

EXPLANATION OF SIGNIFICANT DIFFERENCES  
NUMBER 2 (ESD#2)

for the

HARBOR ISLAND SUPERFUND SITE  
Soil and Groundwater Operable Unit  
Seattle, Washington

From the  
Record of Decision (ROD), September 30, 1993  
ESD #1, July 26, 1994  
ROD Amendment, January 25, 1996

I. INTRODUCTION

A. Site Name and Location

Harbor Island  
Seattle, Washington

B. Lead and Support Agencies

The U.S. Environmental Protection Agency (EPA) is the Lead Agency for the Harbor Island Superfund site (Site). The Washington Department of Ecology (Ecology) is the Support Agency for the Site. Ecology has the lead for the Tank Farms Operable Unit, one of the seven current operable units (OUs).

C. Explanation of Significant Differences

This document addresses a significant change to the Selected Remedy in the Soil and Groundwater Operable Unit (S&G OU) for the total petroleum hydrocarbon (TPH) action level at selected Hot Spot cleanup areas as defined in the Record of Decision (ROD), dated September 30, 1993. This ESD#2 change is not a change in the ROD cleanup level but an alternative action level for specific fully characterized Hot Spots. The ROD remedy was modified by an ESD#1, dated July 26, 1994; and by a ROD Amendment, dated January 25, 1996, which dealt with treatment method clarification and disposal of TPH contaminated soil. This document provides an Explanation of Significant Differences (ESD) as required under Section 117c of CERCLA, and the National Contingency Plan (NCP), 40 C.F.R. Section 300.435(c)(2)(1).

#### D. Circumstances Leading to the Changes to the ROD

Several TPH contaminated Hot Spot soil areas, amounting to about 1.5 acres and over 4,500 cubic yards of TPH contaminated soil, have been removed from the Site since 1993, Figure 2. A TPH Hot Spot is defined in the ROD as any soil contaminated with TPH concentrations greater than 10,000 mg/kg. Two new Hot Spots were identified during construction activities in summer 2000. These are identified as; underground storage tank #2 (UST#2) in the S&G OU, and ARCO Plant 2 which is part of the Ecology lead Tank Farms OU. Only Hot Spots in the S&G OU are covered by this ESD. Ecology has established the cleanup action levels for the Tank Farms OU. Based on the contamination characteristics for UST#2, the amount of contaminated soil that would have to be removed to clean it up to 10,000 mg/kg TPH is extensive in area. But some new Hot Spots may extend beneath permanent structures (utility trenches, buildings, roads, etc.) which makes the costs for cleanup substantially greater. Therefore a change in the TPH Hot Spot soil action level from 10,000 mg/kg to 20,000 mg/kg TPH is being made for specific situations at Harbor Island that meet certain criteria (described later in this document). The change in TPH Hot Spot action level criteria would also be consistent with the Tank Farm OU cleanup action level of 10,000 and 20,000 mg/kg established by Ecology under state cleanup authorities for that OU. The 20,000 mg/kg was established by Ecology for the highly weathered Diesel and oil petroleum hydrocarbons.

#### E. Administrative Record

This ESD#2 will become part of the Administrative Record for the Harbor Island Superfund Site, which is available to the public at the following location:

U.S. Environmental Protection Agency  
Record Center, 7th Floor  
1200 Sixth Avenue  
Seattle, Washington 98101

#### F. Site Background

Harbor Island is located approximately one mile southwest of downtown Seattle, in King County, Washington, and lies at the mouth of the Duwamish River on the southern edge of Elliott Bay. The island is approximately 420 acres in size and is bordered by the East and West Waterways of the Duwamish River and Elliott Bay, part of Puget Sound, on the north, Figure 1.

From 1903 to 1905, Harbor Island was created from marine sediments dredged from the Duwamish River. Dredged sediment was placed across the Duwamish tidelands to form a generally homogeneous sandy fill which is now Harbor Island.

Since construction, Harbor Island has been used for commercial and industrial activities including shipping, railroad transportation, bulk petroleum storage and transfer, secondary lead smelting, lead fabrication, shipbuilding, and metal plating. Warehouses, laboratories, and office buildings have also been located on the island. Harbor Island was placed on the National Priorities List as a Superfund Site in 1983 due to elevated lead concentrations in soil from the former lead smelter on the island, (which ceased operation in 1984) as well as elevated levels of other hazardous substances identified at the Site.

EPA has currently divided the Site into seven operable units (OUs), Figure 3: the sitewide Soil and Groundwater OU; the Tank Farm OU; the Lockheed Shipyard Upland facility OU; the Lockheed Shipyard Sediments OU; the West Waterway OU; the East Waterway OU; and the Todd Shipyards Sediments OU. EPA is the lead agency for the Lockheed, marine sediments, and soil and groundwater operable units. EPA has designated the Ecology as the lead agency for the petroleum storage tank operable unit because the primary contaminant there is petroleum, which is excluded from the federal Superfund statute but is a regulated substance under the State's Model Toxic Control Act (MTCA).

EPA completed a Phase I Remedial Investigation of Harbor Island in 1990. EPA initiated a Phase II investigation in May, 1991, and completed the RI/FS reports for the soil and groundwater operable unit in February, 1993. A Proposed Plan for this unit was issued in June 1993, and the ROD for this unit was completed in September 1993.

On August 6, 1996, a Consent Decree was entered with 39 Settling Parties for the cleanup of the Soil and Groundwater Operable Unit.

Implementation of the Consent Decree began immediately with the cleanup of Hot Spots located on the island. The Port of Seattle's Harbor Island Redevelopment Project created a schedule to remove all of the Hot Spots from areas that would be impacted by the project. This is a major redevelopment project impacts the entire island north of Spokane Street with new streets, rails, and shipping container storage. All of the Hot Spots in the redevelopment project area have to be removed prior to the completion of the project because the final project's surface becomes the protective cap over about one-half of the total Harbor Island area. The Port's Redevelopment Project is expected to be completed in 2003.

#### G. Site Contamination

The most significant organic contaminant in soil on Harbor Island is petroleum hydrocarbon. During the Remedial Investigation and Feasibility Study the range

of petroleum hydrocarbon concentrations were between approximately 20 and 1,000,000 mg/kg (free product). The TPH contamination is spread throughout the site by the historical activities. Also present in smaller quantities in surface soil were polycyclic aromatic hydrocarbons (PAHs). The highest concentrations of heavy PAHs found in surface soil ranged between 10 and 50 mg/kg. Polychlorinated biphenyls (PCBs) in surface soil ranged from 2 to 420 mg/kg.

Floating petroleum product was found at one location adjacent to the shoreline on the north end of the island. Groundwater at several locations along the shoreline on the northern portion of the island also contained benzene, ethylbenzene, and xylene, vinyl chloride, and other compounds associated with petroleum products.

Elevated levels of inorganic contaminants including mercury, nickel, cadmium, lead, and zinc are also found in groundwater across the island. The most significant inorganic contaminant in the soil is lead, which is found over most of the island and originated primarily from the lead smelter. The majority of samples with elevated lead in the range from 5,000 to 200,000 mg/kg, occurred in the central portion of the site. The highest concentrations of other inorganics are found in soil include: arsenic at 1,830 mg/kg, cadmium at 131 mg/kg, and chromium at 791 mg/kg.

## II. REMEDY SELECTED IN THE RECORD OF DECISION (ROD)

The remedial action objectives (RAOs), and their associated numerical Cleanup Goals, are intended to protect human health and the environment by reducing risks to acceptable levels. For Harbor Island, the primary soil applicable or relevant and appropriate requirements (ARARs) are the criteria contained in the State of Washington, Model Toxics Control Act (MTCA). The RAOs for TPH in soil are found on Table 7 in the ROD and the Objectives are: a) Protect human health from infrequent exposure to contaminants in the subsurface soil which pose a risk greater than  $10^{-5}$  for each contaminant; and b) Prevent release of contaminants into the groundwater where they can be transported to the shoreline, where marine organisms could be exposed. The numerical Cleanup Goals for TPH in subsurface soil associated with the RAOs identified in the ROD are:

TPH (Diesel)	600 mg/kg
TPH (gasoline)	400 mg/kg
PAHs (carcinogenic)	20 mg/kg
Benzene	1.0 mg/kg
Ethylbenzene	200 mg/kg
Toluene	100 mg/kg
Xylenes	150 mg/kg

(Based on the MTCA Petroleum-Contaminated Soil Matrix Rating method)

The selected remedy in the Harbor Island ROD includes the following components:

- Excavate and treat or dispose soil containing the highest levels of contamination ("hot spots"). These soil hot spots are defined as Total Petroleum Hydrocarbons (TPH) greater than 10,000 mg/kg, PCB greater than 50 mg/kg, and soil with mixed carcinogens with a total risk greater than  $10^{-4}$ . TPH hot spot soil would be treated on-Site by thermal desorption with condensate collection [which was clarified by ESD#1 and modified by the ROD Amendment to allow off-site treatment and disposal]. PCB and carcinogenic hot spot soil would be disposed in an off-Site hazardous waste disposal facility.
- Contain exposed contaminated soil exceeding inorganic or organic cleanup goals. Containment would be achieved with a three inch asphalt cap which would prevent infiltration of rainwater and reduce contaminant migration into the environment. Existing asphalt and concrete surfaces would be repaired to prevent infiltration of rainwater.
- Invoke institutional controls which would require long term maintenance of new and existing caps, warn future property owners of remaining contamination contained under capped areas on their properties, and specify procedures for handling and disposal of excavated contaminated soil from beneath the capped areas if future excavation is necessary.
- Remove and treat floating petroleum product and associated contaminated groundwater at Todd Shipyards to prevent its migration into the marine environment. Monitor groundwater quality for 30 years and review of groundwater quality data every 5 years to assess the effectiveness of the selected remedy.

### III. CHANGES IN THE SELECTED REMEDY REQUIREMENTS IN THE ROD

#### A. Changes in the S&G OU ROD

The changes in this ESD (ESD#2) modify the action level for specific TPH Hot Spots. This change will allow an increase in the concentration of TPH contaminated soil that can be contained onsite from 10,000 mg/kg to 20,000 mg/kg without increasing the carcinogenic risk.

The initial change to the remedy selected in the ROD was the first ESD, dated July 26, 1994. This ESD modified the technology selected to treat excavated petroleum contaminated soil from thermal desorption with condensate collection

to thermal desorption with an afterburner. The second change to the ROD was a ROD Amendment dated January 25, 1996. In this amendment the TPH Hot Spot soil, which can be classified both as non-hazardous waste (EPA RCRA definition) and non-dangerous waste (under the Washington Dangerous Waste Regulations), is to be disposed at the Roosevelt Regional Landfill, or an equivalent landfill. Soil which is classified as State dangerous waste because of petroleum hydrocarbon concentration would be treated by thermal desorption as specified in the original remedy.

This action, ESD#2, changes the selected action level for TPH Hot Spot contaminated soil under certain criteria. The current remedy for TPH is removal and/or treatment for soil contaminated at greater than 10,000 mg/kg. This ESD#2 increases the concentration of TPH in soil from 10,000 mg/kg to 20,000 mg/kg that can be contained onsite and does not increase the carcinogenic risk for the site (as explained below).

#### B. Basis for the Change

During construction of the selected remedy, new information about the site was uncovered. This information included:

- New TPH Hot Spots were found,
- Hot Spots were more extensive than initially thought,
- New data on the risks associated with the type of TPH found at these Hot Spots on Harbor Island were identified,
- Increased costs of TPH Hot Spot remedial actions are disproportionately large because the Hot Spots extend under permanent structures; i.e., existing buildings, roads, and buried utility corridors.

The extent of several new TPH Hot Spots that were encountered during the construction were delineated, and it was apparent that not all of the Hot Spots were identified in the remedial investigation plan, nor was their areal extent fully identified. Secondly, several new TPH Hot Spots extend under permanent structures, i.e., roads, building, utility corridors, etc., which changes the cleanup costs and implementation. It is for these reasons that this ESD#2 is issued.

This change for TPH Hot Spots is not a change in the original ROD cleanup remedy, but in the action levels that are part of the selected cleanup alternative. The original ROD remedy requirements for TPH were based on the combined human health and environmental risk factors for all of the contaminants of concern at the site. Further characterization of the TPH Hot Spots that have been identified since the RIFS has produced laboratory data to indicate that the TPH constituents in the newly discovered Hot Spots are heavy weathered

petroleum products and do not contain the more volatile hydrocarbons which contain the primary constituents of the carcinogenic risk generally associated with TPH. The contaminated soil analyses performed on Hot Spots were based on the breakdown of TPH into gasoline, BETX (benzene, ethylbenzene, toluene, xylene), Diesel, and fuel oil range hydrocarbon compounds. Most of the volatile compounds are found in the gasoline and BETX fractions. The Remedial Action Objective (RAO), stated in the ROD, for TPH in the subsurface soil is to protect human health from a risk of greater than  $1 \times 10^{-5}$  for each contaminant.

An evaluation of the TPH Hot Spots was done and the conclusion is that very little change in human health or environmental risk would occur if the TPH Hot Spot action level was changed from 10,000 mg/kg to 20,000 mg/kg for TPH cleanup areas which are fully characterized. The human health risk would remain less than the ROD RAO of  $1 \times 10^{-5}$ .

For a TPH Hot Spot to qualify for this new action level, the potentially responsible parties (PRPs) must demonstrate to EPA in writing that a potential TPH Hot Spot meets all of the following criteria:

- Areal extent of the Hot Spot and a full characterization of the soil for TPH and other contaminants of concern must be known,
- Any free floating petroleum product will be removed and treated;
- No increase in the human health or environmental risk above the criteria established in the ROD for subsurface soil is allowed. This criteria must include all of the contaminants of concern for the dermal contact and ingestion risk pathways. The method for determining the risk is contained in the State MTCA ARAR at the time the ROD was signed.
- A demonstration that there would be a disproportionate incremental cost associated with the removal of contaminated soil between 20,000 mg/kg TPH and 10,000 mg/kg,
- The area of a Hot Spot where the soil is not removed will be capped with a three inch thick asphalt (or equivalent) cover system with a hydraulic conductivity of  $1 \times 10^{-5}$  cm/sec or less; and,
- Any changes in the Hot Spot action level within 200 feet of the shoreline or bulkhead line will require a special evaluation. The evaluation must demonstrate that contaminated soil above 10,000 mg/kg up to 20,000 mg/kg TPH prevents the release of contaminants into the groundwater and the migration of those contaminants to the shoreline, where marine organisms could be exposed.

The overall protection of human health and the environment is preserved with this change in the TPH action level. The risk evaluation remains protective because the carcinogenic risk must remain less than  $1 \times 10^{-5}$  and the non-carcinogenic Hazard Index must remain less than 1. This TPH action level is also consistent with the Ecology decision to use 10,000 mg/kg and 20,000 mg/kg TPH as the criteria in the Tank Farm OU Cleanup Action Plan (CAP).

Each Hot Spot cleanup for which this higher action level is desired will be evaluated independently by EPA. EPA will issue an evaluation of each Hot Spot for which this increased TPH contamination is requested. The Hot Spot evaluation will have to be approved by EPA before this change in the TPH action level is authorized for the specific Hot Spot. If there is an action level change for a particular identified parcel within the site, all soil that remains between 10,000 mg/kg and 20,000 mg/kg TPH will have to be capped. The goal to protect human health and the environment remains a purpose of Superfund cleanups.

#### IV. AFFIRMATION OF STATUTORY DETERMINATIONS

Considering the new information on the cleanup of TPH Hot Spots collected since the ROD was completed, EPA believes that the revised remedy is as protective of human health and the environment and achieves cleanup goals more cost effectively. The revised remedy utilizes permanent solutions to the maximum extent practicable for this Site. It complies with the NCP and other federal and state requirements that are applicable or relevant and appropriate to this remedial action and that were identified in the ROD.

The Washington State Department of Ecology has reviewed this ESD#2 and has found it consistent with state requirements and concurs with this change in the TPH action level for specifically identified Hot Spots.

#### V. PUBLIC PARTICIPATION ACTIVITIES

This ESD will become a part of the Administrative Record for the Harbor Island Site. The availability of ESD#2 and a summary of its impact on the site remedy will be announced in a fact sheet sent to the mailing list and published in a local newspaper. For additional information regarding ESD#2, please contact the Superfund Project



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Approval:



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Michael F. Gearheard, Director  
Environmental Cleanup Office

*26 Sept. 2001*  
Date

# Figure 1 Harbor Island Location

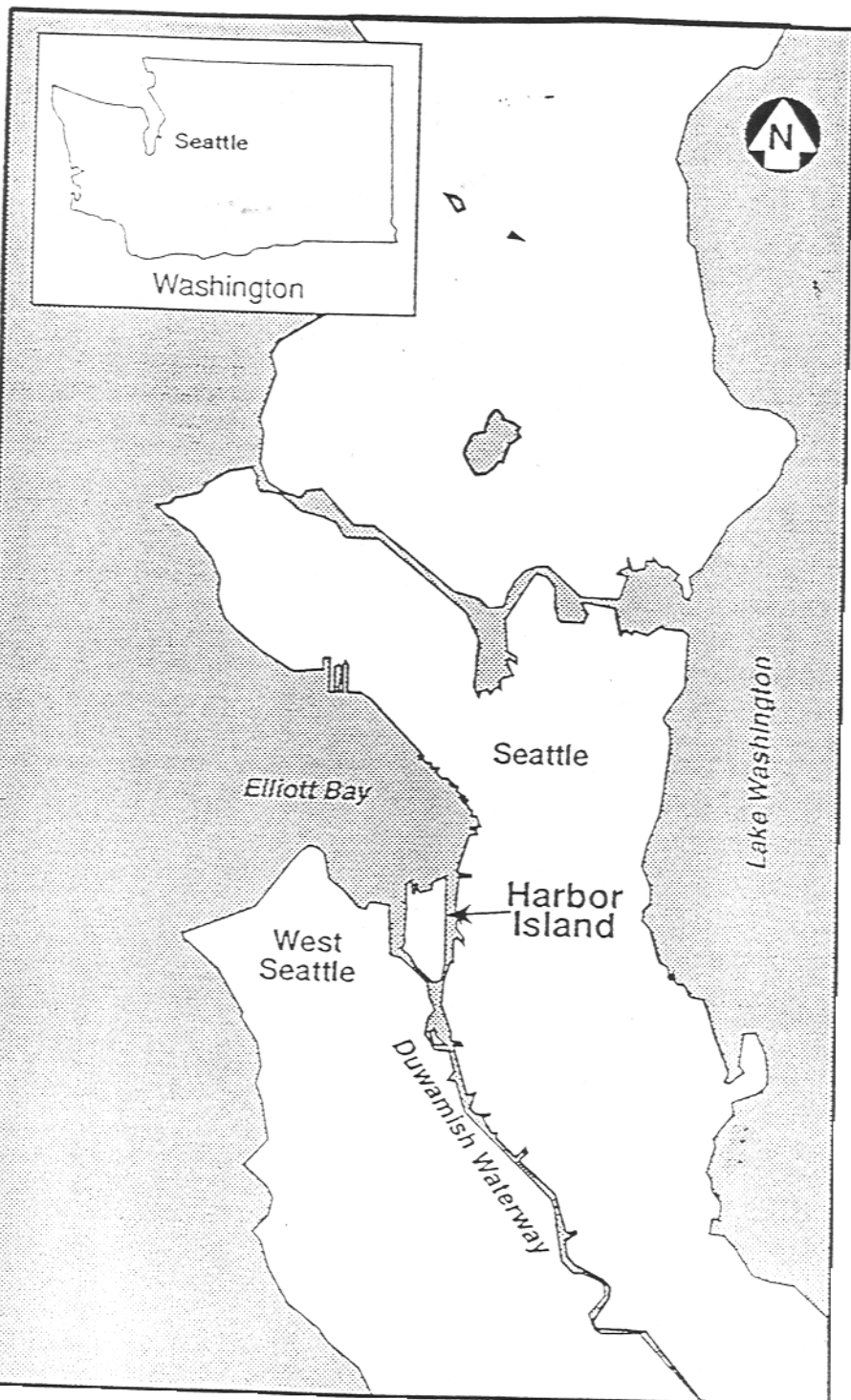
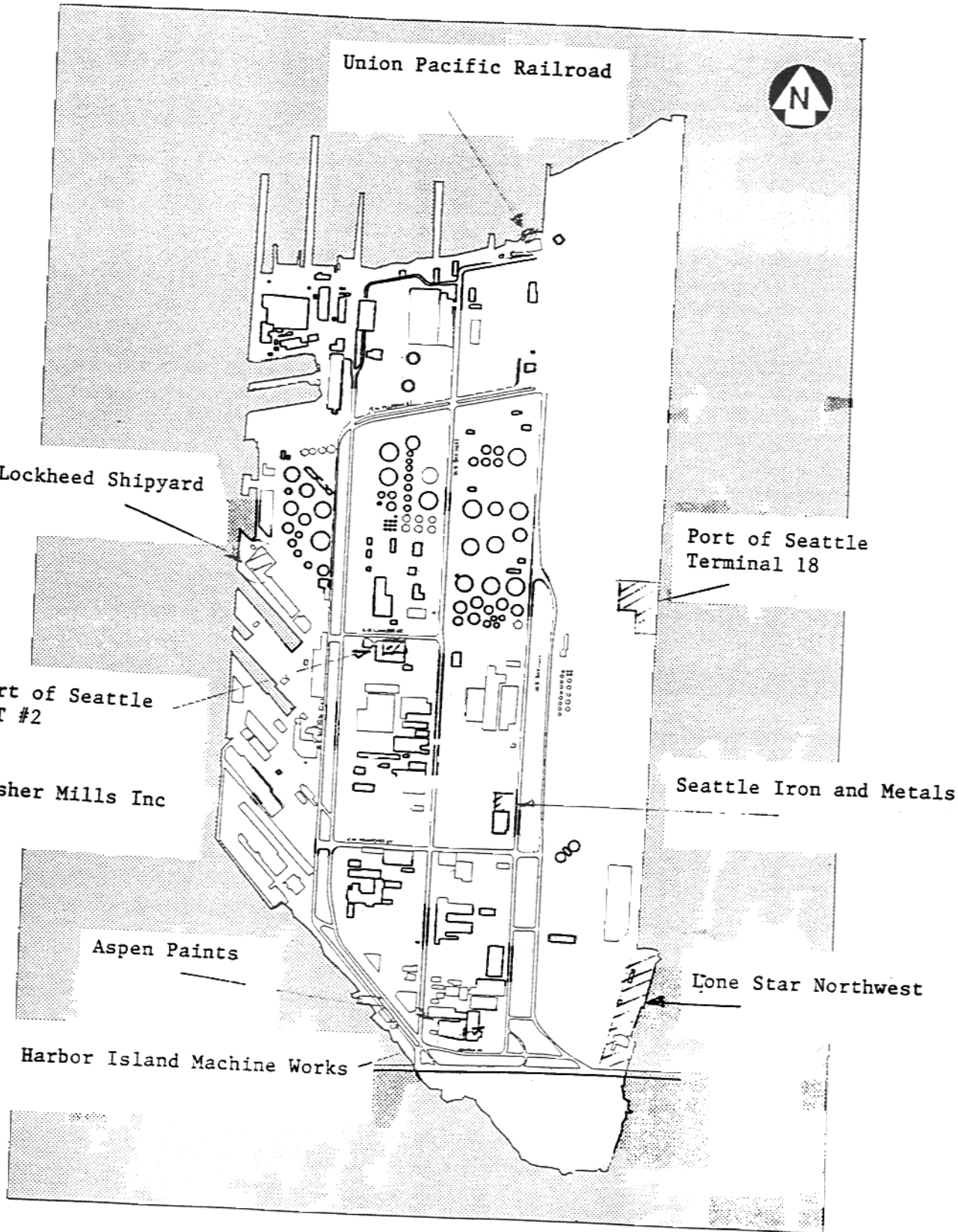


Figure 2  
Harbor Island





Todd Shipyards  
Sediment OU 9

Tank Farms  
OU 2

Lockheed Ship  
Sediment OU 7

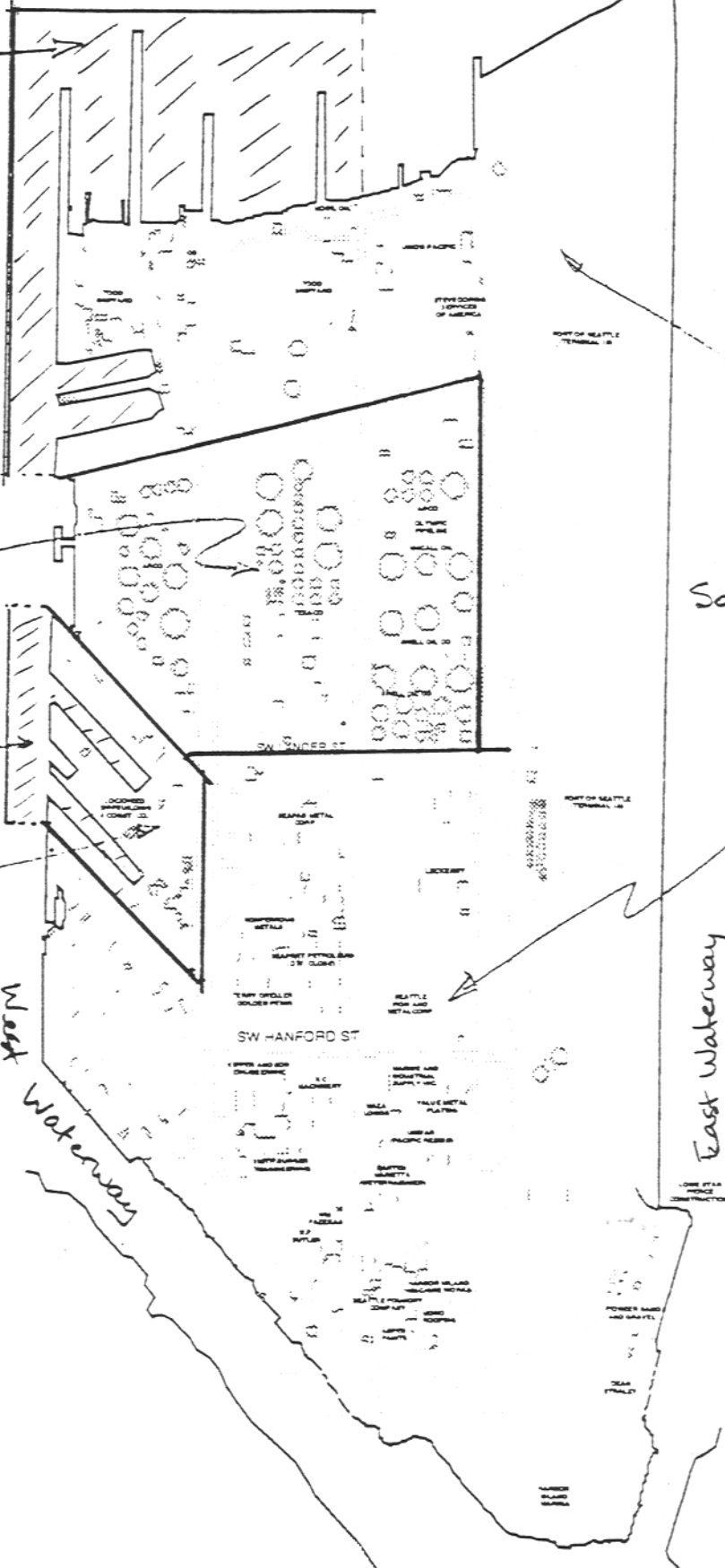
Lockheed  
Upland OU 3

Soil & Groundwater  
OU 1

West Waterway

East Waterway

0 Meters 150  
0 Feet 500



HARBOR ISLAND OPERABLE UNITS  
Figure 3

