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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Signed December 2, 2003

MEMORANDUM

SUBJECT: CSTAG Recommendations on the Lower Duwamish Waterway Contaminated Sediment Superfund Site

FROM: Stephen J. Ells **/s/ Stephen J. Ells**
John C. Meyer, Co-chairs **/s/ John C. Meyer**
Contaminated Sediments Technical Advisory Group (CSTAG)

TO: Allison Hiltner, Remedial Project Manager
Region 10

Background

OSWER Directive 9285.6-08, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (Feb. 12, 2002), established the Contaminated Sediments Technical Advisory Group (CSTAG) as a technical advisory group to "monitor the progress of and provide advice regarding a small number of large, complex, or controversial contaminated sediment Superfund sites." The main purpose of the CSTAG is to help Regional site project managers of selected large, complex, or controversial sediment sites appropriately manage their sites throughout the Superfund process in accordance with the 11 risk management principles set forth in the OSWER Directive. CSTAG membership consists of one representative per Region, two from the Office of Research and Development, and two from the Office of Superfund Remediation and Technology Innovation (OSRTI).

Brief Description of the Site

The Duwamish River originates at the confluence of the Green and Black Rivers near Tukwila, Washington, then flows northwest for approximately 13 miles, bifurcating at the southern end of Harbor Island to form the East and West Waterways before discharging to Elliot Bay in Seattle, Washington. The portion of the river that is maintained by the U. S. Army Corps of Engineers (ACOE) as a federal navigation channel (*i.e.*, the reach downstream of the Upper Turning Basin) is customarily referred to as the Lower Duwamish Waterway (LDW). The LDW Superfund study area comprises approximately 5 miles of the waterway starting upstream south of the Norfolk Combined Sewer Overflow (CSO) and ending at the south end of Harbor Island. The East and West Waterways around Harbor Island are being addressed as a separate Superfund site. LDW navigation depths maintained by the ACOE generally range from -15 feet mean lower low water (MLLW) from the Upper Turning Basin north to Slip 4, -20 feet MLLW from Slip 4 to the 1st Avenue South Bridge, and -30 feet MLLW from the 1st Ave. South Bridge to Harbor Island.

Most of the upland areas adjacent to the LDW have been heavily industrialized for many decades. Historical and current commercial and industrial operations include cargo handling and storage, marine construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane parts manufacturing. While the LDW has received many different types of industrial and municipal wastewater, there are currently no permitted industrial discharges of wastewater directly into the LDW. However, there are still industrial and municipal storm water discharges that currently enter into the LDW. In addition, the combined sewer overflow system, which receives wastewater from a variety of industries, discharges to the LDW intermittently, especially during periods of high rainfall.

Common shoreline features within the LDW include constructed bulkheads, piers, wharfs, buildings extending over the water, and steeply sloped banks armored with rip-rap or other fill materials. Intertidal shoreline habitats (*e.g.*, mudflats and marsh-like areas with upland vegetation) are dispersed in relatively small patches (generally less than one acre in size), with the exception of Kellogg Island, which represents the largest contiguous area of intertidal habitat remaining in the Duwamish River. Additional habitat areas are present below upper bank rip-rap in the reaches upstream of the 1st Ave. South Bridge. Despite this limited habitat, the LDW supports a variety of fish and wildlife species, including three ESA-listed threatened species: chinook salmon, bull trout, and bald eagle, and one candidate species, coho salmon.

There are two mixed commercial/residential neighborhoods adjacent to the waterway. The South Park neighborhood borders the west bank of the LDW at approximately river mile 3.5. The neighborhood includes approximately 1000 feet of residential shoreline, and several houses in South Park abut the LDW. The Georgetown neighborhood is east of the LDW but is separated from the waterway by several commercial facilities. The LDW is not a major area for recreational use compared to other water bodies in and around Seattle, however, there are several public access points and boat launches where people may enter the LDW for recreational purposes.

The LDW constitutes part of the Muckleshoot Tribe's Usual and Accustomed fishing area and is the only marine habitat where the Tribe has access. Tribal members use boats to conduct salmon gill net fishing throughout the LDW. Fishing by the general population for species other than salmon has not been regularly observed in the LDW. However, individuals do crab and fish for species other than salmon at points at the south end of the East and West Waterways. Clams have also been found within the LDW, though there is an advisory against clam consumption because of fecal coliform contamination.

The LDW was proposed to the National Priorities List on December 1, 2000, and final listing occurred on September 13, 2001. In December 2000, EPA and the Washington Department of Ecology (Ecology) signed an Administrative Order on Consent (AOC) with the City of Seattle, Port of Seattle, King County, and The Boeing Company (collectively known as the "Lower Duwamish Waterway Group" or "LDWG") to perform a Remedial Investigation/ Feasibility Study (RI/FS) at the LDW. The AOC called for a two-phased RI, the first phase consisting of gathering existing information on the LDW, identifying candidate sites for early remedial action, and identifying what additional information is needed to complete the RI. The first phase was completed with EPA and Ecology's approval of the Phase I RI report on August 8, 2003. The Phase I RI compiled the results of several investigations that have been conducted on the LDW over the years by various agencies before the start of the RI/FS. Approximately 1200 surface samples and 230 subsurface samples of varying data quality have been collected since 1990. With the exception of 328 samples collected by NOAA in 1997 (analyzed for PCBs and polychlorinated terphenyls), most sediment samples were analyzed for metals, semi-volatile organic compounds, organic carbon, and PCBs. LDWG used the existing data to prepare the

Phase I RI report, which included a Phase I human health and ecological risk assessment. Existing data show 59 contaminants are present in LDW surface sediments at concentrations exceeding the Washington State Sediment Management Standards.

Investigation and cleanup activities were already underway in three areas in the LDW prior to the start of the RI/FS. A 2-acre cleanup was completed at the Norfolk CSO in 1999 under a 1991 Natural Resource Damages Consent Decree between the Natural Resource Trustees, King County, and the City of Seattle. A 7-acre cleanup at the Duwamish/Diagonal CSO/SD began November 2003 under the 1991 Consent Decree. In addition, sediments in front of Boeing Plant 2 have been investigated and a cleanup plan is being developed for an approximately 10-acre area under the oversight of EPA's RCRA program.

The CSTAG visited the site and met with the site team from October 15 to 16, 2003. Three of the invited stakeholders made presentations to the CSTAG. The three presenters included the Lower Duwamish Waterway Group, NOAA, and the Duwamish River Cleanup Coalition.

CSTAG Recommendations

Based upon the site visit, the review of the site information provided to us, and the presentations made by three stakeholders, the CSTAG offers the following recommendations in order that the remedial project manager (RPM) can more fully address the 11 principles. The CSTAG expects that the RPM will consider these recommendations as the investigations continue, as the conceptual site model is refined, and as remedial alternatives are developed and evaluated.

Principle #1, Control Sources Early

- Measure or estimate the amount of key contaminants discharged at the major Combined Sewer Overflows in order to evaluate the potential for recontamination.
- Optimize the areal extent of planned early source control actions, including localized hot spots, in order to reduce recontamination potential and to minimize the scope of any future remedial actions. Post-response monitoring should also be performed in order to evaluate if there is any significant recontamination in these early action areas.
- Continue to assess other key potential contaminant transport pathways to the LDW (*e.g.*, groundwater at Rhone-Poulenc and PACCAR, 60,000 cubic yards of cement kiln dust in ravine, *etc.*) in order to evaluate if they are significant contributors to sediment contamination or may affect the effectiveness of any future response actions.

Principle #2, Involve the Community Early and Often

- CSTAG supports the Region's efforts in providing opportunities for enhanced community involvement.
- Consider hosting a technology transfer meeting to describe available remediation and treatment technologies.
- Encourage the RCRA and Superfund programs to continue their attempts to coordinate the community involvement activities associated with all early actions and other planned cleanup activities.

Principle #3, Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees

- CSTAG encourages the Region to continue with these efforts.

Principle #4, Develop and Refine a Conceptual Site Model that Considers Sediment Stability.

- CSTAG supports the Phase II RI work plan to evaluate the stability of the surficial sediments in the waterway using, as proposed, the *in situ* inverted flume developed by Ravens and Gschwend (1999). However, since this device only measures the shear stress required to initiate surficial bed sediment movement, this device cannot be used to characterize the erosion potential of sediment with depth. It is recommended that the USACE's Sedflume be used, in addition to the *in situ* inverted flume, for this purpose.

Principle #5, Use an Iterative Approach in a Risk-Based Framework

- CSTAG supports the Region's efforts in using the Phase I RI data to develop the Phase II RI work plan.
- CSTAG recommends that sampling immediately south of Boeing Plant 2 occur as expeditiously as possible in order to determine the most appropriate geographical boundary for the planned early action in this area.
- Incorporate monitoring results and lessons learned from early actions in future remedy selection and implementation.
- CSTAG recognizes that significant efforts have been made toward source control and supports early actions at this site; however CSTAG recommends that the Region evaluate whether downstream early action sites might become recontaminated due to later upstream actions, *i.e.*, CSTAG recommends the Region determine whether contaminated sediment movement under normal flow conditions is significantly affected by net downstream flow, as opposed to tidal flow in both directions.

+ what if it was determined that this would happen? What would CSTAG say

Principle #6, Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models

- For the Phase II PCB analyses, use congener-specific analyses to ensure a statistically significant correlation with Aroclor data and be mindful of possible phthalate analytical interference. CSTAG is concerned that the currently proposed 13 samples may not be sufficient to achieve a correlation.
- Establish appropriate background concentrations in relevant media such as sediment and/or aquatic biota for the Contaminants of Concern that are expected to be the risk drivers.
- Taking into consideration the known spatial variability in surficial sediment characteristics (*e.g.*, grain size distributions) at this site, the proposed Phase II RI sampling plan to characterize contamination at depth and resuspension potential using 20 cores is inadequate. It is recommended that at least 40 cores be collected to more completely characterize the contamination at depth and the resuspension potential. The locations for the cores should be selected based primarily on the hydrodynamic and sedimentary regimes of the waterway to insure that cores are collected in both depositional as well as potentially erosional areas.

Principle #7, Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals

- If the State of Washington's sediment criteria for the protection of benthic organisms are used as the basis of sediment cleanup levels, consider using a statistically-based method to confirm that the sediments remaining after an action meet the criteria. If any site sediment cleanup levels are based on protection of ecological receptors that are motile or migrate (not necessarily out of the site), consider using a surface-weighted averaging approach.
- Be realistic about the timing and effectiveness of source control actions when developing remediation goals and cleanup levels.

Principle #8, Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals The CSTAG will evaluate consistency with this principle later in the process.

Principle #9, Maximize the Effectiveness of Institutional Controls and Recognize their Limitations

- Evaluate whether ICs are necessary to protect the integrity of the Norfolk CSO cap.

Principle #10, Design Remedies to Minimize Short-term Risks while Achieving Long-term Protection The CSTAG will evaluate consistency with this principle later in the process.

Principle #11, Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness The CSTAG will evaluate consistency with this principle later in the process.

Regional Response

Please send us a short written response to these recommendations within 60 days. If you have any questions or would like a clarification to any of these recommendations please call one of us (Steve 703 603-8822, John 214 665-6742).

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