



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10

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OFFICE OF  
ENVIRONMENTAL CLEANUP

SEP 23 2010

SUBJECT: Action Memorandum for the Time-Critical Removal Action at North Boeing Field near the Slip 4 Early Action Area of the Lower Duwamish Waterway Superfund Site, Seattle, King County, Washington

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**I. PURPOSE**

The purpose of this Action Memorandum is to request and document approval of the selected time-critical removal action described herein for the North Boeing Field (NBF) at 7500 East Marginal Way near the Slip 4 Early Action Area of the Lower Duwamish Waterway (LDW) Superfund Site, Seattle, in King County, Washington. The proposed time-critical removal action is expected to be conducted by a potentially responsible party (PRP), The Boeing Company (Boeing), in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) with oversight by the U.S. Environmental Protection Agency (EPA).

This removal action consists of the design, installation, and operation of stormwater treatment facilities at NBF to remove polychlorinated biphenyls (PCBs) and other hazardous substances prior to the discharge of stormwater from NBF to the Slip 4 Early Action Area. This removal action is intended to minimize the potential for recontamination of sediment in Slip 4, which is currently scheduled for remediation starting in October 2011, pursuant to a separate EPA settlement agreement with the City of Seattle and King County, dated September 28, 2006.

**II. SITE CONDITIONS AND BACKGROUND**

The CERCLIS ID No. is WA0002329803 and the Site ID is 10JE.

At NBF, Boeing operates research, flight testing, aircraft finishing, and delivery facilities. Many of these operations are part of their primary business to produce airplanes. Boeing has operated at this facility since the 1940s.

NBF is approximately 99% impervious, and the stormwater<sup>1</sup> is collected in a storm drain system (the System) that carries stormwater from NBF to the LDW. The NBF storm drain system includes over 600 storm drain structures, including catch basins, manholes, trench drains, inlets, and oil-water separators. The total length of the system is estimated to be 7 to 8 miles. Studies conducted by Boeing, the Washington State Department of Ecology (Ecology), and the City of Seattle report significant concentrations of PCBs and other contaminants in solids in manholes, catch basins, and sediment traps at NBF, and in water in the storm drain system. There is substantial information indicating that stormwater from NBF is a source of PCBs in the Slip 4 sediments, and this action is necessary to effectively eliminate the continuing threat of these PCBs to Slip 4 of the LDW Superfund site, and thereby allow for the remediation of sediments in Slip 4 while minimizing the risk of sediment recontamination in Slip 4.

## **A. Site Description**

### **1. Removal site evaluation**

Substantial environmental information exists on the NBF site, and the site has been the subject of numerous environmental investigations and cleanups beginning in the early 1980s (see Ecology's *North Boeing Field and Georgetown Steam Plant Supplemental Summary of Existing Information and Identification of Data Gaps Report, April 2009*). Contaminants from NBF have been transported to Slip 4 sediments via the storm drain system (see Ecology's *Technical Memorandum: Status of Slip 4 Source Control, 2007*). The primary contaminant of concern is PCBs (see Ecology's *North Boeing Field/Georgetown Steam Plant Site Remedial Investigation/Feasibility Study, Preliminary Stormwater Sampling, Interim Data Report, May 2010*). A brief summary follows:

- In 2001, the LDW was placed on the National Priority List (NPL) pursuant to CERCLA. PCBs are the primary contaminant of concern throughout the LDW.
- In 2003, the sediments and portions of the bank in Slip 4 were identified as an Early Action Area. Within the Slip 4 Early Action Area, the chemical of concern in the contaminated sediments is PCBs. PCB concentrations in surface sediments range from 0.2 ppm to 5.1 ppm and in subsurface sediments range up to 17 ppm.
- In 2006, EPA issued a non-time-critical removal Action Memorandum for the Slip 4 Early Action Area. The removal action addresses approximately 3.5 acres of contaminated marine sediments and banks, and will be conducted by the City of Seattle and King County pursuant to an EPA Settlement Agreement. The chemical of concern is PCBs.

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<sup>1</sup> Stormwater shall mean all liquids, including any particles dissolved therein, in the form of base flow, storm water runoff, snow melt runoff, and surface runoff and drainage, as well as all solids which enter the storm drain system.

- In January 2007, Ecology (as the lead for source control at the LDW Superfund site) determined that the cleanup of the Slip 4 Early Action Area should not proceed due to ongoing PCB discharges to the slip, and the corresponding likelihood of recontamination of the sediments following the removal action. Ecology also concluded that NBF was the most significant source of contamination, based on PCBs found in solids in the storm drain system at NBF.
- In 2007, Ecology's *Technical Memorandum: Status of Slip 4 Source Control* identified NBF as a significant source of PCBs to the LDW.
- In 2008, pursuant to the Model Toxics Control Act (MTCA), Ecology signed an Agreed Order DE 5685 with Boeing, King County, and the City of Seattle to facilitate remedial action at the NBF/Georgetown Steam Plant site. The order describes the process by which Ecology will conduct a Remedial Investigation/Feasibility Study (RI/FS) and interim actions.
- In August 2009, EPA and Ecology notified Boeing that EPA intended to require treatment of storm water if PCB discharges to Slip 4 are not eliminated by accelerated source control measures.
- In 2009, Ecology updated existing reports to document environmental conditions at NBF and to identify data gaps that need to be filled in order to characterize the site and its potential to re-contaminate Slip 4 sediments following cleanup. Data on storm drain solids from NBF were again evaluated documenting the significant presence of PCBs in the storm drain system at NBF.

From the early 1980s through 2010, NBF and its storm drain system has been the subject of numerous environmental investigations that have documented PCBs in soil, groundwater, storm drain solids, whole water, and filtered solids. The testing of as many as 300 drainage units (e.g., catch basins) at NBF shows that there were PCBs in solids in each of these locations, with many samples exceeding 1 ppm, and ranging up to 1,320 ppm PCBs. As recently as April 2010, there were PCBs in hundreds of samples of solids obtained from the storm drain system at a concentration of up to 34 ppm, and in samples of whole water obtained from the system at concentrations up to 0.15 ug/L PCBs. There have also been PCBs found in asphalt, caulk, concrete, and miscellaneous debris at NBF.

## **2. Physical Location**

NBF is located approximately 4 miles south of downtown Seattle at 7500 East Marginal Way South, and occupies approximately 120 acres, primarily within the Seattle and Tukwila city limits. NBF is approximately 150 feet from the head of Slip 4, which is an Early Action Area at approximately River Mile 2.8 on the Duwamish Waterway within the LDW Superfund Site. The precise location is 47.541410 North Latitude; -122.316506 West Longitude.

NBF is an industrial site. Surrounding land use is primarily industrial, except to the northwest along Ellis Avenue South, which is residential. Within the portion of NBF that will be subject to stormwater treatment, there are no known historical landmarks or cultural structures with historical significance that have been identified.

Slip 4 is currently used for navigation and possible recreational activities such as kayaking, canoeing, and motor boating. Commercial and tribal fishing occurs within and near the Duwamish River. The Muckleshoot Tribe has federally-recognized treaty rights in the vicinity of Slip 4. Tribal Usual and Accustomed fishing areas recognize commercial, subsistence, and ceremonial tribal fishing rights.

Threatened or endangered species potentially occurring within the local area include Chinook salmon (*Oncorhynchus tshawytscha*) and Puget Sound steelhead (*Oncorhynchus mykiss*). The Duwamish River and Slip 4 are designated critical habitat for Chinook salmon. Designated habitat for steelhead is currently under development.

### **3. Site characteristics**

NBF is an active facility. Boeing manages numerous research, testing, and manufacturing facilities on the property. The majority of the site is leased by Boeing from King County, and Boeing owns the improvements it has constructed on the leased property.

No other CERCLA removal actions have been conducted at the site.

### **4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant**

The substances known to be on-site and present in stormwater discharges from NBF to Slip 4 include PCBs. For this removal action, the chemical of concern is PCBs. This is a hazardous substance as defined by Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §9601(14). Other hazardous substances, pollutants, and contaminants (e.g., metals, including mercury, petroleum, and oils) may also be on-site.

Numerous environmental investigations have documented the presence of PCBs at NBF, including PCBs in stormwater samples collected in and from the storm drain system at NBF and discharges through storm drain pipes to Slip 4 (see Section II.A.1 of this Action Memorandum).

PCBs found in solids in the System: (i) at a concentration of over 900 ppm in 1985; (ii) at a concentration of over 420 ppm in 1992; (iii) at a concentration of up to 1,320 ppm and ranging from 10 ppm to 50 ppm in 66% of the tested locations in 2005; (iv) at a concentration of over 100 ppm in 2006; (v) at a concentration of up to 94 ppm and with all 24 samples exceeding 10 ppm in 2007; and (vi) at a concentration of greater than 0.1 ppm in all 61 samples in 2009.

From 1994 to 1997, PCBs were detected about 25 times in soil at NBF at concentrations ranging from 55 ppm to 25,300 ppm. During the past six years, PCBs at a concentration ranging from 62 ppm to 2,680 ppm have been found in about 15 soil samples obtained from NBF. In 2009, PCBs were found near Building 3-322 at NBF in each of 36 soils samples, six asphalt samples, and 75 samples of solids from within ground surface drains; and in 26 of 30 samples from solids located on ground surfaces.

Sampling in 2000 and 2001 showed there to be PCBs at a concentration of up to 79,000 ppm in up to 90,000 linear feet of caulk used to fill the expansion joints in concrete ground surfaces at NBF. Following the removal of this PCB-contaminated caulk, the newly installed replacement caulk was found to be contaminated with PCBs at a concentration of 370 ppm.

In March and April of 2010, PCBs with a concentration of up to 34 ppm were found in each of 244 samples of solids in the System, and 83 of these samples had a concentration of PCBs at greater than 1 ppm. Also in 2010, samples of whole water and filtered solids were obtained from Manhole 108 and the King County Lift Station. The samples obtained during a storm water runoff event showed there to be PCBs in filtered solids from Manhole 108 at concentrations ranging from 2.2 ppm to 18 ppm, and from the King County Lift Station at concentrations ranging from .66 ppm to 2.8 ppm. The samples of whole water obtained during the storm event showed there to be PCBs at a concentration of up to 0.15 micrograms per liter (“ug/L”). In samples obtained from these same locations during base flow conditions, which is a time when infiltration and inflow into the System were not being influenced by a storm water runoff event, there were PCBs in filtered solids at concentrations ranging from 1.6 ppm to 25 ppm, and in whole water at concentrations ranging from 0.014 ug/L to 0.22 ug/L.

In an effort to adequately protect Slip 4 of the LDW from the impacts of further contamination, EPA has established interim maximum levels for releases of PCBs at 0.1 ppm in solids and 0.014 ug/L in liquids. The sampling of the System conducted in 2010 shows there to be solids in 123 of 125 tested locations with PCBs above the established interim maximum level for a release to Slip 4, and that these PCBs infiltrate the System at up to 25 ppm even in the absence of a storm water runoff event. This sampling further shows there to be whole water at multiple locations in the System with a concentration of PCBs which is up to 16 times greater than the established maximum level for a release to Slip 4.

## **5. NPL Status**

NBF is located adjacent to Slip 4, which is a portion of the LDW Superfund site. The LDW site was listed on the NPL on September 13, 2001.

## **6. Maps, pictures, and other graphic representations**

Refer to attached Figures 1 and 2.

### **B. Other Actions to Date**

#### **1. Previous Actions**

There have been no previous CERCLA removal actions at NBF.

NBF is subject to an Ecology MTCA order for a Remedial Investigation/Feasibility Study (RI/FS) (see Section II.A.1 above). Under EPA Toxic Substances Control Act (TSCA) authorities, Boeing has removed PCB-contaminated soil, asphalt and debris in the vicinity of Building 3-322, as well as concrete joint material (caulk) at NBF.

In 2006, EPA issued a non-time-critical removal Action Memorandum for sediment cleanup in the Slip 4 Early Action Area, which has been on hold pending implementation of actions to control upland discharges of PCBs to Slip 4. With implementation of stormwater treatment at NBF, the non-time-critical removal action in Slip 4 is now scheduled for contractor in-water work to begin October 2011.

## **2. Current actions**

As the lead agency for source control efforts at the LDW Superfund site, Ecology is currently performing upland source control work throughout the LDW under state authorities. Ecology has issued a Source Control Action Plan for the Slip 4 Early Action Area, which is currently being implemented to address sources of contamination, including PCBs, to Slip 4. Pursuant to a MTCA order, Ecology is also overseeing the RI/FS for the NBF/Georgetown Steam plant site. As part of this effort, Ecology has updated information about source control activities at NBF; documented environmental conditions at NBF, including identification of data gaps to be filled in order to adequately characterize the site and its potential to re-contaminate Slip 4 sediments following cleanup; and collected stormwater and continuous flow measurements from the storm drain system to identify contaminant sources at NBF, including contaminant loading contributions.

Boeing has undertaken some cleanup and maintenance work in an effort to remove PCBs from NBF and the storm drain system. Boeing has removed 89,000 linear feet of PCB-contaminated joint compound (caulk) from NBF, and flushed parts of the system with water and removed the dispersed liquids and solids. Boeing has also placed filters in some of the drains at NBF in order to collect PCB-contaminated solids which run off into the system from ground surfaces. In addition, Boeing has removed PCBs found in soil, asphalt, solids, and debris within the Building 3-322 area of NBF. Although the cleanup and maintenance work performed by Boeing has likely resulted in the removal of some PCBs from NBF and the system, the data continue to show releases of PCBs.

With stormwater treatment in place, PCBs will be prevented from reaching Slip 4, and the LDW site will be protected from further contamination. It will also allow Boeing and Ecology to continue to investigate the nature and extent of contamination at NBF, and implement source control actions as necessary, while allowing EPA to proceed with the sediment cleanup in Slip 4 and protect public health and the environment from continued exposure to contamination.

### **C. State and Local Authorities' Roles**

#### **1. State and local actions to date**

The LDW Superfund site is a joint-lead between EPA and Ecology. Ecology has fully participated in the cleanup decisions for the Slip 4 Early Action Area. Ecology, the City of Seattle, and King County coordinate efforts at NBF and communicate regularly.

Ecology has worked with EPA in assessing the release at NBF, and will continue work on the MTCA order and interim actions at the site. Ecology and EPA meet regularly and coordinate on all work associated with the NBF and LDW cleanups.

## **2. Potential for continued State/local response**

Ecology will continue work at NBF pursuant to the MTCA order and in its role as lead agency for source control for the LDW Superfund site.

### **D. Tribal Interests**

For the LDW Site, including Early Action Areas and source control actions within the LDW, EPA has initiated formal consultation with the Muckleshoot and Suquamish Tribes. Tribes have participated in document reviews, special meetings upon Tribal request, and frequent coordination meetings such as quarterly updates and project-specific briefings. For this removal action, EPA has provided information to the Tribes at LDW quarterly meetings and has asked the Tribes if they have any concerns about the proposed removal action. Most recently, on August 17, 2010, EPA provided a project update to the Muckleshoot Tribe and Suquamish Tribe. Neither Tribe expressed any environmental or cultural resources concerns related to the removal action for EPA to consider.

## **III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES**

The current conditions at this site meet the following factors which indicate that the site is a threat to the public health or welfare or the environment and a removal action is appropriate under the National Contingency Plan (NCP), 40 C.F.R. § 300.415(b)(2). Any or all of these factors may be present at a site and any one of these factors may determine the appropriateness of a removal action.

### **A. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants (300.415[b][2][i]).**

The elevated concentrations of PCBs found in solids and water in stormwater that is discharged from NBF to Slip 4 of the Duwamish Waterway poses a threat to human health and the environment.

After discharge to Slip 4, PCBs present in the stormwater are likely to be deposited on sediments in Slip 4. Potential exposure pathways for human health risks include direct contact with PCB-contaminated sediments during net-fishing or beach play, and ingestion of fish or shellfish that are in contact with sediment or that have fed on prey that reside within the sediment. PCBs are a known human carcinogen and are also known to accumulate in the tissue of fish and shellfish. PCBs found in Slip 4 sediments likely contribute to potential unacceptable risks to humans throughout the LDW, as documented in the EPA/Ecology RI/FS for the LDW Site.

Potential exposure pathways for ecological receptors (benthic organisms, fish, birds and mammals) include direct contact with PCB-contaminated sediments and ingestion of PCB-contaminated sediment. The primary potential exposure pathway for fish, birds and mammals is ingestion of marine organisms. Bottomfish may have additional exposure due to direct contact with or ingestion of contaminated sediment. PCBs are known to adversely affect aquatic biota. Sediments in Slip 4 have concentrations of PCBs that exceed the Washington State Sediment Management Standards (SMS) that are considered protective of benthic organisms.

Additionally, PCBs present in stormwater at NBF, as documented by whole water sample analysis, have been shown to exceed toxics water quality criterion that are established for aquatic life protection and human health protection from consuming water and fish/shellfish.

**B. Actual or potential contamination of drinking water supplies or sensitive ecosystems.**

Stormwater discharges from NBF to Slip 4 of the Duwamish Waterway cause contamination of the marine and freshwater ecosystem. PCBs are known to adversely affect biota as described in Section III (1).

**C. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.**

Heavy rainfall in the Fall would be expected to cause an increase in stormwater flows that would release PCBs from the NBF storm drain system to Slip 4. Based on National Weather Service Seattle Precipitation Summaries, normal rainfall in August averages 1 inch, and increases in September (average 1.63 inches) and October (average 3.19 inches), with the highest rainfall occurring in November (average 5.90 inches).

**D. The availability of other appropriate federal or state response mechanisms to respond to the release (300.415(b)(2)(vii)).**

The proposed time-critical removal action is expected to be conducted by the PRP in accordance with CERCLA and subject to the oversight of EPA. Other than CERCLA, there are no known other appropriate federal or state response mechanisms capable of providing the appropriate resources in the prompt manner needed to address the potential human health and ecological risks associated with the stormwater discharges described herein. Coordination efforts have occurred between EPA and Ecology for this removal action.

#### **IV. ENDANGERMENT DETERMINATION**

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

## V. PROPOSED ACTIONS AND ESTIMATED COSTS

### A. Proposed Action

#### 1. Proposed Action Description

The Removal Action will primarily consist of the design, installation, and operation of stormwater treatment facilities to remove PCBs prior to the discharge of stormwater from NBF via the King County Airport Storm Drain #3/PS44 Emergency Overflow (EOF) to the Slip 4 Early Action Area. In the normal operation of the treatment facility(s), other hazardous substances that occur in stormwater will also be reduced.

The long-term stormwater treatment facility(s) for the NBF storm drain system shall meet the following interim goals for PCBs in solids and water:

- Water discharged to Slip 4 must be below the Aquatic Life - Fresh/Chronic water quality standard of 0.014 µg/L total PCBs, unless a salinity study is conducted in Slip 4 and results justify the use of the Marine/Chronic water quality standard of 0.03 ug/L total PCBs.
- In line storm drain solids discharged to Slip 4 must be below 100 ppb dry weight total PCBs. This interim goal shall be used as a point of departure in considering whether the long-term interim goal for in-line storm drain solids discharged to Slip 4 should be modified in accordance with the all known, available and reasonable methods of prevention, control and treatment (AKART) as described below.<sup>2</sup>

EPA will select a long-term interim goal for the protection of water and sediment quality from discharges of PCBs in solids that meets AKART. AKART shall represent the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge. For this project, stormwater treatability studies must focus on removal efficiencies for smaller particles ( $\leq 5$  microns), as existing data show that a large percentage of the mass of PCBs is associated with these smaller particles). Any such alternative determination by EPA will be documented in a publically-available decision document.

The short-term stormwater treatment facility for the NBF storm drain system shall meet the following interim goals for PCBs in solids and water:

- Water discharged to Slip 4 must be below the Aquatic Life - Fresh/Chronic water quality standard of 0.014 µg/L total PCBs.

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<sup>2</sup> The basis for establishing the long-term interim goal of 100 ppb dry weight total PCBs for solids in discharges from the storm drain system to Slip 4 is described in correspondence from EPA to Boeing dated February 16, 2010; February 18, 2010; and June 24, 2010. The current derivation of the Slip 4 sedimentation model predicts that a maximum bulk storm drain solids concentration of 100 ppb PCBs will not recontaminate Slip 4 sediments above 130 ppb PCBs, which is the equivalent dry weight concentration for the carbon-normalized State Sediment Quality Standard based on the 1988 Puget Sound Apparent Effects Threshold (AET) database (Tetra Tech 1988).

- In-line storm drain solids discharged to Slip 4 must be below 10 mg/L total suspended solids<sup>3</sup> (TSS) as a daily maximum concentration and 5 mg/L TSS as an average monthly concentration, and must be below 420 ppb dry weight total PCBs.<sup>4</sup>

The compliance point for the interim goals shall be measured at the Lift Station LS431.

EPA maintains that zero discharge of PCBs to Slip 4 remains a long-term goal for source control actions, as the risk to humans and the environment associated with PCBs in the Lower Duwamish Waterway may only be properly addressed by stopping PCB inputs to this aquatic system.

To control contaminant discharges to Slip 4 and meet PCB interim goals for solids and water, and in response to the directive of EPA, a short-term treatment facility was installed and placed into operation on or about September 15, 2010. This facility will be operated on a continuous basis under the oversight and direction of EPA until the long-term stormwater treatment facility(s) is installed and operating, which is expected to occur by or about September 2011. The long-term treatment facility(s) shall be designed, installed, operated and maintained under the oversight and direction of EPA, and in accordance with EPA-approved work plans, design documents, and operation and maintenance manuals.

Based on current knowledge and readily available data and other information, the best alternative which is anticipated to immediately reduce the most significant amount of PCBs from stormwater at NBF is the short-term stormwater treatment facility that has been placed into operation in the north portion of NBF near Manhole 130. Stormwater capture, pump-out, and reintroduction of treated stormwater, with a minimum of two 18,000 to 21,000-gallon holding tanks, is occurring, and will continue to occur at this facility. Based on a preliminary evaluation of stormwater treatment technologies, it was determined that chitosan-enhanced sand filtration should be used in the short-term stormwater treatment facility for the effective removal of suspended solids and PCBs. Carbon filtration units will be added to this facility, if necessary. The long-term stormwater treatment facility will be designed based, in part, on data collected during operation of this short-term stormwater treatment facility.

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<sup>3</sup> In this context, total suspended solids (TSS) are viewed as a surrogate for hydrophobic compounds, such as PCBs. Based on the relationship between PCBs and TSS, the concentration of 10 mg/L TSS would result in the water quality standard of 0.014 ug/L total PCBs being consistently met (as cited in GeoSyntech, August 24, 2010).

<sup>4</sup> The interim goals for the short-term treatment facility have been established in recognition of the need for additional analysis of whole water and filtered solid samples from the NBF storm drains system, as well as the need for consideration of performance data from the 2010/2011 operation of the short-term treatment system. These data collection efforts will include, at a minimum, PCB analyses of influent and effluent associated with the short-term treatment system; PCB fractionation studies; flow measurements; mass balance monitoring; and, evaluation of results from compliance assessment evaluations of the short-term treatment system, including demonstration of effectiveness of treatment under a variety of storm water flows and characteristics particularly as it relates to the removal of smaller particle sizes. In order to allow for the time that may be necessary to develop the most effective treatment facility(s), EPA has established the short-term interim goal of 420 ppb dry weight total PCBs in solids (as cited in *Technical Memorandum: PCB Remediation Level for Storm Drain Solids*, Landau Associates, July 23, 2010), but fully expects the more stringent interim treatment goal of 100 ppb dry weight total PCBs in solids to be attained as soon as possible.

Sampling and analysis of influent and effluent will be monitored to ensure compliance with the interim PCB goals for solids and water and ARARs.

Temporary Best Management Practices (BMPs) will be implemented during cleanup activities to protect workers, the public, and the environment from short-term construction impacts. All wastes, including solids removed by the treatment facility, shall be packaged, transported, and disposed of appropriately in accordance with state and federal regulations.

At this time, there are no expected post-removal site controls. Any post-removal site controls will be managed by Boeing.

## **2. Contribution to remedial performance**

Stormwater from NBF discharges to the Slip 4 Early Action Area of the LDW Superfund site. The proposed response action will contribute to the efficient performance of any long-term remedial action for the LDW site with respect to the release or threatened release concerned.

## **3. Applicable or relevant and appropriate requirements (ARARs)**

The NCP requires that removal actions attain Applicable or Relevant and Appropriate Requirements (ARARs) under federal or state environmental or facility siting laws, to the extent practicable considering the exigencies of the situation (40 CFR § 300.415[j]). In determining whether compliance with ARARs is practicable, EPA may consider the scope of the removal action and the urgency of the situation (40 CFR § 300.415[j]). The scope of the removal action proposed in this Action Memorandum is limited. ARARs are described below.

*Washington State Water Quality Standards for Surface Waters (WAC 173-201A).* Standards for the protection of surface water quality have been established in Washington State. These water quality criteria are anticipated to be relevant and appropriate requirements for discharge to surface waters in Slip 4. Due to the complexity of the estuarine environment and the goal of protecting the full array of species that are present, the lower of the marine and freshwater criteria will be applied to this removal action.

*Washington State Sediment Management Standards (WAC 173-204).* Chemical concentration and biological effects standards are established for Puget Sound sediments and are applicable to sediments in Slip 4. A goal for the stormwater discharge from NBF will be to not cause or contribute to exceedances of the applicable State sediment management standards pertaining to PCBs.

*Washington State Hazardous Waste Management Act and Dangerous Waste Regulations [RCW 70.105; Chapter 173-303 WAC].* Washington State Dangerous Waste regulations govern the handling and disposition of dangerous waste, including identification, accumulation, storage, transport, treatment, and disposal. The Dangerous Waste regulations are potentially applicable to generating, handling, and managing dangerous waste at the Site, and would be potentially relevant and appropriate even if dangerous wastes are not managed during remediation.

*Toxic Substances Control Act (TSCA) Regulations [40 CFR 761]*. These regulations are applicable to solids in the storm drain system and stormwater treatment system that contain PCBs. All solids with PCBs at a concentration equal to or greater than 50 ppm must be disposed of in a state or federally authorized chemical waste landfill, and those solids with PCBs at a concentration less than 50 ppm may be disposed in a municipal solid waste or non-hazardous waste landfill. These regulations are also applicable to the discharge of water to the LDW, and prohibit such a discharge unless the concentration of PCBs is less than 3 ug/L.

*Washington State Solid Waste Management Act (RCW 70.95) and Solid Waste Handling Standards (WAC 173-350)*. These regulations are applicable to the disposal of non-hazardous waste generated during removal activities. The off-site rule (40 CFR 302.440) of the NCP requires that solid and hazardous waste offsite landfills to which CERCLA hazardous substances are being sent must be acceptable to EPA. The project specifications will require EPA approval of the proposed disposal facility for any material sent off-site.

*Endangered Species Act [16 U.S.C. §§ 1531 – 1544; 50 CFR Parts 17, 402]*. The Endangered Species Act (ESA) protects species of fish, wildlife, and plants that are listed as threatened or endangered with extinction. It also protects designated critical habitat for listed species. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species, including consultation with resource agencies. For this response action, listed threatened or endangered species (i.e., Chinook salmon and Puget Sound steelhead) and critical habitat areas (Chinook salmon) occur within the vicinity of NBF. However, this response action does not occur in-water and all construction activities (i.e., stormwater treatment facility) will occur above the Mean Higher High Water elevation of Slip 4. EPA actions were evaluated, and EPA has determined that there is no effect on listed species and critical habitat under the ESA (see August 30, 2010, letter from EPA to National Marine Fisheries Service).

#### **4. Project Schedule**

It is expected that project implementation will begin in September, 2010. Short-term stormwater treatment will occur until about September 2011, or until long-term stormwater treatment is operational and functional.

##### **B. Estimated Costs**

It is anticipated that the work described for this proposed time-critical removal action will be implemented by Boeing and their contractor personnel. The estimated costs for the short-term stormwater treatment facility are \$250,000. Estimated construction costs for the long-term stormwater treatment facility, which will be designed in part based on data collected during operation of the short-term treatment facility and resolution of issues regarding diversion of off-site stormwater, are unavailable at this time but will may range from \$3 to \$7 million for three years. It is anticipated that Boeing, and possibly other liable parties, will be held financially responsible for costs incurred by the EPA as set forth in Section 107 of CERCLA.

EPA estimated costs per this Action memorandum are anticipated only for costs associated with oversight of work performed by Boeing. This work includes, but is not limited

to, review and comments on required deliverables, field oversight of work, and other EPA responsibilities with respect to implementation of this response action. If EPA were to undertake implementation of the work described in this Action Memorandum with its own resources, an Action Memorandum Amendment and cost Ceiling Increase would be required.

#### **VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

If the proposed removal action should be delayed or not taken, hazardous substances will remain as potential human health and ecological threats and hazardous substances will remain a continuing source of solid and dissolved-phase contaminants to the environment. In addition, removal of contaminants from Slip 4 sediments may not proceed and current risks to human health and the environment associated with the sediments will remain.

#### **VII. OUTSTANDING POLICY ISSUES**

None.

#### **VIII. ENFORCEMENT**

It is anticipated that this removal action will be implemented by Boeing, pursuant to an Administrative Settlement Agreement and Order on Consent for Removal Action (Settlement Agreement). The Settlement Agreement is currently being negotiated between EPA and Boeing. The Settlement Agreement describes the work to be performed for the removal action, including preparation and submittal of work plans, project design documents, and removal action documents, implementation of the removal action, and submittal of a Removal Action/Stormwater Treatment Completion Report. EPA would oversee compliance and enforcement of this Settlement Agreement.

If, for any reason, EPA and Boeing do not consummate the Settlement Agreement, EPA may take other action to require the implementation of the removal action, or may perform the removal action with public funds and then seek to recover those funds from Boeing and other liable parties. See the Confidential Enforcement Addendum for enforcement details.

**IX. RECOMMENDATION**

This decision document sets forth the selected removal action for the North Boeing Field site, located in Seattle, King County, Washington, which has been developed in accordance with CERCLA, and is consistent with the NCP. This decision is based on the administrative record for the Site.

Conditions at the site meet the NCP 40 C.F.R. § 300.415(b) criteria for a removal action and I recommend your approval of the proposed removal action. The proposed removal action is expected to be conducted by Boeing, a Potentially Responsible Party, with oversight by EPA.

**X. APPROVAL / DISAPPROVAL**

APPROVAL:



Daniel D. Opalski, Director  
Office of Environmental Cleanup

9/23/2010  
Date

DISAPPROVAL:

\_\_\_\_\_  
Daniel D. Opalski, Director  
Office of Environmental Cleanup

\_\_\_\_\_  
Date

**Figure 1**  
**Site Location, North Boeing Field**

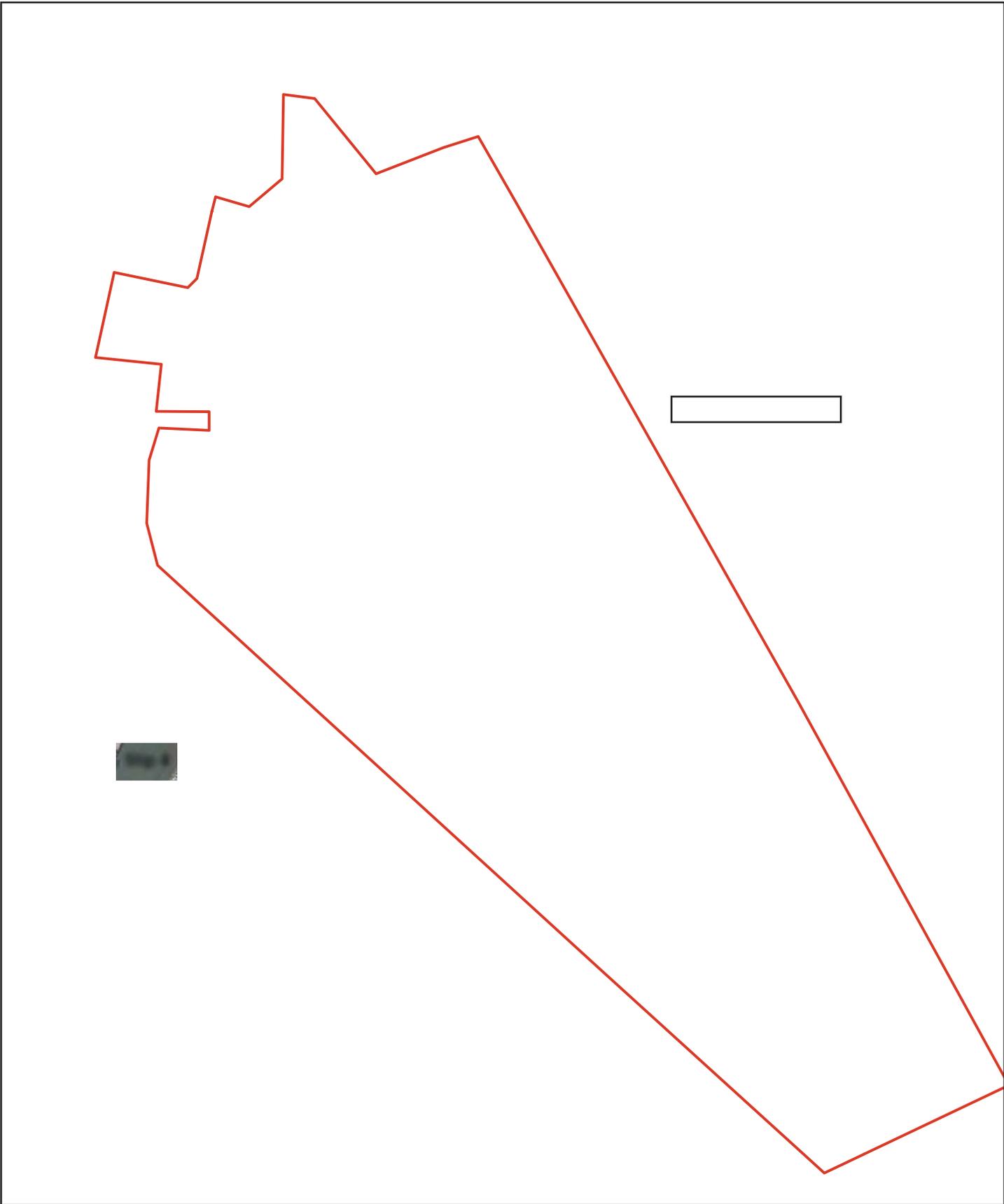


Figure 1. Site Location, North Boeing Field



**Figure 2**  
**Site Layout, Most Recent PCB Concentrations**  
**in Storm Drain Structures at North Boeing Field**

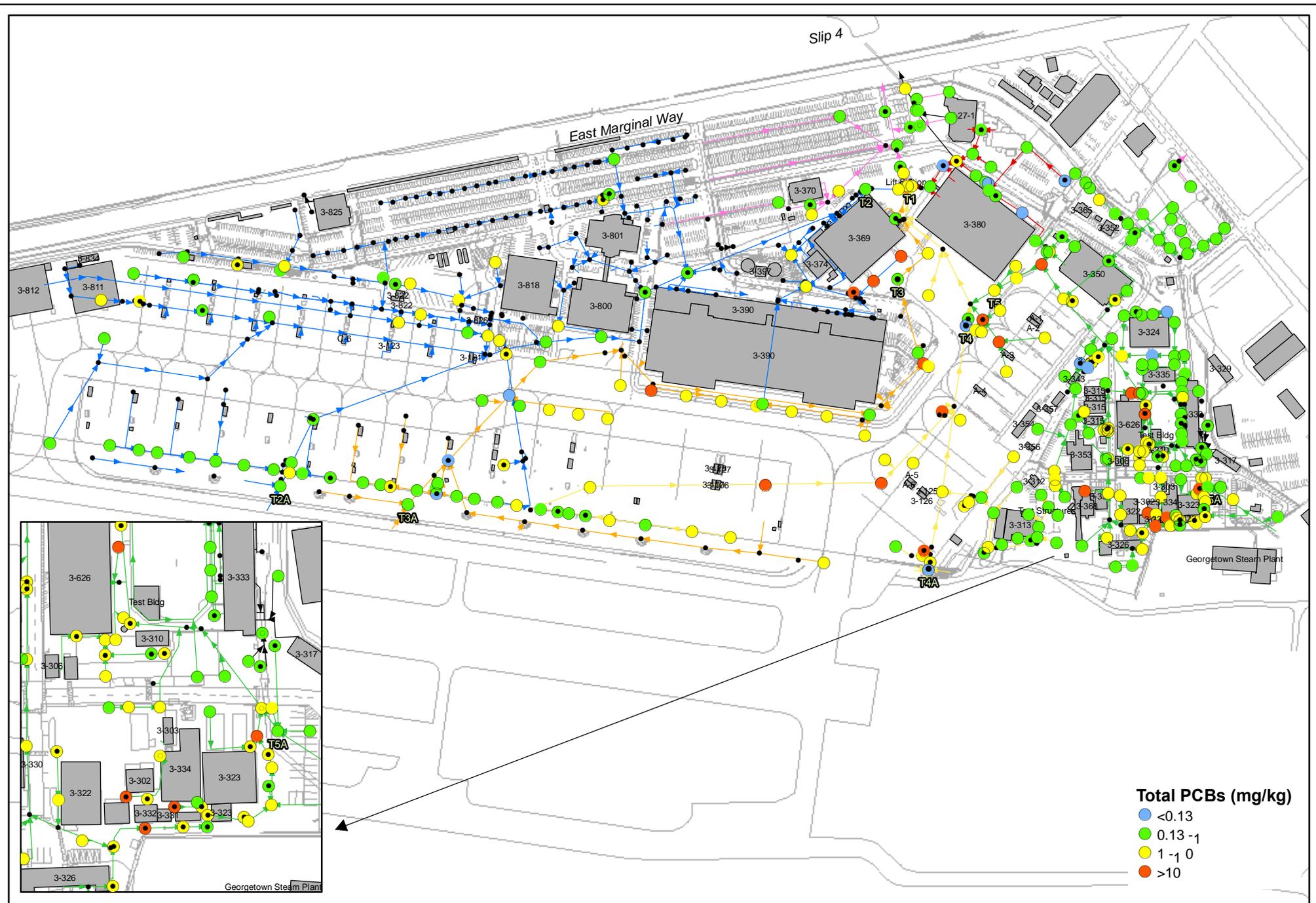


Figure 2. Site Layout, Most Recent PCB Concentrations in Storm Drain System Structures, North Boeing Field

