EXPLANATION OF SIGNIFICANT DIFFERENCES
MIDDLE WATERWAY
COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE

FEBRUARY 2002

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ABBREVIATIONS AND ACRONYMS

AOC	administrative order on consent
ARARs	applicable or relevant and appropriate requirements
BA	biological assessment
CAD	confined aquatic disposal
CB	Commencement Bay
CBN/T, CB/NT	Commencement Bay Nearshore/Tideflats
CDF	confined disposal facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CHB	Citizens for a Healthy Bay
CM	Centimeter
COE	U.S. Army Corps of Engineers
DER	data evaluation report
DESD	draft explanation of significant differences
DNR	Department of Natural Resources
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation/cost analysis
ENR	enhanced natural recovery
EPA	U.S. Environmental Protection Agency
ESD	explanation of significant differences
HPAHs	high-molecular-weight polycyclic aromatic hydrocarbons
LPAHs	low-molecular-weight polycyclic aromatic hydrocarbons
MLLW	mean lower low water
MTCA	Model Toxics Control Act
MUDS	Multi-user Disposal Siting
MWAC	Middle Waterway Action Committee
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NR	natural recovery
NRDA	natural resource damage assessment
OMMP	operations, maintenance, and monitoring plan
OU	operable unit
OVRA	Olympic View Resource Area
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PRPs	potentially responsible parties
RCW	Revised Codes of Washington
RI/FS	remedial investigation/feasibility study
ROD	record of decision
SEPA	state environmental policy act
SMU	sediment management unit
SQO	sediment quality objective

SQS	sediment quality standard
TOC	total organic carbon
UBAT	Urban Bay Action Team
WDNR	Washington State Department of Natural Resources

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COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE

February 2002

I. INTRODUCTION

A. Purpose

EPA's September 30, 1989 Record of Decision (ROD) for the Commencement Bay Nearshore /Tideflats (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. In July 1997, EPA issed an Explanation of Significant Differences (ESD) which modified the PCB cleanup level. In August 2000, EPA issued an ESD which described the cleanup plans for three of the waterways in Commencement Bay–Thea Foss, Wheeler-Osgood and Hylebos– and identified the disposal sites selected to contain dredged contaminated sediments from all the waterways. The purpose of this ESD is to describe the specific cleanup plans for Middle Waterway. The specific requirements and clarifications provided in the July 1997 and August 2000 ESDs are not repeated here but are applicable to Middle Waterway as well. This ESD describes the manner in which the remedial methods outlined in the ROD will be applied in Middle Waterway and identifies those instances where the selected remedy differs from the ROD.

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).

II. BACKGROUND

A. Site Name, Location and 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. Middle Waterway is located between Thea Foss Waterway and the Puyallup River.

EPA placed the CB/NT site on the National Priorities List (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 and Proposed Plan 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. Contaminated sediments in Middle Waterway have high concentrations of mercury, copper, and PAHs.

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 NPL because cleanups had been completed in these areas, or studies had been completed showing that they did not require cleanup.

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 1989 ROD, EPA selected a remedial action for eight of the nine sediment problem areas which were identified during the RI/FS. 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), was addressed in a separate ROD signed in July 2000. To date, remedial actions consistent with the 1989 ROD have been completed at the Sitcum and St. Paul waterways.

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 through consumption 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.

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. In addition, the August 2000 ESD identified disposal sites (nearshore, in-water, and upland) which would be most appropriate to safely contain dredged sediments. Since then, pre-remedial design studies for Middle Waterway 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 or enhanced natural recovery would be appropriate.

This ESD documents the following changes for Middle Waterway:

a) the size of the problem area and the volume of sediment to be dredged;
b) the disposal site for contaminated sediments; and
c) the cost of the remedial action.

None of these significant differences discussed below fundamentally alter the remedy selected in the ROD.

B. Volume

The ROD recognized that the estimated quantity of sediments needing active remediation (i.e., dredging and disposal or in-situ capping), as well as the associated costs, would be refined during the remedial design phase. Since the ROD was signed, additional investigations and studies have been undertaken by the potentially responsible parties (PRPs) at each of the waterways. Post-ROD studies in Middle Waterway identified a higher volume of sediment that requires dredging and disposal than was originally estimated in the ROD. These studies demonstrate that sediment contamination extends to greater depths than was believed when the 1989 ROD was issued. A comparison of the volume estimate in the 1989 ROD with the refined volume estimate is provided in Table 1.

Table 1. Comparison of 1989 ROD and 2001 ESD Volume Estimates for Areas Requiring Dredging

	1989 ROD volume estimate	2001 ESD volume estimate
Middle Waterway	57,000 cy	92,700 cy

C. Selection of Disposal Sites

As summarized in EPA's August 2000 ESD, EPA has selected Blair Slip 1, the St. Paul Nearshore Fill and disposal at an upland regional landfill as approved disposal sites to contain contaminated sediments dredged from Hylebos, Thea Foss, Wheeler-Osgood, and Middle Waterways. More detailed information about the selected disposal sites is provided in the August 2000 ESD.

Recently, the Middle Waterway Action Committee (MWAC) signed an agreement with the Port of Tacoma to use the Blair Slip 1 nearshore fill for disposal of contaminated sediments from Middle Waterway. Mitigation measures required for disposal in Blair Slip 1 are being addressed by the Port of Tacoma as part of the Hylebos Waterway cleanup.

D. Costs

The 1989 ROD provided 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. The cost estimate has increased since the 1989 ROD.

Table 2. Comparison of cost estimates in the 1989 ROD and the 2001 ESD

	1989 ROD cost estimate ($ million)	2001 ESD cost estimate ($ million)
Middle Waterway	$2.66 - $7.47	$12.3

The 1989 ROD cost estimates were based on a smaller volume of sediment to be dredged, as shown in Table 1. Disposal costs have also increased since 1989. Detailed cost estimates are provided in the Middle Waterway Evaluation of Remedial Options Report (2001) and in Appendix A of this ESD.

For the purposes of providing cost estimates, EPA has assumed that Middle Waterway contaminated sediments will be disposed of in Blair Slip 1 based on cleanup options developed by the Middle Waterway PRPs. EPA reserves the flexibility to allow the PRPs to make adjustments to the disposal location (among the three disposal sites selected by EPA) during

design based on final disposal capacity, volumes, and timing.

IV. PERFORMANCE CRITERIA FOR THE REMEDIAL ACTIONS

For all the waterways in Commencement Bay, the August 2000 ESD expands on and clarifies the general cleanup approach set forth in the CB/NT ROD; it includes the Endangered Species Act (ESA) as an applicable, or relevant and appropriate, requirement (ARAR) for remedial actions under the ROD; it selects two in-water disposal sites and upland disposal as acceptable disposal options; and, it provides performance criteria to be applied to the design and implementation of the selected remedial actions and mitigation projects. Those performance criteria apply to all capping, dredging, confined disposal, natural recovery, and enhanced natural recovery activities, and address subsurface contamination and mitigation. The additional requirements and clarifications supplied in the August 2000 ESD are not repeated here but are applicable to the Middle Waterway. While this ESD describes the remedial actions for the Middle Waterway with some degree of specificity, remedial design will further refine the details of the remedial action.

V. DESCRIPTION OF IN-WATERWAY REMEDIAL ACTIONS

EPA and MWAC, which is comprised of Foss Maritime Co., Marine Industries Northwest, Inc., and Pioneer Industries, Inc., entered into an Administrative Order on Consent (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, and prepared a pre-design data evaluation report, evaluation of remedial options report, and recommended remediation plans. EPA has reviewed and approved these reports and has placed them in the Administrative Record.

The areas within Middle Waterway that require cleanup have been identified. The Middle Waterway has been organized into Sediment Management Units (SMU's), which are depicted in Figure 2. There are sixty-seven (67) SMU's in Middle Waterway, distributed among three different segments in the Waterway known as Areas A, B, and C. The studies completed to date indicate that the most severe contamination is located at the mouth of Middle Waterway and in the subsurface sediments at the head of the waterway (i.e., Areas A and C). The primary contaminants of concern in Middle Waterway sediments are mercury, copper, and PAHs.

Substantial active remediation is needed to achieve cleanup objectives, particularly in Area A. The following paragraphs describe EPA's remediation plan for Middle Waterway, consistent with the remedial action EPA selected in the ROD and similar to MWAC's preferred alternative as proposed to EPA in the Final Recommended Remediation Plans for Areas A, B and C (dated November 24, 2000, and revised April 9, 2001), with some modifications. EPA's remedy is described below. The selected cleanup actions are protective of human health and the environment and provide the best overall effectiveness proportional to their costs.

A. Area A

Selected Remedies

The majority of sediments within Area A have SQO exceedences that require removal and/or capping. Figure 2 shows the locations of all the SMUs in Middle Waterway. Appendix B identifies the selected remedy for each SMU.

Under EPA's remediation plan, problem sediments in SMUs 1 - 3b, 4a, 6, 7, 9a, 9b, 15a, 16 - 24, 26 - 38, 40 - 42, and 44 - 47 will be dredged. Additional dredging in adjacent SMUs will be done to provide an even grade between dredged and non-dredged SMUs. Sediments in SMU 4b will be capped. Due to the presence of obstacles such as marine railway structures, sediments in SMUs 30, 31, and 32 will first be dredged to the extent possible and then capped. Enhanced natural recovery will be used at SMU 5a. SMUs 4c, 5b, 8, 10, 11, and 25 will be monitored for natural recovery. SMUs 12 - 14, 15b, 39, 43, and 48 - 50 are designated for no action.. Institutional controls will also be required in areas that will be capped or where enhanced natural recovery will be used to ensure that these remedial actions will not be compromised in the future. Specific controls will be determined during design.

The following paragraphs provide additional clarification regarding selected elements of the remedy:

(a) Capping will provide better protection than natural recovery at SMU 4b because EPA believes the net sedimentation rate used by MWAC in the natural recovery model is too high considering the amount of boat traffic and potential sediment resuspension associated with the nearby Foss dock. In addition, even when using the higher net sedimentation rate, the model predicts a recovery time for mercury exceeding fifteen years, which is an unacceptably long time for natural recovery, and inconsistent with the ROD.

(b) For SMUs 4c and 25 EPA selects natural recovery along with monitoring based on the limited chemical data associated with these SMUs and their proximity to SMUs proposed for dredging.

(c) The Olympic View Resource Area (OVRA), a separate problem area in the CB/NT Superfund site, is adjacent to SMU 5a. As part of the planned removal action for OVRA, a portion of SMU 5a will be excavated to a minimum depth of 1.1 feet below existing grade and then backfilled with a minimum thickness of 1.3 feet of clean import material (see City of Tacoma's Engineering Evaluation/Cost Analysis for the Olympic View Resource Area Removal Action dated April 30, 2001). That cleanup action will address the location of one of the mercury exceedances in SMU 5a. A thin layer (10 cm) of clean sediment will be placed in the portion of SMU 5a not effected by the removal action at OVRA to address another slight exceedance of the mercury SQO. SMU 5a in its entirety will be monitored for enhanced natural recovery. The long-term monitoring program needs to include specific measures to monitor the effectiveness

and persistence of enhanced natural recovery in this area. These measures will include as a minimum collection and analysis of surface sediment samples, biological testing, and routine survey and inspection for evidence of erosion. If monitoring program results indicate erosion or other potential failure of the remedy for SMU 5a, EPA will evaluate other options which may include but are not limited to the need for expanded monitoring or more active remediation.

(d) Not enough samples have been taken in SMU 5b to define the levels of contamination, if any. This is due to several factors including difficulties encountered in collecting sediments in this area and the method used to composite samples. Therefore, at this time, there is very limited information available for SMU 5b. SMUs 5a and 5b are adjacent to two large eelgrass beds located approximately 500 feet offshore in the shallow subtidal and deep subtidal areas of the low gradient beach off the peninsula that forms Middle Waterway. These eelgrass beds provide critical salmon habitat within Commencement Bay. The PRPs must evaluate through sampling and analysis during the early stages of remedial action whether natural recovery will be sufficient to be protective of this area by reducing existing chemical concentrations to SQOs within ten years after sediment remedial action. Results of this sampling and analysis effort will be used to decide what, if any, additional remedial action is needed.

(e) In general, areas requiring dredging will be dredged deep enough to expose clean sediments (generally defined as below the SQO). In a few locations dredging to depths of more than ten feet below the mudline will be required to remove contaminated sediment, but in most locations dredge depths will be less than ten feet. Remedial design documents will specify dredging depths for all areas except those noted in (f) below. Post-dredge confirmation samples will be collected to assess chemical concentrations and verify that all contamination has been removed. At SMUs 3b, 30, 31, and 32 approximately three feet of material will be removed around the marine railway structures and the area backfilled with clean sand. Post-dredge confirmation samples similarly will be collected to assess chemical concentrations of the dredged surface prior to backfilling.

(f) There are three areas-- MW 105, MW113/MW116, and MW 137-- proposed for dredging where the vertical limit of SQO exceedences was not fully defined during the first two rounds of sampling. EPA may require additional dredging and/or capping depending on the results of post-dredge confirmation sampling in these areas. Specific criteria to determine how these decisions will be made will be developed during remedial design.

(g) EPA will ensure that the final plans and specifications for the Middle Waterway cleanup and implementation of the remedy will be coordinated with Simpson to minimize any impacts on Simpson's ongoing operations, as well as with any mobilization or construction work for the Thea Foss remedy.

B. Area B

Selected Remedies

No action is required in most of this area of the waterway except for dredging in SMU 53; the western bank of this SMU will be dredged until all contamination is removed and replaced with a new engineered slope. There is no overall net loss of habitat associated with this cleanup action. No action will be taken in SMU 54.

Enhanced natural recovery is the selected remedy for SMU 55 in the northern portion of the SMU (to address exceedences at MW156, MW158, and MW039) and no action is required in the southern portion of SMU 55. However, the sediments in SMU 55 are part of the area that is planned to be included in the construction of the habitat mitigation required for the St. Paul Waterway nearshore disposal facility. When that mitigation project is constructed, as part of that construction effort, sediments in SMU 55 will be dredged and disposed at a suitable disposal site. Once that occurs, this SMU will no longer need to be monitored for enhanced natural recovery.

Figure 2 indicates the locations of all the SMUs in Middle Waterway, and Appendix B identifies the selected remedy for each SMU.

C. Area C

Selected Remedies

The remedies selected for this area are enhanced natural recovery in SMU 51b and no action within SMUs 52a and 52b other than removing the pile of roofing material located at MW008-SP. For SMU 51a, EPA elects to address surface contamination with enhanced natural recovery, to leave the subsurface contamination in place, and to require extensive monitoring. Appropriate institutional controls will also be required and will be specified during remedial design as part of an overall plan for institutional controls in Middle Waterway. Remedial actions selected for SMU 51a must meet the performance criteria previously established in the Commencement Bay ESD dated August, 2000, and achieve the SQOs within the predicted ten-year timeframe. As with any contamination left in place, the PRPs will remain potentially liable for further cleanup of the subsurface contamination should conditions change and it presents a threat to human health or the environment. Long-term monitoring for SMU 51a will include but not be limited to regular sampling and chemical analysis of sediments as well as surveying and inspection for any sign of changed water flow patterns, erosion of sediment, colonization by marine species capable of transporting subsurface contamination to the surface, impacts to existing restoration areas, biological testing or other indications of increased risk of potentially unacceptable exposure of the subsurface materials.

EPA's selection of enhanced natural recovery in SMUs 51a and 51b also assumes that channel

armoring or other extensive erosion protection measures will not be required to avoid potential exposure of the subsurface contamination. Evidence of failure of the remedy or a need for additional habitat restoration or mitigation actions that could lead to exposure of subsurface contaminated materials will signal the need for more vigorous or frequent monitoring. The presence of subsurface contamination in SMU 51a does not prevent future restoration or mitigation efforts in this area. Any future changes that will negatively impact the effectiveness of the remedy or any evidence of remedy failure will lead EPA to evaluate more active remediation options.

Due to the high levels of contamination and circumstances surrounding SMU 51a, below is a summary of key considerations involved in the remedy selection process for SMU 51a:

Surface sediments in SMU 51a are contaminated primarily with PAHs and mercury at levels above the SQOs. The maximum concentration for mercury found in the surface sediments in this location was 2.26 mg/kg (the SQO is .59 mg/kg) and the maximum concentration for dibenzo(a,h)anthracene found in this location was .65 mg/kg (the SQO is .23 mg/kg). Modeling predicts that placement of a 10 cm or more layer of clean material will be successful in maintaining levels of chemicals below the SQO in the top 10 cm of SMU 51a, and that levels below the SQOs would be sustained for at least 50 years. The key assumptions in the modeling include no ongoing sediment deposition and no ongoing erosion. In support of these assumptions, photographs taken approximately 60 years ago show channels that are virtually unchanged. To minimize change in the existing Area C habitat at the head of the Waterway, material used for enhanced natural recovery will be similar to existing sediments.

SMU 51a is also marked by high levels of PAH and metals contamination in the subsurface. The maximum measured concentrations of HPAHs and LPAHs in Area C are found at a depth of approximately 3 to 5 feet below the sediment surface. These maximum concentrations are 983 mg/kg and 3,483 mg/kg, exceed SQOs by factors of approximately 58 and 670. In comparison, the maximum HPAH and LPAH exceedance factors measured in surface sediment samples collected throughout Area C are approximately 4 and 6. Within a lateral distance of 300 feet the maximum subsurface results, the maximum measured HPAH and LPAH exceedance factors are less than 3. As discussed in the August 2000 ESD, any cleanup plan must protect against exposure of subsurface contamination in the future. 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 (not the case at SMU 51a), or there must be a very low potential for exposure. The data suggest that any tendency for PAHs to rise through the sediments is comparatively limited and therefore there is a low potential for exposure. PAHs have a general tendency to adsorb to particulate matter; the fine-grained sediments in Area C act to cap and contain the subsurface PAH contamination.

The area encompassing SMU 51a is one of the few remaining relatively natural mudflat habitat areas within Commencement Bay. Several habitat restoration projects have been selected for areas within or adjacent to the head of Middle Waterway. All of these habitat enhancements are

in support of the recovery of ESA-listed threatened species (e.g., Puget Sound Chinook salmon and bull trout). Therefore, EPA at the time the initial plans for remedial action were being considered, EPA was concerned about potential exposure of subsurface contamination to this habitat area. Initial plans called for the introduction of a freshwater source at the head of Middle Waterway as part of the St. Paul habitat mitigation project. Were that to happen, the likelihood of exposure of the contaminated subsurface sediments from scouring would be very high and therefore the subsurface material would have to be removed. However, based on recent information submitted by the City of Tacoma, the freshwater delivery system will not be located at the head of Middle Waterway as originally thought. Instead, the 90% Design submitted in November, 2001, shows the freshwater delivery system will be installed along the eastern shoreline of Middle Waterway and indicates the discharge will be "via diffuser." At this time, EPA has no reason to believe that there will be a single discharge point at the head of the waterway and the threat of scouring is no longer a factor. If there is a significant deviation from this current design plan, EPA will reevaluate the selected remedy for SMU 51a. In addition, the head of the waterway is not an active navigational area-- there is no boat traffic and other than the daily tidal fluctuations, the head of the waterway is a relatively low-energy environment. There is no current exposure pathway associated with the contaminated subsurface sediment in SMU51a; it is relatively isolated, well-contained, and immobile, thus there is very low potential for exposure.

EPA acknowledges that based on public comments, there is strong community support to require removal of the subsurface contamination in SMU 51a. However, leaving the subsurface contamination in place meets EPA's threshold crriteria for protection of human health and the environment and compliance with ARARs. Therefore, from a technical and risk perspective EPA believes that removal of the subsurface contamination is not warranted at this time. Removal would certainly provide the most long-term effectiveness and protection, however, the contamination has been encased in this mudflat area for at least 50 to 60 years and evidence suggests that it has not moved or acted as a significant source of contamination to the waterway throughout that time period. If conditions do not change, there is no reason to believe that the subsurface contamination will move or present an exposure risk. In the short term, removal would have pronounced impacts on the unique mudflat environment in the waterway. The logistics of dredging in this area would result in significant short-term impacts to the head of the waterway. Existing restoration areas which have recently been completed would in all likelihood be disturbed, if not severely damaged. Since there is no exposure pathway for the subsurface sediments, containment of the sediment in place will result in protection to the surrounding restored habitat without short-term construction impacts. Both removal and enhanced natural recovery would have similar adverse impacts on the benthic community at the head of the waterway. However, the recovery time for ENR is also likely shorter than for dredging and backfilling since the thin layer of material placed for ENR will gradually mix with the existing underlying sediment, so organic enrichment should be reestablished more rapidly than with a thick layer of new material. Based on the assumptions used by MWAC in the "Evaluation of Remedial Options Report" dated April 9, 2001, it is estimated that dredging and disposal of this contaminated material would cost approximately $2.9 million dollars. The estimated cost for

leaving this material in place with enhanced natural recovery is approximately $200,000 plus at a minimum, approximately $25,000 per year for monitoring. Actual monitoring costs cannot be determined at this time and will depend on the details to be worked out in the Long Term Monitoring Plan. Given the fact that the contaminated sediment is contained, immobile and there is a low risk of future exposure, containment is more cost effective than additional remediation, such as dredging. However, it is possible that long-term monitoring costs could exceed the costs of dredging if other dredging or removal methods were to prove less costly. Overall, leaving the subsurface contamination in place with enhanced natural recovery and monitoring represents the best balance of tradeoffs when all options are compared.

Regular monitoring will be conducted in this area as part of the Long Term Monitoring Plan that will be developed as part of the remedial design. Should monitoring data indicate that any selected remedy is not viable, the need for additional remedial action will be considered. In addition, since contamination will be left on site, CERCLA requires a Five Year Review to ensure that the selected remedies remain protective. The Five Year Review will address issues including but not limited to erosion, chemical contamination levels, biological testing, contaminant movement, bioturbation or other problems that may lead to remedy failure.

D. Middle Waterway Cleanup Areas and Volumes

The total area of the Middle Waterway is approximately 49 acres. Under this cleanup plan, about 10 acres will be dredged yielding an approximate disposal volume of 92,700 cubic yards, 1.5 acres will be dredged and backfilled, .24 acres will be capped, and 4 acres will be monitored for natural recovery and enhanced natural recovery. The estimated cost of this remedy, assuming disposal of dredged sediments at the Blair Slip 1 disposal site is approximately $12.5 million.

E. Habitat Considerations

Remedial activities in the Middle Waterway would result in temporary and permanent impacts to approximately 14 acres of aquatic habitat. Of this, approximately 7 acres are above -10Mean Lower Low Water (MLLW) and an equal amount below -10MLLW. In the areas above -10MLLW (hereafter, littoral zone), 1.93 acres will be dredged, 1.2 acres will be dredged and capped and/or backfilled, 3.51 acres will receive a cover of clean material for enhanced natural recovery and 0.24 acres will be capped in a 3 foot cap. Included in the 1.93 acres designated for dredging, approximately .29 acres currently above -10MLLW will be dredged to a depth below -10MLLW. This is a "berm" area in front of an existing scow shed that has silted in and there is limited access to the shed. Removal of the berm will allow unimpeded tidal flow to additional areas of the waterway that currently traps water. Of the acreage below -10MLLW, 6.59 acres will be dredged, 0.27 acres will be dredged and backfilled and .44 acres will receive a cover of clean material for enhanced natural recovery.

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 that 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. Additionally, provision of soft or organic-rich substrates beneficial to salmonids will be investigated for use as final capping material.

The net effect of these changes to the aquatic ecosystem would be the unavoidable conversion of .29 acres of intertidal habitat to subtidal habitat. However, removal of the berm will allow unimpeded tidal flow to additional areas that currently trap water. This habitat conversion will actually improve the aquatic resource functions of the waterway by improving circulation and access to an adjacent shallow subtidal areas within the scow shed. Habitat quality for the site would improve because of the removal of contaminated sediments.

VI. 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 Middle Waterway.

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 all of the Milestone Reports for the Middle Waterway. The following section provides more detailed information about completed and on-going source control actions in Middle Waterway.

B. Middle Waterway

Ecology identified one major ongoing source to Middle Waterway sediment contamination: Marine Industries Northwest (boat repair, contruction). Essential source control actions have been completed for this facility, as documented in Ecology's milestone reports for Middle Waterway.

Ecology also identified six other ongoing sources of contamination to Middle Waterway sediments. Essential administrative actions (orders, decrees, or permits) are in place to address all of these sources of problem chemicals to Middle Waterway sediments, as documented in Ecology's October 1997 Milestone 4 reports for Middle Waterway. 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, control of industrial and stormwater discharges, and long-term monitoring programs. Ecology submitted its Milestone 5 report, documenting completion of source control for Middle Waterway sources on December 8, 2000. In accordance with the ROD, Ecology will continue to monitor and evaluate

the effectiveness of source control actions.

VII. SUPPORT AGENCY COMMENTS

The Washington Department of Ecology (Ecology) had the opportunity to review and comment on the draft ESD for Middle Waterway. While the state is generally supportive of most of the selected cleanup remedies for the waterway, Ecology disagrees with EPA's decision to leave subsurface contamination in place in SMU 51a. EPA has included Ecology's comments and responded to Ecology's concerns in the attached Responsiveness Summary.

The Puyallup Tribe also had the opportunity to review and comment on the draft ESD. The primary focus of the Tribe's comments was also on SMU 51a and EPA's decision to leave the subsurface contamination in place at the head of Middle Waterway. The Tribe is not supportive of this action. EPA has included the Tribe's comments and provided responses in the attached Responsiveness Summary.

VIII. 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 and subsequent ESDs, 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.

IX. PUBLIC PARTICIPATION ACTIVITIES

EPA has held regular public meetings and has issued many fact sheets to update the public on its activities for the CBN/T Superfund site since the ROD was signed in 1989. EPA mailed a fact sheet describing the Middle Waterway draft ESD to 1300 people. A public comment period was held from August 24, 2001, through September 24, 2001. A request for an extension to the comment period was received, and the date to submit public comments was then extended to October 9, 2001. EPA received 80 comment letters during the public comment period. Many letters expressed opposition to leaving the subsurface contamination in place in SMU 51a at the head of the waterway. Several comments were in favor of the selected remedy for SMU 51a. Overall there is general support for the selected remedies throughout the remainder of Middle Waterway. A summary of the comments received during the public comment period and EPA's responses are included in this ESD as Appendix C. This Final ESD can be found at the

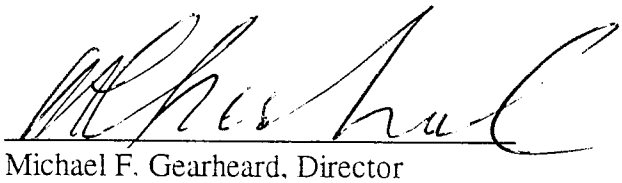
following information repositories:

Tacoma Main Public Library
1102 Tacoma Avenue S.
Northwest Room
Tacoma, WA

Citizens for a Healthy Bay
917 Pacific Avenue
Suite 406
Tacoma, WA

U.S. Environmental Protection Agency
7th Floor Records Center
1200 Sixth Avenue
Seattle, WA

Signed:



Michael F. Gearheard, Director
Office of Environmental Cleanup

2-4-07
Date

Appendices

A Cost Summaries for the Middle Waterway Remedial Actions
B Summary of Selected Remedies by Area and SMU
C Responsiveness Summary