

Frequently Asked Questions



**Cadet Manufacturing and
Port of Vancouver Building 2220**

May 2008

Background

The Department of Ecology (Ecology) created this document to summarize questions discussed during the January 15, 2008 public meeting at the Fruit Valley Elementary School. During the meeting, Ecology and Washington Department of Health (DOH) staff discussed the proposed groundwater pump and treat interim action, results of the September 2007 multi-media sampling event and a recent health consultation. The Department of Health assisted Ecology with questions related to these topics and health concerns.

We hope you find this document helpful in answering your questions and addressing your concerns. If you need more information about the site work and sampling results, please contact Craig Rankine (contact information to the right). You can find more information about the site on the Ecology Web site at http://www.ecy.wa.gov/programs/tcp/sites/cadet/cadet_hp.htm.

Department of Health Consultation Report Summary

The Washington State Department of Health completed a health consultation report in December 2007. This report contains information about health risks posed by indoor air solvent levels found through February 2007 in some Fruit Valley neighborhood homes located above a plume of solvent-contaminated groundwater. The report also contains the results of an epidemiological study. The study compared cancer rates in Clark County and across Washington with cancer rates in the portion of the Fruit Valley neighborhood where solvent-contaminated groundwater has been found.

A fact sheet that briefly summarizes the health consultation report findings can be found at <http://www.doh.wa.gov/ehp/oehas/fact%20sheets%20pdf/fruitvalley-07.pdf>. The health consultation report is available on the health department Web site at http://www.doh.wa.gov/ehp/oehas/publications_pdf/HealthConsults/fruit-valley-12-4-07.pdf.

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Department of Ecology Groundwater Pump and Treat System

The Department of Ecology and the Port of Vancouver (Port) have entered into an Agreed Order to design and implement a groundwater pump and treat system. The system will provide area-wide containment (prevent further contaminant movement) and continued treatment of the groundwater plume originating from the former Swan Manufacturing Company property and the Cadet Manufacturing Company property (See Figure 1).

Contaminated groundwater will be pumped from a well on Port property and into a pre-treatment system. The pre-treatment system will remove minerals from the water that might build up in the treatment system and cause it to run less effectively.

After the pre-treatment, the contaminated groundwater will be pumped into the top of two air stripping towers (Figure 2). Air is blown into the bottom of the towers at the same time the water is sprayed into the top of the tower. As water travels down the inside of the tower, it is broken into smaller parts by the packing material in the center of the tower. This creates more liquid surface area and increases the amount of evaporation of the contaminants from water into the air stream. Solvents dissolved in the water are evaporated into the air stream.

The air from the stripping towers, containing solvents pulled from the groundwater, will be released to the atmosphere. Solvent levels in this air must remain below air discharge levels set by the Southwest Clean Air Agency (SWCAA). Testing will be used to make sure the system is operating in compliance with the SWCAA permit. If necessary, the air will be treated using carbon filters.

Water from the system will be released to the Columbia River. Remaining chlorine will be removed from this treated groundwater before it is discharged to the Columbia River. It will meet all state and federal standards established in the federal NPDES (National Pollution Discharge Elimination System) water discharge permit issued to the Port of Vancouver for the site. The system will begin operation in early 2009.

Groundwater Pump and Treat System Questions

Q: Is the air stripper technology new or has it been used before?

A: Systems which combine groundwater pump and treat systems with air stripping are not new technology. They have been used for many years at many sites to remove volatile solvents (trichloroethene [TCE] and tetrachloroethene [PCE] and others) from groundwater. The systems are effective, often removing over 98 percent of these chemicals. The U.S. Environmental Protection Agency has documented the effective use of this remediation technology at hundreds of cleanup sites throughout the nation.

Q: Where will the air stripper be located?

A: The air stripping towers and the water treatment system will be located with on Port property. See Figure 3 for more detailed information about the specific location.

Q: Why aren't you just using carbon filters alone?

A: One of the goals of this interim action is to prevent the contaminated groundwater plume from spreading any further. To achieve this goal, it is necessary to pump groundwater into the system at a very high rate. Air stripping is more efficient and cost-effective when removing solvents from large volumes of water.

Q: What is the fate of the TCE and other chemicals? Are they released into the air or are they trapped and disposed of?

A: Provided air concentrations are low enough that additional treatment is not required, TCE and the other chemicals stripped from the contaminated groundwater will be released into the outdoor air. Discharged chemicals will immediately be diluted by outdoor air and will pose no hazard to Fruit Valley Neighborhood residents, Port tenants or the environment. If additional treatment is required prior to air discharge, the contaminants will be trapped by carbon adsorption (where TCE adheres or sticks to the filter).

All air discharged by the system will meet standards set by Southwest Clean Air Agency. Carbon filtration may be needed, in addition to the air stripping towers, to further treat the air before it is discharged to meet these standards. When filters are replaced in the system, old filters are taken to a special facility where the solvents are burned off so the carbon can be re-used.

Q: Does TCE sink? Won't it drop out of the atmosphere and come into contact with people?

A: Although pure TCE vapors are heavier than air, the extremely low levels that will be discharged here will be unable to sink. TCE in air discharged from the system to the atmosphere will be at low levels (at or below levels set by Southwest Clean Air Agency to protect human health). The low concentration levels of TCE in air from the air stripper exhaust (under 1 part per million) are too dilute to "sink" or drop in a mass from the atmosphere.

Q: Will winds push contaminants back down to the ground?

A: Any TCE in air discharged by the system will be at or below levels deemed protective of human health by SWCAA. Wind will further dilute TCE with air.

Q: To what cleanup level is the water being treated to?

A: The contaminated groundwater will be cleaned to meet human health criteria for fresh water set by the National Pollution Discharge Elimination System (NPDES) permit. The treatment levels will be consistent with the Model Toxic Control Act levels protective of human health and the freshwater ecosystem. The permit will require water quality monitoring to make sure those levels are achieved before the water is discharged to the Columbia River.

Q: Why has it taken so long for this air stripper to be used? Why have we gone through this experimental system?

A: Before decisions can be made about appropriate cleanup methods, Ecology staff must understand the nature and extent of contamination. This initial study is the first phase of a cleanup and is called the Remedial Investigation. On large and complex sites like the Cadet Manufacturing and Port of Vancouver Building 2220 site, it takes a long period of time to completely evaluate the nature and extent of contamination.

Every cleanup undertaken by Ecology must follow standards outlined by the Model Toxics Control Act (70.105D RCW). Cleanup work is done in phases, each building on the previous phase (Figure 4). A large area of contamination will require a greater number of work phases to completely understand every migration pathway and organism that could be affected.

The Remedial Investigation for this site was recently finished and Ecology is now reviewing the reports. Determining the nature and extent of contamination at this site required extensive sampling of indoor and outdoor air, groundwater and soil vapor during each season.

Ecology has taken several steps to reduce the levels of contamination and protect the health of the community, since the discovery of contamination in 1998 and while the Remedial Investigation has been in progress.

These actions include:

- Collection and analyses of soil, soil gas and groundwater samples to understand who could be affected.
- Installation of over 200 groundwater monitoring and soil gas wells to determine where the contamination is going and how it is breaking down.
- Removal and treatment of contaminated soil from the Port of Vancouver Building 2220 (former Swan Manufacturing) property.
- Source area groundwater treatment (injection of oxidants to break down contaminant) at the Port of Vancouver Building 2220 property.
- Installation and operation of an air sparging and soil vapor extraction system at the Cadet Manufacturing property.

- Installation and operation of recirculating groundwater remediation wells at the Cadet Manufacturing property and in the North Fruit Valley Neighborhood.
- Collection and analysis of indoor and outdoor air samples from 142 homes in the Fruit Valley Neighborhood.
- Installation and operation of soil vapor vacuum system in six North Fruit Valley Neighborhood homes.

Q: How long will treatment take using the groundwater pump and treat interim action?

A: The final cleanup method for this site (two properties) has not yet been determined. During the next stage in the cleanup, the Feasibility Study, the Port will review and evaluate cleanup options and Ecology will select the final cleanup method. The groundwater pump and treat Interim Action may be part of this final cleanup action.

We cannot estimate how long the cleanup will take at this time, but restoration time frames will be examined as part of the Feasibility Study. Ecology is committed to a thorough, comprehensive and effective cleanup and will make protection of human health and the environment a priority.

Q: Can the City of Vancouver and Port storm water discharge pipe handle the extra load of water from the groundwater pump and treat system?

A: Yes, the additional water from the groundwater pump and treat system can be accommodated by the storm water discharge pipe. The City and the Port own portions of the storm water discharge pipe proposed for use. The Port is obtaining an agreement from the City for system discharge through the City owned portion of the storm water pipe.

The Port consulted with the City during the initial design of the system and completed detailed flow modeling to determine if there is enough discharge capacity for both storm water and system discharge. During very rare and short-term circumstances (extreme rainfall or flooding) there is potential for the storm water pipe capacity to be overloaded. Therefore, the groundwater pump and treat system will be designed to shut down during an event that might overload the pipe. A shut down would be brief and would not significantly affect the overall remediation progress or contaminant containment.

Q: Is the Port responsible for the new system? Will the City of Vancouver be liable in any way?

A: The Port is responsible for the new system. The City of Vancouver is not liable for the system.

Q: What happens if development occurs across or around the stormwater discharge pipe?

A: Because it is very important that containment of the plume be maintained, any future development involving the stormwater pipe must not interrupt the operation of the pump and treat system. Ecology will work with the Port and City of Vancouver (both own portions of the pipe) to make sure there is no long-term interruption of the operation of the system or loss of containment during any planned development.

Q: Is this going to impact the municipal water supply?

A: No, this system will not impact the municipal water supply. One of the system's primary design considerations is to make sure contamination is contained and will not spread to other areas. System operation should ensure that contamination will not spread and cause any impact to municipal water supplies.

Q: If levels of TCE in ambient air did rise, would there be a way to shut down the process to avoid contributing more TCE to the air?

A: TCE levels discharged from the treatment system to outdoor air will be at or below rates necessary to meet SWCAA requirements. The air discharge permit (administered by SWCAA) will require system monitoring to make sure contaminant levels remain below required discharge levels. Those standards are set at levels protective of human health and the environment.

The system is designed to be able to shut down during extreme weather events. Ecology will take all necessary measures to ensure that human health and the environment are protected.

Q: Could you have an automatic shut down during atmosphere inversion events?

A: Ecology has no evidence that atmosphere inversion events, or other weather related events, will significantly increase the concentration of TCE in outdoor air from the groundwater pump-and-treat system. In the future, if any evidence shows this could be an issue, Ecology will take steps to ensure that human health and the environment are protected.

Q: What about a fog episode that can trap and concentrate chemicals in the air, keeping them close to the ground or re-depositing them onto the ground?

A: Fog events are not likely to cause a significant increase in the ground-level concentration of TCE. Fog events normally occur at relatively cool temperatures. During these events, it is most likely the gas stripper discharge air temperature will be higher than the outdoor air temperature causing the discharged gas to continue to rise from the already elevated stack, instead of settling down on the ground.

Department of Health Consultation Report Questions

Q: How many Fruit Valley residents were tested or questioned during the health department community health study (i.e., epidemiological study)? For example, were residents tested for neurological effects or immune deficiency?

A: No residents were tested or questioned during the epidemiological study.

Q: A cancer registry was used as part of the epidemiological study. What is a cancer registry?

A: The Washington State Cancer Registry is a system established to monitor the occurrence of cancer in Washington. The cancer registry provides standards for cancer data collection and information for cancer prevention and control programs at the local, state and national levels. Additional information about the Washington State Cancer Registry can be found at <http://www3.doh.wa.gov/wscr/>.

Q: Why is your epidemiological study statistical rather than on the ground – going door-to-door and asking, for example, who has cancer or who has worked in the industry, or mailing a survey to residents asking if they have had cancer in the family?

A: There are three things that the health department considers before deciding whether to conduct a door-to-door or mail survey as part of an epidemiological study in a community:

- What diseases are potentially related to the chemical exposure?

- Are there any unusual occurrences of those diseases in the community based on reported health information and statistics?
- Are the levels of the chemical found in the community likely to cause disease?

For the Fruit Valley Neighborhood, DOH reviewed available scientific information about TCE and related solvents. They found that liver, kidney and cervical cancers showed some evidence of a positive association with TCE and related solvents. It should be noted, however, that these positive associations were found with workplace exposures, which are many times higher than the exposures occurring in the Fruit Valley Neighborhood.

Statistics were then used to compare liver, kidney, and cervical cancers rates in the Fruit Valley neighborhood with levels expected in Clark County and Washington State. As noted in the health consultation report, there were no unusual occurrences of liver, kidney, or cervical cancers in the Fruit Valley Neighborhood. As a result of these findings, the health department determined that a neither a door-to-door nor mail survey was necessary.

Q: What about the people who have left the neighborhood and die of cancer somewhere else? These people were not recorded as being exposed to the chemicals.

A: The epidemiological study looked at occurrences of cancer, not death from cancer. The cancer occurrence data reviewed by the health department covered 13 years of data beginning with cancer cases in 1992. Therefore, people who were residents in the Fruit Valley neighborhood in the past would still be identified as a resident of the Fruit Valley neighborhood as long as they were diagnosed with kidney, liver, or cervical cancer after 1991 and before they left the neighborhood. There are no records available to indicate whether a person diagnosed with cancer has been exposed to TCE or related solvents.

Q: What are the five indoor air chemicals of possible health concern?

A: Trichloroethylene (commonly known as TCE), tetrachloroethylene (commonly known as PCE); 1,2-dichloroethane; vinyl chloride, and chloroethane are the five indoor air chemicals of possible health concern identified by the health department. The levels of these five chemicals found in indoor air in some homes in the Fruit Valley neighborhood are well below levels where we would expect people to get sick. However, the levels could pose, in theory, a small increased cancer risk. A small increased cancer risk does not mean that people will get sick. It means there is a small chance that someone in the Fruit Valley could develop cancer from exposure. That cancer risk, however, could be as low as zero.

Q: Why is only TCE mentioned as a chemical of concern when there are actually five chemicals of concern?

A: The health department discusses all five chemicals of concern in its health consultation report.

Q: Of all the possible illnesses associated with TCE and other solvents listed in the health study (liver, kidney and cervical cancers), were there other illnesses looked at that could have been caused by these chemicals?

A: Available scientific studies show that liver, kidney, and cervical cancers are the three diseases that may have a positive association with exposure to TCE and related solvents. However, the strength of those associations are reported as weak to moderate even at occupational exposure levels, which are many times higher than those found in the Fruit Valley neighborhood.

The health department also looked to see if there were associations between exposure to TCE and related solvents and other types of cancer (other than liver, kidney and cervical cancers) and non-cancer health conditions such as arthritis, neurological disorders, or adverse effects on immunity. No evidence of firm association was found.

Q: Were residents whose homes now have home vapor vacuum systems experiencing risk from the vapors before the systems were installed?

A: The estimated risk associated with the levels of solvents found in homes that now have home vapor vacuum systems ranged from low to moderate before the systems were installed. However, the actual risk could have been as low as zero. It is important to know that an estimated low to moderate health risk does not mean that people will get sick.

Q: What were the solvent levels in the air at these homes and what were the corresponding thresholds of risk?

A: The solvent levels found in indoor air at the homes where soil vapor vacuum systems were installed posed a low to moderate cancer risk. The indoor air solvent levels for those homes are summarized in the health department's 2003 health consultation report. That report is available at http://www.doh.wa.gov/ehp/oehas/publications_pdf/HealthConsults_cadeti-doorairhc_vancouver_clark_5-6-03.pdf.

Q: Was any indoor air data collected from Fruit Valley Neighborhood homes before 2002?

A: No indoor air data was collected from Fruit Valley Homes before 2002.

Figure 1. Conceptual Treatment System.

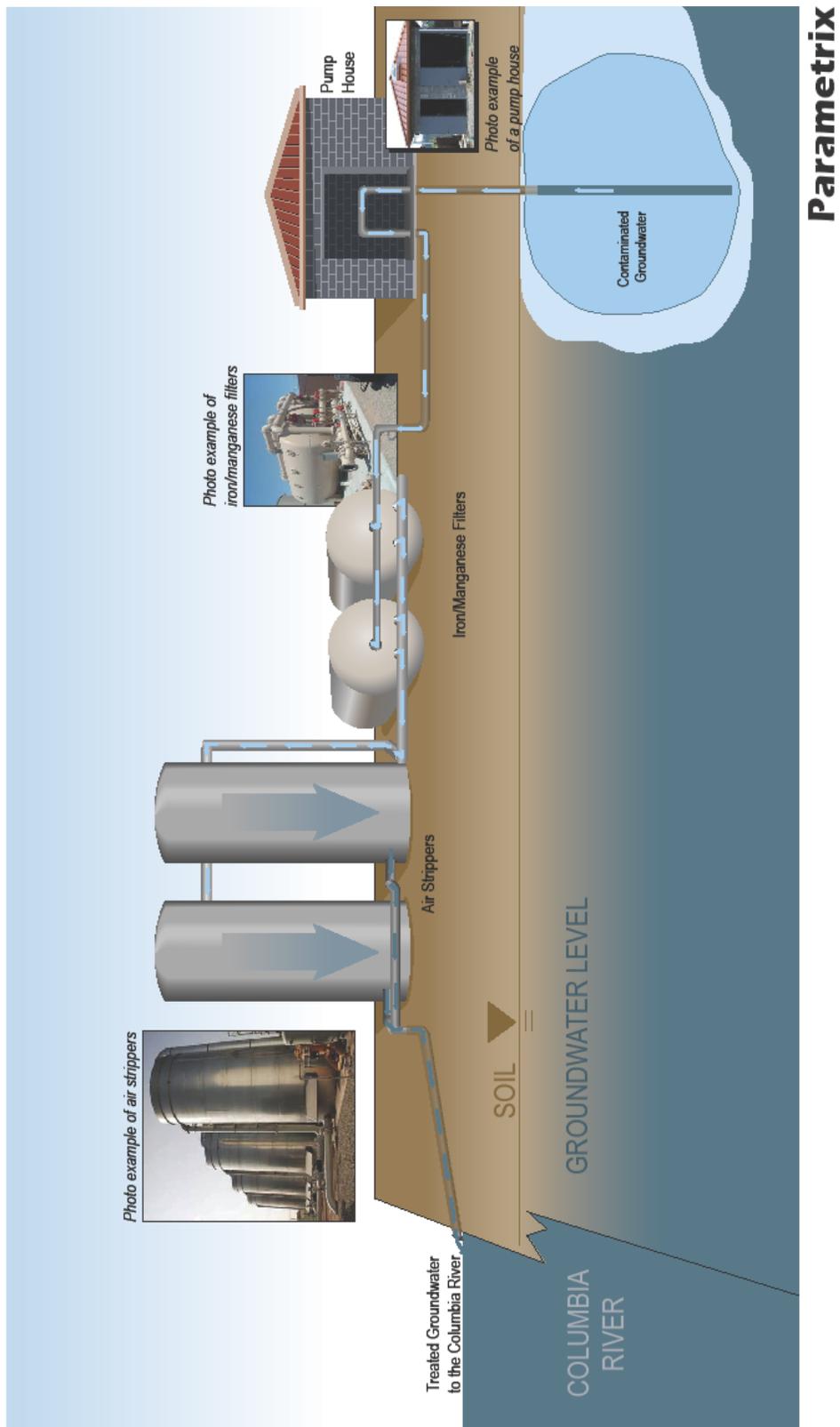


Figure 2. Groundwater Pump and Treat System.

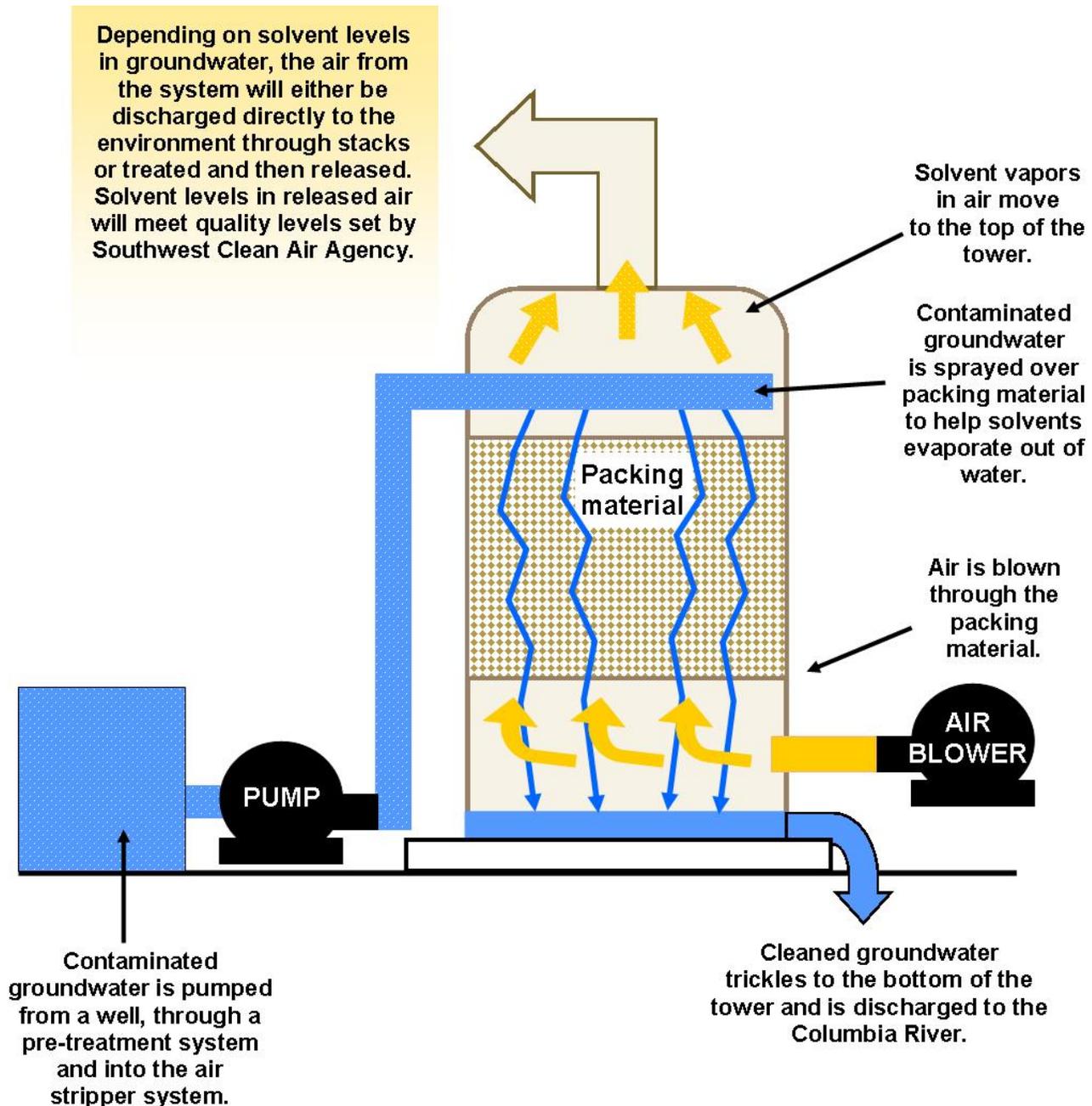


Figure 3. Conceptual layout of Interim Action System.

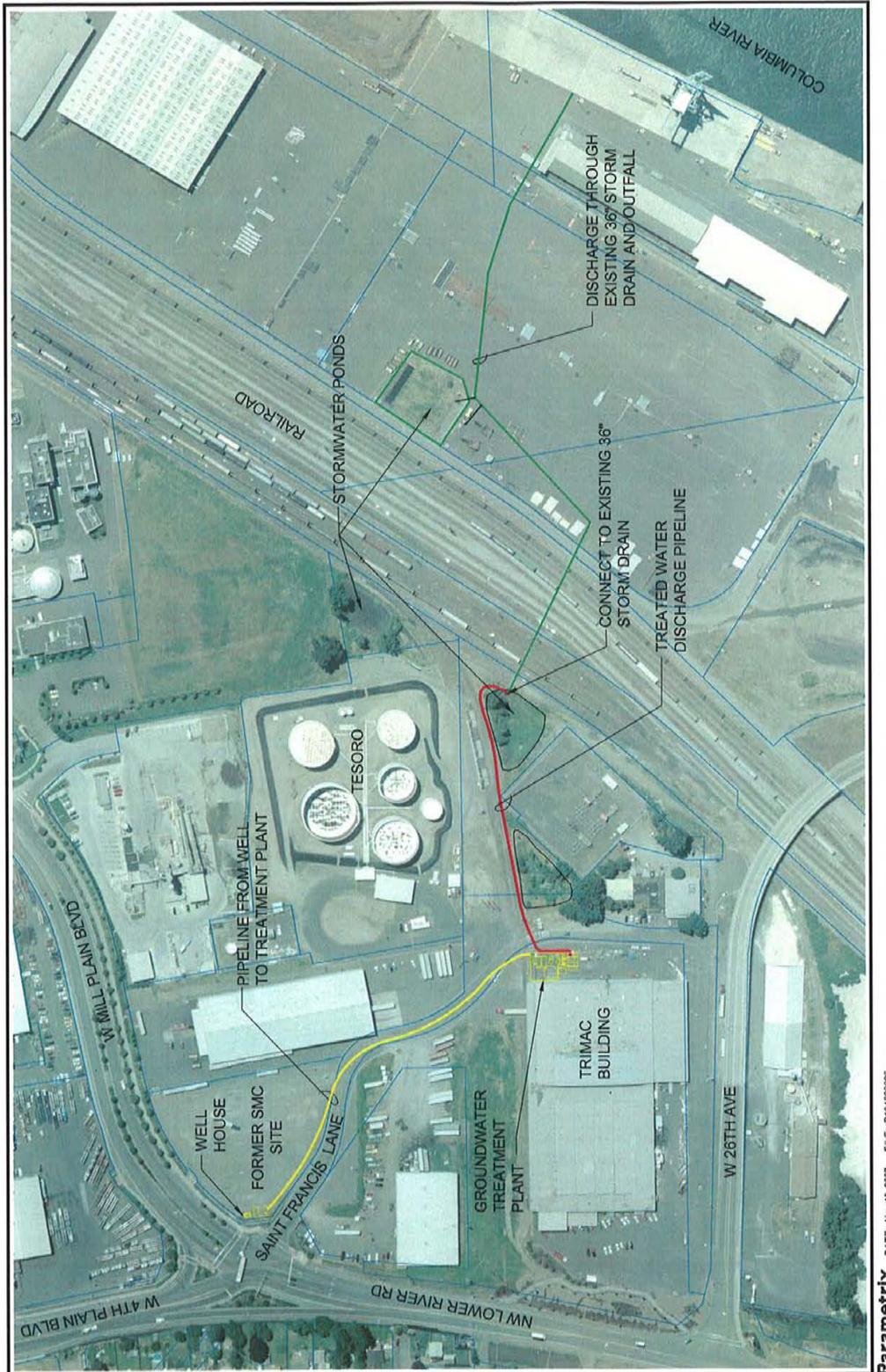


Figure 4. Steps in the Model Toxics Control Act Cleanup Process.

