



DEPARTMENT OF
ECOLOGY
State of Washington

PUBLIC PARTICIPATION PLAN

8801 EAST MARGINAL WAY SOUTH SITE
FORMER PACCAR KENWORTH TRUCK COMPANY
SITE
TUKWILA, WASHINGTON

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Introduction

The Washington State Department of Ecology (Ecology) developed this public participation plan according to the Model Toxics Control Act (MTCA). This plan is designed to promote meaningful community involvement during the investigation and cleanup of the 8801 East Marginal Way South site located in Tukwila, Washington (also called the 8801 site and the former PACCAR Kenworth Truck Company site). This plan outlines and describes the tools Ecology will use to inform the public about site cleanup activities, and it describes how the community can become involved in this process.

Ecology and the potentially liable persons (PLPs), PACCAR Inc. (PACCAR) and Merrill Creek (Merrill Creek) Holdings, LLC, have negotiated a legal agreement called an Agreed Order that formally describes their working relationship. This is the second Agreed Order for this site (for information on the first Agreed Order, see pages six and seven). Under the Agreed Order the PLPs will complete work set forth in the Interim Action Work Plan (formerly called the Cleanup Action Plan) for the upland area of the 8801 East Marginal Way South site. The Draft Interim Action Work Plan summarizes past investigations, identifies contaminants of concern, areas of concern, and data gaps, and evaluates feasible cleanup alternatives for the upland area. The Remedial Investigation/Feasibility Study is required under WAC 173-340-350 and is part of the interim action work for the upland area of the site. The Remedial Investigation will determine the nature and extent of contamination in the upland area soil, groundwater, stormwater and stormwater solids, and seeps. The Feasibility Study will evaluate the cleanup alternatives for the upland area of the site. If there are data gaps, then the PLPs will prepare a Data Gaps Work Plan and implement it after Ecology has approved it. Once the Remedial Investigation/Feasibility Study and Data Gaps Work Plan (if required) are complete, the PLPs will implement the cleanup tasks described in the Interim Action Work Plan after Ecology approves it.

This second Agreed Order is only for the upland area of this site; however, this public participation plan is for investigation and cleanup of the entire 8801 East Marginal Way South site.

Location and Site Background

Location

This site is located at 8801 East Marginal Way South in Tukwila, Washington on the east bank of the Lower Duwamish Waterway. The site includes the upland area and the sediments in the Lower Duwamish Waterway next to the upland area. The upland area is bordered to the north by property owned by The Boeing Company, to the south by property owned by Container Properties, LLC (formerly the Rhone-Poulenc site) and the Museum of Flight Foundation, to the east by East Marginal Way South and to the west by the Lower Duwamish Waterway in a mainly industrial area (See figure on page nine).

Site Background

The upland area is 25 acres covered with paved or concrete surfaces and buildings. This property is zoned for heavy industrial activities. In 1929, Fisher Body Corporation built the main manufacturing building. During World War II, the property was used to make trucks and airplane assemblies. In 1946 Kenworth Motor Truck Corporation, a PACCAR subsidiary, bought the northern two thirds of the property. In 1966, PACCAR bought what is now the southern third of the property from the Monsanto Company. PACCAR built trucks on site from 1946 until 2002 when it decommissioned the facility. Merrill Creek Holdings, LLC bought the entire property in 2004. Currently the property is leased to Insurance Auto Auctions, Inc. of Westchester, Illinois which auctions damaged vehicles.

Contaminants of Concern

Contamination at this site is due to heavy industrial use since the 1920's. The contaminants of concern in the upland soil are:

- Petroleum hydrocarbons.
- Semi-volatile organic compounds (SVOCs), mainly phenols and phthalates.

- Metals, mostly lead.

The contaminants of concern in the groundwater are:

- Volatile organic compounds (VOCs).
- Petroleum hydrocarbons.
- Poly-aromatic hydrocarbons (PAHs), mostly fluoranthene.
- Metals, mostly copper, chromium, and nickel.

The contaminants of concern in the stormwater are:

- Volatile organic compounds (VOCs).
- Polychlorinated biphenyls (PCBs).
- Poly-aromatic hydrocarbons (PAHs).
- Metals, mostly copper and zinc.

The contaminants of concern in the sediment investigation area are:

- Polychlorinated biphenyls (PCBs).
- Semi-volatile organic compounds (SVOCs).
- Poly-aromatic hydrocarbons (PAHs).
- Metals, mostly lead and zinc.

Previous Cleanup Work

Between 1986 and 2004 PACCAR closed and removed all onsite underground storage tanks. Petroleum impacted soil around these tanks was excavated and removed for off-site treatment and disposal.

In the early 1990s PACCAR found volatile organic compounds from paint solvents in shallow groundwater. For two years a pump and treatment system was run. PACCAR also pilot tested and installed an air sparging/soil vapor extraction system. Data results

show that the operation of both systems have removed a portion of the volatile organic compounds from soil and groundwater.

In January 2001, PACCAR entered into Ecology's Voluntary Cleanup Program. Work continued, and in 2002 and 2004 PACCAR did Phase I and Phase II Data Gaps Investigations. These upland investigations included the following:

- Evaluation of volatile organic compounds (VOCs) in upland soil and groundwater.
- Ambient Indoor Air Investigation in 2002.
- Installation of groundwater monitoring wells along the north and south boundaries of the upland area, and along the Lower Duwamish Waterway.
- Cleaning and sampling stormwater catch basins and drain lines.

Other past cleanup work includes:

- Groundwater extraction (1993 through 1995).
- Application of oxygen-releasing compound to soils and groundwater (2003 and 2004).
- Pilot testing and installation of an air sparging/soil vapor extraction system to remove VOCs including trichloroethene, dichloroethene, and vinyl chloride from soil and groundwater (2004 through present).
- Studies of tidal influences (1998, 2002, 2006).
- Soil and groundwater investigations (1986 through present).

In 2006 Ecology and PACCAR negotiated the first Agreed Order for the site (#DE 3599) to evaluate the potential contamination in the sediment (mud at the bottom of the waterway) part of the site. The Sediment Evaluation Work Plan was meant to find the nature and extent of contamination in the sediment investigation area of the Lower Duwamish Waterway. The sediment investigation area is next to and west of the upland area of this site and located in the Lower Duwamish Waterway.

For the past two years PACCAR has done sediment evaluation tasks including sampling and analyses of surface sediment and sediment cores, stormwater, stormwater solids, and seeps. Two comprehensive groundwater monitoring events were also done: Wet Season (June 2006) and Dry Season (February 2007). This information will be compiled in the Interim Action Work Plan, which will outline the cleanup alternatives for source control and upland cleanup work. If sediment cleanup work is required by the PLPs, it will be done under a separate agreement and in coordination with Ecology and the U.S. Environmental Protection Agency (EPA). PACCAR reported the sediment data to Ecology in July 2008, and is now working on a Sediment Evaluation Data Report to evaluate the data.

In 2007-08 PACCAR compiled all previous analytical data with sample locations and compared these results with screening criteria to find potential contaminants of concern. This evaluation found eight areas containing soil or groundwater impacts higher than site screening criteria.

In 2007-08 Insurance Auto Auctions Inc., the current lessee, installed water quality improvements for the stormwater system.

Current Activity

The Draft Interim Action Work Plan summarizes past investigations, identifies contaminants of concern, areas of concern, and data gaps, and evaluates feasible cleanup alternatives for the upland area. The proposed cleanup action tasks, with review and approval by Ecology will include:

- Complete the Remedial Investigation (RI) for the upland area of the site.
- If there is more soil or ground water data needed to complete the Remedial Investigation/ Feasibility Study for the upland area of the site, create and implement a Supplemental Remedial Investigation Work Plan.
- Complete the Feasibility Study (FS) for the upland area of the site.

- Revise and implement the Interim Action Work Plan for the upland area of the site.
- If Ecology finds that there are data gaps affecting the engineering design for the cleanup tasks, then Ecology will require that the Draft Interim Action Work Plan include a Data Gaps Work Plan.
- Update the Public Participation Plan.



Community Profile

For decades much of the land along to the Lower Duwamish Waterway has been industrialized. Current commercial and industrial operations include cargo handling and storage, marine construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane parts manufacturing.

Although the Lower Duwamish Waterway is viewed primarily as an industrial corridor, two residential neighborhoods border the banks of the river: South Park and Georgetown. The South Park neighborhood is on the western shore of the Lower Duwamish Waterway, and the Georgetown neighborhood is on the eastern side of the Duwamish Waterway. Both neighborhoods are downstream of the 8801 East Marginal Way South site. The residents of the community are well known for their commitment to neighborhood issues particularly related to the ongoing site cleanups along the Lower Duwamish Waterway. A description of these communities is provided below.

South Park Community Description

The South Park neighborhood is located in South Seattle, on the west bank of the Lower Duwamish Waterway. Native Americans of the Duwamish Tribe were the first residents of South Park who lived on the shores of the Duwamish River for thousands of years. This area was once a small farming town composed of Italian and Japanese farmers who supplied fresh produce to Seattle's Pike Place Market. South Park became part of the City of Seattle in 1907. By 1920 the Duwamish River was straightened out into a straight, deep channel that would accept ocean-going ships and barges. This change in the Duwamish greatly impacted South Park. The curving meanders had been straightened, which made it easier for industry to develop along the banks of the waterway.

In the mid 1960s, South Park was rezoned as industrial. Over 4,000 people complained and the City of Seattle changed the zoning to low-density residential. The City of Seattle built the South Park Community Center in 1989 which remains a vital resource within the community. The South Park Community Center offers a wide variety of free and low

cost programs and special events. Special events include free breakfasts and family events. The community center provides before and after-school programs and school break camps for students. They also offer adult classes ranging from yoga to technology to English classes. South Park is also served by the City-owned neighborhood center, managed by the South Park Neighborhood Association. The neighborhood center houses several non-profit and city services including the South Park Food Bank, City-sponsored South Park Action Agenda, and the Environmental Coalition of South Seattle.

The Seattle Public Library opened the new South Park branch at 8604 Eighth Avenue South (at Cloverdale Street) in September 2006. This new branch is 5,019 square feet and has the capacity to hold 18,700 books and materials (about one-third of the collection is Spanish-language, including bilingual children's materials and Spanish Language fiction and non-fiction). The library also has bilingual staff on hand to answer questions and to help patrons.

The South Park neighborhood is comprised of about 3,717 people of various ethnicities: 37% Hispanic, 34% white, 14% Asian, 7 % Black, 5% multiracial, 2% American Indian, 1% Native Hawaiian/Pacific Islander. The average age is 31 years old and the average income is \$20,917 (based on records from 2005). A variety of retail and service businesses are located along 14th Avenue South. Data from the Seattle Office of Economic Development lists the primary categories of employment in South Park as wholesale trade, transportation and utilities; construction/resources; manufacturing; and services.

Georgetown Community Description

The Georgetown neighborhood is located in South Seattle, on the east side of the Lower Duwamish Waterway across the river from South Park. Georgetown is Seattle's oldest neighborhood, settled by Luther Collins in 1851. It was incorporated as the City of Georgetown from 1904-1910, and later annexed by the City of Seattle.

According to records from 2005, just over 1,100 people live in Georgetown. The largest local employers in Georgetown are in the arts, entertainment, and recreation industries. The Georgetown Community Council is very active.

The Duwamish River Cleanup Coalition

The Duwamish River Cleanup Coalition (DRCC) is an advisory group to EPA and Ecology and works with the South Park and Georgetown neighborhoods and other stakeholders to ensure a Duwamish River cleanup that is accepted by and benefits the community and is protective of fish, wildlife and human health.

DRCC was formed by an alliance of community, environmental, tribal, and small business groups affected by ongoing pollution and cleanup plans for the Lower Duwamish Waterway. The coalition members include: Community Coalition for Environmental Justice, the Duwamish Tribe, The Green-Duwamish Watershed Alliance, I'M A PAL Foundation, Environmental Coalition of South Seattle, Georgetown Community Council, People for Puget Sound, Puget Soundkeeper Alliance, South Park Neighborhood Association, Washington Toxics Coalition, and Waste Action Project.

DRCC is a formal "community advisory group" recognized by EPA and representing the interests of the community toward the cleanup work along the Lower Duwamish Waterway. DRCC receives public participation grant funding from Ecology. They also receive technical assistance grants from EPA for technical advisors to review all Lower Duwamish Superfund cleanup related studies and plans. They are involved in all aspects of the proposed Superfund cleanup and related MTCA cleanups. DRCC is working with Ecology to ensure that the cleanup and source control measures meet community standards.

Key Community Concerns and Issues

Ecology and EPA conducted interviews with community members, environmental organizations, and community organizations in October 2002 for the Lower Duwamish

Waterway Site Community Involvement Plan. The 8801 East Marginal Way South site is located within the larger Lower Duwamish Waterway site. Ecology did an abbreviated version of community interviews in 2006 and determined that the concerns raised in 2002 were still pertinent. In 2008 Stakeholder groups provided comments to EPA and Ecology on the Lower Duwamish Waterway Remedial Investigation Draft Report developed for the Lower Duwamish Waterway Superfund Site. Although these comments are directed to the entire Superfund site, they are relevant for the 8801 East Marginal Way South site because it is part of the larger Superfund site. The stakeholder comments indicated that their concerns have remained constant with the concerns outlined below.

There is clear interest in this cleanup process along the Lower Duwamish Waterway. The following is representative of significant concerns and issues expressed during the community interviews. Ecology will work to respond to community concerns through the cleanup process and through coordination with EPA, other organizations, such as state and local health agencies, and the community advisory group that has been established for the site.

- **Health:** Stakeholders are concerned that living close to the Lower Duwamish Waterway could affect their health. They expressed concern about consumption of all bottomfish and parts of other fish, as well as contamination from chemicals, bacteria and viruses. There is concern about exposure to contaminated sediments through contact at public access parks, employment at industries on the waterway, restoration work, and other cleanup work. Some said that there should be limited access to the river if there is a health risk.
- **Wildlife:** Stakeholders expressed concern for fish and wildlife. Sea lions, salmon, bottomfish, crabs, mussels, clams, shrimp, opossums, squirrels, ducks and other birds were mentioned, as well as concern about the disappearance of herons and for herons on Kellogg Island in the Duwamish Waterway.
- **Domestic animals:** There is concern about dogs eating garbage from the river and

horses being on a greenbelt above the river.

- **River and groundwater contamination:** There is concern that the river is dying and that it contains contaminants, including PCBs and mercury. There is concern about the effect of septic systems near the river; sewer overflows; surface water runoff, including oil, antifreeze and fertilizers; unreported spills and illegal dumping; and pumping of waste into the river or groundwater. There is concern that permits for discharges to the river are not being enforced or will be revised to be less strict. There is concern that sources of PCBs are not being addressed and that calculated cleanup levels for many contaminants will not be strict enough. There is also concern that the current efforts to control ongoing sources of pollution will not be enough to actually control the sources.
- **Economics:** Some people interviewed are concerned about contamination lowering property values. Others are concerned that businesses will leave the area due to the designation of the Lower Duwamish Waterway as a Superfund site.
- **Cleanup:** Some people are concerned that South Park and the businesses on the water will be affected by cleanup activities, such as increased truck or barge traffic and potential accidents. There are concerns about the costs of damages to natural resources and the possibility that parties responsible for contamination will do some early cleanup activities but nothing more.
- **Information:** Several people expressed concern about a lack of warning signs for fishermen and recreational users and suggested that such signs should be installed. People are concerned about whether adequate information reaches the Spanish-speaking and other non-English-speaking communities and whether the average person and immigrants understand the risks.
- **Image:** While some people described the Lower Duwamish Waterway neighborhood as an industrial area, others are concerned that it is perceived as a dumping ground.

- **Tribal Rights:** Some community members are concerned that the tribal rights to harvest fish and shellfish in the Lower Duwamish Waterway are not being honored at a level protective of these treaty rights.

Other public concerns may be identified over the course of the cleanup through: public comment periods; further community interviews; surveys; meetings; and other contacts with individuals, community groups, or organizations.

Ecology will work to respond to community concerns through the cleanup process and coordination with other regulatory agencies and property owners as necessary.

Public Participation Activities and Responsibilities

The purpose of this Public Participation Plan is to promote public understanding and participation in the MTCA activities planned for this site. This section of the plan addresses how Ecology will share information and receive public comments and community input on the site activities.

Public Participation Activities

Ecology uses a variety of activities to facilitate public participation in the investigation and cleanup of MTCA sites. Ecology will implement input provided by community residents, businesses, and other stakeholders whenever possible.

The following is a list of the public involvement activities that Ecology will use, their purposes, and descriptions of when and how they will be used during this site's source control investigation and cleanup.

Formal Public Comment Periods

Comment periods are the primary method Ecology uses to get feedback from the public on proposed investigation and cleanup decisions. Comment periods usually last 30 days

and are required at key points during the investigation and cleanup process before final decisions are made.

During a comment period, the public can comment in writing and via e-mail. After formal comment periods, Ecology reviews all comments received and will respond in a document called a Responsiveness Summary.

Ecology will consider the need for changes or revisions based on input from the public. If significant changes are made, then a second comment period may be held. If no significant changes are made, then the draft document(s) will be accepted and finalized.

Future public comment periods will be held for other documents and legal agreements that are developed for the site.

Public Meetings and Hearings

Public meetings may be held at key points during the investigation and cleanup process. Ecology also may offer public meetings for actions expected to be of particular interest to the community. These meetings will be held at locations convenient to the community.

Information Repositories

Information repositories are places where the public may read and review site information, including documents that are the subject of public comment.

Ecology has established two repositories for the 8801 East Marginal Way South site.

- Washington State Department of Ecology, 3190 160th Avenue SE, Bellevue, WA 98008, (425) 649-7190. Please call for an appointment.
- South Park Library, 8604 Eight Ave S. at Cloverdale St. Seattle, WA

Site information also will be posted on Ecology's web site at:

http://www.ecy.wa.gov/programs/tcp/sites/8801/8801_hp.html

Site Register

Ecology's Toxics Cleanup Program uses its bimonthly *Site Register* to announce all of its public meetings and comment periods, as well as many other activities. To receive the *Site Register* in electronic or hard copy format, contact Linda Thompson at (360) 407-6069 or by e-mail at ltho461@ecy.wa.gov. It is also available on Ecology's web site at: http://www.ecy.wa.gov/programs/tcp/pub_inv/pub_inv2.html

Mailing List

Ecology has compiled a mailing list for the site. The list includes individuals, groups, public agencies, elected officials, private businesses, potentially affected parties, and other known interested parties. The list will be maintained at Ecology's Northwest Regional Office and will be updated as needed.

To have your address added or deleted from this mailing list, please contact Ecology's public involvement coordinator **Molly Morris at (425) 649-7135 or momo461@ecy.wa.gov**.

Fact Sheets

Ecology will mail fact sheets to persons and organizations interested in the 8801 East Marginal Way South site to inform them of public meetings and comment opportunities and important site activities. Ecology also may mail fact sheets about the progress of site activities.

Newspaper Display Ads

Ecology may place ads in the *Seattle Times* and *Seattle Post Intelligencer*, to announce public comment periods and public meetings or hearings for the site.

Enhanced Public Participation

Ecology will work with EPA and stakeholders according to the enhanced public participation efforts that occur for the Lower Duwamish Waterway Superfund site.

Ecology site managers and community involvement coordinators may participate in community meetings and events as needed. Ecology will coordinate with DRCC throughout the public involvement process. This may include such activities as coordination for public meetings and sharing drafts of documents with DRCC for review, as appropriate.

Public Participation Plan Update

This public participation plan may be updated as the project proceeds. If an update is necessary, the revised plan will be submitted to the public for comment.

Points of Contact

If you have questions or need more information about this plan or the 8801 East Marginal Way South site, please contact:

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Glossary

Agreed Order: A legal document issued by Ecology which formalizes an agreement between the department and potentially liable persons (PLPs) for cleanup actions needed at a site. Orders are subject to public comment. If an order is substantially changed, an additional comment period may occur.

Cleanup: Actions taken to deal with a release, or threatened release of hazardous substances that could affect public health and/or the environment. The term "cleanup" is often used broadly to describe various response actions or phases of remedial responses such as the remedial investigation/feasibility study.

Cleanup Action Plan: A document which identifies the cleanup action and specifies cleanup standards and other requirements for a particular site. After completion of a comment period on a Draft Cleanup Action Plan, Ecology will issue a final Cleanup Action Plan.

Comment Period: A time period during which the public can review and comment on various documents and proposed actions. For example, a comment period may be provided to allow community members to review and comment on proposed cleanup action alternatives and proposed plans.

Copper: A ductile, malleable, reddish-brown metallic element that is an excellent conductor of heat and electricity and is widely used for electrical wiring, water piping, and corrosion-resistant parts, either pure or in alloys such as brass and bronze. Copper is toxic in its unbound form.

Contaminant: Any hazardous substance that does not occur naturally or occurs at greater than natural background levels

Feasibility Study: This study develops and evaluates cleanup options for a given site.

Groundwater: Water found beneath the earth's surface that fills pores between materials such as sand, soil, or gravel. In some aquifers, ground water occurs in sufficient quantities that it can be used for drinking water, irrigation and other purposes.

Hazardous Substance: Any material that poses a threat to public health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.

Information Repository: A file containing current information, technical reports, and reference documents available for public review. The information repository is usually located in a public building that is convenient for local residents such as a public school, city hall, or library.

Interim Action: Any remedial action that partially addresses the cleanup of a site. For example, at this site the upland area is currently being addressed, not the sediment portion.

Lead: A bluish-white soft malleable ductile plastic but inelastic heavy metallic element found mostly in combination and used especially in pipes, cable sheaths, batteries, solder, and shields against radioactivity. Lead may cause irreversible neurological damage as well as renal disease, cardiovascular effects, and reproductive toxicity.

Model Toxics Control Act (MTCA): Legislation passed by citizens of the State of Washington through an initiative in 1988. Its purpose is to identify, investigate, and clean up facilities where hazardous substances have been released. It defines the role of Ecology and encourages public involvement in the decision making process. MTCA regulations are administered by the Washington State Department of Ecology.

Monitoring Wells: Special wells drilled at specific locations on or off a hazardous waste site where groundwater can be sampled at selected depths and studied to determine the direction of groundwater flow and the types and amounts of contaminants present.

PAH (Polynuclear Aromatic Hydrocarbons): PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. There are more than 100 different PAHs.

PCBs (polychlorinated biphenyls): A group of toxic, persistent chemicals. Due to their non-flammability, chemical stability, high boiling point and electrical insulating

properties, PCBs were used in hundreds of industrial and commercial applications including transformers and capacitors for insulating purposes, and in gas pipeline systems as a lubricant. PCBs are a serious threat to public health because they have been proven to cause cancer in animals. In 1977 they were made illegal to produce, yet large amounts still remain in the environment.

Potentially Liable Person: Any individual(s) or company(s) potentially responsible for, or contributing to, the contamination problems at a site. Whenever possible, Ecology requires these PLPs, through administrative and legal actions, to clean up sites.

Public Participation Plan: A plan prepared to encourage coordinated and effective public involvement designed to the public's needs at a particular site.

Remedial Investigation: This study characterizes the site and defines the extent of contamination.

Remedial Investigation/Feasibility Study: Two distinct but related studies. They are usually performed at the same time, and together referred to as the "RI/FS." They are intended to:

- Gather the data necessary to determine the type and extent of contamination;
- Establish criteria for cleaning up the site;
- Identify and screen cleanup alternatives for remedial action; and
- Analyze in detail the technology and costs of the alternatives.

Responsiveness Summary: A summary of oral and/or written public comments received by Ecology during a comment period on key documents, and Ecology's responses to those comments. The responsiveness summary is especially valuable during the Cleanup Action Plan phase at a site when it highlights community concerns.

Site: Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located.

Superfund: The federal government's program to clean up the nation's uncontrolled hazardous waste sites.

SVOCs (semi-volatile organic compounds): This group includes a variety of chemicals that have boiling points higher than water and that may become a gas at temperatures above room temperature. Most of these substances are used as industrial chemicals. They include phenols, polynuclear aromatic hydrocarbons (PAHs), and phthalates. Sites where these potentially toxic chemicals may be found include burn pits, chemical manufacturing plants and disposal areas, electroplating/metal finishing shops, firefighting training areas, hangars/aircraft maintenance areas, solvent degreasing areas, vehicle maintenance areas, and wood preserving pits. These compounds generally evaporate slowly at room temperature. Their water solubility and environmental persistence is highly variable, and they are commonly found as contaminants in soil and water.

TPHs (total petroleum hydrocarbons): Describes a large family of several hundred chemical compounds that originally come from crude oil. Crude oil is used to make petroleum products, which can contaminate the environment. TPH is a mixture of chemicals, but they are all made mainly from hydrogen and carbon, called hydrocarbons. Scientists divide TPH into groups of petroleum hydrocarbons that act alike in soil or water. These groups are called petroleum hydrocarbon fractions. Each fraction contains many individual chemicals.

Toxicity: The degree to which a substance at a particular concentration is capable of causing harm to living organisms, including people, plants and animals.

VOCs (volatile organic compounds): include a variety of chemicals that become a gas at room temperature. Most such substances are industrial chemicals and solvents. They include light alcohols, acetone, trichloroethylene, perchloroethylene, dichloroethylene, benzene, vinyl chloride, toluene, and methylene chloride. These potentially toxic chemicals are used as solvents, degreasers, paints, thinners, and fuels. Because of their volatile nature, they readily evaporate into the air, increasing the potential exposure to

humans. Due to their low water solubility, environmental persistence, and widespread industrial use, they are commonly found in soil and water.

Zinc: Zinc is a metallic chemical element; it has a white color with a bluish tinge. It has a high resistance to atmospheric corrosion. A major use is as a protective coating for iron and steel sheet and wire. Excess zinc in the body interferes with the metabolism of other minerals in the body.