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United States Environmental Protection Agency

Enforcement and Compliance Assurance (2201A)

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EPA

Superfund At Work

Hazardous Waste Cleanup Efforts Nationwide

Photo courtesy of Washington Gas, Washington, D.C.

U.S. Environmental Protection Agency
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The first coal gas street lamps had open-flame burners.

Success in Brief

From Coal to Natural Gas: Fueling the Demand for Lights

As history has shown, most battles are fought over land or energy. The settlement of our western states proceeded over the course of about 150 years, and that expansion embodied the greed for both. Coal was one of the first energy sources and remains today a versatile natural fuel with manifold utility. Gas from coal lit our city streets in the 1800s and provided the energy for industrial manufacturers to transform a steady stream of raw materials into useful products.

The vast frontier of the west seemed endless, but the towns filled up with homesteaders who demanded modern conveniences and economic prosperity. One of the last U.S. cities to use coal gas for lighting was Tacoma, Washington, caught in the fray between a rapidly growing population and new industries rushing to extract the bountiful natural resources of the land. The city used the old technology of manufacturing gas, a dirty process that discarded large volumes of tarry wastes and heavy metals. With the advent of natural gas, the municipal utility abandoned the crude gasification process, along with 30 acres of hazardous wastes.

Almost 20 years later, a salvage company would further contaminate the land and ground water with a myriad of scrap metals and toxic chemicals. The U.S. Environmental Protection Agency then stepped in to clean up the site and restore the burdened wetlands. Fair and wide-ranging enforcement actions brought a quick resolution to this small but significant site.

Tacoma Tar Pits Site Profile

Site Description: Former coal gasification plant and current metal recycling facility

Site Size: 30 acres

Primary Contaminants: Heavy metals, polychlorinated biphenyls, benzene, and polynuclear aromatic hydrocarbons

Potential Range of Health Effects: Central nervous system and cardiovascular disorders; increased risk of cancer

Nearby Population: 162,000 people

Ecological Effects: Ecosystem degradation in the Puyallup River and Wheeler-Osgood Waterway

Year Listed on NPL: 1983

EPA Region: 10

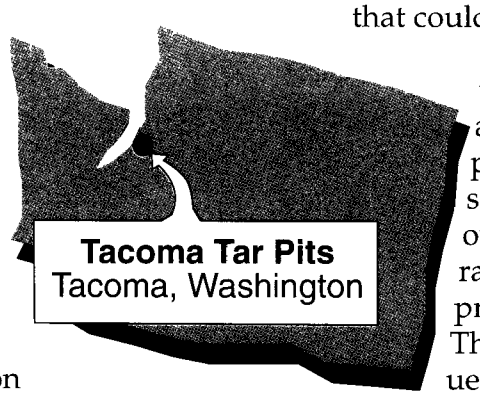
State: Washington

Congressional District: 6

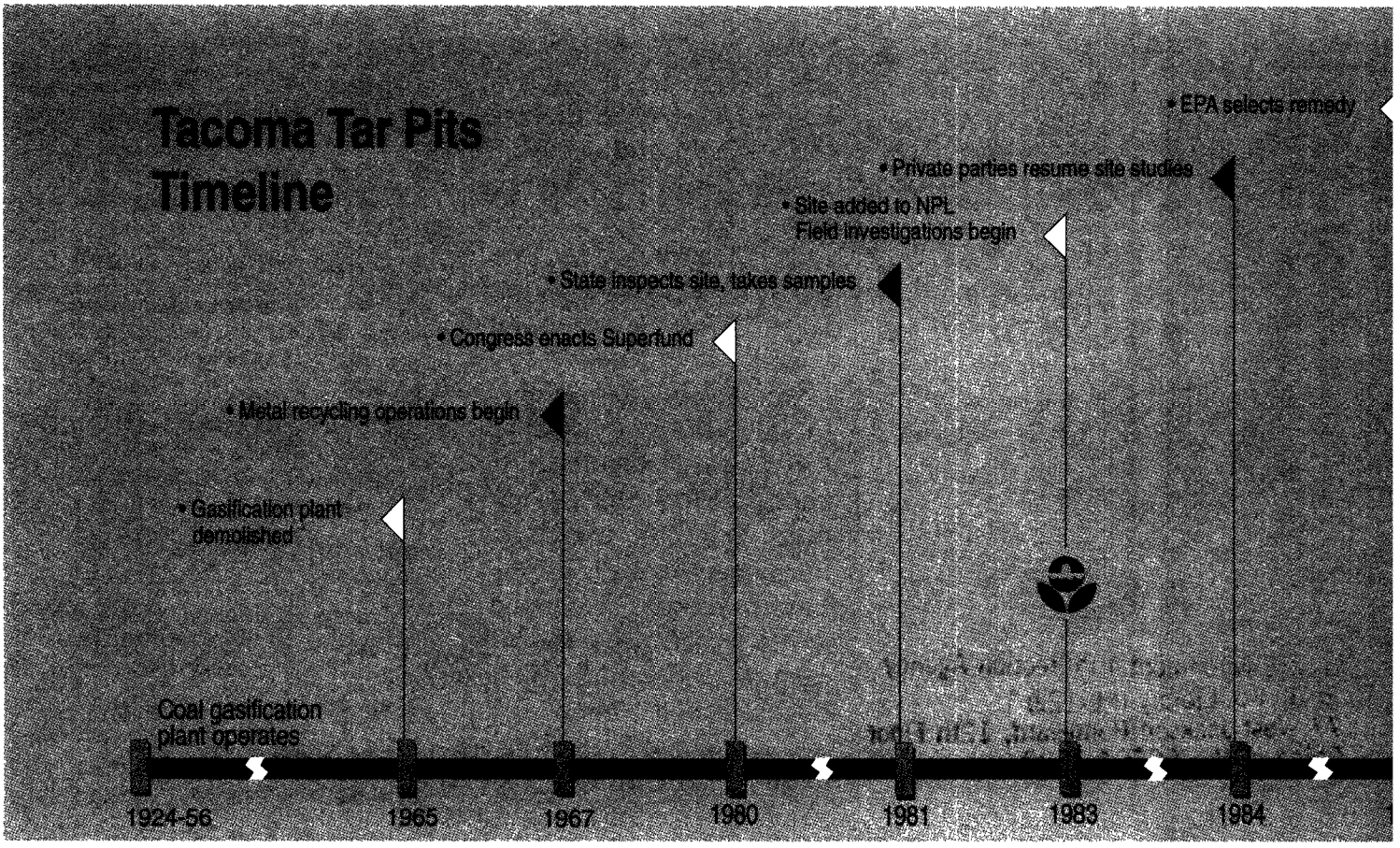
A Site Snapshot

The Tacoma Tar Pits are part of the much larger Commencement Bay, Nearshore/Tideflats Superfund site. This 30-acre section is located between the Puyallup River and the Wheeler-Osgood Waterway on the outskirts of Tacoma, Washington. The river and waterway are important sources of fish and shellfish; a variety of adjacent industries depend on surface and ground water.

From 1924 until 1956, a predecessor company of what is now Washington Natural Gas operated a coal gasification plant at the site to provide power for city lights. Discarded coal tar liquors, coal ash, and coal tar wastes contained a variety of heavy metals including arsenic, mercury, and lead, as well as volatile organic compounds such as benzene, toluene, and polynuclear aromatic hydrocarbons (PAHs).



Joseph Simon and Sons, the current tenant, began a metal recycling operation at the site in 1967, accepting scrap metals and shredded automobiles. Discarded electrical transformers and capacitors from local utilities contained polychlorinated biphenyls (PCBs) that seeped into soil and surface water. PAHs, benzene, and lead also leached into area ground water. Scrap and other materials that couldn't be recycled (auto fluff) were used to fill holes and ditches on the property and on surrounding land owned by two railroads and a food products company. This practice continued through the 1980s. By then, the list of site contaminants had been associated with central nervous system and cardiovascular disorders. PCBs are suspected carcinogens and their manufacture, distribution, and use have been banned since 1974. Ecological effects include estrogenic and reproductive consequences that may never be fully documented.



Coal Gasification Lights Up Tacoma at Turn of t

The east coast cities of the early 1800s were ports of trade where new world riches flowed into merchant ships from half way around the world. Commerce emanated from the wharf but ended at sunset, the bustling city streets dark with shadows, the crooked lanes lit poorly by kerosene lanterns. In 1817, Baltimore, Maryland was the first to use gas distilled from coal to light city streets. The National Road opened to the public in 1818, the greatest wagon trail of the day and the first to connect the east to the newly settled Ohio River Valley. As pioneers settled the west, various innovations and technologies followed. More than 125 years would go by before municipal utilities on the west coast switched from coal to natural gas and then to electricity for lighting.

In the gasification process, bituminous coal is prepared by crushing and drying, pretreated to prevent caking, and then gasified with a mixture of air or oxygen and steam. By-products are coal tar and coke, which have useful purposes if properly handled. The process also produces some benzene, toluene, and xylene, today regulated as hazardous substances.

The Seattle Gas Light Company was still using the gasification process when five public streets were first lit on New Year's Eve in 1873. Gas was stored in wooden containers and piped through the city in bored-out fir logs. Despite the crude distribution to homes and businesses, the plant was the first of its kind on Puget Sound. The City of Tacoma finally received gas lights in the late 1880s. Not until the 1890s were the first gas ranges introduced to relieve the drudgery of cooking. With the modernization of early 20th century homes, Mountain States Power Company opened the gasification plant in 1924, fueling the area's burgeoning industries in smelting and forest products. Washington Gas and Electric Company of Tacoma purchased the plant in 1928.

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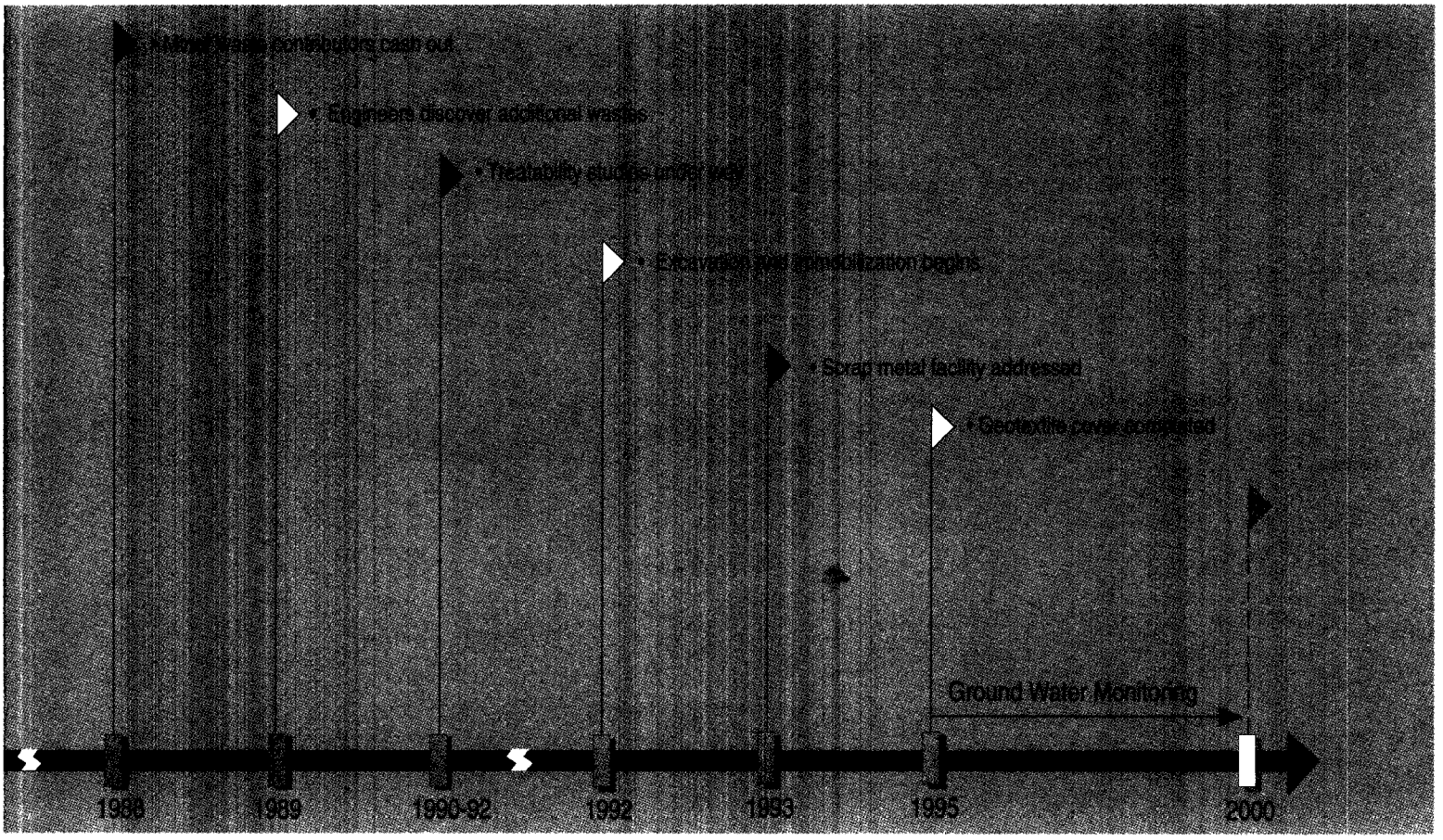

Century

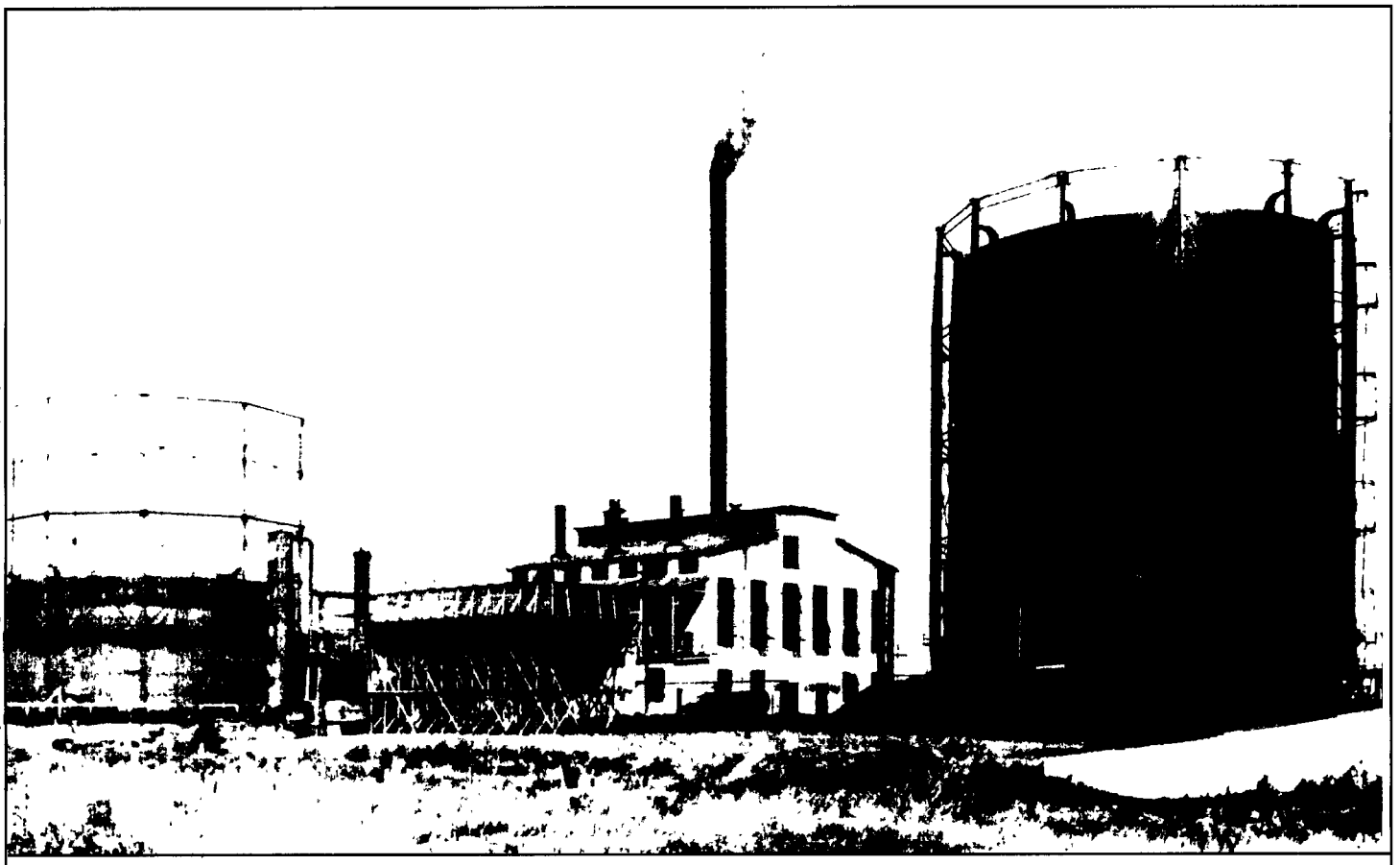

Photo courtesy of Washington Natural Gas Company, Seattle, Washington.

View of the carborated water gas plant showing the gas holder on the right and relief tank on the left, circa 1945.

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Operations ceased in 1956 with the introduction of the cleaner, more potent natural gas that replaced the manufactured variety. Washington Natural Gas formed as a merger between the Seattle and Tacoma utilities to distribute the new fuel through major pipelines that linked Puget Sound with Canada. But the site of the old gasification plant remained heavily laden with tar pitch residuals, PCBs, and trace metals widely distributed over the property. Almost a decade would pass while contaminants silently percolated into the ground water from areas of saturation. When the plant was finally demolished in 1965, tanks and pipelines still contained sizable quantities of hazardous wastes.

Then in 1967, Joseph Simon and Sons began metals recovery at the site to recycle scrap metals from area businesses, including shredded automobiles. Handling and storage practices were environmentally irresponsible, but the operators were likely not fully cognizant of the toxicity associated with used transformers, for example, that came loaded with PCBs. Thus the site became increasingly burdened with heavy metals and lead, the PCBs leaching into soil and ground water.

In addition to the metals work, the Simons also used auto fluff and other materials that couldn't be recycled to fill ditches and holes on their own and adjacent property owned by Burlington Northern Railroad, Union Pacific Railroad, and the Hygrade Food Products Company. That off-site contamination continued through the 1980s.

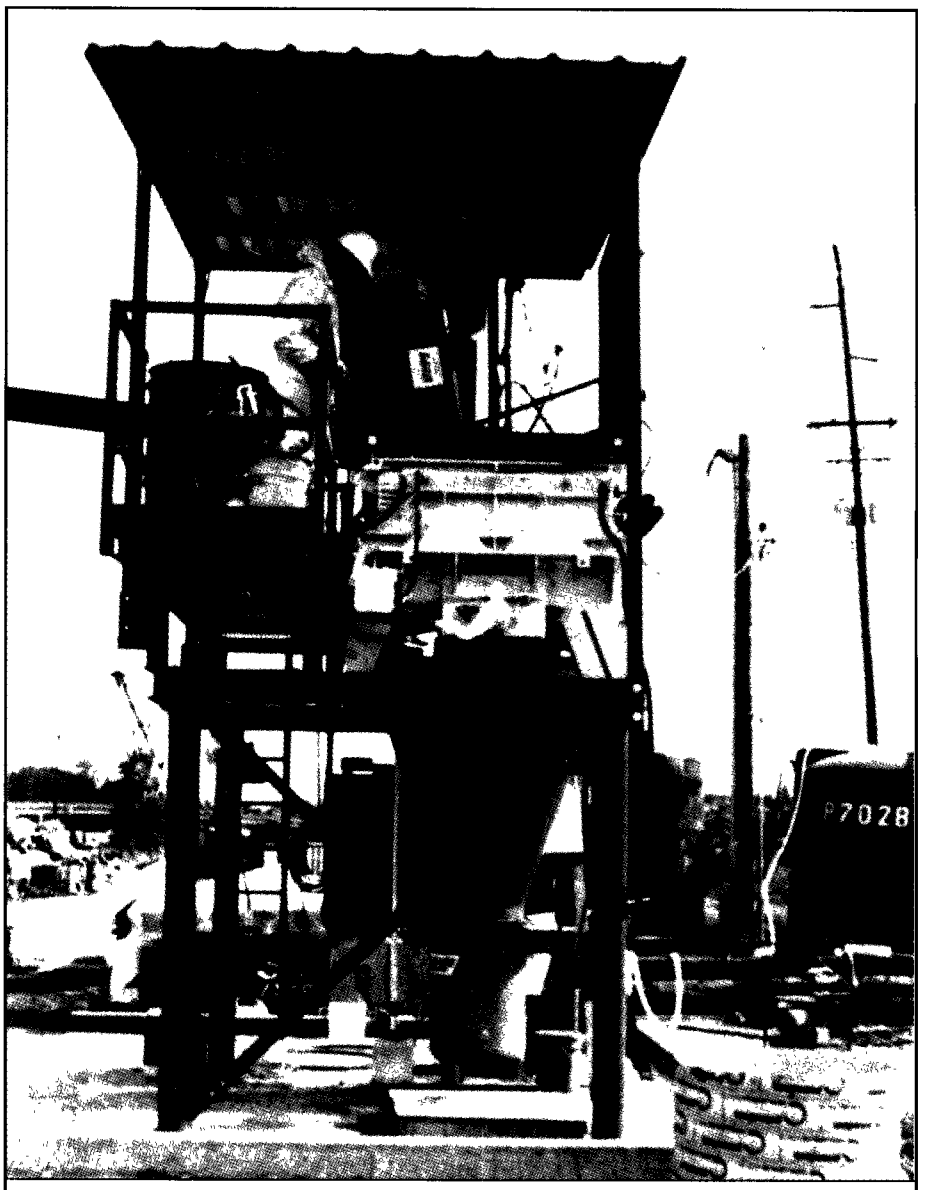
Environmental Officials Seek Federal Assistance

Local authorities became suspicious when someone noticed that pockets of tar surfaced and boiled in the heat during the summer. In April 1981, the Washington State Department of Ecology (Ecology) inspected and sampled from the old tar pits. The vertical extent of relatively "pure" tar was estimated on the order of several feet; soil investigations later found even greater depths. State officials promptly requested assistance from the regional EPA in Seattle.

Four months earlier, Congress had enacted the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This law established a national program to clean up the complex problems associated with improper hazardous waste disposal. Derived from excise taxes on chemical feedstocks and petroleum products, no taxpayer dollars are in the "Superfund".

In October 1981, EPA proposed to add Tacoma Tar Pits (as part of the Commencement Bay, Nearshore/Tideflats site) to the National Priorities List (NPL), a roster of hazardous waste sites requiring comprehensive cleanup. Following official listing in 1983, EPA and Ecology identified the major responsible parties, and in 1984 this group agreed to study the extent of site contamination and to propose a cleanup plan.

Three years of in-depth studies confirmed varying concentrations of benzene, PAHs, lead, and PCBs in soil and surface water. Three aquifers also were polluted, but the extent of the contamination was not determined at that time.



Loading soil for a trial mix during treatability studies.

Enforcement Provisions Take Over

Initial attempts to negotiate a settlement with the major waste contributors ended in a stalemate, prompting EPA to issue an administrative order for site cleanup. Noncompliance with the order resulted in a penalty of $600,000, which the Simons and Washington Natural Gas paid. The two railroads, the Simons, and a number of minor waste contributors agreed to fund a portion of the work with Washington Natural Gas conducting the bulk of activities.

In 1987, EPA selected a remedy whereby contaminated soil would be excavated, treated, and replaced with clean fill. But in the winter of 1989, design engineers discovered considerably more tainted soil than originally estimated. Treatability studies were completed and construction began in 1992.

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Since then, more than 200,000 cubic yards of soil, tar, and auto fluff have been stabilized with a polymer/cement mixture. A geotextile cap made of high-density polyethylene and native grasses cover a mound of confined wastes 40 feet high. All excavated areas have been backfilled with clean soil.

A new drainage system shunts precipitation away from the geotextile cover with continuous ground water monitoring ongoing. EPA included provisions in the settlement documents that may require ground water pump-and-treat should any samples dictate future activity. A comprehensive strategy for overall surface and ground water will be encompassed in the remedy selected for the Commencement Bay, Nearshore/Tideflats site. The scrap metal dealer continues using more than half the original site and has an operational surface water treatment plant that is inspected at regular intervals.

Small Waste Contributors Cash Out

To date, EPA has negotiated separate settlements with 17 *de minimis* parties who contributed small amounts of waste to the site. Successful negotiations returned prior investigation and oversight costs to EPA and have helped fund the $42 million cleanup.

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Success at Tacoma Tar Pits

Hazardous waste that took more than 50 years to accumulate on this 30-acre site was cleaned up less than five years after construction began. Effective enforcement provisions prohibited delays and footdragging, achieving fair settlements with a diverse group of waste contributors. Today, contaminants have been sealed under a multi-layer, geotextile cover, now seeded for grass. Ground water monitoring continues while Commencement Bay restoration efforts proceed over a 12-square-mile area adversely affected by mining, smelting, and industrial activities spanning nearly a century.

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