PEOPLE FOR PUGET SOUND

pugetsound.org

May 6, 2008

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Olympia, WA 98504-0900
Via email: actionagenda@psp.wa.gov

RE: Initial Discussion Draft Water Quality Topic Forum White Paper – Science Question One

Dear Martha:

We are writing to comment on *Initial Discussion Draft Water Quality Topic Forum* white paper, dated April 14, 2008. We will refer to this document as the "WQ Paper" for the remainder of the comments.

People For Puget Sound is a nonprofit, citizens' organization whose mission is to protect and restore Puget Sound and the Northwest Straits.

The Puget Sound Environmental Caucus, which includes People For Puget Sound, is submitting comments that focus on management actions – status, gaps and needs, including needed regulatory changes.

In this letter, People For Puget Sound is focusing on the first science question in the document: *Science Question 1 (S1): Status of Water Quality in Puget Sound.* We have been participating in the Indicator development effort and we therefore are looking at this portion of the WQ Paper from that point of view.

In summary, we suggest that the WQ Paper be re-organized to match the Indicator Group's Water Quality Conceptual Model, that these components be carried through to the Policy Questions, and that more summary information be added to the Paper, such as tables that summarize chemicals of concern.

Reorganization

For clarity and completeness, we suggest that the S1 Section of the WQ Paper be reorganized to the following framework as is outlined in the conceptual model developed by the team of scientists working with Sandie O'Neill and Tracy Collier (The Provisional Indicators Workgroup) in this order:

- **Sources**: *Currently mixed with pathways in the section titled: "Sources and pathways for nutrients, pathogens, and toxics entering Puget Sound*
- *water bodies"*
- **Pathway**: *See above*

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- **State and Impacts**: *Currently section titled: "Documented threats to fresh water and marine water quality in Puget Sound."*
- **Management Response**: *Science Question #2, Policy Questions #1 and #2*

Each class of pollutant can be considered within this framework. Below, we offer comments within this framework suggestion along with some cited statements of current conditions. We primarily used the sources that are listed in the Water Quality Conceptual Models. The current structure of the WQ Paper leaves out many pollutant sources and pollutants. We suggest that the remainder of the paper cover the policy questions related to each of the pollutant sources and pathways in a similar systematic manner so as to highlight which are addressed and which are partially or inadequately addressed.

Additions

We suggest that a discussion of Natural Drivers be should be separated out into its own section of the WQ Paper. This section could include a brief discussion of how natural processes influence pollution conditions, such as the role of wind in areas with dissolved oxygen problems.[1]

In addition, we suggest that the WQ Paper include more tables and charts that show the chemicals of concern, effects, types of sources, etc. One example is shown in Attachment 1 - *Sources of Air Pollutants of Concern to Great Waters and Coastal Areas.* Another example is use of the information from the Ecology-led Toxics Loading Assessment Phase I (completed in November 2007). While imperfect, the Assessment document lists the relative loads of 15 individual or families of toxic chemicals of concern to Puget Sound. A great deal of discussion and thought went into choosing those chemicals. A table showing this list of chemicals, including their toxic effects on wildlife, could be included in the WQ Paper as an important starting point for discussion. Further, the relative loads of these chemicals in 10 pathways should be included in a table in the WQ Paper in order to give readers a relative sense of the problems we face. We look forward to the results of Phase I and Phase III studies, but in the meantime, the Phase I results form a credible basis for discussing toxic chemicals of concern.

Suggested Framework

We didn't have time during this short public comment period to fully comment on each component below but offer examples of referenced statements that could be added to some of the Source or Pathway components as well as a listing of references that could be used for the State and Impacts section.

A. Sources

Industrial processes/Power Plants

In this section, we suggest a that the WQ Paper include a brief discussion of the numbers of, distribution of and pollutants associated with the industrial facilities in the Puget Sound Basin. An easy starting point would be EPA's TRI (Toxic Release Inventory) database and Ecology's permit database. The most recent (2006) TRI reporting facilities are compiled in Attachment 2. Their reported 2006 toxic

[1] Albertson, S.L., et al., 2007. Estuarine Flow in the South Basin of Puget Sound and its Effects on Near-Bottom Dissolved Oxygen. Department of Ecology. Publication No. 07-03-033.

chemical release (air, surface water, injection, land) totaled 16,069,795 pounds.[2] This total load is significantly lower than the offsite transmittal of toxic chemicals to sanitary sewers or to landfills which could also be compiled.

Vehicles

- **Emissions and oil drip.**
- **Brake pads**.
- **Wheel weights**.
- **Tire wear.** Tire wear is a significant source of metals. Tires contain arsenic, cadmium, nickel, zinc, mercury, chromium, and zinc as well as a suite of organic chemicals.[3] New automobile tires weigh 25 pounds while scrap tires weigh 20 pounds; new truck tires weigh 120 pounds, scrap tires 100 pounds.[4]
- **Resuspension.** One of the most significant sources of pollutants to the atmosphere and potentially to waterbodies are due to the resuspension of particles due to movement of vehicles on roadways contributing metals such as chromium, copper, lead, nickel and zinc.[5]

Marine vessels

- **Recreational boats.**
- **Container Ships, Tankers and other large vessels.**
    - **Oil.**
    - **Ballast**. A good summary of ballast problems, including number of ships arriving in Puget Sound and ports of origin, ballast volumes (average of 8 million cubic meters of ballast), and critical locations was presented by Kevin Anderson of the Puget Sound Action Team.[6] Significant additional work on this topic has been conducted by Ecology.
- **Cruise Ships**
- **Maritime-associated air emissions.** The Ports of Seattle, Tacoma and Vancouver BC recently completed an excellent inventory of maritime-related emissions with a focus on diesel and greenhouse gas emissions. Toxic chemical loadings can be calculated from Appendix D.[7]

Marinas/Boathouses

- **Wastes**
- **Paint and maintenance operations**

Other transportation: rail, air

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[2] EPA TRI web page. http://www.epa.gov/tri

[3] US EPA 1997 (October). Air Emissions from Scrap Tire Combustion. EPA600-R-97-115.

[4] Rubber Manyfacturers Association. Scrap Tire Fact Sheet. Web Page. http://www.rma.org/scrap_tires/scrap_tire_markets/scrap_tire_characteristics/

[5] Lisa D. Sabin, Jeong Hee Lim, Maria Teresa Venezia, Arthur M. Winer, Kenneth C. Schiff and Keith D. Stolzenbach. 2006. Dry deposition and resuspension of particle-associated metals near a freeway in Los Angeles Atmospheric Environment, Volume 40, Issue 39, December 2006, Pages 7528-7538.

[6] www.psmfc.org/ballast/ballast_2006/Anderson.ppt

[7] Puget Sound Maritime Air Forum. 2007. Maritime Air Emissions Inventory

- **Airplane-related**
  - **De-icers.**
  - **Jet emissions**
- **Rail**
  - **Idling.**
  - **Yards/Transfer Operations.**

Accidental spills (land-based)

Mining

Forest Practices

Agricultural

- **Biosolids use in agriculture/forestry**. 70% of the antibiotic triclocarban persists in Biosolids after treatment [8]
- **Fertilizers**.
- **Pesticides.** In a study of pesticides from agricultural lands in the Yakima area from 2003-2005, the most frequently detected herbicides were 2, 4-D, bromacil and terbacil, atrazine, and diuron and most common insecticides were chlorpyrifos, malathion and azinphos.[9]
- **Animal Wastes.** 90% of the estrogen load is animal manure from concentrated animal-feeding operations (CAFOs). These estrogens, as well as those from human sources, are shown to be the most potent endocrine disrupters in aquatic environments.[10]

Pesticide use in homes, schools, landscaping

- **Outdoor use in urban areas.** In urban areas, Pentachlorophenol, a wood preserver, is used in large enough quantities and persists to the extent that it shows up in creeks. In addition to pentachlorophenol, other most frequently detected compounds as shown in a 2003-2005 urban study (Thornton Creek) are herbicides triclopyr, dichlobenil and MCPP and the insecticide diazinon.[11]

Aquatic pesticides applied directly to waterbodies

Home Wood Stoves and Trash Burning

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[8] Jochen Heidler, Amir Sapkota, and Rolf U. Halden, Partitioning, Persistence, and Accumulation in Digested Sludge of the Topical Antiseptic Triclocarban During Wastewater Treatment. Environmental Science & Technology. April 26, 2006.

[9] Washington State Departments of Ecology and Agriculture. 2006. Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams, 2003-2005. Ecology Publication No. 06-03-036.

[10] Khanal, S.K., et. al., 2007. Fate, Transport, and Biodegradation of Natural Estrogens in the Environment and Engineered Systems. Environ. Sci. Technol., ASAP Article 10.1021/es0607739 S0013-936X(06)00773-5.

[11] Washington State Departments of Ecology and Agriculture. 2006. Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams, 2003-2005. Ecology Publication No. 06-03-036.

Building materials

- **Roofing, gutter materials**
- **Vinyl siding**
- **Coatings**
- **Asphalt paving**

Consumer products (used in homes, offices, industry, etc)

Chemicals such as polybrominated diphenyl ether (PBDE) flame retardants, PFOAs, phthalates, other organic chemicals and metals in consumer products off-gas or are eroded from the products and adsorb onto particulates in air or onto dust.

- **PBDE example.** PBDEs are found in common foamed or textile products such as upholstery, carpet padding and padded dashboards and in electronics plastics such as computer and television housings. PBDEs volatilize into the air and attach to dust, although the exact mechanism is unknown. Recent studies show that higher levels are found in Americans compared to Europeans and that some populations have much higher levels than others ("super highly exposed people") which is believed to be reflective of varying concentrations in households. A portion of this dust is ingested.[12] In addition to human sewage, additional pathways to the Sound may be indoor-outdoor air exchange, or through sewage via household laundering and cleaning processes.

Log Booming/Rafting

Existing Structures/Creosote pilings

Aquaculture

- **Fish Pens**
- **Shellfish Growing Areas**
- **Hatcheries**

Sewage

- **Pharmaceuticals**. In addition to reference listed in the WQ Paper, pharmaceuticals in Washington have also been studied in Sequim[13]
- **Drinking Water.** Surface waters that are downriver from Sewage Treatment Plant Outfalls are used in at least two rivers for drinking water (Anacortes and Firnwood). Lake Whatcom, a major source of drinking water is severely impaired due to development pressures.

Leaking landfills.

Hazardous waste sites

Sediment Sites

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[12] Betts, Kellyn S. Unwelcome Guest: PBDEs in Indoor Dust . 2008 (May) Environmental Health Perspectives Volume 116, Number 5

[13] WA Department of Ecology. Environmental Assessment Program. 2004. Results of a Screening Analysis for Pharmaceuticals in Wastewater Treatment Plant Effluents, Wells, and Creeks in the Sequim-Dungeness Area. Publication Number: 04-03-051

- A listing and map of contaminated sediment sites in the Puget Sound Basin, including chemicals of concern would be helpful.

Soil Sites

- Rayonier Mill - which left dioxin in soils and in landfills in Port Angeles
- Everett Smelter - which left lead and arsenic in a footprint[14]
- Asarco Smelter - which left a large areawide plume of lead and arsenic in soils from Tacoma northward

Military activities

- In-water Ordnance training in specified bays
- Other training exercises
- Construction and maintenance operations

Other?

Source Issues that should be listed as areas for further research:

- **Additional Emerging Chemicals.** Impacts of extremely persistent sugar substitute Sucralose (a half-life in water of up to several years) on the environment is unknown. New studies show that a significant amount passes through sewage treatment plants.[15]
- **DNA impacts.** New studies show that contaminates are causing changes in the DNA structure and cellular physiology of the livers and gills of English sole in lower Duwamish River .[16]

B. Pathways

Aerial deposition

- Air is not routinely assessed on a cumulative basis in Washington. Further, the air toxics program has been measured by the amount of emissions reductions achieved as opposed to measured changes in air quality.[17]
- A concern is that inorganic mercury from air and other sources is converted by bacteria to highly toxic methylmercury in oxygen-poor sediments[18] in the bottom of wetlands, lakes, rivers and the Sound. This conversion process presents a significant complicating factor if we aim to create more salt marsh and nearshore habitat at the same time as we continue to allow significant sources of mercury in air emissions in our low lying industrialized areas.

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[14] ://www.ecy.wa.gov/programs/tcp/sites/asarco/es_main.html

[15] Brorström-Lundén, E et al., 2008. Measurements of Sucralose in the Swedish Screening Program 2007- PART I; Sucralose in surface waters and STP samples. IVL Swedish Environmental Research Institute Ltd. IVL Report B1769.

[16] D.C. Malins, K.M. Anderson, J.J. Stegeman, P. Jaruga, V.M. Green, N.K. Gilman and M. Dizdaroglu. 2006. Biomarkers signal contaminant effects on the organs of English sole (Parophrys vetulus) from Puget Sound. Health Perspectives 114 No 6. June 2006.

[17] U.S. Environmental Protection Agency. Office of Inspector General. 2005. Progress Made in Monitoring Ambient Air Toxics, But Further Improvements Can Increase Effectiveness. Report No. 2005-P-00008. March 2, 2005

[18] Branfireun, B.A., Hilbert, D., Roulet, N.T., 1998. Sources and sinks of methylmercury in a boreal catchment. Biogeochemistry 41, 277-291.

Groundwater

- **Groundwater associated with leaking landfills.**
- **Groundwater associated with hazardous waste sites.**
- **Groundwater associated with faulty septic systems.**
- **Seeps to Puget Sound.** Seeps have been studied in detail as part of the Duwamish Superfund Site investigation.
- **Seawater Intrusion.** Seawater intrusion has begun to be a problem in some Puget Sound areas leading to salty water in domestic supplies, including Bainbridge.[19] Although this issue may be discussed in the water resources issue, it should be also included in the WQ Paper in brief.

Surface Runoff

Stormwater

- **Toxic chemicals**. The WQ Paper unnecessarily focuses on the variability of stormwater data (on page 7) rather than the demonstrated need to address toxic chemicals in stormwater. In addition, the last paragraph on page 8 does not accurately reflect the conclusions and recommendations of Nat Sholtz's team's work.

Oil Spills

Contaminated Sediment Site Flux/Dredge Activity

Sewage Wastewater Point Discharges

- On page 9-10, the WQ document could be strengthened by a more robust discussion of the number of Sewage Treatment Plants that discharge to surface waters (103), the number that discharge to rivers and creeks versus directly into Puget Sound, an acknowledgement that many discharge into shallow waters, that Washington allows mixing zones for PBTs which allow for the discharge of toxic chemicals at acute levels near the outfalls, and the lack of data we have available about the bioaccumulation of toxic chemicals in organisms near outfalls.[20]

Industrial Wastewater Point Discharges

Combine Sewer Overflows (CSOs)

- There are 10 CSOs systems in Puget Sound, primarily in older urban areas.[21]
- On page 10, the WQ document incompletely describes the impacts of CSOs in Puget Sound: "Combined sewer overflows: Episodic discharge of a mixture of untreated wastewaters and stormwater from combined sewer overflow outfalls contributed relatively little to the total loading of toxic chemicals to Puget Sound (Hart Crowser et al., 2007)." Ample evidence shows the significant impacts of CSO discharges associated with legacy and ongoing pollution in urban bays.

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[19] http://www.ci.bainbridge-isl.wa.us/documents/WRReport2006.pdf

[20] Trim, H., et. al., 2007. Draft Toxic Chemicals in Puget Sound: The Impact of Mixing Zones on Permitted Discharges.

[21] Trim, H., et. al., 2007. Draft Toxic Chemicals in Puget Sound: The Impact of Mixing Zones on Permitted Discharges.

Direct Contact (Creosote pilings, Ordinance Training)

Other?

C. State and Impact Status

For this section of the WQ Paper (in paper, this is the "*"Documented threats to fresh water and marine water quality in Puget Sound"* section*)* we suggest a number of other current references

- **Pesticides in waterbodies.** A 2003-2005 study examined the difference in pesticides in urban areas versus agriculture in Washington.[22] A major study by U.S. Geological Survey examined pesticides detected in urban streams.[23]

- **Regional groundwater quality.** USGS water research paper published in 2000 covered much of the Puget Sound region.[24]

- **Air in National Parks.** Recent study examined toxic chemicals in snow, lichen, fish and alpine lakes associated with regional and local air pollution.[25]

- **Use of 305/303(d) List.** Everywhere that this report is mentioned, it should be qualified that the list is not based on representative data collection program and must be viewed as incomplete. On page 4, the statement, "There have been an increasing number of impaired water body listings on the State's 303(d) lists for temperature, fecal coliform bacteria, and dissolved oxygen in freshwater streams over the last 10 years," should be modified to indicate that the increase may be based on increased data collection and compilation.

- **Shellfish Beds.** On page 5, the discussion of closed shellfish beds should also include the status of all recreational areas as well.

- **Biota.** A major gap in the WQ Paper is a lack of discussion of biota endpoints. The topics that should be included range from orcas, otters and osprey, salmon and herring to benthic invertebrates. PCBs in fish in Lake Washington, PBDEs in salmon, osprey eggs,[26] and fish kills

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[22] Washington State Departments of Ecology and Agriculture. 2006. Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams, 2003-2005. Ecology Publication No. 06-03-036.

[23] Voss, F.D., Embrey, S.S., Ebbert, J.C., Davis, D.A., Frahm, A.M., and Perry, G.H., 1999, Pesticides detected in urban streams during rainstorms and relations to retail sales of pesticides in King County, Washington: U.S. Geological Survey Fact Sheet FS-097-99, 4 p.

Voss, F.D., and Embrey, S.S., 2000, Pesticides detected in urban streams during rainstorms in King and Snohomish Counties, Washington, 1998: U.S. Geological Survey Water-Resources Investigations Report 00-4098, 22 p.

[24] Inkpen, E.L., Tesoriero, A.J., Ebbert, J.C., Silva, S.R., and Sandstrom, M.W., 2000, Ground-water quality in regional, agricultural, and urban settings in the Puget Sound Basin, Washington and British Columbia, 1996-1998: U.S. Geological Survey Water-Resources Investigations Report 00-4100, 66 p.

[25]

[26] http://fresc.usgs.gov/news/newsreleases.asp?NRID=12

in Hood Canal are other obvious subject areas. Sex altered fish in Elliott Bat should also be included.

Thank you for the opportunity to comment on the draft white paper. We would be pleased to provide references, if needed, for many of the components in the proposed framework that are left blank in this comment letter. Please contact me with questions at (206) 382-7007.

Sincerely,

Heather Trim
Urban Bays and Toxics Program Manager

Attachments

Attachment 1
Sources of Air Pollutants of Concern to Great Waters and Coastal Areas

From: U. S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds; U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 2001. Frequently Asked Questions about Atmospheric Deposition: A Handbook for Watershed Managers. EPA-453/R-01-009

After: Third Report to Congress, 2000, Deposition of Air Pollutants to the Great Waters (U.S. EPA 2000).

Mercury and Compounds: Naturally occurring element often used in thermometers, electrical equipment (such as batteries and switching equipment), industrial control instruments, and industrial processes (e.g., Chlor-alkali plants). Released during combustion of fossil fuels (e.g., coal, oil); incineration of municipal, medical, and hazardous waste; and from numerous manufacturing and natural processes. Banned as a paint additive in U.S. in both interior (1990) and exterior (1991) paint. Being phased out of batteries. Removed from catalysts, turf products, and explosives.

Cadmium and Compounds: Naturally occurring element used in metals production processes, batteries, and solder. Often released during combustion of fossil fuels and waste oil, and during mining and smelting operations.

Lead and Compounds: Naturally occurring element historically used in gasoline and paint additives, and still used in storage batteries, solder, and ammunition. Released from many combustion and manufacturing processes and from motor vehicles. Use in paint additives restricted in U.S. in 1971. U.S. restrictions on use in gasoline additives began in 1973 and have continued through the present, with a major use reduction in the mid-1980s.

POM_b (includes PAHs): Naturally occurring substances that are by-products of the incomplete combustion of fossil fuels and plant and animal biomass (e.g., forest fires). Also, by-products from steel and coke production and waste incineration.

Dioxins/Furans: By-products of combustion of organic material containing chlorine, chlorine bleaching in pulp and paper manufacturing, and diesel-fueled vehicles. Also a contaminant in some pesticides.

Nitrogen Compounds: By-products of power generation, industrial, and motor vehicle fossil fuel combustion processes (NO_x). Also, compounds used in fertilizers and released from agricultural animal manures (NH_3).

PCBs: Industrial chemicals used widely in the U.S. from 1929 until 1978 for many purposes, such as coolants and lubricants and in electrical equipment (e.g., transformers and capacitors). In the U.S., manufacture stopped in 1977 and uses were significantly restricted in 1979. Still used for some purposes because of stability and heat resistance, and still present in certain electrical equipment used throughout the U.S.

Chlordane: Insecticide used widely in the 1970s and 1980s. All U.S. uses except termite control canceled in 1978; use for termite control voluntarily suspended in 1988. Use of existing stocks permitted.

DDT/DDE: Insecticide used widely from introduction in 1946 until significantly restricted in U.S. in 1972. Still used in other countries. Used in U.S. for agriculture and public health purposes only with special permits.

Dieldrin: Insecticide used widely after introduction in late 1940s. Used in U.S. for termite control from 1972 until registration voluntarily suspended in 1987.
Hexachlorobenzene: Fungicide used as seed protectant until 1985. By-product of chlorinated compound and pesticide manufacturing. Also a by-product of combustion of chlorine-containing materials. Present as a contaminant in some pesticides.
Hexachlorocyclohexane: Component of technical-HCH, an insecticide for which use is restricted in U.S., but which is used widely in other countries.
Lindane: An insecticide used on food crops and forests, and to control lice and scabies in livestock and humans. Currently used primarily in China, India, and Mexico. U.S. production stopped in 1977. Use was restricted in 1983; many uses are still registered, but are expected to be voluntarily discontinued in the future.
Toxaphene: Insecticide used widely on cotton

Attachment 2. Toxic Chemical Releases of Puget Sound Basin Facilities

Toxic Release Inventory (TRI) 2006

Total On- and Off-site Releases, including air emissions, surface discharge, injection, onsite landfills and land treatment. This table does not include offsite transport and discharge to sanitary sewers (which are much larger loads). These numbers should be considered minimum numbers as the TRI reporting thresholds are high and information is based on self-reporting. *Reference: http://www.epa.gov/tri*

Categories	# Facilities	Chemicals		Total Pounds in 2006
Aircraft Manufacturing Other Aircraft Parts and Auxiliary Equipment Manufacturing	10	Certain Glycol Ethers Chromium Compounds Copper Diethanolamine Freon 113 Hydrogen Fluoride Lead Manganese	Manganese Compounds Methanol Methyl Isobutyl Ketone Naphthalene Nickel Nitric Acid Phenol Tetrabromobisphenol A Toluene	356,892
All Other Motor Vehicle Parts Manufacturing Heavy Duty Truck Manufacturing Overhead Traveling Crane, Hoist, and Monorail System Manufacturing	5	Certain Glycol Ethers Ethylene Glycol Lead Manganese		37,680
Boat Building Ship Building and Repairing	8	1,1-Dichloro-1-Fluoroethane Diisocyanates Dimethyl Phthalate Dioxin And Dioxin-Like Compounds	Methyl Methacrylate Styrene Toluene Xylene (Mixed Isomers)	310,717
Concrete Pipe Manufacturing Cement Manufacturing Ready-Mix Concrete Manufacturing	9	Dioxin And Dioxin-Like Compounds Lead Lead Compounds Manganese Compounds	Mercury Compounds Nitrate Compounds Polycyclic Aromatic Compounds Zinc Compounds	761
All Other Basic Inorganic Chemical Manufacturing All Other Miscellaneous Chemical Product and Preparation Manufacturing Carbon and Graphite Product Manufacturing Other Chemical and Allied Products Merchant Wholesalers	5	Di(2-Ethylhexyl) Phthalate Ethylene Glycol Lead Lead Compounds	Mercury Methanol Nitric Acid Sulfuric Acid Tetrachloroethylene	190,913
Bare Printed Circuit Board Manufacturing Dental Equipment and Supplies Manufacturing Printed Circuit Assembly (Electronic Assembly) Manufacturing Switchgear and Switchboard Apparatus Manufacturing Telephone Apparatus Manufacturing /Other Communications Equipment Manufacturing	9	Ammonia Copper Formaldehyde	Lead Lead Compounds Nitrate Compounds	11,226
Creamery Butter Manufacturing Dry, Condensed, and Evaporated Dairy Product Manufacturing Fats and Oils Refining and Blending Fluid Milk Manufacturing Soap and Other Detergent Manufacturing	5	Certain Glycol Ethers Methanol Nitrate Compounds Nitric Acid		2,560
Brick and Structural Clay Tile Manufacturing	1	Hydrogen Fluoride		51,574
Hazardous Waste Treatment and Disposal Solid Waste Collection/Hazardous Waste Collection / Other Nonhazardous Waste Treatment and Disposal Specialized Freight (except Used Goods) Trucking, Local /Specialized Freight (except Used Goods) Trucking, Long-Distance /Hazardous Waste Collection	5	1,2-Dichloroethane Acetonitrile Barium Benzene Chloroform Chromium Copper Copper Compounds Cyclohexane Dichloromethane Ethylbenzene Ethylene Glycol Lead Lead Compounds	Mercury Methanol Methyl Isobutyl Ketone N,N-Dimethylformamide N-Butyl Alcohol N-Hexane Nickel Compounds Nitric Acid N-Methyl-2-Pyrrolidone Pyridine Silver Toluene Triethylamine Xylene (Mixed Isomers)	256,669
All Other Miscellaneous Fabricated Metal Product Manufacturing	26	Aluminum (Fume Or Dust) Antimony	Manganese Manganese Compounds	1,494,796

Categories	# Facilities	Chemicals		Total Pounds in 2006
Electroplating, Plating, Polishing, Anodizing, and Coloring Fabricated Pipe and Pipe Fitting Manufacturing Finishing Iron and Steel Forging Iron and Steel Pipe and Tube Manufacturing from Purchased Steel /Fabricated Pipe and Pipe Fitting Manufacturing Metal Can Manufacturing Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers Other Nonferrous Foundries (except Die-Casting) Plate Work Manufacturing Primary Aluminum Production Rolled Steel Shape Manufacturing Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum) Sheet Metal Work Manufacturing / Other Aircraft Parts and Auxiliary Equipment Manufacturing Steel Foundries (except Investment) Steel Investment Foundries /Machine Shops /Metal Heat Treating Steel Wire Drawing		Benzo(G,H,I)Perylene Carbonyl Sulfide Certain Glycol Ethers Chromium Chromium Compounds Copper Copper Compounds Hydrochloric Acid Hydrogen Fluoride Lead Lead Compounds	Mercury Mercury Compounds Naphthalene N-Butyl Alcohol Nickel Nickel Compounds Nitric Acid Polycyclic Aromatic Compounds Trichloroethylene Xylene (Mixed Isomers) Zinc Compounds	
National Security	4	Copper Copper Compounds Ethylbenzene Ethylene Glycol Lead	Lead Compounds Manganese N-Butyl Alcohol Nickel Xylene (Mixed Isomers)	428,639
Fossil Fuel Electric Power Generation Industrial Gas Manufacturing Petroleum Bulk Stations and Terminals Petroleum Lubricating Oil and Grease Manufacturing Petroleum Refineries	13	1,2,4-Trimethylbenzene 1,3-Butadiene Ammonia Benzene Benzo(G,H,I)Perylene Carbon Disulfide Carbonyl Sulfide Chlorine Copper Compounds Cresol (Mixed Isomers) Cumene Cyanide Compounds Cyclohexane Diethanolamine Dioxin And Dioxin-Like Compounds Ethylbenzene Ethylene Hydrochloric Acid Hydrogen Cyanide Lead	Lead Compounds Manganese Compounds Mercury Compounds Methanol Molybdenum Trioxide Naphthalene N-Hexane Nickel Compounds Nitrate Compounds Phenanthrene Phenol Polycyclic Aromatic Compounds Propylene Styrene Sulfuric Acid Tetrachloroethylene Toluene Xylene (Mixed Isomers) Zinc Compounds	1,771,352
Flat Glass Manufacturing Glass Container Manufacturing Lime Manufacturing Other Pressed and Blown Glass and Glassware Manufacturing	4	Barium Compounds Lead Lead Compounds Zinc Compounds		2,133
Fabric Coating Mills All Other Plastics Product Manufacturing All Other Plastics Product Manufacturing /Sheet Metal Work Manufacturing All Other Plastics Product Manufacturing /Industrial Mold Manufacturing /Special Die and Tool, Die Set, Jig, and Fixture Manufacturing Fiberglass products manufacturing Plastic materials manufacturing Plastics Pipe and Pipe Fitting Manufacturing Urethane and Other Foam Product (except Polystyrene) Manufacturing	13	Chromium Chromium Compounds Di(2-Ethylhexyl) Phthalate Dichloromethane Diisocyanates Manganese Methyl Methacrylate N-Methyl-2-Pyrrolidone Phenol Styrene Toluene Diisocyanate (Mixed Isomers)		637,300
All Other Converted Paper Product Manufacturing All Other Miscellaneous Wood Product Manufacturing Coated and Laminated Paper Manufacturing Paper (except Newsprint) Mills Paperboard Mills	13	Acetaldehyde Ammonia Barium Compounds Benzo(G,H,I)Perylene Catechol	Lead Compounds Manganese Compounds Mercury Compounds Methanol Naphthalene	2,279,122

Categories	# Facilities	Chemicals		Total Pounds in 2006
Pulp Mills /Paper (except Newsprint) Mills /Coated and Laminated Paper Manufacturing Pulp Mills/Paper (except Newsprint) Mills Sawmills Softwood Veneer and Plywood Manufacturing		Chlorine Chlorine Dioxide Diisocyanates Dioxin And Dioxin-Like Compounds Ethylbenzene Formaldehyde Formic Acid Hydrochloric Acid Lead	Nitrate Compounds Phenol Polycyclic Aromatic Compounds Propionaldehyde Sulfuric Acid Toluene Xylene (Mixed Isomers) Zinc Compounds	
Paint and Coating Manufacturing	5	Certain Glycol Ethers Di(2-Ethylhexyl) Phthalate Ethylbenzene Ethylene Glycol Manganese Compounds Methanol Methyl Isobutyl Ketone	Methyl Methacrylate N-Butyl Alcohol Styrene Tetrachloroethylene Toluene Xylene (Mixed Isomers)	24,092
Wood Preservation	2	Dioxin And Dioxin-Like Compounds Pentachlorophenol	Polycyclic Aromatic Compounds	22