis of Public Comments

Outdoor residential burning produces highly toxic chemicals that pose serious risks to human health, especially among children and other sensitive populations across the state. [20,21] In addition, smoke is a nuisance to many citizens in residential areas.

Some PBTs such as dioxins and PAHs are products of incomplete combustion and commonly stick to small bits of soot, called particulate matter (PM). The association between dense PM and adverse health effects, including increases in disease and deaths, has been recognized for many years[22]. Studies have demonstrated a link between PM and respiratory and cardiopulmonary diseases such as chronic obstructive pulmonary disease (COPD), heart attacks and bronchitis, as well as increases in asthma-related hospital admissions[23].

Ecology agrees that we can achieve further reductions in outdoor burning. Consequently, we have identified all outdoor burning, not just residential, as a high priority during the next 10 years and have adopted a phased approach to reduce air pollution from outdoor burning[24].

Outdoor residential burning is now banned in all densely urban and populated growth areas where reasonable alternatives exist. In Spokane County the air pollution control authority recently proposed revised regulations that will ban all residential burning and tighten restrictions on other types of burning. Although outdoor burning is now allowed in some areas of the county, it is legal only seven days a year and is limited to plant debris. Other regulatory authorities are working to regulate and limit agricultural field burning, which subjects Spokane, Spokane county and other areas in the state to smoke. Furthermore, the Spokane Air

[20] Norris G., ***Air Pollution and the Exacerbation of Asthma in an Arid, Western US City***. Dissertation at the University of Washington. June 9, 1998
[21] Larson TV and JQ Koenig. ***Wood Smoke: Emissions and Noncancer Respiratory Effects*** Annu. Rev. Public Health 15:133-56. 1994 .
[22] Waller RE. ***London fog***. Science 1968 Jul 5;161(836):6-7.
[23] EPA. Office of Research and Development. ***Air Quality Criteria for Particulate Matter***. Second External Review Draft. U.S. Environmental Protection Agency. March 2001.
[24] Air Quality Program. Strategic Plan. Washington Department of Ecology. August 2000.

Pollution Control Authority and the Department of Ecology are working together on efforts aimed at reducing carbon monoxide (CO) emissions in the area.

Ecology also is identifying and encouraging alternatives to outdoor burning, including hauling and yard waste recycling[25]. Composting, chipping and mulching all provide useful products for landscaping and fertilizing residential or even commercial areas. And, the agency plans to coordinate with local air pollution control agencies and communities to further reduce emissions from woodstoves and fireplaces. Ecology's objectives include:

- Establish local-area wood smoke management programs, including voluntary or mandatory advisories on air quality, weather and forecasts.
- Prepare wood stove education programs in cooperation with retailers, owners, builders and air quality agencies.
- Work closely with local government agencies to prevent future problems.
- Involve communities in designing creative solutions to wood smoke problems[26].

Atmospheric PBTs arriving in Washington from out-of-state can be significant depending on the characteristics of a particular chemical.[27] Although Ecology does not have jurisdiction outside our state, we frequently enter into partnerships with neighboring states and Canada. These partnerships are important in reducing pollution sources outside our control. For example, Ecology's Air Quality Program, working with the state Department of Health and Canadian government agencies,[28] reduced lead and PM emissions from the Cominco lead smelter by over 90 percent, improving air quality for the residents of Northport, Washington.[29]

According to recent estimates from an EPA report, two groups of PBTs, dioxins and furans, are primarily associated with point sources like the Centralia Power Plant. Although no site-specific emission estimates are available for the Centralia Power Plant, it is among a category of sources – "utility/industrial coal combustion" – estimated to emit dioxins and furans at significantly lower concentrations than municipal and medical waste incinerators and secondary copper smelting, and somewhat lower than residential wood burning, motor vehicle exhaust and forest or brush fires. Mercury is another PBT generated from coal-fire boilers that adheres to PM. But studies have found that mercury, too, is present in insignificant amounts on the power plant's emissions.

Potential emissions from the Centralia Power Plant, without the use of control equipment, are estimated at 415,000 tons per year. However, these emissions will be controlled with more than 99.9 percent efficiency when the new control technology applications required in 1997 are fully implemented. Similarly, the required control technology will reduce sulfur dioxide (SO^2)

[25] Chapter 173-425 Washington Administrative Code. *Outdoor Burning Rule*. Effective April 13, 2000.
[26] Ecology Air Quality Program, 2000.
[27] EPA. ***Deposition of Air Pollutants to the Great Waters. Third Report to Congress***. OAQPS. U.S. Environmental Protection Agency. EPA 453/R-00-005. June 2000.
[28] Letter from M. Saikewicz, Washington State Department of Ecology Air Quality Program to C. Johnson, BC Environment. November 20, 1996.
[29] Washington State Department of Ecology. ***Northport, Washington Air Quality Study: Phase III***. October 1998. Publication number 98-210.

emissions by approximately 90 percent. These reductions will result in corresponding reductions in potential risks from exposures to airborne particulate matter.[30]

Finally, Ecology recognizes the importance of collaborative efforts to improve air quality, such as those by the Puget Sound Clean Air Agency to reduce PBTs emissions from diesel- and gasoline-powered motor vehicles. [31]

Ecology's Conclusions

For the past several years, Ecology has developed, implemented and enforced emission standards related to air quality. Our key successes include a multitude of pollution control technologies installed at permitted facilities over the years, as wells as continual improvements in pollution controls for consumer products such as automobiles and wood stoves. Furthermore, we are placing more stress on identifying new pollution sources and dealing with them before they cause further damage to air quality.

We recognize a potential for conflicting mandates. Ecology must use care in executing the PBT Strategy and anticipate the consequences of its policy decisions, rule changes or implementation actions. The PBT Strategy encourages a communication approach that will ease conflict resolution and promote informed decision making.

[30] EPA. ***The Inventory of Sources of Dioxin in the United States.*** External Review Draft. Exposure Analysis and Risk Characterization Group. Office of Research and Development. Washington DC. U.S. Environmental Protection Agency. EPA/600/P-98/002A. April 1998.

[31] Southwest Air Pollution Control Authority (SWAPCA***). Technical Support Document: Centralia Plant Reasonably Available Control Technology (RACT)***. SWAPCA 97-2057. September 30, 1997.

Comments Related to Hazardous Waste

The Draft Strategy

Hazardous waste management is an integral part of the draft PBT Strategy. Current hazardous and dangerous waste regulations, however, were designed with industry and municipalities in mind. Typically, household hazardous wastes are not managed the same; although Ecology sets statewide standards, local landfills are free to establish more stringent standards and decide what wastes they will or will not accept.

Public Comments

A summary of the comments submitted to Ecology include:

- Provide more notice and information about hazardous waste collection and bio-hazard disposal days
- Do blinking sneakers go to hazardous waste collection?
- Look into adding a bin to our other recyclable materials where the homeowner can place some of our less toxic chemicals so they can be recycled.
- The TRI is an inappropriate measurement tool for the strategy because it only looks at point sources and ignores nonpoint sources.
- While additional efforts are appropriate, it is also true that Washington probably is not enforcing its own existing law barring disposal of hazardous waste products by large quantity generators. Expanding enforcement of and education about existing laws and recommended management practices should be high on the state's agenda.
- To expand recycling opportunities for hazardous wastes, the state needs to adopt a universal waste rule consistent with rules in other states for the wastes in question.
- Washington should adopt the federal universal waste rule for lamps to help establish a consistent rule through out the nation for recovering spent lamps. The failure to adopt the universal waste rule or the adoption of inconsistent rules makes collection, storage and shipment of universal wastes including lamps very difficult.
- Expand education about existing laws barring disposal of hazardous waste products by large quantity generators. NEMA believes the most effective education program is for manufacturers to provide information about mercury in lamps and spent-lamp disposal on the wholesaler invoices for the lamps and for wholesalers to adopt the same language on invoices to their customers.
- Washington should enforce existing laws barring disposal of hazardous waste products by large quantity generators.
- Ecology needs to expand its universal waste program to cover products it wants collected for recycling. This should be a major element of the Department's strategy.

- PCBs have been banned from lamp ballasts since 1977. It is unlikely, therefore, given the passage of time, that there are very many fluorescent lamp ballasts with PCB fluids still in service.

Several people mentioned fluorescent tubes and suggested the Universal Waste Rule for lamps should be adopted. Ecology adopted this rule in June 2000. Additional information about it is available at www.ecy.wa.gov/apps/hwtr/hwsd/default.htm, or by telephone at 800-633-7585.

A key part of the PBT Strategy is assisting local governments to find appropriate disposal options for products such as PCB-lamp ballasts and household mercury fever thermometers.

Ecology's Review and Analysis of Public Comments

The TRI data alone are too limited to meet the needs of the PBT Strategy. However, they will be one of several sources Ecology will use to assess sources of PBTs, the success of PBT efforts and PBT cross-media effects.

The TRI has recently been improved by the addition of new PBTs, such as dioxin, and lowering of some reporting thresholds. This will increase the sensitivity of the TRI to smaller releases. These reporting thresholds have been substantially lowered for PBTs in general and for the dioxin category in particular.

The PBT Strategy also will rely on data from environmental monitoring, permitted discharge reports and spill-response and clean-up efforts.

Ecology's Conclusions

For the past several years, Ecology has developed, implemented and enforced hazardous waste generation, storage, use, transport and disposal rules. One of our key achievements in the hazardous substances arena has been improving awareness of the pollution-prevention approach, handling problems before rather than after they affect the environment. The agency's PBT Strategy will continue to emphasize this point, with the main focus on those PBTs determined to be a high priority for continual long-term reductions in Washington. We will keep local governments informed as chemical action plans are developed so that they can update their waste management policies based on current information. We also are proposing to strengthen regulatory requirements for hazardous waste management facilities to ensure that hazardous wastes are treated and disposed of properly, and wastes are not left exposed to the environment if these facilities close.

Comments Related to Solid Waste and Biosolids

The Draft Strategy

Proper management of solid waste is integral to the PBT Strategy, which identifies a need to improve regulatory and non-regulatory approaches to this issue. The Guiding Principles for the strategy include the observation that, *"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 (emphasis added)."* The statutory foundation of the strategy identifies those laws which the agency currently uses and which will be important in implementing the PBT Strategy. This includes the Solid Waste Management Act, Chapter 70.95 RCW . The foundation, however, is not strictly limited to the laws identified in the proposed strategy. The department also implements Chapter 70.95 J – Municipal Sewage Sludge – Biosolids and Chapter 173-308 WAC.

Public Comments

Several people questioned whether there might be conflicts between the proposed PBT Strategy, recycling goals and solid waste management requirements.

- Will the strategy pose a potential conflict with recycling goals?
- Will the strategy force landfilling of materials such as biosolids?
- How will Ecology's strategy address the re-circulation of PBT sources?
- Will recycling of PBT-containing materials keep certain PBTs in the environment?
- What about the re-circulation of PBTs in the food chain?
- Moving materials into landfills is not always the best solution.
- There is a need to clarify requirements for spent-product management resulting from building demolition.
- Wastewater and biosolids are not sources of PBTs, but rather are recipients of PBTs from other actual sources. The department should not focus on wastewater discharges until source control measures can be enhanced.

Ecology's Review and Analysis of Public Comments

We generally agree with these concerns. There is indeed some potential for conflict between implementation of the PBT Strategy and statewide recycling goals. And yes, it is possible decisions made in implementing the PBT Strategy could drive materials more appropriate for recycling into a landfill. Conflicting mandates are one of the reasons why reduction of PBTs is a difficult proposition, and it is also one of the reasons the strategy emphasizes the need for coordination and cooperation throughout. The Solid Waste & Financial Assistance Program has been represented throughout the process of developing this strategy, and it continues to participate.

Persistence and bioaccumulation in the food chain are two of the characteristics that make PBT problems a challenge to solve. How, for example, do we weigh the benefits and consequences of a decision which promotes recycling and slows landfill disposal but allows a small amount of PBTs to continue circulating in the environment. How do we find the balance point for very small incremental gains in the reduction of PBTs if the economic consequence is very high? What if a decision to pursue or not pursue a particular action results in more or less agency resources to be directed toward a different problem?

Biosolids and wastewater are receivers, but not producers, of PBTs. Pretreatment of industrial discharges to municipal sewers has resulted in a dramatic improvement in influent, effluent and biosolid quality over the years. At this time, we are inclined to believe a pollution-prevention approach is most successful in improving influent and effluent qualities.

The department is constantly trying and will continue to try and provide appropriate guidance for the management of waste streams, including demolition debris. For more information, visit the following web sites: www.ecy.wa.gov/programs/hwtr/demodebris/index.html and www.ecy.wa.gov/programs/swfa/cdl/index.html.

Ecology's Conclusions

Ecology certainly recognizes a potential for conflicting mandates. The agency must take care in implementing the PBT Strategy and examine the potential consequences of policy options, rule changes and actions. Would it be possible, for example, to make recycling more desirable in some cases by building strategies to reduce or eliminate PBT sources typically landfilled? As these conflicts become more apparent, open exchange with the public and regulated communities will become increasingly important. The PBT Strategy encourages a communication approach that will ease conflict resolution and decision making.

Comments Related to Water Quality

The Draft Strategy

The draft strategy discusses water as both transporter and receptor of PBTs and other pollutants. Water not only plays an important role as fish and wildlife habitat, but also as a sink for pollutants from air, nonpoint sources and point sources. Therefore, the draft strategy contains a number of current and proposed actions related to water and sediment. The draft strategy also says, *"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."* This refers to mixing zones in many different media, including water.

Public Comments

Ecology received a wide array of comments about water and PBTs. In most cases, these urged the agency to do more to regulate PBTs in water and to do it faster. The comments addressed both water and sediments, although the majority were aimed at mixing zones in water; most recommend eliminating mixing zones immediately, while some others support use of mixing zones for PBTs. Some commentors recommended that industries meet water quality criteria at the end of the pipe immediately, while others recommended that Ecology's Water Quality Program (WQP) use the current triennial review rule-making process to eliminate mixing zones for PBTs.

Other comments concerned issues such as sediment clean-up, uncharacterized discharges, polluted waterbodies in Washington and how we should regulate PBTs in waters. Some of the comments include:

- In the case of historic pesticide residues in sediment, best available science says they should not be disturbed. Efforts to clean up sediment are more likely to stir up residues causing exposure to aquatic life. What is the purpose of raising public concern about a situation that cannot be remedied with available technology
- Synthetic hormones and prescription drugs are not filtered out of wastewater discharges and may re-enter water supplies relying on groundwater.
- There should be signs at waterbodies in the state warning of toxins in the water.
- Ecology needs to have a consistent policy across all of its divisions that releases of PBTs are to be phased out, not increased.
- Has testing for PBTs had been conducted for Skagit County, and if so, are any PBTs found in Skagit County.
- Ecology should model their PBT Strategy after California's program, and citizens should sue the state for not enforcing laws.

Ecology's Review and Analysis of the Public Comments

For purposes of review, Ecology has assigned the comments to three broad categories of concern:

- Dealing with known sources of PBTs affecting water quality, such as mixing zones and historically contaminated sediment.
- Managing uncharacterized sources of PBTs, such as pharmaceuticals in wastewater discharges.
- Taking a consistent and effective approach to controlling PBTs in water.

Current regulations allow the use of mixing zones. A mixing zone is an area surrounding the discharge pipe where pollutants mix with the surrounding water; the area around a discharge is used to dilute pollutants. The discharger must meet water quality standards only at the edge of the mixing zone, but not within the mixing zone. Mixing zones traditionally have been used to attain criteria levels for pollutants in ambient air, water and sediments. The PBT Strategy endorses, among other things, re-examination of current mixing zone use *"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."*

Sediment clean-up is a useful and effective tool in remediating historical sediment contamination in waterbodies and the plants and animals that rely on those waterbodies. Ecology's TCP works with the public, responsible parties and other agencies to evaluate and plan clean-up, containment and control of discharges from contaminated sites. Aquatic sediments sites can be addressed by several means, including sediment removal and capping. We use the best options available to keep PBTs and other chemicals from entering the surrounding environment from these sites. Many of our decisions involve consideration of the potential for secondary damage resulting from clean-up efforts.

In addition to mixing zone control and sediment clean-up, source control may provide opportunities to reduce the discharge of PBTs into water. Examples include improving disposal practices for waste that contain PBTs, protecting uncontaminated sediments and waters and reducing contamination in stormwater run-off. Posting signs in areas where chemicals are detected in sufficient quantities to be a health concern serve to reduce exposure of the public to unsafe levels of contaminants.

The issue of uncharacterized sources is large and complex. When information showing chemical presence is not available, control becomes difficult. In the case of PBTs, the high detection threshold imposed by traditional laboratory analyses make it difficult to determine whether they are present. We also traditionally analyze for only a small suite of the many thousands of chemicals in use. Furthermore, the geographic scale of Washington, its rivers, lakes and coastline, presents a considerable challenge to identifying PBTs comprehensively.

The PBT Strategy seeks ways to address a specific list of priority chemical compounds. Ecology will develop action plans for these chemicals. Once action plans are produced, timelines, actions and deadlines will become available. The list of PBTs is unlikely to address all chemicals about which people have raised concerns. In the case of pharmaceuticals and other under-characterized chemicals, Ecology is interested in credible data demonstrating persistence, bioaccumulation and toxicity so we can rank these chemicals.

The draft strategy is an effort by Ecology to develop an integrated, multi-media approach to control of PBTs. Thus far Washington is the only state in the U.S. to develop a comprehensive, strategic approach that not only coordinates with the EPA approach, but also is tailored to fit the needs of an individual state.

How the approach will translate into changes in water quality management or controls of discharges to water remains to be seen. In addition to action plans aimed at specific, high-priority PBTs, the agency will identify activities aimed at reducing the broader PBT threat to Washington's environment. The Water Quality Program will work with other agency programs to design PBT control and prevention measures that make sense from a inter-program, multi-media perspective.

Ecology Conclusions

Water is a media central to PBT transfer in the environment. PBTs in water accumulate in sediments and from there travel up the food chain, concentrating as they go, eventually to be eaten by humans or wildlife. Therefore, it seems reasonable to search for ways to reduce sources of PBTs into water.

For the past several years, Ecology has developed, implemented and enforced water quality pollution standards. Our key successes include installation of many pollution control technologies at permitted waste water treatment plants, industrial and other facilities over the years. In addition, we have worked to improve awareness and use of pollution prevention.

The agency has no plans at this time to reduce or ban mixing zones. However, we believe pollution prevention is more cost-effective than paying for technology and treatment at the "end of the pipe."

Ecology recognizes a potential for conflicting mandates and will take care to consider the consequences of any particular policy decision, rule change or action before it is executed. The PBT Strategy encourages an approach to communication that will help the agency resolve these conflicts when they arise. We cannot say with certainty what decision will be made in any particular scenario, but we are doing our best to be fully aware that there may be consequences for all sides of the issue.

Comments Related to Pulp and Paper – General

The Draft Strategy

Washington's pulp and paper industry has worked closely with Ecology and EPA over the years to improve and upgrade pollution control equipment. For example, the draft PBT Strategy singles out new 1998 guidelines requiring reduced effluent limits at pulp and paper plants. These new limits take into consideration technological improvements undertaken at these facilities as they move from chlorine bleaching to elemental-chlorine free pulping processes.

Despite these changes, many people are of the opinion that pulp and paper facilities in Washington release significant amounts of dioxins and furans. Ecology views the pulp and paper sector as a part of the bigger picture of PBT releases in the environment. In July 1998, Ecology released the *Washington State Dioxin Sources Assessment*. This study ranks bleached pulp and paper mills medium in importance in terms of the need for additional data and as a target of source control and reduction efforts. This ranking was based on the fact that pulp and paper mills were in the process of improving plant technologies to meet new 1998 federal effluent limits.

Ecology received a number of comments from individuals, public interest organizations and stakeholders about pulp and paper facilities. Specific comments were directed a two pulp and paper facilities in particular. We have placed these comments in the following categories:

- General comments about pulp and paper
- Comments about health and safety issues
- Comments about the Georgia-Pacific facility in Bellingham
- Comments about the Rayonier facility in Port Angeles

Public Comments

- Pulp mills should be regulated to eliminate the use of chlorine in paper production. Totally chlorine free technologies should be mandatory, this would eliminate the releases of dioxins, furans and other PBTs.
- Issue water pollution permits for pulp mills based on totally chlorine-free technology. Ecology must require that these plans be implemented.
- The strategy is not clear enough on the deadlines established in cleaning up the contaminated sediments and in reducing harmful emissions. There is not reason that TCF technology is not being enforced for all pulp mills.
- Strategy disregards progress made by pulp and paper over the last 10 years.
- Ecology should not advocate consumers using non-bleached paper products. Northwest mills targeted unfairly in draft, overheads, presentations and newspaper articles.
- Ecology should not use the term "enforce" when it mentions pulp and paper, as this implies pulp and paper facilities are not complying with permits.

- The International Joint Commission's (IJC) latest biennial report states that conversion to chlorine dioxide will virtually eliminate dioxin from mill discharges. The strategy quotes the IJC. If the mills are complying with the cluster rule, they should not be pinpointed in the strategy as large sources of dioxins.
- You need to put enforceable language in pulp mill permits so that Georgia Pacific, Weyerhaeuser and others stop putting dioxins, furans and other PBTs into the environment.
- What is the single biggest industrial source of PBTs in Whatcom County?
- Numerous industrial point sources nearby

Ecology's Review and Analysis of Public Comments

Pulp mills use different processes to produce pulp and bleach. Several comments addressed the water permitting process and new permit requirements, centering on the issue of chlorine use to bleach pulp.

Pulp mills are permitted under federal rules issued by EPA. The PBT Strategy seeks ways to address specific chemical compounds, and Ecology will develop action plans for these chemicals. Once action plans are produced, timelines, actions and deadlines will become available. If an action plan specifies that new requirements ought to be added to a permit, we will modify the permit accordingly.

Agency regulatory staff will continue to take enforcement actions when appropriate. None of the comments made during the presentations of the draft PBT Strategy were meant to imply that pulp mills are not working to comply with their permits. And in fact, we anticipate decreases in dioxin discharges from pulp mills as a result of changes made to comply with new EPA rules. Ecology is drafting permits, enforceable by agency regulatory staff, to address pulp mill dioxin discharge.

One person asked us to identify the single biggest industrial source of PBTs in Whatcom County. Since the closure of incinerators and the GP pulp mill, there is no single, large industrial facility of concern. We should note here that all citizens who drive motor vehicles or burn wood have the potential to produce dioxins. An action plan for dioxins will look not only at industrial facilities but at all potential sources of dioxin. Only by looking at all sources will we make progress in our mutual efforts.

Ecology's Conclusions

In the past, large facilities such as pulp mills have used large amounts of chlorine. Recent regulatory changes have prompted pulp mills to reduce the amount of chlorine they use. In addition, regulations will limit allowable chlorinated organic compounds produced by pulp mills. When an action plan for dioxins is developed, the agency will consider all options for decreasing dioxin production and release.

Comments Related to Pulp and Paper – Public Health and Safety

The Draft Strategy

The draft PBT Strategy does not address any public health and safety issues related to pulp mills. The strategy is intended to raise awareness about and promote the need for reducing persistent, bioaccumulative toxins. Exposures to PBTs has been linked to a wide range of toxic effects in fish, wildlife and humans. In addition, some PBTs can be transported long distances on wind and water currents as air particulate or sediments.

Public Comments

Several people provided comments concerning the health and safety at pulp mills:

- With the advent of new public health threats we cannot afford to curtail the use of disinfectants based on the emotional hysteria of environmental groups.
- Strategy lacks sufficient detail about the immediate or long-term impacts to business in the state as well as to the public health.
- There are other societal values at stake, such as rationales underlying certification processes requiring the use of proven manufacturing technologies to assure product safety and quality. For example, some metals considered for addition to the list of targeted PBTs may be needed to meet safety or performance standards established by the Federal Aviation Administration or the Department of Defense in aircraft manufacturing.

Ecology's Review and Analysis of Public Comments

Even though Washington has a state department of health, Ecology also is concerned with public health and safety. All of our regulations are developed in a public process and in cooperation with DOH. We expect to develop action plans with input from many people outside Ecology. Implementing action plans for PBTs will not result in an increase in risk to public health.

We worked hard to provide examples and details in the draft strategy to help the public and business understand its possible immediate or long-term business and public health impacts. Still, the details of many impacts will become apparent only after action plans are created for each PBT. Any safety requirements contained in federal government rules will be addressed during action plan development.

Ecology's Conclusions

Ecology will continue on a course that protects public health and our environment. Action plans will reflect the agency's concern for these issues.

Comments Related to Pulp and Paper – Georgia-Pacific, Bellingham

The Draft Strategy

The draft PBT Strategy does not address issues directly related to the GP facility in Bellingham. The strategy is intended to raise awareness about and promote the need for reducing persistent, bioaccumulative toxins. Exposures to PBTs has been linked to a wide range of toxic effects in fish, wildlife and humans. In addition, some PBTs can be transported long distances on wind and water currents as air particulate or sediments.

Public Comments

Several individuals provided Ecology the following comments regarding the GP pulp mill in Bellingham and the draft PBT Strategy:

- Not OK with GP Mill poisoning community day after day.
- GP must shut down the four hog fuel boilers.
- …the agency has neglected to include the removal of the toxic incinerator of the Georgia Pacific mill here in Bellingham.
- GP is a beast of a polluter here in Bellingham that affects our health daily and the survival of the surrounding marine ecosystems. Please take action by issuing water pollution permits for pulp mills such as GP who value money over environment.
- Is it true that GP burns chlorinated clarifier sludge in its hog fuel incinerators and that doing so exponentially increases the amount of dioxin and furan emissions?
- Is it true that the 1989 EPA/Paper Industry Cooperative Dioxin and Furan Study (national) showed that GP's furan emissions were generally 5 to 97 times higher that other Washington State pulp and paper mills?
- If GP, for whatever reason, were to go Totally Chlorine Free, by approximately what percentage would its emissions of dioxins and furans and chlorinated phenolics be reduced? We think "more than 90 percent" is the right answer.

Ecology's Review and Analysis of Public Comments

The situation with GP's facility in Bellingham has changed greatly; the pulp mill and the by-products facility have been closed. Only the tissue mill remains, and it will operate with purchased pulp. The facility will not use chlorine in any of its processes in the future. A NPDES permit was recently issued to the facility, and it will have to be modified to reflect these changes. The air quality responsibility will change from Ecology to the local air authority since the facility will no longer be a pulp mill.

Ecology's Conclusions

Many of the issues associated with facility were resolved when its pulp mill closed. There will be clean-up issues, permitting issues for the remaining tissue mill and transfer of air regulatory authority from Ecology to the local air authority. The clean-up process will be a public process and will include site assessment, completed prior to the start of work on a site closure plan for the mill.

Comments Related to Pulp and Paper – Rayonier, Port Angeles

The Draft Strategy

The draft PBT Strategy does not address any issues related to the Rayonier facility in Port Angeles. The strategy is intended to raise awareness about and promote the need for reducing persistent, bioaccumulative toxins. Exposures to PBTs has been linked to a wide range of toxic effects in fish, wildlife and humans. In addition, some PBTs can be transported long distances on wind and water currents as air particulate or sediments.

Public Comments

Several people provided Ecology the following comments regarding pulp mills, clean-up, aquatic and landfill issues in Port Angeles in relation to the draft PBT Strategy:

- Follow the PBT reduction steps at the Port Angeles Rayonier and Daishowa toxic landfill sites.
- Use these sites as pilot projects before final implementation of your plan. Do not let the PBT pollutants in citizens' back yards be increased.
- Build a working partnership with Olympic Environmental Council (OEC) and citizens to remove the PBTs, and halt Rainier from dumping more of these into its Mt. Pleasant Road Landfill which is in the back yards of two dozen or more private residences.
- Instruct your SWRO personnel to oppose a Closure Permit for the Rayonier dump, the SEPA Exemption and the Closure Plan itself. Failure to do so will send a contradictory message of planning but not acting.
- Instruct your SWRO staff to make Rainier test all wastes under WAC 173-303, not 304, as we now know these wastes are ranked hazardous.
- Insist the failing steep east slope on which the landfill rests be correctly studied and monitored for geological engineering reasons.
- Immediately recognize the May 2000 EPA Dioxin Reassessment.
- Take a precautionary approach to closing this landfill and actions at the other two.
- Help us get cross-media testing.
- Insist PBTs be measured in landfill ponds collecting leachate, stormwater and sediment.
- Help us get funding from EPA and other opportunities.
- Help OEC develop and implement a public education plan for these affected neighborhoods.
- Insist a neighborhood – OEC Coalition oversight body with decision-making powers be implemented at these sites.
- Port Angeles is in the region with the highest PCB polluted whales, cited by Dr. Peter Ross. This should set off Ecology alarms.

- Add Port Angeles Harbor to your PBT list.
- Apply EPA's WMPT to this site.

Ecology's Review and Analysis of Public Comments

These comments address concerns with the level of contamination in the ground and water in the Port Angeles area. Some of the concerns deal with the closed pulp mill, formerly owned and operated by Rayonier. Issues related to the closure of Rayonier's mill are to be dealt with in a clean-up action the agency will complete through the consent decree process.

Other concerns centered on landfills. The 13th & M streets landfill was closed over ten years ago, and it is in conventional post-closure maintenance and monitoring. The Mt. Pleasant/Shotwell landfill has received a closure permit and will be formally closed over the next 18 months or so.

Ecology's Conclusions

Ecology will use action plans developed over the next two years to address PBTs in the environment. In the meantime, the agency will continue to complete clean-up projects under the appropriate statutory authority. As with any Ecology undertaking, any regulation and law changes prompted by the PBT Strategy will be implemented as rapidly as possible.

Ecology Activities Specific to the PBT Strategy

The draft strategy identifies several goals Ecology expects to accomplish by the end of the 1999-2001 biennium:

- Use EPA's WMPT to define characteristics for persistence, bioaccumulation and toxicity in PBTs present, used or produced in Washington to screen additional PBTs and prioritize the strategy's starter list of nine PBTs.
- Coordinate among Ecology programs to ensure increased collaboration on regulatory decisions with cross-media implications.
- Work with EPA, other agencies and interest groups.
- Continue to pursue grant opportunities from EPA.
- Integrate existing indicators to track PBT reduction successes and failures.

Depending on the availability of funding and resources, the agency also proposes to do the following, beginning July 1, 2001:

- Develop and implement chemical-specific action plans.
- Develop a PBT public education program.
- Coordinate with other state agencies to identify and track PBT use and reduction needs.
- Develop and implement a PBT baseline monitoring program.
- Convene a PBT symposium every two years, starting in fall 2001.
- Establish new measurable indicators to track PBT reduction successes and challenges.

Ecology received several comments about activities identified in the strategy and assigned them to the following category:

- Comments related to the strategy document

The agency's evaluation and response to these comments follow.

Comments Related to the Strategy Document

The Draft Strategy

The draft PBT strategy for Washington outlines the following:

- the need for a PBT reduction strategy
- the vision and goals of the PBT initiative
- a starter list of chemicals of initial concern in Washington
- a method to screen and prioritize additional chemicals
- specific steps for continually reducing PBTs in Washington's environment over the next 20 years

The draft strategy also spells out activities the agency will pursue if funding is available for the 2001-2003 Biennium. Finally, the draft strategy specifies a public participation process consisting of a series of public meetings during an overlapping, 70-day public comment period.

Public Comments

Comments, concerns, and observations about the draft PBT Strategy include the following:

- Two years ago – "elimination" was focus, now the strategy seems to have lots of vision & goals
- The strategy needs more meat. What's being proposed to comment on? (Pollution control doesn't always work) It's too vague/general.
- How much pollution is attributable to industry vs. individual?
- Increase fees or charges to permits given to corporations
- Want scientific information to know how the chemicals will be selected
- Dispense with the chemical action plans – only a way to procrastinate
- Chemical action plans are very important – need to do comprehensive emission inventories. How are chemicals coming into the system and look at nonpoint sources
- Strategy needs to identify precise programs, goals, timetables compliance procedures and other means for achieving the goals set forth in the vision
- A plan with mandatory requirements is essential…Voluntary compliance just plain does not work
- Your PBT program, therefore, should consist of different efforts for different products. The goal is to identify cost-effective ways to reduce mercury emissions to the environment from products. In addition, you will want to adopt policies that do not adversely affect public safety and the environment.
- Why wasn't this meeting advertised?

- Lastly, the public should have bit more time to review and respond to the initial draft. I believe you would receive a wider range of informative responses.
- In order to accomplish meaningful reductions of PBTs in the environment, Ecology must present an accurate assessment of where PBTs occur in the environment and facilitate the public's understanding that a plan to reduce PBTs includes sources which will require changes to personal lifestyles.

Ecology's Review and Analysis of Public Comments

In developing the draft PBT Strategy, Ecology carefully examined the implications of such words as "eliminate," "virtually eliminate," "reduce" and "continually reduce." We concluded that the most practical and achievable course to pursue with respect to PBTs is one of "continual reduction."

The agency's proposed PBT Strategy is long-range in nature and visionary in scope; it identifies problems associated with PBTs in Washington's environment and it lays out measures to address these problems. It is not the intent of this strategy to usurp or over-rule existing regulations, policies or statutes. Therefore, the agency will make every effort to avoid abusing its existing authority or applying authority it does not have.

At the same time, we feel it is important to clarify how the agency is using its existing funding and authority to reduce PBTs. The proposed strategy, submitted to the Legislature earlier this year, lays out steps we will take during the 2001-2003 Biennium if there is sufficient funding.

Ecology's Conclusions

After carefully evaluating comments we heard about the organization and scope of the draft strategy we incorporated some modifications before submitting it to the Legislature. These modifications include:

1. A more clear articulation of the "precautionary principle." In the proposed PBT Strategy submitted to the Legislature, language describing the precautionary principle was revised to include:

- a clear definition of the precautionary principle.
- clarification of the role of the precautionary principle in the PBT Strategy.
- a clear rationale in the Responsiveness Summary.

2. Maintain the 2020 timeframe and include some interim milestones. The proposed strategy is unequivocal about the time necessary to achieve significant PBT reductions: 20 years, at least. The proposed strategy also includes some interim milestones for the 2001 – 2003 biennium and the 2003 – 2005 biennium

3. Expand number of PBTs listed in the draft strategy. Based on public comment, the proposed strategy was modified to allow expansion of the original starter list. This option involves

- limiting the starter list to nine chemicals or chemical groups
- clearly defining a process and the criteria for adding more chemicals to the list
- identifying other chemicals to be included in the baseline monitoring program as high priority for future listing.

4. Clarify the purpose and scope of the chemical-specific action plans. The proposed strategy expands the scope of each chemical action plan to include information about:

- sensitive sub-populations such as infants, nursing mothers, pregnant women and so forth.
- possible economic incentives and environmental credits.
- opportunities for business owners to describe the affect of actions plans on them.

In addition, the proposed strategy modifies the budget proposal to reflect realistic projections on the number of action plans that can be prepared at proposed funding levels.

5. List other approaches Ecology can do to reduce or phase out PBTs prior to the development of chemical-specific action plans. The PBT Strategy identified several current and proposed actions that Ecology is currently doing to address PBTs in Washington's environment. Many of these actions, such as continuing pollution prevention activities, continuing the Toxics reduction Engineer exchange Program, and developing regulations to limit metals concentrations in fertilizer have been implemented.

6. Include intra-agency actions that Ecology is taking to reduce PBTs in Washington's environment. These activities, outlined in the PBT Strategy, include the following:

- Purchasing paper products that are partially recycled and made from the elemental chlorine free pulping process.
- Adding electric/gasoline fueled vehicles to Ecology's fleet.
- Promoting car- and van-pooling, telecommuting and other alternatives to single-occupant commuting.
- Recycling older computers for use in public schools.
- Purchasing low-mercury fluorescent lighting.
- Collecting and recycling burned-out fluorescent light tubes.
- Working with the state departments of Agriculture, Corrections, Fish and Wildlife, General Administration, Health, Labor and Industries, Natural Resources, and Transportation to promote and encourage the reduction of PBTs and other toxic chemicals.

The PBT Strategy identifies:

- the need for a PBT reduction strategy
- the vision and goals of the PBT initiative
- a starter list of chemicals of initial concern in Washington
- a method to screen and prioritize additional chemicals

- specific steps for continually reducing PBTs in Washington's environment over the next 20 years

The PBT Strategy also has proposed activities that Ecology will undertake, contingent on funding for the 2001-2003 Biennium.

Proposals for Measuring Progress

Ecology proposes to evaluate the overall success of the PBT strategy in reducing use, release and environmental PBT concentrations in Washington's environment. The agency will present an evaluation of progress at biannual PBT symposiums. Initially, we will quantify and track the following measures of long-term strategy success:

- 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 waterways listed as impaired.
- Continued reduction of PBT concentrations recorded in sediments deposited in the state's key waterbodies.
- Continued reduction of PBT concentrations found in fish and shellfish in waters with consumption advisories.

Ecology also proposes to create a baseline monitoring program, in combination with existing programs, to measure progress in reducing PBTs.

Comments Related to the Timeline

The Draft Strategy

The 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:

- Reducing and phasing out existing sources of PBTs
- Cleaning up PBTs from historical sources
- Preventing new sources of PBTs

To achieve this over the next 20 years, Ecology proposes the following steps:

- Build partnerships to promote efforts to reduce and eliminate PBTs.
- Ensure that regulatory and non-regulatory approaches maintain a cross-media perspective, addressing air, soil and water impacts.
- Identify and prioritize additional PBTs.
- Improve public awareness of PBT problems and solutions.
- Improve the availability of information essential to informed decision-making about PBT reduction.

Public Comments

Several people suggested the reduction effort be accelerated. For example, some felt reductions ought to be accomplished by 2010. Others suggested high priority PBTs be eliminated by 2003. And some pointed out the lack of a timeline for achieving the goals set out in the draft strategy. One person asked that Ecology "build PBTs into all operations as fast as they can."

Comments included:

- The timelines aren't clear in the strategy. How can they be measured?
- Why not say "no" to new sources today?
- Timelines – what will be done every 5 years? How will end points be presented?
- Audience wants the chemical-specific action plans accomplished in five years or less.
- Timeline – please do it quicker (PBTs mess up reproductive and immune systems).
- Move forward the rate immediate prohibition of original 27 chemicals
- Wants action – no more talk
- Long overdue
- Year 2010 – chemicals gone by this date at the least
- Responsible Support – all 27 PBTs by 2010
- Important to take action at this time – Washington taking lead position on PBT issue
- We're working on a cross-generational issue here – time compressed

- Agriculture, labor, environment. Justice asks that research not obstruct action
- Human health effects demand immediate action
- Establish an urgent timeline
- Build PBT into all operations as fast as they can
- Need to head-off trend to want more research
- WashPIRG has been canvassing folks around state to strengthen strategy – has collected over 1,000 petitions (Ecology has actually received about 9,000 to date).
- Tom Fitzsimmons has referred to this as a "ticking time bomb" – well the time bomb has exploded
- Need a shorter term solution – refer to the Environmental Defense fund – their web site could feed information for Washington State – Who's putting out most PBTs in Country
- Feels like there's so much to learn- and is it too late? – We are in a "Time compressed situation".
- There is a common message heard that industry always wants to do more "research"
- People don't want so much research that it causes immobility
- There are no timelines for achieving the goals set out in the strategy.
- Adopt PBT phase-out provisions in state water and air quality standards. Mixing zones should be eliminated and deadlines should be set for ZERO discharge of PBTs in Washington's air and water.
- Ecology needs to integrate and use existing permitting processes and regulations to eliminate the discharge of PBTs. Specific deadlines need to be set.
- Establish a deadline of 2010 for ending releases from existing sources and toxic sites.
- Immediately prohibit the release of these chemicals from new sources.
- Phase-outs of PBTs shall not be imposed until there is public review of the need, technical feasibility, economic impacts and viability of proposed actions, and reasonable alternatives are available.
- New sources of PBTs should be prevented immediately.
- Delay is deadly. Regulations are restorative.
- Strategy says reduce and where possible eliminate PBTs by 2020, but never actually states that PBTs will be eliminated by 2020.
- Time line of 2003 for high priority PBTs.
- Adopt PBT phase-out timelines into the standards and permits for air, water, sediments and clean-ups.
- Ecology has the authority and the systems in place to enforce stronger restriction now. I want a timeline based on public health as the first priority.
- The draft strategy…must establish a deadline of 2010 for ending release from existing sources and toxic sites and immediately prohibit the release of the chemicals from new sources.
- What good is a plan if deadlines are not made…

Ecology's Review and Analysis of Public Comments

Ecology appreciates the urgency of this issue, but we also recognize the difficulties inherent in establishing a time frame for accomplishing significant PBT reductions. We also are aware that many PBT releases result from everyday activities: driving motor vehicles, backyard burning and improper disposal of fluorescent lights and motor oil. This effort will require viable alternatives, as well as a protracted public education effort. Only then will society modify its behavior, and only then will significant PBT reductions become a reality.

The draft PBT Strategy does not call for immediate prohibition of PBTs. Instead, it reflects the realistic need for their continual reduction. Take B(a)P, for example. A sudden, immediate prohibition of B(a)P would involve a ban on all outdoor and indoor burning, closure of municipal waste incinerators and severe restrictions on motor vehicle use.

We also recognizes that many alternatives are several years away. As technologies change, there will be greater attention given to identifying PBTs, creating safer alternatives and preventing their release. But these things will take time.

Furthermore, PBTs are, by definition, persistent. They linger in the environment for 10 to 20 years and longer. A three- to 10 year-time frame ignores this persistence period. Accelerated elimination of PCBs imposes impractical economic burdens on society and industry and impossible technical demands on science.

And finally, to be meaningful, a goal must be achievable. Seeking to ban high priority PBTs within a few years is not achievable for reason discussed above. To declare such an intention would render the long-term PBT Strategy meaningless.

Ecology's Conclusions

Ecology does not have *carte-blanche* to ban chemicals or to prevent new technologies, practices or industries. Public education and creation of alternatives are key tools in the effort to reduce PBTs, and both will take time. We believe the 20-year timeline proposed in the PBT Strategy is realistic. It will take at least that long to alter the behavior of individuals, industry and agriculture to significantly reduce PBTs in air, land and water.

Miscellaneous Comments

Comments Related to Mercury and Dental Amalgam

The Draft Strategy

The draft strategy acknowledges mercury throughout as one of the highest priority PBTs. It is one of the nine chemicals on the strategy's starter list of PBTs and is one of EPA's 12 priority PBT pollutants. More than 30 Washington State locations listed in the strategy's Appendices A and B report levels of mercury at or above those that raise concerns for health and safety. The strategy also mentions mercury in connection with steel-mill flue dust, fertilizers and demolition materials. Mercury is one of many PBTs slated for reduction efforts and will be the subject of Ecology's first chemical action plan.

Public Comments

There were two basic categories of comments related to mercury in the draft strategy: 1) those about mercury in dental amalgam and dental office wastes and 2) those about reducing mercury releases into the state's environment. Of the 31 mercury-related comments we received, the majority were in the first category. None of the comments suggested mercury be excluded from Ecology's PBT Strategy or removed from the starter list.

Comments included:

- We have technology now to prevent mercury releases. Why isn't this being done?
- What is the "safe level" of mercury that someone can be exposed to (Bellingham Bay)?
- Dentist commented – heated mercury vapors in pan inhaled by son resulted in immediate death.
- Thresholds based on a single chemical (mercury) – need to look at native consumption rates also.
- Ecology language should include testing to ensure safety of chemicals in dental amalgam
- Mercury goes into food chain at the Columbia River
- Dentists use six hundred thousand pounds of mercury in this country
- Dental amalgam fillings – what steps are being taken to stop this from happening?
- Wastewater from dental clinics – what's being done to stop this?
- Mercury on list – why no mention of amalgam (fillings)? Damaging to health.
- Be the first state to ban amalgam fillings
- Old fillings – Need to be in bio-hazard containers
- Japan has one of highest levels of toxins – because of fish and discharges into water –

- Poisoned by mercury amalgam dental fillings
- Amalgam – Instructions with it indicate a serious biohazard (to dentist)
- Showed fact sheets, emphasized dangers of amalgam
- Urging Ecology to get them banned
- Promoting a video tape on the mercury and pesticides issues
- Baby – amalgam filling – the federal government has a book on the side effects of amalgam (beginning with gastrointestinal distress). Doesn't come out of body as other chemicals do.
- Directions for Dental Staff when using/handling amalgam – treats as hazardous material.
- Read the ATSDR – Toxicological profile for Mercury – 625 pages
- One way for exposure – fillings and handling by staff – not safe in our mouth
- A couple other countries already banning amalgam
- WashPIRG -- Agrees with comments on amalgam fillings
- Representative of the Seattle/King County Dental Association: Amalgam Alloy with mercury is safe for use in dental procedures. It's safe, durable and affordable, has an indisputable safety record and has been extensively reviewed. Safe for vast majority of people. Removal of fillings – large pieces are easy to catch, small pieces present a challenge to collect. No clear evidence that mercury and amalgam alloy are bioavailable.
- Displayed government document that describes mercury poisoning, warned about silver amalgam.
- Dental Researcher – found that 52 percent mercury in silver fillings. When fillings tested 5 years later – only 26 percent of the mercury remained. Where did the other go? Mercury is the main cause of MS, Parkinson's, ALS and Alzheimer's. In the Merck Manual for veterinarians, it states the poisonous effects of mercury to animals – why hasn't the same been stated for humans.
- Mother had mercury amalgam fillings – became very sick 15 years ago – tested and found heavy metals in her body from mercury amalgam fillings. Her children don't have these fillings, they became sick – were tested and had same metals in their bodies – got the contamination from her.
- Dentist – he put mercury amalgam fillings in patients for 20 years – and has spent the last 15 years taking them out. In that time, he has seen 1,000s of patients get well. The World Health Organization says fillings are the largest source of mercury exposure to people. With fillings, you're exposed to one of the most toxic elements known to man, 24 hours a day.
- Has mercury poisoning – it causes chronic fatigue and anxiety, depression, concentration problems, blurred vision and memory loss, and he's only 33.
- Pollutants cause health problems. I know because I have mercury poisoning due to my amalgam/silvery fillings which are 50 percent mercury.
- I ask you to question the sanity of a profession putting a known poison into our mouths and saying it's supposedly safe. It is not safe. Amalgam fillings leak and cause many health issues. Add this trade association to the list of polluters because it is the right thing to do.
- Why hasn't Ecology placed a ban on amalgam? I would appreciate it if you could explain this to me at length.

- There is much that can be done in a cost-effective manner. It does suggest, however, that it may be difficult to measure progress using more traditional methods because Washington will not have control over most of the mercury that is deposited in the state.
- Another issue to deal with is mercury retirement.
- A one-size-fits-all approach will be ineffective. The issues involved in waste management vary for each product. In addition, a one-size-fits-all approach could, be penalizing environmentally preferable products, have the effect of promoting the use of much less energy efficient mercury-free incandescent lamps and mechanical thermostats instead of mercury-containing fluorescent lamps and mercury-switch thermostats.
- Washington should continue to promote the use of high efficiency mercury containing lamps.
- The TRC (Thermostat Recycling Corporation) will operate the thermostat-recycling program in Washington and report annually on collections. Washington should assist in having state wholesalers and contractors participate in the program.
- Amalgam alloy remains a safe material for use in dental procedures.

Ecology's Review and Analysis of Public Comments

There was one comment, from the Seattle King County Dental Association, declaring, "amalgam alloy with mercury is safe for use in dental procedures." All other comments in this category questioned the safety of mercury in fillings, opposed its continued use in dental amalgam or suggested the agency ban or restrict such use. However, Ecology lacks regulatory jurisdiction over use of mercury in dentistry, and the PBT strategy suggest no change to the status quo.

Nonetheless, since we received so many comments about mercury dental fillings, we sought further information. The University of Washington's (UW) School of Dentistry, Dental Public Health Sciences, reports that "… since [mercury] has been in use for so long with only minimal numbers of anecdotal and inconsistent reports of any side effects, it has been assumed that it is safe." The report goes on to say, however, that some recent studies "… have demonstrated that there is likely ongoing low level mercury exposure from dental amalgam restorations, and such exposure is naturally of some concern."

Currently, the UW School of Dentistry is in the midst of what is probably the most ambitious research project to date on this issue, but results of the multi-year study are not yet available. In summary, the university wrote, "Until that time, I think it is fair to say that we encourage efforts to minimize mercury releases into the environment (including strict controls on releases of mercury in dental office waste), but the issue of whether there are health risks to patients associated with dental amalgam restorations will be more objectively answered at the completion of our study."[32]

[32] 25 January 2001 letter to William Backous, Department of Ecology, from Dr. Tim DeRouen, University of Washington, Professor of Biostatistics, Professor and Chairman of Dental Health Sciences, Associated Dean for Research, School of Dentistry, Director, Comprehensive Center for Oral Research.

A few comments suggest Ecology more aggressively enforce dental clinic waste management. Some suggested use of mercury collection devices at dental clinics be a state requirement. We currently are working with other government agencies on how best to address this issue.

There also were a handful of comments about mercury discharges into Bellingham Bay and the Columbia River. We anticipate addressing the full range of mercury pollution sources as the PBT Strategy unfolds. Mercury will be the first PBT addressed by an action plan.

Ecology's Conclusions

None of the comments conflict with the contents of the PBT Strategy's as it pertains to mercury. Since Ecology does not have regulatory authority over mercury in dental amalgam, we must defer to the State's public health authorities in this case. Where the agency does have jurisdiction over monitoring and management, we will continue to seek opportunities to decrease mercury pollution and promote mercury clean-up. In particular, the agency has worked with the dental industry for many years now to improve mercury waste management and pollution prevention. These efforts will continue regardless of progress on the PBT Strategy.

Comments Related to the Fluoridation of Drinking Water

The Draft Strategy

The draft strategy focuses on PBTs currently being discharged or already present in the environment as the result of historic releases. Both sources have resulted in measurable levels of PBTs in the air, water, soils and sediment throughout Washington. The draft strategy does not explicitly address issues surrounding fluoride in drinking water.

Public Comments

Ecology received several comments, both written and verbal, asking that we address health risks associated with fluoride additives in drinking water. Some asked that fluoride be added to the PBT list. Others questioned the safety of public drinking water sources for their customers and asked how extensively they are tested for chemical contaminants.

Comments included:

- Concerned about fluorides and hydrogen fluoride and hydrofluorosilicic acid and its sodium salts
- Fluoridation in water – no government agencies seem anxious to look into this.
- Please read about fluoride – the aging factor *How to Recognize and Avoid the Devastating Effects of Fluoride* by Dr. John Yiamouylannis – and *Fluorides, Hydrogen Fluoride, and Fluorine* by U.S. Dept. of Health Human Services TP-91/17
- Fluoridation agent needs to be addressed – government agency needs to examine and expose
- Concerned about fluorides and hydrogen fluoride being flushed into water at wastewater treatment plant.
- Re: ballot issues on fluoridation of water – don't want
- Bleached paper towels also have fluoride problem.
- Dead animals along Oregon Coast – from fluoride being flushed into ocean?
- Put fluoride on PBT list to get rid of it
- Testing: Fluoride on fields

Ecology's Review and Analysis of the Public Comments

DOH has primary responsibility for implementing the Safe Drinking Water Act, which regulates drinking water additives. You may contact Jim Hudson, from DOH's Drinking Water Program at 360-236-3131 with questions about fluoride in drinking water and drinking water monitoring.

Fluoride will not be included on the PBT Strategy priority list because it does not meet our definition of a persistent, bioaccumulative toxin. Specifically, fluoride does not bioaccumulate sufficiently. This does not mean fluoride ought to be dismissed as inconsequential; this simply means the PBT Strategy is not an appropriate place to deal with it.

Ecology's Conclusion

The PBT Strategy refers to neither fluoridation of drinking water nor fluoride. However, in cooperation with DOH, Ecology will continue to seek out other possible sources of drinking water contamination that ought to be addressed by the PBT Strategy.

Other Comments and Suggestions

The Draft Strategy

In addition to the public comments identified in the 40 comment categories listed above, Ecology received several that did not fit into any identifiable category or were not relevant to the draft PBT Strategy. Many of the comments were statements and individual opinions.

We have determined that these particular comments fall outside the scope of the draft PBT Strategy. Therefore, the agency plans no response to them. They are listed below for the public record.

Public Comments

- Household bleach combined with other chemicals can be lethal.
- More than 7,125 mill lbs. recognized carcinogens
- Source on Columbia River – with dumping into it from Canada (raw sewage) – this affects Washington folks too
- View symptoms – still need to look at disease – how to cure disease
- Emissions and Hazardous Waste
- Top 20 percent for release of toxic waste (Spokane County)
- 23 percent cotton T-shirt made of toxic chemicals
- Disparity between reality and facts
- Science vs. EPA vs. industry information to communities
- In 1997, one million and neurotoxic chemicals were released Spokane
- Check with the Spokane County Planning Department/Zoning Code/Critical Material List
- At what point in time do we start with sound science?
- What happens in one geographical area – happens everywhere
- Advisor for the Puget Sound manual -- See many activists in this room – haven't seen folks at other meetings/ groups
- State of Washington has made it impossible for me to conduct experiments on DBCP and human genomes – wants to be able to continue to do so.

Ecology's Review and Analysis of Public Comments

As a result of the 70-day public comment period, Ecology has received numerous comments. These comments have been categorized, reviewed and evaluated. Written responses were prepared for each of the 40 categories. Records deemed not relevant have been placed in the *Other Comments and Suggestions* category and are included here for the public record.

Ecology's Conclusions

Ecology has concluded that the comments listed in the category are outside of the scope of what is proposed in the draft PBT Strategy. Ecology is not planning to provide responses to these comments.