EXPLANATION OF SIGNIFICANT DIFFERENCES
COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE

August 2000

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I. INTRODUCTION

A. Site Name and Location

The Commencement Bay Nearshore /Tideflats (CB/NT) Superfund site is located in Tacoma, Washington, at the southern end of the main basin of Puget Sound (Fig. 1). This Explanation of Significant Differences (ESD) describes the cleanup plans for the Thea Foss, Wheeler-Osgood and Hylebos waterways and identifies the disposal sites being selected to contain dredged contaminated sediments from Thea Foss (formerly City) and Wheeler-Osgood, Hylebos, and Middle waterways. The cleanup plan for Middle Waterway will be outlined in a separate ESD in the fall of 2000.

B. Lead and Support Agencies

U.S. Environmental Protection Agency (EPA) -- Lead Agency for Sediment Remediation

Washington State Department of Ecology (Ecology) - Lead Agency for Source Control; Support Agency for Sediment Remediation

Puyallup Tribe of Indians - Support Agency for Sediment Remediation

C. Statutory Authority

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 117(c) and National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435(c)(2)(i).

D. Purpose

EPA's September 30, 1989 Record of Decision (ROD) for the CB/NT Superfund site selected a remedy involving a combination of five key elements: site use restrictions (now commonly referred to as institutional controls), source control, natural recovery, sediment remedial action (i.e., confinement and habitat restoration), and monitoring, to address contaminated sediments in the waterways of the CB/NT site. This ESD describes the specific manner in which the ROD is being implemented at these individual waterways and points out the significant differences between the ROD and the cleanup plans described in this ESD. The ESD will: (1) describe the

remedial actions consistent with the ROD to clean up contaminated sediments in the Thea Foss, Wheeler-Osgood, and Hylebos waterways of the CB/NT Superfund site; and (2) identify disposal sites that will be used to contain the contaminated sediments to be dredged from Thea Foss, Wheeler-Osgood, Hylebos, and Middle waterways.

II. BACKGROUND

A. Site History

The CB/NT Superfund site is located in Tacoma, Washington at the southern end of the main basin of Puget Sound (Fig. 1). The site includes 10-12 square miles of shallow water, shoreline, and adjacent land, most of which is highly developed and industrialized. The upland boundaries of the site are defined according to the contours of localized drainage basins that flow into the marine waters. The marine boundary of the site is limited to the shoreline, intertidal areas, bottom sediments, and water of depths less than 60 feet below mean lower low water level (MLLW). The nearshore portion of the site is defined as the area along the Ruston shoreline from the Mouth of Thea Foss Waterway to Pt. Defiance. The tideflats portion of the site includes the Hylebos, Blair, Sitcum, Milwaukee, St. Paul, Middle, Wheeler-Osgood, and Thea Foss waterways; the Puyallup River upstream to the Interstate-5 bridge; and the adjacent land areas.

In 1996, EPA deleted the St. Paul Waterway, the Blair Waterway, and all or part of four properties transferred to the Puyallup Tribe in the Puyallup Land Settlement Agreement from the National Priorities List (NPL) because cleanups had been completed in these areas, or studies had been completed showing that they did not require cleanup.

EPA placed the CB/NT site on the NPL of sites requiring investigation and cleanup under EPA's Superfund Program on September 8, 1983. A remedial investigation/feasibility study (RI/FS) was completed by Ecology in 1988. EPA made the final RI/FS available for public comment in February 1989. The RI/FS evaluated contaminants detected in sediments at the CB/NT Superfund site to identify problem chemicals that pose a risk to human health and the environment. The RI/FS concluded that sediments in the nearshore/tideflats area were contaminated with a large number of hazardous substances at concentrations greatly exceeding those found in Puget Sound reference areas. In the RI, a multi-step decision-making process was used to identify problem chemicals, and to identify and prioritize problem areas where these chemicals were present at concentrations that are harmful to humans and wildlife.

Contaminants found at elevated levels in the Thea Foss and Wheeler-Osgood waterways included zinc, lead, mercury, high molecular weight polycyclic aromatic hydrocarbons (HPAHs), low molecular weight polycyclic aromatic hydrocarbons (LPAHs), cadmium, copper, nickel, 2-methylphenol, 4-methylphenol, bis[2-ethylhexyl] phthalate (BEP), butyl benzene phthalate, and polychlorinated biphenyls (PCBs). In addition, non-aqueous phase liquid (NAPL) seeps have been found at the head of the Thea Foss Waterway. The most severely contaminated sediments at Hylebos Waterway had high concentrations of several chlorinated organic compounds (including

PCBs, pesticides, hexacholorbenzene and hexachlorobutadiene), HPAHs, LPAHs, lead, copper, zinc, mercury, and arsenic. Mercury and copper were identified as indicator chemicals of severe sediment contamination in Middle Waterway.

B. Commencement Bay Nearshore/Tideflats Record of Decision

The Commencement Bay site has been divided into smaller project activities, called operable units (OU), in order to more effectively manage the overall cleanup of the site. In the 1989 ROD, EPA designated two operable units for the cleanup of the nearshore/tideflats portion of Commencement Bay: source control (OU 5), which focuses on efforts to control upland discharges or releases to the Bay; and sediment remediation (OU 1), which addresses the cleanup of the contaminated marine sediments in Commencement Bay. The Washington Department of Ecology is the lead agency for source control and EPA is the lead agency for sediment remediation. OUs 2-4 and 6 address contamination at geographically separate areas at the former ASARCO smelter and Tacoma Tarpits.

In the ROD, EPA selected a remedial action for eight of the nine sediment problem areas identified through the RI/FS process as being the most significantly contaminated areas. These problem areas are: 1) Mouth of Hylebos Waterway, 2) Head of Hylebos Waterway, 3) Sitcum Waterway, 4) St. Paul Waterway, 5) Middle Waterway, 6) Head of Thea Foss Waterway, 7) Mouth of Thea Foss Waterway, and 8) Wheeler-Osgood Waterway. The ninth problem area, off-shore of the ASARCO smelter (OU 6), is being addressed in a separate ROD. To date, remedial actions consistent with the CB/NT ROD have been completed at the Sitcum and St. Paul waterways. (The St. Paul Waterway cleanup occurred at a different location than the St. Paul Nearshore Fill selected in this ESD.)

The cleanup objective for the remedial action, as described in Section 10 of the 1989 ROD, states that "the selected remedy is to achieve acceptable sediment quality in a reasonable time frame." "Acceptable sediment quality" is defined as "the absence of acute or chronic adverse effects on biological resources or significant human health risks". The ROD designated biological test requirements and associated sediment chemical concentrations referred to as sediment quality objectives (SQOs) to attain the cleanup objective for the CB/NT site. The PCB SQO was subsequently updated in a 1997 ESD. Habitat function and enhancement of fisheries resources were also identified as overall project cleanup objectives.

The ROD selected a remedy comprised of five key elements: site use restrictions (now commonly referred to as institutional controls), source control, natural recovery, sediment remedial action (i.e., confinement and habitat restoration), and monitoring, to address contaminated sediments in the waterways of the CB/NT site.

The ROD noted that institutional controls would consist primarily of public warnings to reduce potential exposure to site contamination, particularly of contaminated seafood. The

Tacoma/Pierce County Health Department has installed signs at several locations in the CB/NT waterways providing warnings in several languages against eating seafood caught there.

The objectives under source control are to control major sources of contamination to the waterways prior to implementation of active remediation in the waterways and to monitor source control effectiveness both prior to and after completion of sediment remedial action.

For marginally contaminated areas expected to recover naturally to the SQOs within 10 years after sediment remedial action, the ROD calls for natural recovery. For areas that are not expected to recover within a 10-year time frame, the ROD specified that active remediation of problem sediments would be accomplished by utilizing a limited range of four confinement technologies. These technologies are in-place capping, confined aquatic disposal, nearshore disposal, and upland disposal.

Long-term monitoring of the remediated areas, including disposal sites and habitat mitigation areas, is also a component of the remedy. Monitoring will be conducted to evaluate the effectiveness of the remedy in achieving SQOs and in achieving the habitat functions that are called for in the mitigation plans.

C. Analysis of Treatment Technologies

The ROD also concluded that the selected remedy described above represented the maximum extent to which permanent solutions and treatment technologies could be utilized in a cost-effective manner at the CB/NT site. To determine whether the ROD's conclusion about treatment technologies was still valid at this time, EPA Region 10 asked EPA's National Risk Management Research Laboratory in Cincinnati, Ohio to review site-specific data that have been generated at the three waterways since the ROD, and to provide Region 10 with an opinion about the viability and cost-effectiveness of currently available treatment technologies.

EPA's conclusion is that while some new treatment technologies are available, most are still in the pilot stage, and all would be more expensive than the most expensive confined disposal option, upland disposal. The wide-spread, low level sediment contamination present in much of Commencement Bay is not the optimal scenario for applying a treatment technology, which generally works best when applied to low volume, highly concentrated waste. At this time, confinement remains the best option for the contaminated sediments being addressed under the 1989 ROD and this ESD.

Treatment may be used, however, to address localized "hot spot" areas in the Hylebos and Thea Foss waterways. This includes some of the contaminated materials found near the former Occidental Chemical facility on the Hylebos Waterway, which is being addressed under a separate CERCLA response action (see Section V), and potentially NAPL at the head of the Thea Foss Waterway. In general, NAPL is considered a "principal threat" source material. EPA expects that treatment be used to address principal threats wherever practicable. The decision to treat

principal threat materials, however, is made on site-specific basis. EPA has determined that containment is the most appropriate option for the NAPL at the head of Thea Foss Waterway. Some NAPL, however, will be excavated as needed for construction of the cap and may require treatment prior to disposal (see Section V). The need for treatment prior to disposal will be determined by further testing during the remedial design phase.

III. DESCRIPTION OF AND BASIS FOR THE SIGNIFICANT DIFFERENCES

A. Introduction

The CB/NT ROD sets forth a general cleanup approach for the waterways that comprise the CB/NT site and identifies, based on RI/FS sampling data, problem areas requiring response action. Since then, pre-remedial design studies at the individual waterways have better defined the area and volume of sediment exceeding the SQOs, and identified specific areas to be dredged or capped, as well as areas where natural recovery would be appropriate. In addition, the post-ROD studies helped EPA identify which disposal sites (nearshore, in-water, and upland) would be most appropriate to safely contain dredged sediments.

Consequently, this ESD documents the following changes:

a) the size of the problem areas and the volume of sediment to be dredged,
b) institutional controls related to contaminated sediments contained on-site,
c) addition of an option to use a thin layer of clean material to allow marginally contaminated sediments to naturally recover, (i.e. "Enhanced Natural Recovery"),
d) additional specificity of remedial actions for the Thea Foss, Wheeler-Osgood, and Hylebos waterways,
e) elaboration of performance criteria for the cleanup plans,
f) inclusion of the Endangered Species Act (ESA) as an applicable, or relevant and appropriate, requirement (ARAR) for remedial actions under the ROD, and
g) the cost of the remedial action.

While these are significant changes, the cleanups that are described in this ESD are fundamentally consistent with the remedy set forth in the 1989 ROD. The ROD selected natural recovery or confinement as the primary methods for addressing contaminated sediments at the CB/NT site. This ESD identifies natural recovery areas and the areas that require dredging and confinement or capping. The ROD also set forth the types of disposal sites that may be suitable to contain contaminated sediments. Consistent with the ROD, this ESD identifies the locations that will be used as disposal sites. None of the significant differences discussed below fundamentally alter the remedy selected in the ROD.

B. Volume

The ROD recognized that the estimated volume of sediments needing active remediation (i.e., confinement via dredging and disposal or in-situ capping) would be refined during the remedial design phase and that both volume and costs "are anticipated to change accordingly." Since the ROD was signed, additional investigations and studies were undertaken by the potentially responsible parties (PRPs) at each of the three waterways. Those studies have resulted in the identification of higher volumes of sediment that are the subject of remedial action than was originally estimated in the ROD. The increase in contaminated sediment volumes is due to: 1) extensive remedial design sampling, which showed larger areas of contamination than were identified during the limited RI/FS sampling effort; and 2) refinement of natural recovery models in the design phase, which showed a smaller area would achieve SQOs over 10 years through natural recovery than had been estimated during the RI/FS. A comparison of the volume estimates in the ROD with the refined volume estimates in this ESD is provided in Table 1.

Table 1. Comparison of 1989 ROD and 2000 ESD volume estimates

	1989 ROD volume estimate	**2000 ESD volume estimate**
Hylebos	448,000 cubic yards (cy)	940,000 cy*
Middle	57,000 cy	75,000 cy
Thea Foss/Wheeler Osgood	437,000 cy	620,000 cy
Total	**942,000 cy**	**1,635,000 - 1,835,000 cy**

*Confined disposal of an estimated additional 120,000 cy may be needed if additional navigational dredging by the U. S. Army Corps of Engineers (Corps), the Port of Tacoma, and private parties is conducted (see Section V).

In addition to the disposal volumes for the Thea Foss Waterway, 32 acres will be capped; 4 acres will receive a minimal cap to enhance natural recovery; and 21 acres will be monitored to confirm that natural recovery is achieving sediment quality objectives in the required 10 year time frame. At the Hylebos Waterway, the estimated disposal volume includes 11.6 acres in isolated intertidal or under dock/structure areas. If the remedial design shows that those areas can be capped, it would reduce the disposal volume from 940,000 cy to 845,000 cy. Twenty (20.7) acres are identified as natural recovery areas. Refinement of dredge volumes and estimates of capping and natural recovery areas for Middle Waterway will be addressed in a separate ESD.

C. Institutional Controls

The 1989 ROD noted that institutional controls would consist primarily of public warnings to reduce potential exposure to site contaminants, particularly contaminated seafood. Informational and advisory controls, such as fishing and fish consumption notices will continue to be used as long as it takes for fish to lose their contaminant body burdens or be replaced by younger, healthy fish that have not been exposed to contaminants.

To increase the long-term protectiveness of the waterway cleanups, institutional controls are required to meet the following objectives:

1. reduce potential exposure of marine organisms to contaminated sediments disposed of and confined in aquatic disposals sites or confined by capping; and
2. reduce potential exposure to marine organisms to contaminated sediments left on the CB/NT site.

The ROD anticipated that other regulatory programs would address contaminated sediment exposed due to navigational dredging or dredging conducted for development purposes, such as permitting requirements under Section 404 of the Clean Water Act and the state Shoreline Management Act. Thus, institutional control mechanisms that will be used to achieve the objectives stated above include governmental controls, such as local, state, and federal regulatory permitting/approval processes for dredge and fill projects in the waterways, city zoning ordinances that limit site use, or other types of governmentally required best management practices regarding maintenance activities in the waterway and removal and placement of in-water pilings. Additionally, parties constructing and maintaining the disposal sites must agree to maintain the disposal sites so as to prevent contaminated sediments from migrating or becoming exposed. Owners and/or operators of any disposal sites must ensure that any uses made on the top of the disposal site will not disturb the integrity of the disposal site or cause or contribute to the exposure of contaminated sediments to the environment. Other institutional controls may be used on a property-specific basis if determined necessary and feasible, including proprietary controls relying on real property interests, such as environmental easements and land use restrictions.

D. Natural Recovery and Enhanced Natural Recovery

The ROD identified natural recovery as an important component of the overall remedy. The expectation is that in some areas, the natural processes of sedimentation, chemical degradation, and surface sediment mixing due to bioturbation will allow contaminated sediments to recover to SQOs within 10 years after cleanup. Areas with marginally contaminated sediments that were expected to recover naturally to SQOs within 10 years after sediment remedial action would be initially exempt from sediment remedial action. Monitoring to confirm the long-term effectiveness of natural recovery is required under the ROD, and the need for active sediment remediation will be reconsidered if subsequent monitoring data indicates that natural recovery is not viable in a reasonable timeframe.

In this ESD, EPA is adding a component to help accelerate the natural recovery process. In certain locations, natural recovery will be enhanced through the application of a thin layer of clean material in specific areas of marginal contamination. This method is being referred to as Enhanced Natural Recovery. The application of minimal volumes of clean material speeds up the natural sedimentation at the outset and enhances the recovery of bottom-dwelling animals in surface sediments, which aids in building a larger base of clean material that will cover the marginally contaminated sediments.

E. Disposal Sites

The ROD did not select specific disposal sites for contaminated sediments. This ESD selects two in-water disposal sites (St. Paul Nearshore Fill, and Blair Slip 1) and upland disposal in a regional landfill, consistent with the four confinement options considered acceptable under the ROD. See Section VI.

F. Specific Cleanup Plans for the Thea Foss, Wheeler-Osgood, and Hylebos Waterways

Consistent with the ROD, this ESD describes the specific cleanup plans for Thea Foss, Wheeler Osgood, and Hylebos waterways. See Section V.

G. Performance Criteria for the Cleanup Plans

Consistent with the ROD, this ESD describes the specific performance criteria that the cleanup plans must meet to ensure that the cleanup is protective of human health and the environment. See Section IV.

H. Protection of Endangered Species

ESA is an action-specific and location-specific ARAR for the response actions under the ROD. The recent listing of Puget Sound chinook salmon and bull trout as threatened species under ESA has emphasized the need for EPA to work with the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS), the other natural resource agencies, and Native American tribes to evaluate habitat impacts and habitat enhancement opportunities on a bay-wide basis.

Conservation and recovery of listed species has been an important consideration in approving cleanup plans and selecting disposal sites. Consistent with the ROD cleanup goal of enhancing habitat function and fisheries resources, EPA, Washington Department of Natural Resources (DNR), and the City of Tacoma hired a fisheries biologist from the University of Washington to conduct a bay-wide habitat assessment, *Commencement Bay Aquatic Ecosystem Assessment* (Simenstad, 2000). The assessment, discussed in Section IV.F., identifies habitat concerns associated with in-water disposal sites and incorporates effective salmon recovery components into EPA's cleanup decisions. These components have been incorporated into EPA's requirements for mitigation under Section 404 of the Clean Water Act.

EPA has prepared a biological assessment of the impacts the remedial actions in this ESD will have on the threatened or endangered species and has submitted it to NMFS and USFWS. The assessment is also included in the administrative record for this ESD. EPA's assessment has concluded that performance of the remedial actions together with all of the mitigative measures that will be required is not likely to jeopardize the continued existence of any federally listed or threatened or endangered species or result in the destruction or adverse impacts to critical habitat

for these species. EPA will continue to consult with NMFS and USFWS on these cleanup plans. The consultation process may result in adjustments to mitigation plans and remedial action plans to ensure protection of endangered species and their habitat during the construction of the remedy.

I. Costs

The 1989 ROD provide a range of cost estimates for dredging contaminated sediments and disposal by confined aquatic disposal, nearshore disposal, or upland disposal. Table 2 provides a comparison of the cost estimates in the 1989 ROD to the estimates for implementing the remedial actions outlined in this ESD.

Table 2. Comparison of cost estimates in the 1989 ROD and the 2000 ESD

	1989 ROD cost estimate ($ million)	**2000 ESD cost estimate ($ million)**
Hylebos Waterway	$10.7 - $30.9	$46.1
Thea Foss/Wheeler Osgood	$8.89 - $26.7	$35
Middle Waterway	$2.66 - $7.47	no new estimate

The original ROD cost estimates were based on a smaller volume of sediment to be dredged, as shown in Table 1. The low end of the 1989 ROD cost range represents disposal in a nearshore fill that was associated with a permitted development project. There are some differences in the assumptions used to develop cost estimates in the 1989 ROD and in this ESD. For example, the ROD assumed that site preparation costs for nearshore fills would be absorbed by the developer of the commercial development project. In this ESD, cost estimates include the larger, estimated volume of sediments that require remedial action, and the cost of disposal in the selected disposal sites, including site preparation costs. For both the St. Paul Nearshore Fill and Blair Slip 1 disposal sites, the fill projects would create additional upland property, which will be beneficially used by the landowners. Economic benefits from development of new upland properties have not been taken into account in these cost figures.

For the purposes of providing cost estimates, EPA has assumed that Thea Foss and Wheeler Osgood sediments will be disposed of in St. Paul Waterway and Hylebos Waterway sediments will be disposed of in Blair Slip 1 and the Upland Regional Landfill, based on cleanup options developed by the Thea Foss and Hylebos PRPs. EPA supports this mix but reserves the flexibility to allow the PRPs to make adjustments during design based on final disposal capacity, volumes, and timing. Also, as noted in Section VI (Disposal Sites), EPA will continue to explore expanding the capacity of both the Blair Slip 1 and St. Paul Waterway disposal sites, and using contaminated sediments as upland industrial fill, which if implemented, would lower the volume of sediments requiring disposal in a regional landfill and be expected to reduce cleanup costs. Current cost estimates based on increased volumes of sediment to be dredged are provided in

Appendix A and are summarized below. Costs for Middle Waterway will be refined in a separate ESD.

Hylebos Waterway

Total remediation cost is estimated at $46,137,000 for dredging 940,000 cy of contaminated sediments from the Hylebos Waterway and disposing of 640,000 cy at the Blair Slip 1 disposal site and 300,000 cy at an Upland Regional Landfill. Cost estimates do not include land acquisition or leasing costs that may be related to use of Blair Slip 1 or with dewatering facilities associated with upland disposal. Detailed cost estimates are provided in the Hylebos Pre-Remedial Design Evaluation Report (1999), and in Appendix A of this ESD.

Thea Foss and Wheeler-Osgood Waterways

Total remediation cost for the Thea Foss and Wheeler-Osgood waterways is projected at $35,000,000. Detailed cost estimates are provided in Appendix N-9 of the "Round 3 Data Evaluation and Pre-Design Evaluation Report"and in Table A-3 of this ESD. These detailed cost estimates include the cost of a slurry wall at the head of the Thea Foss waterway, which has been excluded from EPA's selected remedy. Exclusion of the slurry wall reduces the cost from $35.9 to approximately $35 million.

A significant proportion of the total cost is attributed to remediating the head of the Thea Foss (from approximately the SR-509 bridge to the south end of the waterway). If the City's approach for remediation cannot meet specific performance criteria as discussed below then the remedy for the head of the waterway may need to be modified. Modifications may include additional source removal and/or alteration of the cap design or other possible modifications. Consequently, the remediation costs for the head of Thea Foss Waterway may change and thereby result in changes to the total remediation costs.

The following sections IV-VII provide further detail on performance criteria, the specific cleanup plans for Thea Foss, Wheeler-Osgood, and Hylebos waterways, the selected disposal sites for dredged contaminated sediments, and the status of source control actions.

IV. PERFORMANCE CRITERIA FOR THE REMEDIAL ACTIONS

While this ESD describes the remedial actions for the individual waterways with some degree of specificity, remedial design will further refine the details of the remedial actions that will be implemented in the individual waterways. In this ESD, EPA is setting forth performance criteria to be applied for the design and implementation of the cleanup. These performance criteria are consistent with the fundamental cleanup objectives set forth in the ROD and are necessary to ensure that the remedy is protective of human health and the environment, and complies with ARARs. Additional performance criteria will be identified during remedial design.

A. Cap Requirements

One of the remedial actions selected in the 1989 ROD and in this ESD is capping. EPA intends to maintain the integrity and effectiveness of caps over contaminated sediments through requirements for construction, long-term monitoring, and maintenance, including the following:

1) Caps will have a minimum thickness of three feet and will be constructed to address adverse impacts through four primary functions:
   a) Physical isolation of the contaminated sediment from the ecological receptors;
   b) Stabilization of contaminated sediments, preventing resuspension and transport to other locations within the waterway;
   c) Reduction of contaminants transported through the groundwater pathway to levels that will not recontaminate surface sediments (defined as the "biologically active zone" where most sediment-dwelling organisms live) above the SQOs or adverse biological effect levels, or contaminate surface water at levels exceeding background concentrations or marine chronic water quality criteria;
   d) Provide a cap surface that promotes colonization by aquatic organisms.

2) Long-term monitoring of the cap will include, as appropriate, visual inspection, bathymetric survey, sediment deposition monitoring, chemical monitoring, and biological monitoring.

B. Dredging and Confined Disposal

Performance standards for dredging and confined disposal will be consistent with Clean Water Act and Rivers and Harbors Act requirements. Specific details will be developed during project design. Both the remediated waterways and the disposal sites will be subject to long-term monitoring to ensure that the selected remedy remains protective, including monitoring to ensure that surface sediments do not become recontaminated in the remediated waterways, and that marine chronic water quality standards or background concentrations are not exceeded in surface water outside of the confined disposal sites.

C. Natural Recovery and Enhanced Natural Recovery

Natural recovery or enhanced natural recovery is an acceptable remediation approach at locations where sediments are marginally contaminated and are likely to recover to cleanup levels within the 10 year time frame specified in the ROD. At the CB/NT site, EPA considers marginally contaminated sediments as those with chemical concentrations less than the second lowest Apparent Effects Threshold (AET) value (the SQO is set at the lowest AET) or biological test results that do not exceed the minimum cleanup level (MCUL) values under Washington State Sediment Management Standards. Leaving highly contaminated sediments unaddressed for 10 years after remedial action would create an unacceptable short-term environmental risk, even if these sediments are predicted to naturally recover.

Areas selected for natural recovery (including enhanced natural recovery) will require: (1) monitoring plans, (2) triggers for initiating contingent actions if the monitoring indicates natural recovery will not succeed in the 10 year time frame, and (3) contingent plans for active remediation if monitoring in interim years indicates natural recovery will not occur by year 10.

D. Subsurface Contamination

In some areas where the surface sediments meet "no action" or natural recovery criteria, subsurface sediments are significantly contaminated at depth. The ROD states that SQOs must be met at the time of cleanup (or in 10 years, for natural recovery areas) and in the long-term. In order to meet SQOs in the long term, subsurface sediments must either meet SQOs or be isolated from the surface. Exposure of contaminated subsurface sediments may occur during the cleanup by dredging adjacent areas, through physical processes, such as storms or ship scour, or through future dredging or excavation. In order for subsurface contamination to remain in place, it must either be present at such low levels that it would not present a risk if it were exposed, or it must have a very low potential for exposure. These criteria have been applied in selecting the cleanup plans included in this ESD. These criteria must continue to be applied throughout the design and construction phases of the remediation. If contaminated sediments must be disturbed, for example, to accommodate a new future use, they must be handled in an environmentally responsible fashion and the newly exposed surface must meet SQOs. Either existing regulatory programs or other specific institutional controls described in this ESD will be used, as appropriate, to ensure that SQOs are met.

E. Source Control in the Thea Foss Waterway

Toward the head of the Thea Foss Waterway, municipal stormwater discharges, marinas and highly contaminated subsurface NAPL, both in the waterway and in adjacent uplands, pose a risk of recontamination of surface sediments above SQOs. If further source control actions are not taken, BEP and PAHs are predicted to recontaminate sediments in the waterway after sediment cleanup.

Ecology is working with various parties to complete source control actions in upland areas around the head of the waterway including the area near the west bank NAPL seep. This work is being done under the Model Toxics Control Act (MTCA) and the Clean Water Act.

In the "Round 3 Data Evaluation and Pre-Design Evaluation Report, Appendix U," the City of Tacoma recommended a specific in-water remedial action for the head of the Thea Foss Waterway to address the in-water NAPL contamination and seeps. Based on a subsequent technical memorandum, (Technical Memorandum from Hart Crowser to Mary Henley, City of Tacoma, dated June 14, 2000) the City of Tacoma modified their recommended approach.

The City's modified approach for remediation is acceptable to EPA. In the design phase and prior to remedial action, however, the following specific performance criteria for source control and the remedy for the head of the waterway must be met to eliminate or reduce the potential for

recontamination from storm drains as well as from the NAPL beneath the sediments and in adjacent uplands.

1) An approved stormwater action plan which includes, at a minimum, the following:
   a) an Ecology-approved stormwater sampling and analysis plan which will complete the Stormwater Management Plan for Thea Foss as required under the general NPDES permit,
   b) a phthalate study for determining possible phthalate sources to the Waterway,
   c) pilot testing to determine the contribution of dissolved versus particulate contaminant loading to the Waterway,
   d) an evaluation of stormwater structural controls, and
   e) an implementation schedule for the above stormwater studies, plans and controls.

2) A final remedial design based on modeling and treatability studies, and other appropriate studies, that conclusively determine that NAPL in the waterway will be stabilized and prevented from migrating to other portions of the waterway and from recontaminating surface sediments. In addition to the cap performance requirements discussed at Section IV.A. above, the sorbent cap must at a minimum also meet the following requirements:
   a) The final design of the cap must demonstrate that hydraulic control can be achieved in order to prevent remobilization of NAPL within the waterway.
   b) The final design must demonstrate that it prevents recontamination from any source material below the cap.
   c) The cap must require minimal maintenance.
   d) NAPL stabilization should include removal of contaminant source material where necessary for effective confinement.

EPA will require additional source removal and/or modification of the cap design if these performance criteria cannot be met by the City's remedial design and implementation.

F. Mitigation

Throughout pre-remedial design planning, EPA has identified all appropriate and practicable steps to avoid short- and long-term unacceptable adverse impacts to the Commencement Bay aquatic environment. All appropriate measures will be taken during remedial design, construction, and site maintenance to continue to avoid and minimize adverse impacts. Such measures that will be required by EPA include, but are not limited to, avoidance of fish-critical activity periods for in-water work, incorporation of "best-design" features and/or materials into remedial and compensatory mitigation plans that protect or enhance ESA-listed species, and creation or restoration of critical salmonid habitat. Additionally, EPA will require detailed compensatory mitigation plans to offset loss and other impacts to aquatic habitat and meet ESA responsibilities.

In assessing suitable compensatory mitigation measures, EPA has and will continue to rely upon the framework for the Commencement Bay-wide conservation and recovery strategy in the *Commencement Bay Aquatic Ecosystem Assessment* (Simenstad, 2000), along with data developed during consultation with NMFS and USFWS. The strategy of the Simenstad report focuses on broad landscape attributes and ecosystem processes (i.e., landscape ecology) that promote juvenile salmon utilization of existing and potential Puyallup River delta and Commencement Bay habitats. While the report does not specify or set priorities on discrete actions, it does identify criteria to guide selection of sites and actions. It is EPA's intent that remediation, including required compensatory mitigation, of the CB/NT site cumulatively contribute toward the recovery of ESA listed species. Drawing from the Simenstad report, EPA has identified the following "performance criteria" that must, at minimum, be addressed in any acceptable compensatory mitigation plan:

1) All compensatory mitigation must be consistent with the criteria and findings of the Simenstad report.
2) Preference will be given to compensatory mitigation plans that are consistent with habitat function prioritization criteria[1] (to be determined).
3) All compensatory mitigation plans will include an assessment of how they contribute toward recovery.
4) Mitigation plans must include consideration for connectivity (i.e., habitat that is linked or capable of being linked to other habitat and is intended to avoid mitigative actions that are geographically isolated and underutilized by the target species and/or do not reach full function).
5) Compensatory mitigation sites will be located within or will provide connections to or between one or more of the critical areas of "salmon landscape" (e.g., osmoregulatory transition) described by the Simenstad report within the Commencement Bay and lower Puyallup River watershed.
6) The aspect of *risk* of mitigation success/failure must be specifically factored into habitat plans and provided for up-front rather than solely as a post-construction contingency (i.e., in most cases this will mean additional habitat acreage).
7) All compensatory mitigation plans will include measurable performance objectives, management, monitoring and reporting requirements, responsibilities, and schedule.
8) Native species only will be utilized in any plantings to the maximum extent practicable.
9) Mitigation plans should include facility design and site plans for any development/redevelopment that occurs as a result of a fill. The facility and site

[1]The Simenstad report identifies "several emerging "visions" on broad-scale restoration of the delta-Bay" (p. 3) as well as efforts for upriver restoration (p. 9). The report also identifies a number of parcels or groups of parcels as potential sites. No prioritization of those opportunities has occurred to date. EPA will prioritize preferred habitat functions after consultation with the Services, resource agencies, and the Tribes.

plans must ensure that the facility and site characteristics and functions do not create adverse impacts to water, sediment and habitat quality during construction and operation. For example, the site plan for the expanded Simpson facility should include on- and off-site stormwater treatment; beneficial use of relatively clean stormwater (e.g. rooftop runoff, treated stormwater etc.); lighting and noise impacts minimization, including buffering; and other site-specific best management practices.

Compensatory mitigation plans will be developed pursuant to these performance criteria and in consultation with EPA and resource agencies, and be submitted to and approved by EPA during the remedial design phase. EPA may consider mitigation proposals that do not meet all of the performance criteria if the PRPs demonstrate that the proposal is otherwise consistent with the Simenstad report or otherwise significantly contributes to conservation and recovery of ESA listed species.

None of the compensatory mitigation plans submitted to date have been approved by EPA at this time. In addition, 4.6 acres of intertidal habitat within Thea Foss Waterway and 2.7 acres of intertidal habitat within Hylebos Waterway will be lost due to planned remediation in those waterways and have not been accounted for in any of the compensatory mitigation plans or documents provided to EPA. See Section V., *Habitat Considerations* subsections for Thea Foss and Hylebos waterways for more detail on habitat loss from the cleanup plans.

V. DESCRIPTION OF THE IN-WATERWAY REMEDIAL ACTIONS

A. Thea Foss and Wheeler-Osgood Waterways

In March 1994, the City of Tacoma entered into an Administrative Order on Consent (AOC) with EPA to conduct the design of the remedial action for the Thea Foss and the Wheeler-Osgood waterways. The City has analyzed previous data, conducted additional studies regarding the nature and extent of contamination in the waterways, and prepared a pre-design evaluation. The studies and evaluations to date include the following:

a) three rounds of sampling,
b) a feasibility study to evaluate cleanup actions for NAPL seeps located at the head of the Thea Foss Waterway,
c) an evaluation of potential disposal sites for dredged contaminated sediments,
d) an evaluation of the potential for sediment recontamination after cleanup, and
e) an underwater survey at the head of the waterway to locate the source of NAPL seeps beneath the SR 509 bridge.

These studies and evaluations are contained in the following reports which have been reviewed by EPA and placed in the Administrative Record:

a) Round 1 Data Evaluation Report, Thea Foss and Wheeler-Osgood Waterways, Tacoma, Washington, May 30, 1995.
b) Screening of Remedial Options Report, Thea Foss and Wheeler-Osgood Waterways, Tacoma, Washington, November 15, 1996.
c) Round 2 Data Evaluation Report, Thea Foss and Wheeler-Osgood Waterways, Tacoma, Washington, January 17, 1997.
d) Round 3 Data Evaluation and Pre-Design Evaluation Report, Thea Foss and Wheeler-Osgood Waterways, Tacoma, Washington, September 30, 1999.
e) SSMA 7 Technical Update, Memorandum from Hart Crowser to the City of Tacoma , dated June 14, 2000.

The areas within the waterways that require cleanup have been identified. The Thea Foss and Wheeler-Osgood waterways have been organized into Superfund Sediment Management Areas (SSMAs). There are seven SSMAs and they are depicted in Figure 2. The studies that have been completed indicate that the most severe contamination at surface and at depth occurs in segments 6 and 7 and tapers off gradually towards the Mouth of Thea Foss in segments 2 and 1. Primary contaminants found throughout the waterways that require cleanup both at surface and subsurface are BEP and PAHs. Other contaminants, such as metals are more localized. The head of the waterway (SSMA 7) contains deposits of NAPL beneath the sediments. This NAPL presents an ongoing source of contatmination to the waterway via seeps that transport the NAPL to the surface sediments.

Except for SSMA 1, substantial active remediation is needed to achieve cleanup objectives. The following paragraphs describe EPA's remediation plan for Thea Foss and Wheeler-Osgood waterways that is consistent with the remedial action EPA selected in the ROD. EPA's remediation plan is similar to the City of Tacoma's preferred alternative, Alternative 5B, described in the "Round 3 Data Evaluation and Pre-Design Evaluation Report" and in a subsequent technical memorandum. However, EPA's selected remedy for SSMA 7 includes a contingency for additional source removal and/or modification of the cap design if the established performance criteria cannot be met by the City's remedial design and implementation. EPA's remedy also differs from the City's in that it designates some additional areas for either natural recovery or enhanced natural recovery. EPA's remedy is described below.

SSMA 1 (Station 0+00 to 20+00)

No action is required in most of this segment except for SSMAs 1e1 and 1e2, where a cap will be placed to ensure that an area of sediments contaminated with hexachlorobenzene is remediated.

The approximate capping volume required to remediate this area is 15,000 cy of clean material. The remedial action will maintain the current navigable elevation of at least -29 feet MLLW.

SSMA 2 (Station 20+00 to 35+00)

The majority of sampling locations in this segment of the waterway indicate that chemical exceedances are marginal. EPA is requiring natural recovery at those areas where marginal exceedances occur because minor adverse biological effects were predicted for these areas in the City's Round 2 Report. These areas are SSMAs 2b1, 2b3, 2c1a, and 2c1b. In addition, a few discreet areas within SSMA 2 require either capping or dredging. SSMA 2a2 which is adjacent to an upland bank will be capped. Other areas, such as SSMA 2b4 and 2b5 will be dredged approximately four feet to remove all contaminated sediments. While this will eliminate the need for a cap, these areas will be backfilled with clean material to the approximate elevation of surrounding areas.

The estimated total volume for dredging and capping/backfilling this segment is approximately 16,000 cy and 15,000 cy, respectively. The remedial action will maintain the current navigable elevation of -29 feet MLLW.

SSMA 3 (Station 35+00 to 46+40)

The majority of areas within SSMA 3 have SQO exceedances that require removal and/or capping. SSMAs in the navigation channel between the 11th Street Bridge and the 15th Street right of way (ROW) (SSMAs 3b1, 3b2, 3b3, 3b4, 3b5a, and 3b5b) will be dredged to a specified elevation of -32 feet MLLW (elevation -30 feet MLLW with a 2-foot over dredge allowance) to remove all contaminants. Post-dredge samples will be taken to assess chemical concentrations of the dredged surface. If necessary, further dredging and/or some amount of capping may be required. Non-channel areas will undergo a combination of cleanup actions, including no action, natural recovery, capping, and dredging. SSMA 3a1 requires no action based on existing conditions. SSMAs 3a2 and 3a3 are suitable for natural recovery. SSMA 3c1 will undergo a combination of cleanup actions including natural recovery, enhanced natural recovery, dredging and capping. SSMA 3c2 and 3d are areas suitable for capping.

The estimated capping volume for this segment is in excess of 23,000 cy; the dredging volume is approximately 206,000 cy. The navigation channel along this section is authorized to an elevation of -22 feet MLLW. As the channel will be dredged to -32 feet MLLW, this remedial action meets navigation requirements.

SSMA 4 (Wheeler-Osgood Waterway)

Chemical exceedances in this segment indicate that active remediation needs to occur in two main areas: SSMAs 4a and 4c. These areas will be dredged to remove contaminated sediments. It is expected that all contaminants will be removed. The City's studies suggest that dredging SSMA 4a four feet will remove all contaminants. It is expected that SSMA 4c will be dredged to an elevation of -8 feet MLLW (which includes 1 foot of over dredge) to remove all contaminants. This area will then be capped/backfilled to match the current bathymetry for habitat benefits. Approximately 5,000 cy and 22,100 cy will be dredged from SSMAs 4a and 4c, respectively.

In addition, the City of Tacoma recommended no action areas where there are chemical exceedances of the SQOs. EPA requires that these areas be designated as natural recovery areas. If long-term monitoring indicates these areas will not achieve SQOs within 10 years after remedial action, they must be remediated.

The total volume of dredge material from SSMA 4 will be approximately 27,000 cy. The total amount of cap/backfill material needed for SSMA 4 will be nearly 20,000 cy. The Wheeler-Osgood Waterway is not part of the navigation channel. Current elevations will be maintained.

SSMA 5 (Station 46+40 to 52+40)

The navigation channel along this section is divided into two authorized navigation elevations. Between the 11th Street Bridge and the 15th Street ROW, the navigation channel is authorized to an elevation of -22 feet MLLW. From the 15th Street ROW to Station 52+40, the navigation channel is authorized to an elevation of -19 feet MLLW. These areas (SSMAs 5b1, 5b2a, 5b2b, 5b3a, 5b3b and 5b4) will be dredged to a specified elevation of -32 feet MLLW (which includes 2 feet of over dredge) to remove contaminants. It is expected that dredging to this depth will remove all contaminants.

Areas outside of the navigation channel will have a combination of remedial actions, including no action, natural recovery, capping, and dredging. Although SSMAs 5a1 and 5a3 will require no action based on existing conditions, a portion of these SSMAs will be dredged as part of the channel slope. The portions of the bank that the City recommended as no action areas have chemical exceedances of the SQO for copper and zinc; therefore, EPA requires that these areas be remediated either through capping or dredging because banks are not suitable for natural recovery. SSMAs 5c and 5a2, which are located along the channel slope, will be partially dredged. Caps will completely cover these SSMAs to confine remaining contaminants.

The remedial actions in this segment will result in total dredge and cap volumes of approximately 198,000 cy and 16,000 cy, respectively.

SSMA 6 (Station 52+40 to 62+30)

The navigation channel along this section is authorized to an elevation of -19 feet MLLW, however, it will be dredged to an elevation of -24 feet MLLW. Data collected by the City suggests that in places contamination may be considerably deeper. Consequently, a cap will be placed over dredged surfaces resulting in an elevation of -21 feet MLLW which will be 2 feet below the authorized channel depth.

Non-channel areas will receive a combination of no action, natural recovery, dredging and capping. Based on existing conditions, SSMAs 6a2a and 6c will require no action. SSMAs 6a2b and 6b3, located on the east side of the waterway under the Fishing Fleet, will be dredged to an elevation of -17 feet MLLW to remove all contaminated sediments and accommodate marina

users. SMAs 6b4 and 6b5 will be dredged to an elevation of -13 feet and capped back to elevation -10 feet because there are contaminated sediments at depth.

Dredging these areas will result in more than 92,000 cy of sediment needing disposal. Capping will require approximately 58,000 cy of clean material.

SSMA 7 (Stations 62+30 to 72+40 and 77+50 and 80+00)

Contamination in this segment of the waterway is deep and in excess of the authorized navigation depth of -19 feet MLLW. Sediments in SSMA 7b2 within the navigation channel between Stations 62+30 and 68+00 will be dredged to elevation -26 feet MLLW (elevation -24 feet including 2-foot over dredge). This will result in a channel approximately 5 feet below the required channel depth for navigation (-19 feet MLLW) in this area. In SSMA 7b3a, the dredge cut within the navigation channel will taper from -26 feet MLLW at Station 72+00 to -13 feet MLLW near Station 72+40. A cap will be required throughout this area because the majority of sediments at this depth and deeper contain chemical concentrations above SQOs. Following placement of the cap, the mudline elevation will be 2 feet below the authorized channel depth up to Station 72+00 and taper to a final elevation of -10 feet MLLW near Station 72+40.

Non-channel areas including SSMAs 7a and 7b1 (located on the east side of the waterway) will be dredged to an elevation of -13 feet MLLW to provide room for potential marinas. SSMAs 7c, 7d1 and 7d2 will be dredged to an elevation of -13 feet and capped back to an elevation of -10 feet as contaminated sediments exist at depth at these locations.

EPA is selecting the approach recommended by the City of Tacoma for remediation and control of the NAPL at the head of the waterway (approximately from Station 72+00 to 80+00) provided performance criteria specific to source control are met prior to implementation of the remedy. The remedy for the head of the waterway includes the following:

a) Placement of a composite multilayered cap which may consist of sand, sorbent material and geotextile membrane over areas that have active NAPL seeps, to cap and contain those seeps. (The cap must meet the performance requirements described in Section IV. A. and E. above.)
b) Dredging of sediments (some of which may be heavily contaminated with NAPL) as needed for construction of the cap.
c) The appropriate treatment and/or off-site disposal of the contaminated sediments as determined by testing.
d) Placement of at least 3-foot thick sand caps in areas which do not have composite capping material.
f) Placement of a sheet pile wall across the waterway north of the State Route 509 bridge to provide stabilization between the cap in SSMA7 and the remainder of the navigable waterway.

Dredging the channel and slopes will result in approximately 81,000 cy of dredged sediments needing disposal. Caps will be placed throughout SSMA 7 resulting in a total cap volume of approximately 108,000 cy.

Since the post-remediation depth proposed for the head of the waterway (between the north edge of the SR-509 bridge and the head of the waterway) will be more shallow than the federally authorized navigation depth, the City of Tacoma submitted a request to the Army Corps of Engineers (Corps) on August 19, 1999, to partially deauthorize this portion of the navigation channel. Deauthorization is necessary for the cleanup at the head of the Thea Foss to substantially comply with the Rivers and Harbors Act, which is an ARAR. The Corps regional office has completed a public comment period on the deauthorization, and has forwarded its recommendation to deauthorize this portion of the channel to Corps Headquarters. After approval by the Corps, the deauthorization request will be forwarded to the Secretary of the Army and then to Congress for approval.

Thea Foss and Wheeler-Osgood Waterway Cleanup Areas and Volumes

In summary, the remediation plan for Thea Foss Waterway will result in approximate dredging and disposal volumes of 620,000 cy and approximate capping volumes of 255,000 cy. An additional estimated 25,000 cubic yards of sediment and NAPL will be dredged from the heavily contaminated area at the head of the waterway for placement of the cap. These sediments will be tested to determine the appropriate disposal option. If necessary, the sediments from the head of the waterway will be dewatered, treated and disposed off-site.

The remedial action will result in the complete dredging of approximately 24 acres; capping of approximately 32 acres (including some areas that will be dredged and then capped); natural recovery of 21 acres, enhanced natural recovery of approximately 4 acres; and no action at 37 acres.

Complete removal of contaminated sediments will occur in a substantial portion of the navigation channel specifically between the 11th Street Bridge and 15th Street. The waterway will be left deeper than -24 feet MLLW, which is 2 feet below the authorized navigational depth of -22 feet MLLW. This will allow for future maintenance dredging of the waterway. Between 15th Street and approximately station 72+00, the waterway also will be dredged to remove contaminated sediments. However, because the channel is narrow and the contamination deep, it is more difficult to remove all contaminated sediments from this part of the waterway. Therefore, after dredging, a cap of clean sediments will be placed to contain remaining contaminated sediments. In this area, the top of the cap will be left at or deeper than -21 feet MLLW which is 2 feet below the present authorized navigational depth of -19 feet MLLW.

From approximately station 72+00 to the north edge of the SR-509 bridge, there will be a transition to a capping area. As a result, there will be some dredging along this slope and placement of a confining cap. Subject to meeting the performance criteria as described above for SSMA 7, the remaining area between the north edge of the SR-509 bridge and the head of the

waterway will be capped to confine the contaminated sediments in place, leaving the channel depth in this area at an elevation of approximately -10 feet MLLW. Harbor areas that require active remediation also will be: (1) dredged to remove all contaminants, (2) dredged to a specified elevation and capped, or (3) capped. Areas near the Mouth of the Thea Foss with marginal exceedances of the SQOs will undergo natural recovery. Other areas will be capped with minimal volumes of clean material to immediately isolate marginally contaminated sediments and enhance the natural recovery process.

Habitat Considerations

Dredging and capping would sequentially eliminate non-mobile benthos over approximately 56 acres of bottom area during an estimated 1-2 years of construction. These activities, along with natural recovery, would leave a patchwork of clean to much less contaminated bottom that would be predominantly native silty sands rather than the existing, organically enriched sandy silts. The bottom sediments exposed by dredging or created by the cap fill are expected to meet SQOs and to rapidly re-colonize with infauna and epifauna. Dredging and capping would cause temporary and localized impacts to water quality in the vicinity of the active equipment during construction. In-water work would be conducted during periods when few juvenile anadromous fish are present in the nearshore waters to reduce or eliminate the risk of direct impacts to this important resource.

Remedial activities would result in a small decrease in overall area (0.21 acres) below the mean higher high water level (MHHW) due to capping of the bank areas. Total area between MHHW and elevation -10 feet MLLW would decrease by up to 4.6 acres due to dredging to remove contamination. Deeper water habitat area (deeper than -10 feet MLLW) would be increased by that same 4.6 acres, but this is judged to be an unavoidable adverse impact, which requires compensatory mitigation. Habitat quality overall should be improved throughout the two waterways because of the removal or confinement of contaminated sediment. Additionally, provision of soft or organic-rich substrates beneficial to salmonids (e.g., "fish mix" or a silt-sand mix) will be investigated for use as final capping material.

EPA will require compensatory mitigation consistent with the bay-wide mitigation and performance standards discussed in Section IV.F. to offset any loss of habitat, as well as careful timing and monitoring of dredging and capping activities to assure minimal short-term impacts and minimal disruption of migratory salmonids. The resulting substrate should greatly benefit fish and wildlife resources by removing and isolating highly contaminated sediments from biological uptake. EPA will also ensure conservation measures are taken to protect ESA listed species.

B. Hylebos Waterway

EPA and the Hylebos Cleanup Committee (HCC), which consists of ASARCO, Inc., Elf Atochem North America, Inc. (now ATOFINA Chemicals, Inc.), General Metals of Tacoma, Inc., Kaiser Aluminum and Chemical Corporation, Occidental Chemical Corporation, and the Port of Tacoma, entered into an AOC for a pre-remedial design study of the Hylebos Waterway in November

1993. Under the AOC, the HCC has collected more than 500 physical, chemical, and biological samples in two sampling rounds to characterize the nature and extent of contamination, and has developed a cleanup plan to address areas that exceed the SQOs set forth in the 1989 ROD and the 1997 ESD. The HCC also has evaluated the potential for sediment recontamination after cleanup, and has inventoried and evaluated potential disposal sites for dredged contaminated sediments.

During the course of pre-design studies, it was determined that two areas of the Hylebos Waterway should be addressed separately from the overall waterway cleanup described in this ESD, because the materials present are different than the rest of the waterway sediments. In one area, a group of wood products companies (known as the "Wood Debris Group") are working with Ecology to investigate the extent of wood debris in the turning basin at the head of Hylebos Waterway. They are also evaluating options for remediation of wood debris. Ecology's public comment period for the Cleanup Action Plan for the wood debris cleanup closed July 28, 2000.

In the second area, Occidental Chemical Corporation is working with EPA under a separate AOC for two Removal Actions to investigate the extent of, and cleanup options for, a subtidal area known as "Area 5106" and a contaminated embankment in front of the former Occidental facility and an adjacent property at the Mouth of the Hylebos Waterway. In Area 5106, the nature of the sediment contamination is different than other Hylebos sediments, and, if excavated, would require treatment prior to disposal. This area is referred to as the "Area 5106 and Embankment Study Area" in Figure 3a. EPA has issued a separate proposed Engineering Evaluation and Cost Analysis (EE/CA) document for Area 5106 and is receiving public comment during August 2000. After responding to public comments, EPA will prepare an Action Memorandum (analogous to this ESD) to implement the removal action. For the Area 5106 sediments, the EE/CA addresses only those sediments that require treatment prior to disposal. A separate comment period for the embankment area is expected in the fall 2000. EPA's selected action for the embankment area will also be documented in an Action Memorandum. Sediments around and under the 5106 removal area that exceed SQOs but that are outside of the embankment will be addressed under this ESD in the overall Hylebos cleanup. Depending on the selected remedy in EPA's Action Memorandum, an estimated 20,000 cy of treated dredge material from Area 5106 could be disposed of in one of the selected disposal sites identified in this ESD. Because the Area 5106 may be disposed of in one of the selected disposal sites after treatment, the estimated 20,000 cy volume has been included in the estimated total disposal volume for this ESD.

Hylebos Waterway Subtidal Cleanup

The HCC's studies showed that extensive areas at the mouth and head of the Hylebos Waterway, and more limited areas in the middle of the waterway, are contaminated with chlorinated organic chemicals (including PCBs, pesticides, hexachlorobenzene, and hexachlorobutadiene), PAHs, and metals, and will require remediation.

Under the requirements of the AOC, the HCC developed a Pre-Remedial Design Evaluation Report (November 8, 1999), which contains a proposed cleanup plan for contaminated sediments

in the Hylebos Waterway, and proposed disposal sites for dredged sediments. The proposed cleanup plan is shown in Figures 3a-c, and is described in more detail in the report.

As shown in Figure 3a, most of the waterway north of the 11th Street Bridge is to be dredged under the cleanup plan. The area in front of Ole and Charlie's Marina (Sediment Management Area , "SMA" 511), within and in front of the Chinook Marina (SMA 501), and a small area near the 11th Street Bridge (SMA 502) contain only low-level contamination and will be monitored as natural recovery areas.

In the middle of the waterway (Fig. 3b), three areas will be dredged: SMA 421 in front of Taylor Way Properties, SMA 321, a small area near Buffelen Woodworking, and SMA 322 in front of Murray Pacific Corp. (now Port of Tacoma), Modutech, and Hylebos Marina. There also are four small natural recovery areas in the middle of the waterway.

At the head of the waterway (Fig. 3c), most of the waterway from approximately station 110+00 to station 147+00 will be dredged, with the exception of a small natural recovery area at the General Metals graving dock and in front of the General Metals facility. In the upper turning basin, a small area of chemical contamination in front of the Puyallup Tribe's Outer Hylebos property will be addressed as part of this cleanup. The remainder of the upper turning basin will be addressed under a separate cleanup by the Hylebos Wood Debris Group. There are also some small natural recovery areas in the upper turning basin.

As discussed in Section IV, the cleanup must protect against exposure of buried contaminated sediments in the future. Based on existing information, EPA has designated areas for cleanup where there are high or moderate subsurface contamination levels that have a greater potential for exposure, due to their proximity to the navigation channel or remediation dredge areas. There are a few sampling stations with lower-level subsurface contamination, or with insufficient subsurface data to refine the dredging volume. In these instances these areas will require further evaluation during design to determine which areas present a long-term risk of exposure of significant levels of subsurface contamination (e.g., an estimated 20,000 cy area noted as SMA S44 in Fig. 3b must be refined). For the remaining areas not identified for EPA action in this ESD, where and when future dredging or excavation will occur is unknown, but any such activity will be overseen by regulatory agencies as required under the Clean Water Act and the Shoreline Management Act, thus immediate removal of such subsurface sediments is not required. EPA does, however, encourage parties with development needs that involve dredging to consider coordinating their activities with EPA's cleanup schedule. Such a coordinated effort could serve to reduce cost and streamline administrative processes for property owners more than if they wait to initiate work after the Superfund cleanup. This issue is discussed further in the following section, *Hylebos Waterway Cleanup Areas and Volumes*.

Areas requiring dredging will be dredged deep enough to expose clean sediments. In most cases this coincides with the depth of native sediments. Proposed thickness of dredging ranges from 2 to 20 feet, with an average of 6 feet.

The cleanup areas shown in Figures 3a-c represent a preliminary cleanup plan, with specific dredged material management areas and volumes to be finalized and approved by EPA in remedial design.

Hylebos Waterway Intertidal Cleanup

Figures 3a-c also show intertidal areas that require cleanup. The plan presented in the Pre-remedial Design Evaluation Report is for 11.6 areas under dock/structures and isolated intertidal areas to be capped. However, whether intertidal areas will be dredged or capped will be reevaluated in the design phase on a property by property basis, taking into account factors such as:

- protectiveness of the proposed cap,
- compatibility with current land use,
- property owner's willingness to implement use restrictions on the capped area and/or ensure such restrictions will run with the land,
- engineering constraints, and
- avoidance of habitat impacts and any necessary mitigation required under CWA Section 404.

Some intertidal cleanup actions have been addressed by individual property owners working with Ecology. Those intertidal cleanups where EPA has approved the final cleanup will not require remediation as part of the overall waterway cleanup. EPA will, however, determine whether long-term monitoring is needed at these properties as part of the waterway design process. To date, EPA has approved the intertidal cleanups at SMA 232 at General Metals of Tacoma and SMA 241 at the former USG Interiors facility (see Figure 3-c).

Hylebos Waterway Cleanup Areas and Volumes

The total area of the Hylebos Waterway is 285 acres. Under this cleanup plan, 85.5 acres of open access areas (825,000 cy) will be dredged, 11.6 acres (95,000 cy) of intertidal and dock/structure area will be either dredged or capped depending on the final remedial design, and 20.7 acres are natural recovery areas. Additional acreage will be cleaned up under the Occidental Chemical and Wood Debris Group response actions. The total dredging volume represented by the sediment cleanup shown on Figures 3a-c is 845,000 cy, which includes the 20,000 cy estimated for SMA S44. For the purposes of estimating needed disposal site capacity, EPA has assumed that both SMA S44 area, and the intertidal or dock/structures areas will be dredged for a total of 940,000 cy. The estimated cost of this remedy, assuming disposal of dredged sediments at the Blair Slip 1 disposal site and an Upland Regional Landfill is $46,137,000.

An additional volume of contaminated sediments in the Hylebos Waterway may require confined disposal if dredged for navigation or future development purposes. Hylebos Waterway is a federally authorized navigation channel with an authorized depth of -30 feet MLLW. EPA is working with the Corps to determine whether the Superfund cleanup can be coordinated with

additional dredging by the Corps at the request of waterway users. This would increase the volume of sediments dredged and requiring confined disposal, but would address waterway users' concerns about shoaling in the navigation channel. It would also minimize future ecological impacts due to dredging by helping to ensure that no further dredging of the Hylebos Waterway would be needed for many years.

Some property owners also may wish to include additional dredge areas if their future use plans may require dredging and, as a result, risk future exposure of buried contaminated sediments. Because of the difficulties associated with dredging and disposal of contaminated sediments, EPA encourages property owners and waterway users to consider any current or future additional dredging needs and to discuss with EPA whether this dredging can be coordinated with the cleanup. While dredging solely for navigation or other development purposes is outside the scope of this Superfund action, EPA will work with private parties and the Corps to integrate additional dredging activity into the remedial design schedule if there is interest by the parties. For the purposes of determining needed disposal site capacity, EPA has estimated that an additional 120,000 cy of capacity may be needed if a Corps dredging project and dredging by other waterway users is included in the cleanup.

A number of factors could alter EPA's estimate of 120,000 cy of additional sediment resulting from dredging. EPA's estimate of 120,000 cy is based on a conditions survey conducted by the Corps that estimated 120,000 cy of dredging would be needed to address shoaling areas that are currently impacting navigation in the waterway. The Corps' 120,000 cy estimate includes some overlap with the CERCLA remediation areas, however, it does not include any additional dredging to address contaminated surfaces that may remain after the shoaling areas are dredged, which could increase the volume. The Corp's estimate also does not address any potential needs for development purposes. The draft ESD cited an additional volume of 300,000 cy based on the possibility of a much larger Corps dredging project beyond the shoaling areas identified in the Corp's conditions survey.

To pursue any Corps dredging project would require resolution of a number of issues that cannot be fully addressed at this time, including level of interest by private parties. For example, any navigation dredging would need to be initiated by a local sponsor and would require private parties to coordinate with the Corps to determine the precise dredging volume and subsequent cost sharing arrangements required for dredging and disposal. EPA encourages parties with an interest in additional dredging to work together to resolve these issues.

Habitat Considerations

Remedial activities in the Hylebos Waterway would result in the dredging and/or capping of approximately 96 acres of bottom area during an expected 2-3 year construction period, sequentially eliminating non-mobile benthos over that area. These actions include the capping of 11.6 acres of intertidal and shallow subtidal habitat and the dredging of 85.5 acres of subtidal habitat. In the intertidal area, approximately 2.7 acres of intertidal habitat would be converted to subtidal habitat. The resulting substrate would consist of clean imported sand or clean native

sediment. These activities, along with natural recovery, would leave much less contaminated bottom sediment which is expected to result in improved habitat quality throughout the waterway. The bottom sediment exposed by dredging would re-colonize with infauna and epifauna, as would any cap sediment. Dredging and capping activities would cause temporary and localized impacts to water quality in the vicinity of the active equipment during the construction period. In-water work would be conducted during periods when few juvenile anadromous fish are present in the nearshore waters to reduce or eliminate the risk of direct impacts to this important resource. The net effect of these changes to the aquatic ecosystem would be the loss of 2.7 acres of intertidal habitat, which will require compensatory mitigation. The remedial actions may also result in the loss of a very small area of salt marsh (approximately 25 square feet). It may be possible to avoid impacting this area, and this will be closely scrutinized during development of the final project design. Habitat quality for the remainder of the site overall would increase because of the removal of contaminated sediments. Additionally, provision of soft or organic-rich substrates beneficial to salmonids (e.g., "fish mix" or a silt-sand mix) will be investigated for use as final capping material.

EPA will require compensatory mitigation consistent with the bay-wide mitigation and performance standards discussed in Section IV.F. to offset the 2.7 acres and any additional loss of habitat, as well as careful timing and monitoring of dredging and capping activities to assure minimal short-term impacts and minimal disruption of migratory salmonids. The resulting substrate should greatly benefit fish and wildlife resources by removing and isolating highly contaminated sediments from biological uptake. EPA will also ensure conservation measures are taken to protect ESA-listed species.

C. Middle Waterway

EPA and the Middle Waterway Action Committee (MWAC), which is comprised of Foss Maritime Co., Marine Industries Northwest, Inc., and Pioneer Industries, Inc., entered into an AOC for preparation of pre-remedial and remedial design studies for Middle Waterway in April 1997. Under the AOC, MWAC has completed two rounds of sampling to characterize the nature and extent of contamination. MWAC submitted a draft data evaluation report, draft evaluation of remedial options, and draft remediation plan to EPA in June 2000, which are currently under review by EPA. MWAC currently estimates that 75,000 cubic yards of contaminated sediments may require removal.

Contaminated sediments dredged from Middle Waterway will be disposed of in one of the sites selected in this ESD. EPA will issue a future ESD for public comment, which defines the areas of Middle Waterway to be remediated.

VI. DISPOSAL SITES

A. Background

Since 1996, EPA has held several meetings and discussions with potentially responsible parties, representatives of federal, state, and local government, Native American tribes, environmental

groups, and members of the public. EPA met with these parties in an effort to: 1) identify potential disposal sites that meet the criteria set forth in the 1989 ROD, 2) discuss the pros and cons of each site and 3) narrow the list of potential sites to those sites most acceptable to EPA and other parties. Ten sites were identified by this process. EPA's further internal analysis narrowed the list to a few candidate sites.

In June 1999, EPA issued a fact sheet that presented EPA's evaluation of disposal sites for confinement of contaminated sediments dredged from Thea Foss, Wheeler-Osgood, Hylebos, and Middle waterways. The fact sheet described the factors used to evaluate the disposal sites and provided a refined list of promising sites. The list included nearshore fills at Blair Slip 1 and St. Paul Waterway, and confined aquatic disposal sites at Mouth of Hylebos and the Hylebos Upper Turning Basin. Along with these four in-water sites, EPA retained the option to send some volume of contaminated sediments to a regional upland landfill. EPA stated that it would focus further technical evaluations on these promising disposal sites. EPA also solicited public comment on the evaluations and information provided in the fact sheet and the proposed disposal site list. The comments received on EPA's refined list of disposal sites were considered in developing this ESD, and are discussed in Section X.

Subsequent technical evaluations indicated that construction of the Hylebos Upper Turning Basin disposal site would involve serious technical challenges, and may adversely impact migrating salmon. The proposal for the Hylebos Upper Turning Basin disposal site was to build an underwater confined aquatic disposal (CAD) facility at the end of a long, narrow channel, in an area of low circulation and flushing. Due to ongoing deposition of fine sediments with high organic content, near-bottom dissolved oxygen levels drop below levels necessary to support sensitive aquatic species for much of the summer and fall. Dredging and disposal may further reduce dissolved oxygen levels. The turning basin is located at the mouth of Hylebos Creek, a salmon bearing stream. Fish must pass through the disposal site to reach Hylebos Creek. In EPA's judgement, the Hylebos Upper Turning Basin disposal site, while not infeasible, had some serious technical challenges to overcome, and it is uncertain whether migrating salmon could be protected during construction. For these reasons, EPA has not selected this disposal site.

In November 1999, EPA issued a draft ESD proposing disposal of dredged contaminated sediments at three in-water disposal sites: Blair Slip 1, St. Paul Nearshore Fill, and a CAD at the Mouth of the Hylebos Waterway. EPA believes the Mouth of Hylebos site satisfies EPA's threshold criteria of overall protectiveness and compliance with ARARs, and is cost effective and technically implementable. However, based on public comments and further evaluation of the Mouth of Hylebos disposal site, EPA has determined that it is not an administratively implementable alternative at this time. Several issues have been raised about use of the Mouth of Hylebos Waterway disposal site that have not been resolved, including:

1) the landowner, DNR's, stated preference that CADs only be used for temporary disposal while EPA sees them as a long-term solution;
2) lease rates for use of state-owned, aquatic land;
3) need to relocate an existing lease holder at the mouth of the Hylebos;

4) a waiver or Plan amendment of the City of Tacoma's Shoreline Master Plan would be needed, because the majority of the mouth of Hylebos site is in the district S-13, which is designated a "conservancy environment"; and
5) numerous adverse comments received from homeowners, members of the public, and environmental groups.

All of these issues could potentially be resolved, however resolution is expected to be time-consuming. During that time, cleanup would be stalled.

Because EPA has determined that the Mouth of Hylebos CAD is not an administratively implementable alternative at this time, EPA is selecting upland disposal in a regional landfill as an element of the CERCLA remedy in conjunction with the Blair Slip 1 and St. Paul Waterway disposal sites. EPA has determined that the upland regional landfill alternative is feasible and cost-effective, and best meets the CERCLA evaluation criteria.

After the public comment period on the draft ESD closed (February 2000) and the many issues concerning the CAD site at the Mouth of the Hylebos were clarified, a group of four Hylebos Waterway potentially responsible parties hired a neutral third-party facilitation firm, Merritt and Pardini, and requested EPA's support and participation in a public outreach process to develop a solution for disposal of contaminated sediments dredged from Hylebos Waterway. EPA participated in the outreach process, which consisted of a series of three workshop sessions held over a three-month period from March through June 2000. A summary of the workgroup sessions and the workgroup's "Consensus Statement and Conclusions" were provided to EPA on June 21, 2000. The consensus statement is to:

1) Maximize the capacity of Blair Slip 1;
2) Maximize the use of upland industrial fill site(s) (i.e., Kaiser, others);
3) Upland disposal, capping, and Puget Sound Dredged Disposal Analysis [PSDDA; now Dredged Material Management Program (DMMP)] disposal as appropriate for residual volumes based on successful implementation of items 1 and 2;
4) Make sediment available for a treatment bench test if requested by a vendor; and
5) Based on assumed volume (of 940,000 cy) and contingent on the success of items 1 through 4, the Mouth of Hylebos CAD site is not part of this consensus statement.

In response to these recommendations, EPA agrees with the workgroup's recommendation (item 1) that the capacity of Blair Slip 1 be maximized to the extent practicable. EPA will also extend this recommendation to the St. Paul Waterway disposal site. The outreach forum's recommendation on upland industrial fill (item 2) was presented in sufficient concept-level detail to allow for further development during remedial design. The information presented in the recommendations was not, however, sufficient to allow EPA to select alternative on-site upland disposal sites rather than disposal of dredged materials in an upland regional landfill. EPA will allow PRPs to develop such alternatives during remedial design. If they can be demonstrated to EPA's satisfaction to be compatible with existing land use, protective of human health and the environment, compliant with applicable, or relevant and appropriate requirements and cost

effective, then EPA will consider these on-site alternatives as a means to reduce or eliminate the need for disposal at an upland regional landfill.

EPA's ESD includes upland disposal, capping and DMMP disposal as appropriate (item 3). EPA is also willing to make contaminated sediments available to a vendor for bench testing of treatment technologies (item 4), if requested and if compatible with the cleanup schedule, but will not require any such testing of the potentially responsible parties (PRPs).

In summary, EPA has selected Blair Slip 1 and the St. Paul Nearshore Fill and disposal at an upland regional landfill as disposal sites to contain contaminated sediments dredged from Hylebos, Thea Foss, Wheeler-Osgood, and Middle Waterways. The location of these disposal sites is shown in Figure 4. EPA will consider an upland on-site fill as an alternative to disposal at an upland regional landfill if it meets the criteria discussed above. More detailed information about the selected disposal sites is provided below.

B. St. Paul Nearshore Fill

The St. Paul Nearshore Fill (see Fig. 4) will consist of a containment berm and dike of clean dredge material and/or select fill material across the mouth of the waterway. New intertidal habitat will be constructed on the face of the berm.

The fill will create an upland area on top of which Simpson Tacoma Land Company (hereafter Simpson) plans to expand its manufacturing facilities. In order to accommodate the volume of material that needs to be dredged from the Thea Foss, Wheeler-Osgood, and Middle waterways, the St. Paul Waterway must be deepened. A preliminary facility layout that will be refined in the final design process indicates that the St. Paul Fill will have a capacity of approximately 600,000 to 750,000 cubic yards. EPA requires that the St. Paul Nearshore Fill be utilized to its maximum feasible capacity. Once all the contaminated material that needs to be disposed is placed into the St. Paul Fill, the area will be covered by a 6 to 7 foot thick cap.

Construction of the St. Paul Fill will require relocation of the log haul-out facility currently located at the head of the St. Paul Waterway. Simpson is proposing to relocate the facility to the inner end of the subtidal portion of Middle Waterway, at the mouth. Simpson will need to receive approval from Ecology to ensure that their plans are consistent with Ecology policy concerning new log rafting and haul out areas. The relocated log haul out facility must be designed to avoid and minimize habitat impacts and to meet the Best Management Practices (BMPs) in the City of Tacoma's Shoreline Program and comply with practices recently agreed upon for log haul out in Hylebos Waterway (e.g. no log grounding and bark control). Design details of the facility will also need to be approved by EPA.

The creation of the nearshore fill will result in the loss of approximately 13.6 acres of littoral and subtidal aquatic habitat, including 7.6 acres of mudflats. This particular habitat loss is of great concern to EPA, the Trustees, the Puyallup Tribe, and other interested parties. Although the site has been degraded by historic industrial and commercial navigation use, it still provides important

fish and wildlife support functions (refugia, feeding, migration) and compensatory mitigation is required to offset loss of habitat and other impacts.

After evaluation and input from the interested parties, Simpson developed a compensatory mitigation plan to offset losses due to the proposed nearshore fill. The mitigation plan was designed to emphasize recovery for migratory salmonid populations by providing a nearshore habitat connection between the Puyallup River and other existing nearshore habitats. The plan includes approximately 25 acres of estuarine habitat comprised of 15 acres of enhanced and 10 acres of created intertidal habitat, creation of a tidal channel and wetland marsh with a fresh water source, and preservation of land for a potential connector channel between the Puyallup River, the marshland, and Middle Waterway.

At this time, EPA is uncertain of the ability of the Upper Middle Waterway mitigation area to fully function as claimed. EPA believes there are insufficient baseline fish use and salinity data in both St. Paul and Middle Waterways to provide reasonable assurance that juvenile salmonid use will equal or exceed current use levels within the St. Paul Waterway impact area. This uncertainty is partially related to the fact that the St. Paul Waterway is closer to the Puyallup River and its associated fresh water turbidity plume compared to the more distant upper Middle Waterway. Consequently, the provision of a perennial source of river water to the compensatory mitigation lands in the upper Middle Waterway is critical to its functional success toward conservation and recovery of salmonids.

The Habitat Plan (April 2000) notes an option for supplying fresh water from the Puyallup River via rehabilitation and use of a City of Tacoma soon-to-be-abandoned water line along 11th Avenue that will become available in the year 2000 after a new water line is constructed. This pipeline option could potentially allow transfer of the necessary volume of fresh water to the Middle Waterway to achieve immediate benefits to salmonids, including development of brackish marsh habitat. In the future the pipeline could provide fresh water to potential restoration of intertidal brackish marsh and tidal channel habitats in the Delta Reserve/former industrial properties south of 11th Avenue.

EPA is requiring that this pipeline option, and other fresh water source(s) as necessary to meet the volume specifications, be implemented to assure full function of the mitigation project and, in part, to compensate for resource losses from the remedial activities in the Thea Foss Waterway.

Design of the pipe must meet the following requirements:

a) Maximize flow volume, but at a minimum must provide enough volume to create a freshwater lens six inches deep under stratified conditions and extends at least two-thirds the length of the waterway. Pumped artesian well water can be used as necessary to achieve the minimum flow volume. Appropriately treated stormwater or stormwater that meets the appropriate discharge standards may also be used to supplement the flow, but the preferred supplemental source is artesian well water.

b) The capability to eventually divert flows from upper Middle Waterway to the former industrial properties south of 11th Avenue, if those properties are acquired for restoration purposes.

Additionally, EPA has determined that the *risk* of mitigation success/failure must be specifically factored into habitat plans and provided for up-front rather than solely as a post-construction contingency. Accordingly, EPA will require additional acres of aquatic habitat be constructed in addition to what is proposed in the *Habitat Plan and Design Report* (2000) to offset the risk of mitigation failure. EPA will ensure that the requirements specified in this section, and the performance criteria specified in Section IV.F., are included in a final compensatory mitigation plan during remedial design that must be approved by EPA.

C. Blair Slip 1

The Blair Slip 1 disposal site is located at the mouth of the Blair Waterway. The Port of Tacoma has applied for a permit to fill this slip to the ground surface with clean fill (although they have indicated a willingness to use contaminated sediments as fill if required by EPA). The fill project would consist of constructing a berm across the front of the existing slip and filling behind the berm with contaminated sediments to an elevation of +9 feet MLLW, then adding a 7-foot sand cap, converting 13 acres of aquatic land to upland. This fill would be part of a larger Port project to build a new terminal at this location. The Port's permit application is currently under review by the Corps. With this ESD, EPA requires that this slip be filled with contaminated sediments. The current capacity of this site is 640,000 cy.

Information developed by the Port of Tacoma indicates that the slip capacity could be expanded to 750,000 cy if additional clean material is dredged from the bottom of the slip and sent for disposal at a DMMP open-water site. This ESD requires Blair Slip 1 to be designed to utilize its maximum capacity for contaminated sediments to the extent technically practicable.

The creation of a nearshore fill at this site will result in the loss of 13.1 acres of aquatic habitat (including 3.1 acres of intertidal and shallow subtidal habitat). Large piers currently cover the majority of the intertidal and shallow subtidal habitat. An additional 1.1 acres of subtidal habitat would be converted to shallow subtidal and intertidal habitat. Approximately 0.6 acres of existing subtidal habitat would be modified into sloping subtidal habitat.

Mitigation is required under Section 404 of the Clean Water Act to compensate for the impact of the fill on marine habitat. The draft compensatory mitigation plan for use of Blair Slip 1 (December 1998) that was submitted to the Seattle District, Corps of Engineers, as part of the permit application process is insufficient to offset habitat losses and it is unclear as to how it would contribute to conservation and recovery of ESA-listed species. EPA believes that the Simenstad report demonstrates that there is sufficient opportunity within the Commencement Bay and lower Puyallup River watershed to develop compensatory mitigation that also supports conservation of ESA-listed species. Final compensatory mitigation plans will follow the performance criteria discussed in Section IV.F.

D. Upland Regional Landfill

For the purposes of evaluating the upland regional landfill alternative, EPA identified two upland regional landfills that have the capacity to accept the possible dredging volume of Hylebos sediments; Roosevelt Regional Landfill near Goldendale, Washington, and Columbia Ridge Landfill near Arlington, Oregon. These sites are licensed Subtitle D commercial landfills. Bulk chemistry testing during pre-design indicates the sediments in areas other than "hot spots" (see Section II.C.) are suitable for disposal in a Resource Conservation and Recovery Act Subtitle D landfill for solid waste; additional testing will be done in design to confirm this. Both are approximately 200 miles from Tacoma. Dredged sediments would be offloaded landside into a confined stockpile/dewatering area. The location of this temporary disposal area has not yet been identified, however, there are vacant parcels on the shoreline in the vicinity of the dredging project that would provide sufficient capacity. Depending on the weather and water content of sediments, an extended period may be required for dewatering. The free water and interstitial water drained off during the rehandling process would be treated as necessary to meet water quality standards as required by the Clean Water Act and then discharged back to the waterway. After the sediment has been dewatered, it would be loaded into trucks, transported to a rail transfer facility, and transported to the landfill by rail. No compensatory mitigation is deemed owing for disposal of material into an upland regional landfill; although the requirement to avoid and/or minimize adverse impacts is still applicable.

E. Utilization of Disposal Sites

The City of Tacoma has recommended to EPA that the Thea Foss and Wheeler-Osgood contaminated sediments be placed in the St. Paul Nearshore Fill and, if possible, also the contaminated sediments from Middle Waterway. Blair Slip 1 and an upland regional landfill would then be used for the contaminated sediments from the Hylebos Waterway. EPA supports this mix but reserves the flexibility to allow the PRPs to make adjustments during design based on final disposal capacity, volumes, and timing. EPA also will continue to review disposal site designs to ensure that environmental impacts are minimized and unavoidable impacts are adequately compensated.

VII. STATUS OF SOURCE CONTROL

A. Background

The ROD recognized that the sources of contamination throughout the CB/NT Superfund site would have to be controlled before sediment cleanup could be achieved. The cleanup strategy for CB/NT has been to eliminate or reduce ongoing sources of problem chemicals to the extent practicable before implementing in-water cleanup actions. While Superfund is an effective tool to clean up existing contamination, other authorities are needed to address ongoing releases. Several federal, state and local programs were identified as tools to address source control independently of Superfund. In 1989, EPA and Ecology entered into an agreement that identified the Ecology

Commencement Bay Urban Action Team (UBAT) as lead for implementing source control actions. Ecology uses many regulatory tools to control sources, including the Model Toxics Control Act (MTCA) to address upland and groundwater sources and pollutant discharge permits under the Clean Water Act to address direct discharges to the waterways. Ecology reports its progress on the control of sources to EPA and consults with EPA on whether source control is sufficient to move forward with in-water clean up actions.

This ESD does not propose any changes to the source control strategy set forth in the 1989 ROD or the 1992 Source Control Strategy. However, additional information is provided below on how the strategy is being implemented at Thea Foss, Wheeler-Osgood, and Hylebos waterways.

The administrative mechanism used by Ecology to inform EPA of its progress on source control is a series of reports called Milestone Reports issued for each problem area identified in the ROD. There are five types of Milestone Reports and their purpose is as follows:

> Milestone 1 - On-going Confirmed Sources Identified. Ecology has investigated and evaluated all potential sources, and identified all on-going, confirmed sources of problem chemicals.
>
> Milestone 2 - Essential Administrative Actions in Place for Major Sources. Ecology has issued administrative actions, such as orders, consent decrees, or permits, to address major sources of problem chemicals in each problem area to ensure that they will be controlled to the extent necessary to prevent sediment recontamination. Major sources are those most directly linked with current sediment impacts.
>
> Milestone 3 - Essential Remedial Action Implemented for Major Sources. Ecology has implemented all of the remedial actions, such as upland soil cleanup, adoption of best management practices, storm drain cleaning, etc., for all major sources. Essential remedial actions are those needed to eliminate or reduce those contaminant sources that are most likely to recontaminate sediments.
>
> Milestone 4 - Administrative Actions in Place for All Confirmed Sources. Ecology has implemented all of the administrative actions discussed under Milestone 2 for all confirmed sources.
>
> Milestone 5 - Remedial Action Implemented for All Sources. All essential source control work under the decrees, orders, or permits has been completed.

To date, Ecology has completed the following Milestone Reports for Hylebos, Thea Foss, and Wheeler-Osgood waterways:

> Mouth of Thea Foss: Milestones 1 through 5
> Head of Thea Foss: Milestones 1 and 2
> Wheeler Osgood: Milestones 1 through 5

Mouth of Hylebos: Milestones 1 through 5
Head of Hylebos: Milestones 1 through 5

EPA expects that all Milestone Reports will be submitted and approved by the end of 2001.

The following sections provide more detailed information about completed and on-going source control actions at Thea Foss, Wheeler-Osgood, and Hylebos waterways. Because the nature of the sources of contamination are quite different between the Thea Foss/Wheeler-Osgood Waterways and the Hylebos Waterway, the types of source control implemented and issues associated with them are different. While much of the source identification and control work at all waterways has focused on working with individual facilities, Thea Foss Waterway has presented some unique challenges due to several large storm drains discharging into the waterway and multiple sources and deposits of NAPL.

B. Thea Foss and Wheeler-Osgood Waterways

Ecology identified numerous sources to the Thea Foss and Wheeler-Osgood waterways and took cleanup action. Some of the sources that were cleaned up include the following:

D Street Petroleum (groundwater at petroleum facility)
Superior Oil (groundwater at petroleum facility)
UNOCAL (groundwater at petroleum facility)
BP Oil (groundwater at petroleum facility)
Totem Marine Services (boat yard, hull washing)
Picks Cove (boatyard, hull maintenance, stormwater)
J.M. Martinac (shipyard, stormwater and sandblast grit on beach)
Marine Iron Works (storm drains)
West Coast Grocery (storm drains)
1147 Dock Street (bank contamination)
Chevron Bulk Plant (soils)
MPS/Truck Rail Handling (storm drains)
Kleen Blast (storm drains)
Olympic Chemical (groundwater)
City-owned parcels (various historical sources on west shore)

In addition to Ecology's efforts to control independent sources at Thea Foss and Wheeler-Osgood waterways, the City of Tacoma has been actively involved in controlling municipal sources by implementing the Stormwater Management Plan for Thea Foss Waterway. The program is required as part of the City's NPDES permit and lays out a step-wise, on-going process for characterization of effluent, identification and prioritization of potential chemical sources, actions to address sources, and monitoring and reporting on results. Under this program, the City of Tacoma has conducted hundreds of inspections, required businesses to implement best management practices, and required cleaning of stormwater drains, lines and catch basins. These actions, coupled with Ecology's efforts, have eliminated or reduced numerous significant sources

of contamination to stormwater discharging to the waterway. A summary of the stormwater source control actions undertaken for the Thea Foss and Wheeler-Osgood waterways by the City of Tacoma is described in the Round 3 Data Evaluation and Pre-Design Evaluation Report.

While much progress has been made and many sources have been eliminated or reduced, source control is and will continue to be an ongoing prevention activity. Based on existing information, there continues to be some risk of recontamination of sediments towards the head of the Thea Foss Waterway if further actions are not taken to reduce sources of BEP (bis[2-ethylhexyl] phthalate) and PAHs (polycyclic aromatic hydrocarbons). Ecology still must select and implement a cleanup for the coal tar and creosote sources on the uplands at the head of the Thea Foss Waterway. The City of Tacoma also must implement further actions, including potential capital improvements to the municipal storm drains to reduce contaminant loadings to eliminate or significantly reduce the potential for recontamination of sediments. EPA and Ecology are working to ensure that appropriate controls are being applied to the stormwater sources considered likely to contribute to sediment recontamination. Additionally, in accordance with the ROD, results from the monitoring of sediments and effluent discharges will be used as feedback to the regulatory agencies who will monitor the effectiveness of source control actions. See Section IV for additional discussion about and specific requirements for source control.

C. Hylebos Waterway

Ecology identified 10 major ongoing sources to Hylebos Waterway sediment contamination:

Occidental Chemical Corporation (manufacturer of chlorine and chlorine-based chemicals)
Elf Atochem 3009 Taylor Way (inactive log sort yard)
Elf Atochem 2901 Taylor Way (former manufacturer of chlorine-based chemicals)
Kaiser Aluminum and Chemical Corp. (metal fabricator)
General Metals of Tacoma (metal scrap yard)
Wasser Winters (inactive log sort yard)
Louisiana Pacific (operating log sort yard)
Tacoma Boat (former large shipyard)
B&L Landfill (drains to Hylebos Creek)
Blair Backup Property (inactive log sort yard)

Essential source control actions have been completed for all of these facilities, as documented in Ecology's milestone reports for Mouth and Head of Hylebos Waterway.

In addition, Ecology identified 19 other ongoing sources of contamination to Hylebos Waterway sediments. Essential administrative actions (orders, decrees, or permits) are in place to address all of these sources of problem chemicals to Hylebos Waterway sediments, as documented in Ecology's November 1999 Milestone 4 reports for Mouth and Head of Hylebos Waterway. Ecology issued its Milestone 5 reports, documenting completion of source control for all Hylebos Waterway sources on June 14, 2000.

Ongoing sources of sediment contamination from these facilities have been addressed through a variety of permit and cleanup actions, including excavation and/or capping of upland contaminated soils, groundwater pump and treat, installation of sheet pile barrier walls, control of industrial and storm water discharges, and long-term monitoring programs. Appended to the Milestone 3 and 4 reports for the Head of Hylebos Waterway are evaluations of the effectiveness of groundwater and stormwater controls in preventing sediment recontamination after the completion of source control actions. These technical memoranda describe a conservative approach, based on data collected after source control actions have been completed, to estimating stormwater and groundwater contaminant loads to sediments. A similar analysis was completed for Mouth of Hylebos facilities in the Mouth of Hylebos milestone reports. The evaluation concluded that, in general, there was a very low risk of recontamination of Hylebos Waterway sediments from groundwater or stormwater discharges. Nonetheless, in accordance with the ROD, Ecology will continue to monitor and evaluate the effectiveness of source control actions.

VIII. SUPPORT AGENCY COMMENTS

Ecology concurs with this ESD. In particular, Ecology supports EPA's efforts to work with the Corps to integrate the Superfund cleanup on the Hylebos Waterway with a navigational dredging project and dredging for private development purposes. Ecology offered to explore grant funding opportunities to facilitate this additional dredging. Ecology is concerned about responsibility for oversight of navigational dredging of contaminated sediments after the Superfund cleanup. Finally, Ecology encourages EPA to begin cleanup in 2001.

The Puyallup Tribe also concurs with this ESD. However, the Tribe stated concerns about a number of things they believe need to be emphasized in the remedial design to support salmon recovery. These include:

a) emphasize permanence and long-term effectiveness in the cleanup design;
b) design intertidal cleanups to prevent or minimize habitat loss; and
c) avoid use of natural recovery as a cleanup method as much as possible.

The Tribe also stated their support for the bay-wide mitigation approach (see Section IV.F.) and providing "up-front" mitigation to address uncertainty in mitigation plans.

EPA will continue to coordinate with Ecology and the Puyallup Tribe to incorporate their concerns to the extent possible during remedial design and implementation of the cleanup. Concurrence letters from Ecology and the Puyallup Tribe are attached as Appendix B.

IX. AFFIRMATION OF THE STATUTORY DETERMINATION

Considering the new information that has been developed in this ESD and in the Administrative Record, EPA believes that the cleanup plan is and will be protective of human health and the environment, complies with Federal, State and Tribal requirements that are applicable, or relevant and appropriate to this remedial action as identified in the ROD (with the addition of ESA), and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. However, because treatment was not found to be

practicable, this remedy does not satisfy the statutory preference for treatment as a principle element. Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

X. PUBLIC PARTICIPATION ACTIVITIES

EPA has held regular public meetings and has issued many fact sheets to update the public on its activities since the ROD was signed in 1989. Because the selection of disposal sites was of particular interest to the public, EPA has held a series of "Disposal Sites Forum" meetings since 1996. In these meetings, options for sediment disposal were discussed with members of the public, government agencies, Native American tribes, environmental groups, and industry representatives. The group developed a list of candidate sites considered "most promising" for sediment disposal. All of the sites that were considered by EPA are on that list.

EPA mailed a fact sheet and held a 45-day public comment period from July 1, 1999 to August 16, 1999 on its proposed refined list of disposal sites. The refined list included four sites. Approximately 100 people attended a public meeting on June 21, 1999 to discuss the refined list, as well as the latest information on source control and the waterway cleanup plans. EPA also held two meetings with homeowners who live near the location of the proposed Mouth of Hylebos disposal site on July 28, 1999 and November 3, 1999, for a more detailed discussion of that disposal site. On January 12, 2000, Chuck Clarke, EPA's Regional Administrator, met with residents of Marine View Drive to hear their concerns about the proposed Mouth of Hylebos disposal site.

EPA considered the comments received from the public in developing the draft ESD. EPA received more than 20 letters commenting on the June 1999 fact sheet. Many letters urged EPA to move forward with the cleanups of the waterways and to select the St. Paul Nearshore Fill site as a disposal site. There were also letters expressing opposition to the Mouth of Hylebos disposal site. The issues raised in these letters included concerns about noise during construction, concerns about construction activities impeding water access, the site's geologic stability, the impact on property values, the potential effect on the drinking water supply, the impact on homeowner views, and others. EPA also received comments from a number of people who support disposal on state-owned aquatic lands and who urged use of a CAD site.

EPA mailed a fact sheet describing the draft ESD to 1300 people. A public comment period was held from November 29, 1999 to January 3, 2000. Over 100 people attended a public meeting held by EPA on December 8, 1999 to discuss its proposal and take comments from the public. A request for an extension to the comment period was received, and the date to submit public comment was extended until February 2, 2000.

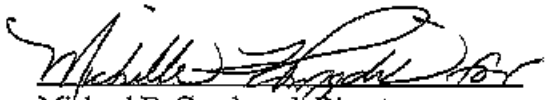
EPA received 180 comment letters during the public comment period. Many letters expressed opposition to the proposed Mouth of Hylebos disposal site and to the proposed cleanup action at

the head of the Thea Foss Waterway. Comments were received from the Puyallup Tribe and from state and federal resource agencies who expressed concerns related to the specific cleanup plans and mitigation proposed under the Clean Water Act.

As a result of the opposition to this proposed site, a group of potentially responsible parties called Partnership for a Clean Waterway (PCW) hired a consultant, Merritt & Pardini, to conduct a series of workshops to look for creative solutions to the cleanup of the Hylebos Waterway. Three workshops were held from March through June 2000. The workshops brought together federal, state, and local agencies, the tribes, and interested community members to identify concerns and explore alternatives to the Mouth of Hylebos CAD site. EPA attended all of the meetings, and the information has been considered for the final decision in this ESD. EPA has placed the recommendations that resulted from the Merritt-Pardini workshops in the administrative record. In particular, EPA has incorporated the recommendations to maximize the capacity of Blair Slip 1 to the extent practicable and to allow further consideration of upland disposal on an upland parcel(s) of property if implementable and in compliance with any ARARs.

A summary of the comments received during the public comment period and EPA's responses is included as Appendix C to this ESD.

Signed:



8/3/00

Michael F. Gearheard, Director
Office of Environmental Cleanup

Date

Appendices

A Cost Summaries for the Hylebos, Thea Foss and Wheeler Osgood Waterway Remedial Actions
B State of Washington Concurrence Letter
Puyallup Tribe of Indians Concurrence Letter
C Responsiveness Summary