STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

July 22, 2010

Dear Lora Lake Apartments Stakeholder:

Thank you for your interest in the Lora Lake Apartments Cleanup Site. This contaminated site is being cleaned up by the Port of Seattle under an Agreed Order with the Washington State Department of Ecology.

Enclosed is the responsiveness summary for comments received on the public review draft of the Draft Remedial Investigation/Feasibility Study Work Plan for the Lora Lake Apartments site. The Port of Seattle has revised the work plan to add data collection activities that will address public concerns. Field sample collection is scheduled to begin the last week in July.

The draft work plan is currently posted on Ecology's Lora Lake Apartments web site. The final work plan will be posted as soon as it is available. The web address is http://www.ecy.wa.gov/programs/tcp/sites/loraLakesAps/loraLakesAps_hp.html.

If you have any questions, please contact me at 425-649-7200 or dsou461@ecy.wa.gov.

Sincerely,

David L. South

David L. South
Senior Engineer
Washington State Department of Ecology

ds/nl/kp

Lora Lake Apartments Stakeholder Distribution List

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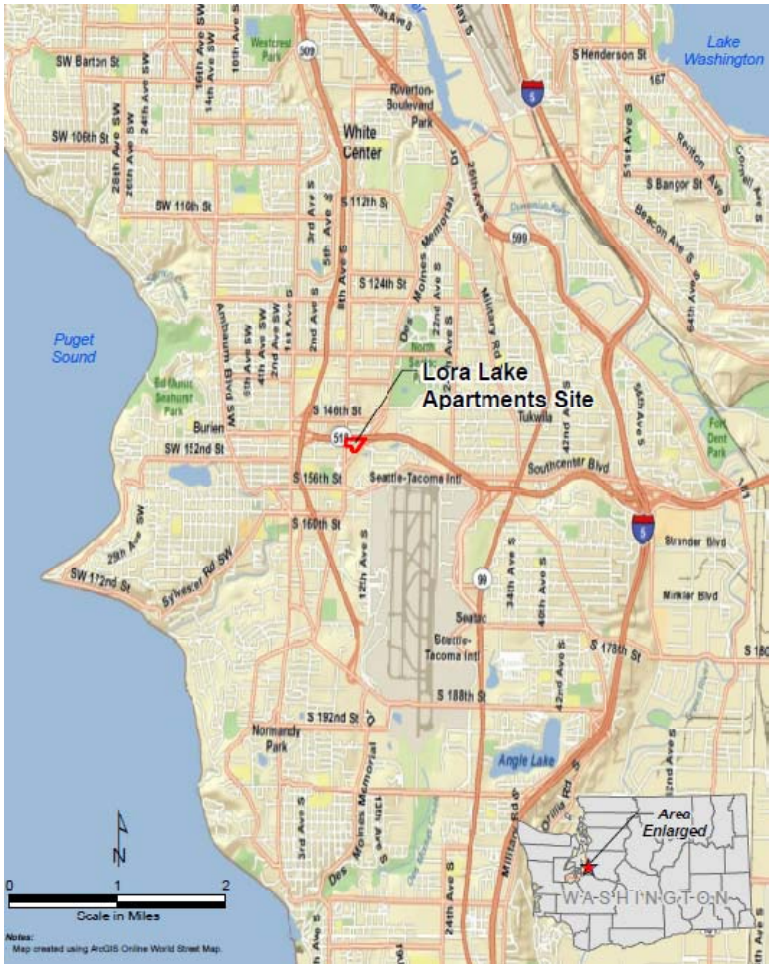
Responsiveness Summary

Lora Lake Apartments
Draft Remedial Investigation/Feasibility Study Work Plan
Public Comment Period
April 23 – May 24, 2010



Washington State Department of Ecology
Northwest Regional Office
Bellevue, Washington 98008

July 2010

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Waste Action Project 60-Day Notice of Intent to Sue the Port of Seattle

Memorandum: *Lora Lake Apartments Catch Basin Sediment Waste Designation*

Introduction

In April and May, 2010, the Washington State Department of Ecology (Ecology) received public comment on the *Lora Lake Apartments Draft Remedial Investigation/Feasibility Study Work Plan dated April 1, 2010* (RI/FS work plan). A public meeting was held on May 4, 2010. Six members of the public attended.

The comments and Ecology's responses are summarized herein.

The figure below shows the location of the Lora Lake Apartments tax parcel and Lora Lake to the southeast. The Site includes the Lora Lake Apartments Parcel and any other areas affected by the release of hazardous substances at the Site.

Site Background

The Site is located at 15001 Des Moines Memorial Drive South, in Burien, Washington. This Site was an orchard and private residence prior to 1940. During the 1940s and 1950s the Site

was used by Novak Barrel Cleaning Company. Novak cleaned barrels received from various industries so the barrels could be reused. From approximately 1960 to 1981 Burien Auto Wrecking operated at the Site. In the 1980s the Site was purchased by a developer, and in 1987 the Lora Lake Apartments were built.

In 1998 the Port of Seattle bought the Site, part of which was required for the Third Runway's runway protection zone. Above-ground structures have been demolished. Foundations and asphalt paving remain. The part of the Site not required for the runway protection zone is to be redeveloped by the Port and the City of Burien for future uses compatible with Site zoning, which is Airport Industrial 1.

The Port of Seattle performed environmental investigations as part of their process for property redevelopment. Hazardous substance of concern were identified on the site. The Port of Seattle and Ecology entered into an Agreed Order to clean up the site in July 2009.

Comments Received

Ecology received two oral comments and two written comments during the public comment period. The written comments are attached. A summary is as follows:

- Mayor George Hadley, Normandy Park, spoke to Ecology to express concern regarding the quality of sediment in Lora Lake and its potential impact on sediment quality in Miller Creek.
- Ms. Becky T. Cox, writing on behalf of the League of Women Voters, indicated the expectation that the proper studies and planning be done.
- Mr. Greg Wingard of the Waste Action Project spoke about his concern that the current characterization of the Site at depth is inadequate. Mr. Wingard also provided several pages of written comments. Mr. Wingard was one of the signatories of a letter to the Director of Ecology dated October 28, 2008 (attached) requesting the Lora Lake Apartments site be made a formal cleanup site under Chapter 173-340 WAC, the Model Toxics Control Act Cleanup Regulation. Mr. Wingard has stated he represents these groups. On July 10, 2009, date, the Port of Seattle and Ecology entered into Agreed Order DE 6703, making the Lora Lake Apartments a formal cleanup site. On May 3, 2010, the Port received Waste Action Project's *60-day Notice of Intent to Sue the Port of Seattle under the Clean Water Act* for discharges from the Lora Lake Apartments site (attached).
- In addition to the comments received during the public comment period, Mr. Brett Fish of the Citizens Against SeaTac Expansion commented earlier on the potential for contamination from heating oil tanks associated with homes that had surrounded Lora Lake prior to construction of the Third Runway. This comment also is addressed.

If you have questions regarding the Site, please email or telephone Ecology's Site Manager for the Lora Lake Apartments Site, David L. South: dsou461@ecy.wa.gov, 425-649-7200.

Overview of Response to Comments and Future Comment Periods

After considering public comments Ecology and the Port of Seattle have agreed to add several new elements to the planned remedial investigations. In summary:

1. **A Revised RI/FS work plan will be submitted to Ecology on July 16, 2010.**

- This work plan will focus primarily, but not exclusively, on the Lora Lake Apartments property (Apartments Parcel).

- This Apartments Parcel Work Plan will include all existing elements of the public review draft work plan except collection of contingent samples from borings east of Des Moines Memorial Drive. The tasks associated with these borings have been moved to a supplemental work plan (see below).

- The Apartments Parcel Work Plan will provide for evaluation of hydrogeology in the vicinity of the Site, and use the results of the evaluation to select appropriate locations to install up to three deep monitoring wells. Information obtained from these wells will be used to characterize the area below the Site to greater depths than had been planned in the public review draft. The hydrogeologic evaluation will be submitted as a technical memorandum on or about July 26th. Ecology plans to expedite review in order to have deep wells drilled as soon as possible. The Port's driller is scheduled to begin work on the Site on July 26th, and schedule is critical to having the work done within the driller's window of availability.

2. **A draft supplemental RI/FS work plan will be submitted to Ecology by fall 2010.**

- The supplemental work plan will focus on the potential that historical industrial activities on the Apartments Parcel could have impacted areas outside the property boundaries, particularly Lora Lake and Miller Creek (Lake Parcel).

- The Apartments Parcel Work Plan submitted on July 16th will define the scope and schedule for preparation of the supplemental work plan (Lake Parcel Work Plan).

An additional public comment period for these documents is not planned. First, schedule considerations are critical in advancing the work, and a formal public comment period would result in unacceptable delays to the 2010 field work. Second, only six members of the public have actively engaged in the public review and comment process to date, and it will be far more efficient, both for Ecology and for those individuals, to continue to engage in direct communication about the RI/FS, work rather than engaging in an additional formal process.

All of the documents mentioned above will be public record documents when received by Ecology. Ecology will forward electronic copies to anyone who requests them, and will read and consider any comments received. Hard copies may be obtained by making a public document request to Ecology's Northwest Regional Office Central Files (425-649-7190 or sper461@ecy.wa.gov). There may be a charge for hard copies.

A formal public comment period will be held when the draft RI/FS report is ready for public review. This is anticipated to be in about 18 months, or December 2011. Practically, Ecology avoids holding public comment periods over the Thanksgiving – Christmas holiday season, so the public comment period may be in January 2012.

It is possible that the remedial investigations regarding the Lora Lake Apartments Parcel and the Lora Lake Parcel may proceed on different schedules, and that there will be separate reports for the two parcels. If so, Ecology will schedule public comment periods for each parcel.

The progress of the work can be tracked by visiting Ecology's Lora Lake Apartments web site. http://www.ecy.wa.gov/programs/tcp/sites/loraLakesAps/loraLakesAps_hp.html. Monthly reports are posted on the web site as they are received. These reports include data collected as it becomes available.

Finally, after the RI/FS report is finalized, Ecology will prepare a Cleanup Action Plan for the site. A formal public comment period will be held for this Plan.

Investigation Costs and Ecology Grant to the Port

The Port of Seattle applied to Ecology for a Remedial Action Grant to help pay the cost of the RI/FS. The Model Toxics Control Act (MTCA) provides for grants to local governments of up to 50 percent of the cost of performing cleanup work. At the time the grant application was prepared, the Port estimated a $3,000,000 cost to execute the RI/FS. The Port asked for a grant of $1,053,000. Ecology granted the maximum amount allowed, 50 per cent of the estimated cost, or $1,500,000. This money comes from the Local Toxics Control Account, an account established by the cleanup law[1], for this purpose. It is funded by a tax on hazardous substances.

The work added as a result of public comment is anticipated to add several hundred thousand dollars to the cost of the work. It is anticipated that much of this cost will be covered by the amount of the grant given to the Port over and above that requested.

The cost of preparing the Cleanup Action Plan for the site, and for conducting the actual cleanup, is not included in the above cost estimates.

Comments and Responses

This section discusses some of the main themes and comments regarding the proposed work. For more discussion of any of the comments, or to provide additional input, please email or telephone Ecology's Site Manager for the Lora Lake Apartments Site, David L. South at dsou461@ecy.wa.gov or 425-649-7200.

[1] Model Toxics Control Act, Chapter 70.105D RCW

Adequacy of Investigations

Several comments expressed concern regarding whether adequate data would be collected during the remedial investigation. Some comments expressed concern regarding the adequacy of past data collection efforts.

The primary objective of the RI/FS process is to collect sufficient data for Ecology to select a cleanup action. Typically, site information is obtained in a series of investigations, each building upon previous ones until sufficient data are available to enable Ecology to make that decision.

The current work plan builds upon data previously collected and outlines new data to be collected. Section 8.7 of the current draft recognizes that additional phases of data collection may be necessary. Additional text has been added to the work plan to promote understanding of the phased nature of data collection. This phasing allows more efficient data collection by using previously collected data to guide appropriate future data collection.

One commentor questioned the tiered approach to sampling for dioxin. The tiered approach proposed collection of both primary and contingency soil samples, enabling the use of previous sample data to trigger future sample analysis. One of the prime reasons for this approach is the expense of dioxin analysis, which typically exceeds $1,000 per sample.[2] Once primary sample results have been obtained they will be reviewed to assess whether sufficient data coverage has been obtained. If not, the archived contingency samples would be tested for dioxin (which testing would be completed within allowable laboratory holding times).

In response to this comment, however, the draft work plan's proposed tiered dioxin analysis approach for samples collected in the Des Moines Memorial Drive right-of-way has been changed. Those samples will be tested for dioxin as part of the primary set of analyses.

Data collection does not end with the RI/FS. Data collection is required during remedial design, and during and after cleanup to ensure the cleanup is meeting its objectives.

Additional Catch Basin Sediment Sampling

One comment called for additional catch basin sediment sampling. This comment refers to chemical sampling of catch basin sediment that had accumulated in the City of Burien storm drain that crosses the Site. Surface water from the Site drains into this storm drain. The comment notes that at the Terminal 117 and the North Boeing Field MTCA Sites cleaned storm drains have been re-contaminated.

Adding further storm drain catch basin sampling to this work plan is not warranted. First, sediments were removed from the catch basins in January 2010, and observations since removal suggest there is likely to be little accumulated sediment to sample. Second, it is anticipated this site will be cleaned up much faster than the Terminal 117 and North Boeing Field sites, which are much larger than the Lora lake Apartments Site and are in active industrial use. If further

[2] Analysis costs for multiple samples can be less.

catch basin sampling is warranted, it likely would be performed following Site cleanup, to assess whether any contamination remaining on the Lora Lake Apartments Site enters the storm drain system.

Ecology's preliminary review of the results of catch basin sediment sampling indicates that concentrations of the hazardous substance of interest at the location where the storm drain enters the site are similar to the concentrations where the storm drain leaves the site.

Many of the hazardous substances of interest (carcinogenic polyaromatic hydrocarbons, dioxins, petroleum products) are wide-spread in the environment. Their presence in storm drain catch basin sediment is to be expected.

Waste Designation for Material Transported Off Site

Concern was expressed that investigation-derived waste be appropriately characterized for disposal and disposed of at properly permitted facilities. The concern specifically mentioned disposal of the sediment that was cleaned out of the storm drain catch basins after it was sampled, and whether it should have been classified as hazardous waste and, therefore, should have been sent to a hazardous waste landfill.

The Port of Seattle documented their assessment of the catch basin sediment for disposal in the memorandum *Lora Lake Apartments Catch Basin Sediment Waste Designation* (attached). The assessment used a conservative approach by considering not an actual sample, but, instead, a hypothetical sample comprised of the highest concentration of each hazardous substance measured in any sample on site. No actual sample contained all hazardous substances at the highest concentration used in the assessment.

First, it must be made clear that just because a waste contains hazardous substances does not make it a hazardous waste. Under Washington law, whether a waste is classified as a hazardous waste, depends upon assessment of the waste source and the waste chemical properties. The Washington Dangerous Waste regulations establish hazardous waste definitions and management requirements for two categories of hazardous waste ("Dangerous Waste", and the more hazardous "Extremely Hazardous Waste". Under those regulations, wastes that are the result of specific named processes are always defined as hazardous (called "Listed Dangerous Wastes"), and waste material that is not "listed" may be defined as hazardous due to its characteristics, i.e., chemical concentrations, toxicity or other properties.

The Lora Lake Apartments contaminated soil and ground water are not listed wastes, and were not generated from a listed source, and, therefore, by regulation, are not listed wastes. The Lora Lake apartments storm drainage system sediments were, therefore, characterized by ascertaining the concentration and toxicity of the hazardous substances they contained (or, as noted above for this assessment, a more conservative set of hypothetical substances), and calculating a regulatory "equivalent concentration." An equivalent concentration is calculated by summing the concentration of each compound multiplied by a factor that reflects its toxicity. The calculations are included in the memorandum. The following table summarizes the calculations.

Category	Calculated Equivalent Concentration	Concentration at which waste becomes a Hazardous Waste	Hazardous Waste?
Persistent Dangerous Waste, Halogenated Organic Compounds	0.0000165%	0.01%	NO
Persistent Dangerous Waste, Polynuclear Aromatic Hydrocarbons	0.0019%	1.0%	NO
Toxic Dangerous Waste	0.0000983%	0.001%	NO

Hence, even using the conservative approach of classifying a hypothetical sample comprised of hazardous substance concentrations at the highest concentration measured on site, all categories considered in the classification are quite far below the concentration at which the waste was designate as a hazardous waste.

Catch basin sediment was sent to LRI Landfill in Puyallup, Washington. This facility is licensed and permitted by the Pierce County Health Department and meets the requirements of 40 CFR 258 and Chapter 173-351 WAC.

Utility Trenches

One comment indicated the utility corridors should be assessed as preferential pathways for transport of material off site. The revised work plan will include performing such an assessment as part of the remedial investigation, including assessment of whether additional sampling is warranted.

Characterization of the Subsurface

One comment asserted that the vertical extent of sampling data collected to date is insufficient and questioned whether planned sampling would be sufficient. The particular concern with respect to deeper portions of the subsurface is whether contaminants that are capable of forming dense nonaqueous phase liquids[3] migrated to the subsurface during the periods of industrial operation at the site and remain there today. In order to address this concern, and as noted above, vicinity hydrogeology will be evaluated using previously collected geologic and hydrologic information. Based on the conclusions of that review, up to three additional

[3] Dense nonaqueous phase liquid are liquids that are heavier than water and that do not mix with water, such as chlorinated solvents. Rather than floating on water, like oil, they sink through it.

monitoring well locations and sampling depths will be recommended in order to provide data to support the evaluations.

Lora Lake and Sediment Quality

The public review draft work plan provided for collection and bioassay testing of four samples Lora Lake sediment. Collection of these samples has been moved to the Lake Parcel work plan. The Lake Parcel Work Plan will provide for additional sediment testing to assess sediment quality below the biologically active zone in Lora Lake and the potential for contaminant migration from Lora Lake to Miller Creek.

Terrestrial Ecological Evaluation

One comment questioned a statement in an earlier report that a Terrestrial Ecological Evaluation was not needed. The comment mentioned the potential for discharge to the Lora Lake area.

First, the comment in the earlier report was referring to the Lora Lake Apartment complex, (Apartments Parcel) which is primarily covered in pavement and building foundations. Upon redevelopment it is anticipated the parcel will remain largely covered with buildings and pavement. If areas of the Apartments Parcel are left undeveloped, and if contamination remains at the Site following cleanup, a Terrestrial Ecological Evaluation may be required.

The supplemental work plan for the Lora Lake area will assess the potential for contamination in soils in the vicinity of Lora Lake and collect samples as appropriate based on the assessment. Determination of the need for a Terrestrial Ecological Evaluation will be completed as part of the RI/FS report preparation process.

Heating Oil Tanks on the Lora Lake Parcel

In the public meeting regarding the interim storm water sampling program a question was asked regarding the disposition of home heating oil tanks at houses in the vicinity of Lora Lake. These houses were demolished as part of the Third Runway construction.

Between 1997 and 2004 the Port of Seattle decommissioned 316 home heating oil tanks at properties purchased for the Third Runway construction. In the vicinity of Lora Lake, home heating oil tanks were removed as part of demolition of homes in 1998-2002. The work is reported in four reports available as the following electronic files[4]:

- Annual Report 1998 Tank Decommissioning West Side Home Heating Oil Tanks Project July 2002.pdf
- Annual Report 1999 Tank Decommissioning West Side Home Heating Oil Tanks Project Aug. 2003.pdf

[4] Contact David L. South at Hdsou461@ecy.wa.govH if you wish to receive the electronic files. The files range from 137 to 235 pages in length, although much of the material is supporting appendices.

- Annual Report 2000 Tank Decommissioning West Side Home Heating Oil Tanks Project Oct. 2003.pdf
- Annual Report 2000 Tank Decommissioning West Side Home Heating Oil Tanks Project Oct. 2003.pdf

Ecology has not reviewed these reports in detail as part of preparing this Responsiveness Summary. However, the Summary and Conclusions section of each of the reports indicates that when home heating oil tanks were removed the adjacent soil was assessed for contamination. Where contamination was found the contaminated soil was excavated. Soil samples were collected at the boundary of the each excavation and tested. The tests confirmed that hydrocarbons were below regulatory levels.

South, David (ECY)

From: Becky & Charles Cox [cgcox@nwlink.com]
Sent: Sunday, May 23, 2010 8:49 PM
To: South, David (ECY)
Subject: Comments on Lora Lake Apartments Site/Remedial Investigation

LEAGUE OF WOMEN VOTERS OF KING COUNTY SOUTH
May 21, 2010

David L. South, Site Manager
Washington Department of Ecology
Toxics Cleanup Program
3190 160th Ave. SE
Bellevue, WA 98008

Reference: Remedial Investigation Feasibility Study for the Lora Lake Apartments Site.

Dear Mr. South,

The League of Women Voters of King County South has reviewed the referenced document.

With the history of the site's use, it is no surprise there is a wide spread problem with toxic materials of all kinds on the property addressed by the study.

The League's primary concern is the follow-on plan for the removal and disposal of the contaminated soil and the compliance monitoring that will be done.

The League's studies of toxic materials lead us to expect that the Department of Ecology will order all the proper studies to cover the issues of removal, disposal and monitoring.

The Burien community needs to be protected from the mishandling of the Lora Lake Apartments site's toxic soil. A good plan is the best way to be prepared for all eventualities.

The League would like to be notified of the issuance of the next phase of the planning for this site.

Sincerely yours,

Becky T. Cox
President Pro Tem
League of Women Voters of King County South
P.O. Box 66037
Burien, WA 98166

South, David (ECY)

From: Greg Wingard [gwingard@earthlink.net]
Sent: Friday, May 28, 2010 12:51 AM
To: South, David (ECY)
Subject: Re: Lora Lake Apartment site RI/FS Workplan Comments

David:

As we discussed you will find my comments on the LLA site RI/FS work plan attached to this email.

I appreciate your cooperation in allowing some additional time to get these comments submitted.

In brief there are a number of serious concerns about the inadequacy of the proposed RI/FS work plan.

While the document gives minimal mention to the fact Lora Lake and surrounding area are part of a designated habitat mitigation area, the document entirely fails to consider or address this fact in terms of doing an ecological evaluation of impacts. In fact the document claims the site has no significant ecological features worth considering and writes off the need to do any evaluation in spite of the sites direct hydraulic connection to the habitat mitigation area, which by definition is high quality habitat.

There is a complex description of hydrology and geology immediately surrounding the site (primarily to the east), but no discussion and no proposal to collect data to minimally describe even the upper most geological and hydrological units at the site. In fact there is no information available on the extent of vertical contamination in groundwater, and apparently no intent to ever find out. There is not even a minimal discussion of the screened depth of the wells or why those depths were selected and what the resulting data mean in terms of the vertical profile of contaminants in the groundwater. From my view this is a huge hole.

The stormwater interim action is referred to as if it in itself will complete the Port's assessment of the stormwater system for the RI/FS. We had a similar problem with the Port in regard to its stormwater system at the T-117 site, where they cleaned out and installed a partial new system. After repeated discussion with the Port and agencies, the Port re-sampled sediment in the "new" "clean", stormwater system to find it contained contaminated sediment. There was a similar experience at the North Boeing Field site, and a number of other sites in the area. It is unreasonable to assume that a one time cleaning of a stormwater system with known defects, in contaminated soil, with groundwater inflow, is going to stay clean due to a one time sediment removal, or that such action removes the need to continue to sample the sediments in

the system if the system continues to discharge. Also in-line sediment traps may have some use as a screening tool, but are not adequate to determine the nature, extent, and risks posed by contaminated sediments in a stormwater system.

The sections on the stormwater system and Lora Lake are not even close to adequate, and appear to totally disregard the requirements of the Clean Water Act, which at a minimum should be addressed as an ARAR for the site. The document utterly fails to do so.

It appears that a substantial amount of contaminated sediment was removed from the stormwater system and disposed of, but there is no information currently available, or provided in the appropriate section of the RI/FS work plan detailing how this was done consistent with the requirements specified in the RI/FS workplan for disposal actions.

The discussion of preferential flow pathways is cursory and fail to consider, or provide for sampling of utilities, or related bedding materials, instead only discussing the stormwater system. This is not adequate.

Off-site sampling for the most part is as screwed up as the Port can make it, consisting of apples and oranges, as well as conditions and hurdles to allow them to make an additional round of arguments as to why artificial lines like property boundaries somehow bound contaminants. The proposal to only do bioassay samples in Lora Lake, which will provide no point of comparison with any other data collected from the site is simply absurd. Data from the lake needs to be collected, which can be compared to the contamination profile of the site, and its stormwater system results. In similar fashion the Port is, via the RI/FS work plan, set up to argue that a single sample on the horizontal plane between the "Site" and off-site, which is not contaminated is sufficient to "prove" the contamination is bounded. This in spite of the likelyhood of any number of activities at the property boundary, to the road pavement, which may have disturbed the contaminant profile in the last 23 years.

Not a complete list, but a few serious concerns about inadequacies in the RI/FS work plan.

Regards,

Greg

LLA-RIFS-WP
.doc

David South, Senior Engineer
Lora Lake Apartments Site
Toxic Cleanup Program
Northwest Regional Office
Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

May 27, 2010

Re: Remedial Investigation/Feasibility Study Work Plan, Lora Lake Apartment Site

David:

Due to being out of commission from an auto wreck, I did not have as much time as I wanted to review and comment on this critical document. I have put document section headers above my comments to assist relating the comments to the document. I look forward to continue working with Ecology and the Port in the assessment and remedial actions for this site.

Section 2.0

The LLA site discharges to a federal, state and locally designated habitat mitigation area. Past, existing, and future impacts to this area need to be carefully evaluated and considered as part of the LLA site RI/FS, in both the evaluation and remedy selection phases of action at this site. This is over and above the usual impacted media assessment.

Section 2.1.2, page 2-3

The document states, "...the Site construction contractor (Chemical Waste Management), had excavated...". This information appears to be in error. Chemical Waste Management during that time period (1986-87) was not providing construction contractor services in western Washington. Rather, CWM provided chemical waste site management services, waste clean up services and waste disposal services. At the LLA site available documents indicate CWM was subcontracted to Golder to conduct certain site activities, such as removal of contaminated soil from the LLA site. The site construction contractor was a separate entity, which appears to have been a general construction contractor with no specific training or expertise in contaminated sites, or contaminated materials. This difference is significant as the construction contractor apparently dealt with a significant area of contaminated material at the site, and the records are not clear on what happened with contaminated material the site contractor came in contact with. It is the Port's hypothesis this contractor spread site contamination through the construction grade and fill activities.

It does not appear that Ecology was aware of this discrepancy at the time they issued the pre-MTCA equivalent of a no further action letter.

Section 2.3, page 2-5

The document states that AECOM determined that a Terrestrial Ecological Evaluation is not needed, and the site qualifies for exclusion for a TEE. Given the issue raised in regard to Section 2.0, above, this appears questionable. The site is discharging, and likely has discharged since the 1940's, to Lora Lake, and the area that is currently a habitat mitigation area. The Port of Seattle is using this area to meet habitat mitigation requirements related to Army Corps of Engineers permit, and in part, state certification of water quality attainment. Historic, existing and future discharges from the LLA site may well impact the functions and values of the habitat mitigation area, and a TEE should be performed.

The document presents a fairly complex assessment of the general area geology, which includes glacial outwash of up to thirty feet in thickness, sediment with peat layers, sedimentary and volcanic basement rocks. The general area hydrology is described as consisting of up to six separate units, with scattered latterly discontinuous areas of perched aquifers. The site investigation to date is lacking any detail as to even a cursory connection between the complex picture they paint of the area immediately surrounding the site, and the almost cartoon simplicity of the on-site geology and hydrology. The existing investigation has only sampled site fill material and the unknown but incomplete portion of the uppermost native soil layer. The same applies to the site hydrology, where only the upper portion of the most shallow groundwater zone has been monitored and there is no description of the bounds of the unit or its connection or lack of connection to other units. Given the seventy-year history of this site and the types of contaminants, which were disposed of at this site, the vertical component of existing and proposed sampling is entirely inadequate. The existing and proposed sampling fails to address the complex geology and hydrology, which the Port assumes exists at this site but has developed no data on. Given the site uses, starting around seventy years ago, including barrel washing, on-site rinsate disposal, and auto-wrecking activities contaminants would likely have migrated to depths greater than fifteen to thirty feet below ground surface in "deposits of sand and gravel", which are well drained and readily allow migration of liquid contaminants to depth. In fact the primary disposal mechanism on site was a cement box, buried in the soil with three walls, and no bottom. This mechanism was designed to discharge liquid waste into glacial outwash soils, and it can be assumed some portion of the disposed liquids migrated to depth.

Section 2.3.2

The document in this section states the shallow aquifer on site is believed to be continuous rather than perched lenses. The conditions that resulted in perched lenses in studies from the surrounding area were related to deposits of relatively impermeable discontinuous layers, which occur at a depth below any of the on-site investigations. This would again suggest that the vertical extent of investigation at the site is inadequate.

Section 2.3.3, page 2.7

The document states that there are federal restrictions on Lora Lake, which restrict human access. As the lake is in direct hydraulic connection (with both groundwater and surface water components), with Miller Creek, the limited restriction of access is not that significant of a factor.

Section 3.3, page 3-3

The document states that a specified dioxin level will be used as a "trigger" for analysis of archived samples. The Port took this approach in past investigations, but used sub-standard archival, so by the time the data was in hand to make the "trigger" determination the holding time on the archived soil had expired. Archive procedures need to be specified and appropriate for the circumstances. Archival samples should not take the place of a complete on and off-site sampling to establish the lateral and vertical extent of contamination. Three years have already elapsed since the Port started its sampling program, and to date not a single off-site sample has been analyzed. There should be no further delay on this count.

Section 4.1.1

The 2007, GeoScience Management investigation had a number of biases. No surface soil samples were taken (minimum sample depth was greater than two feet), for this study. The majority of the samples depths were biased to between six and six and a half feet, and fourteen to seventeen feet. Also areas covered by buildings, concrete or asphalt was excluded from sampling, which is a majority of the site surface area. As a result horizontal sample location has also been significantly biased, and may have yielded skewed results.

Section 4.1.2

This 2008 AECOM study provided sampling of surface soils (sampling at zero to six inches, and from one and a half to two feet). The remaining samples were only taken from two depths, seven feet and fourteen feet. These samples only address the fill and upper portion of the very permeable glacial outwash layers, which doesn't appear to even reach the depth of the bottom of the onsite cement disposal structure. The groundwater samples only reflect conditions in the most-shallow aquifer present at the site.

Vapor sampling taken under existing slabs suggest the potential sub-surface presence of chlorinated solvents beneath some areas currently covered by cement slabs and not sampled since the investigations in the 1980's. Further sampling of chlorinated solvents and degradation products is warranted.

Section 4.1.3, 4.1.4

Although there has been some limited offsite groundwater monitoring to the east of the present site boundaries, no soil samples from offsite were analyzed. The present document continues this unfortunate trend, setting additional conditions and hurdles to any sample analysis of soil beyond the arbitrary site boundary site on property lines.

Section 5.2.3.2, 5.2.3.3

The document refers to in-line sediment traps, which are currently in place in the LLA storm drain system. While these sediment traps may serve a useful purpose, they are not adequate for monitoring of sediment in the LLA storm drain system. The Port has done an initial cleanout of the sediments in this storm drain system after they completed a single set of samples. Experience at other waste sites with similar problems, including a Port of Seattle owned site in the Lower Duwamish Waterway Superfund site (Terminal 117), and an airport site (North Boeing Field), have shown additional monitoring of sediment loads in addition to in-line sediment traps are needed. At both of the above sites organic contaminants were found in the storm drain systems and removed to limit potential discharge of contaminants to the Duwamish River. At both sites, the cleaned storm drains were re-contaminated with polluted sediments shortly after the cleanup activity. In the case of the Boeing Field site the sediment contamination was higher after the sediment removal than it was prior to the removal. In any case, relevant experience at multiple sites in the region points to the need to do additional stormwater sediment sampling as part of the RI/FS, in addition to presently placed in-line sediment traps.

As an aside, the collected sediment was disposed of in a general-purpose landfill rather than receiving treatment, or going to a hazardous waste landfill. Given the persistence of dioxin in the environment and the fact that landfills generate leachate (which tends to be acidic), and leak, sending dioxin-contaminated waste from MTCA sites to general-purpose landfills with no public notice or discussion is not appropriate. Appropriate and transparent treatment and disposal of waste has been a major issue at other Port sites, such as in the LDW Superfund site, and is a major concern at this site as well.

Section 5.2.4

The document provides a rational for stormwater sampling, reports to be supplied and proposed process for addressing contamination discharging to Lora Lake, if detected. The proposal is in violation of the requirements of the Clean Water Act. A notice of violation has been provided to the Port of Seattle, and Ecology providing specific details on this subject. Data developed to date has shown that this site is discharging dioxin and other contaminants in both water and via sediment discharging through the site stormwater system. At a minimum this site should be covered by an individual National Pollution Discharge Elimination System permit, there should be monthly sampling, limits for pollutants with the potential to cause or contribute to violations of water quality standards should be set, and AKART should be implemented to protect Lora Lake and the hydraulically connected Miller Creek.

It should be noted that at a similar dioxin contaminated site at the Port of Olympia, Ecology issued an individual permit after determining that general permit coverage was not appropriate, and required a treatment train to address potential discharge of dioxin. At the Port of Olympia site dioxin was not, and has not been detected in groundwater, surface water, or stormwater. At the LLA site dioxin has been detected in both groundwater and stormwater. Video inspection of the LLA stormwater system found base flow (non-stormwater discharge), and documented groundwater infiltrating into the site stormwater system, as well as root intrusion, which would allow sediment inflow as well. Allowing the facility owner/operator to continue to discharge from this site without an NPDES permit is not appropriate or consistent with the requirements of the Clean Water Act. So this proposal in this section is defective as to sampling frequency and proposed mechanisms to address the site stormwater discharge.

Section 6.3.1

The document discusses compliance with MTCA and the State Dangerous Waste Act, including soil characterization, and evaluation of disposal options. It is not at all clear these standards were followed as the document outlines in the recent removal and disposal of a substantial amount of contaminated sediment from the site stormwater system. Better transparency and evidence of compliance is needed for any contaminated materials being transported off this site.

Section 6.3.2

The section on off-site migration pathways needs to include utilities, utility corridors, and utility bedding materials, in addition to the stormwater system. The sections discussion of preferential flow pathways is incomplete.

Section 6.4

The statement regarding the lack of source material on the site is based on incomplete data, and facts not yet in evidence. Given the type of materials handled at this site and the length of time the contamination happened over, starting seventy years ago, source material such as DNAPL "blobs" may well exist below the depth of any historic, or contemporary sampling. The data developed at this site to date is not sufficient to support the statement that only secondary contaminated material from the central portion of the site remains as a potential source.

The document states the stormwater evaluation being done as an interim action "is being completed". The interim action in itself is insufficient for the purposes of the RI/FS, as at a minimum additional sampling is needed downstream of the property boundary, as well as additional sampling of any accumulated sediments in the storm drain lines and structures. Current data from sites around the region show that a one time sampling and removal of sediment from active storm drain systems is not sufficient to either characterize the site, or evaluate the potential for contaminant migration from a site.

North Boeing Field, Terminal 117, and the Norfolk CSO site, are among the locations where this has been proven to be a serious concern, and potential risk would have been seriously underestimated by the approach apparently suggested in this RI/FS Work Plan. Based on experience and data from stormwater systems around the region, reliance on the present stormwater interim action, without additional stormwater system sediment sampling may well seriously underestimate site contaminant loading and migration potential. The in-line sediment traps are insufficient to meet this concern.

Section 7.1.1

The deepest boring at the site to date was twenty-eight feet bgs. Only a single unit of the native (non-fill), soils is partially described. This is not adequate for site characterization. This is not adequate to determine environmental fate and transport of contaminants. It also assumes where contaminants were disposed of into the permeable sands and gravels (starting around seventy years ago) did not migrate deeper than twenty-eight feet. Given the site history, types of materials apparently handled, disposal structures used on the site, and inconsistencies in previous remedial actions and reporting this is not a valid assumption. Additional sampling is needed to better define the vertical profile of site soils and conditions, including potential migration of contaminants over an extended period of time. When considering this potential it would do to keep in mind that around forty years elapsed between disposal activities related to the barrel washing operation ceasing and the present day.

The document describes the upper groundwater layer encountered during sampling. The information is incomplete, and does not support an adequate conceptual site model. In particular, information is supplied that indicates that for much of the area around the site, there are multiple groundwater layers, in a fairly complex regime, including perched aquifers. The reader is informed (elsewhere in the document), that site well data suggests that the sampled aquifer is continuous, rather than perched. No information is supplied on the thickness of this water-bearing unit, whether it is bounded, or how it connects, or is separated from underlying units, including aquifers used for domestic water supply. The vertical component of site hydrology, in addition to site geology is not minimally sufficient to describe the site. This leaves far too many parameters to supposition in the place of data, which lacks rigor and will result in a weakness in any related decisions.

Section 7.1.2.1, page 7-2 and 7-3

The document assumes that only the shallow groundwater at the site is contaminated or capable of transporting contaminant further to other receptors. No data is supplied to support these assumptions. The uppermost aquifer has not been adequately described. While there is some description of, and assumptions provided about the horizontal component of flow, no information has been provided on the vertical component of flow and whether, or how the upper aquifer connects to underlying units. This is similar to scooping some water off the surface of a lake, and then claiming to understand the entire water column.

Section 7.1.2.3, page 7-4

The document states that "An evaluation of Lora Lake may be conducted if...", this language needs to be removed from the document. In sediment sampling to date from the site stormwater system, all sampling locations in the site showed elevated concentrations of contaminants including dioxin, including the sampling locations at the edge of the current site boundaries discharging to Lora Lake. Given the amount of time contaminants and sediment have had to migrate through the stormwater system to Lora Lake/Miller Creek, it is imperative that sediment sampling in Lora Lake be done as a primary component of the RI, not as a conditional component. The Port of Seattle has been doing everything they can to delay sampling of Lora Lake sediments, since 2007. This is in spite of knowing there have been and are, on-going discharges from the site stormwater system to Lora Lake/Miller Creek. It is time to implement adequate characterization of Lora Lake sediments and end any delays or equivocation on this issue.

The section of the document on ecological evaluation is grossly incomplete.

The document also indicates that uses "in these areas" must not attract wildlife. It should be noted that as it pertains to the habitat mitigation area this statement is not consistent with the requirements of the Port's 404 permit requirements, as the habitat mitigation area includes wildlife with the exception of certain high risk species and habitat types, which were mitigated at an off-site location.

There is reference to a preliminary TEE, which concluded that the site does not provide significant habitat and there are no potential ecological impacts worth considering. The site is in direct hydraulic connection with a federal/state/local listed habitat mitigation area, which includes an area from the west of Lora Lake to east of Miller Creek. The Port has made specific binding representations as to maintaining the high quality of this upland, riparian and freshwater habitat to the federal/state/local governments and public. To attempt to consider ecological impacts as marginal in isolation from the habitat that the site is in direct hydraulic connection to is unacceptable and cynical in the extreme. It may also well violate the Port's obligations to maintain this habitat as mitigation for the impacts related to its construction of the third runway. A full evaluation of the sites ecological impacts on the upland, riparian, and freshwater habitat needs to be done as part of the RI/FS.

Section 7.2.1, page 7-6, and 7-7

Groundwater monitoring for carcinogenic PAH's (cPAH), were conducted for two rounds of sampling using two different methods. As the initial analytical method was less sensitive, and the method reporting limit exceeded the site screening level for cPAH's. As a result, all the detections, including one that was two orders of magnitude greater than the site screening level are discounted in favor of the next set of samples run with a more sensitive method that did not detect cPAH's, above the detection limit. In addition to the previous assumption, the document states that since cPAH's don't dissolve easily in water that cPAH in groundwater is likely limited to what it defines as

the "historical" source area. As a result didn't the next set of groundwater samples were not analyzed for cPAH's. These assumptions and actions are not reasonable, or consistent with existing site data. Like cPAH's, dioxin is also hydrophobic and rarely found in water samples. In spite of this truism, dioxin is found at this site in groundwater and stormwater in multiple samples, from multiple locations, and from multiple sample events. It is far more reasonable to assume that the same factors that have resulted in mobilizing dioxin in water at the site may well do the same for cPAH's. Based on these factors, it is neither reasonable, nor prudent to assume on the basis of a single set of groundwater samples that cPAH's, are only mobile in groundwater at a single pre-determined "hot" location.

The document expresses reservations about the generally accepted approach of setting non-detects at half of the detection limit, rather than at zero, as it could "artificially" increase the extent of contamination. The problems with using zero, and the reason that such an approach is disfavored, is that approach artificially understates contamination, which would potentially cause a hidden and unacceptable increased risk. It is more appropriate to be conservative in assessing the risk related to carcinogens rather than taking an approach that could underestimate such risk.

Section 7.3.1

This section of the document, dealing with data gaps related to stormwater is not sufficient. According to the document the stormwater Interim Action is assumed to be complete within itself and sufficient to deal with this data gap for the RI/FS. The plan is to take the final report from the Interim Action and add it as an appendix to the RI/FS, where the data will be used to assess the stormwater pathway. As discussed previously additional sampling of sediments in the storm drain system (additional to the currently in place sediment traps), is necessary. It is apparently the position of the Port that since they removed existing sediment from the system immediately after the Interim Action sediment sampling that the issue has been dealt with. This is at odds with the inspection of the stormwater system, which found defects, and root intrusion into various locations of the system, which allow access to potentially contaminated soil and groundwater. Further sites around the region have had their stormwater systems become recontaminated shortly after having their sediments removed. The proposed lack of additional sediment sampling would allow the process to move forward with a significant unknown that could substantially understate the risks posed by the site, and allow for a primary mechanism for off-site transmission of contaminants to be undervalued. Also the Interim Action only sampled sediments from within the property boundaries of the apartment property. There is no evidence that contaminated sediments in the storm drain system are limited, or magically filtered by property boundaries. Indeed, review of the existing data strongly infers that sediment downstream of the property boundary in the storm drain system is contaminated as well. These sediments need to be sampled in addition to the Lora Lake sediments. Again, the in-line sediment traps are useful for determining on a screening basis, the presence of contaminated sediments mobilized by stormwater in portions of the stormwater system, but are simply not sufficient for determining the extent to which the stormwater system is being loaded with and potential

for discharge of additional contaminated sediments since the Port's previous removal action.

Section 7.3.2

The document states additional data are necessary to "adequately bound" the contamination across the "Site". The use of the capital form with site strongly infers the limits related to the current site boundaries, which are the property lines of the former apartment complex. The eastern most samples, which are on the down gradient side of the property, contain some of the highest levels of shallow dioxin contamination. There is no reason to assume that the property lines of the site have any properties to stop the migration of contaminants. In fact given the lack of modern stormwater permits or routine construction site best management practices at the time of the apartment building construction, it is likely that soil from the grade, cut, and fill construction activity had associated track off and soil migration, in addition to what ever left the site through the stormwater system. As the site has a down-slope gradient to the east, toward Lora Lake, significant sampling of off-site soils between the site and Lora Lake should be required. The lack of any such data currently is a significant data gap, which is the "tiered" approach is clearly inadequate to address, and only provides the Port one more opportunity to argue against what they should have already done, which is determine if contaminants have migrated off their site.

The vertical extent of sampling to date is insufficient given the history of site activities and length of time for contaminants to migrate vertically. Generally dioxin and similar organic contaminants are assumed to bind strongly to soil, and not migrate to depth. This same general wisdom also assumes that dioxin won't be found in water, which is obviously not so at this site.

Section 7.3.5

Unlike earlier sections of the document discussing groundwater monitoring results and related conclusions, this section of the document essentially indicates that there are so many problems with the existing wells and analytical data that no comprehensive data-base for the site exists. On and offsite groundwater monitoring needs to be robust enough to determine the extent of impacts from this 70+ year old site. This includes information on the extent of the shallow aquifer, vertical to horizontal flow components, confining layers or connections with underlying aquifers, complete with a discussion of where wells are being screened, why, and how the resulting monitoring will adequately describe hydrological and groundwater quality conditions at and in the vicinity of the site. Presentation of such information and rational has been totally lacking to date. For example no information on the vertical extent of dioxin in groundwater has been provided or considered.

Section 8.1

The document states that sediment sampling in Lora Lake is being limited to four samples for bioassay samples. This is entirely inadequate. All sediment sample locations in the site stormwater system contained significant levels of dioxin. The strong implication of this information is that the site stormwater system has been discharging dioxin and other contaminants to Lora Lake. Sediment samples to determine the nature and extent of contamination in Lora Lake are necessary. A primary question to be answered at this stage of the investigation is to what extent have contaminants known to be discharging through the site stormwater system migrated to and contaminated Lora Lake. Employing a metric inconsistent with any other sampling and analysis done to date is not appropriate or relevant to determining the adequacy of the site boundaries, as well as the nature and extent of contamination. Bioassays are not useful in answering any of these questions, particularly as no bioassays have been done at any other locations on the site. This will render the Lora Lake sediment data useless for any comparative purposes. Which given the Port's history on this topic appears to be a strategic decision.

In light of the information presented in Section 7.3.5, on problems related to existing groundwater wells, samples and analysis, it is not clear that three rounds of groundwater sampling will be sufficient to describe the site conditions. There should be at least one year of data collected on a seasonal basis to describe site conditions.

Section 8.2.1.1

The document states that soil borings for shallow dioxin sampling will be limited to six feet in depth. This is inconsistent with both the determination of the depth of fill across the site, and the Port's "working hypothesis", that the main mechanism for contaminants being spread across the site was the grading of the site, which resulted in the current layer interpreted as "fill". The depth of sampling for the shallow dioxin investigation should at least be equal to that of the layer of fill, or the bottom of the cement disposal structure for samples from the "center" of the site.

Section 8.2.2

This section of the document seeks to additionally delay the analysis of off site soil samples for dioxin, by conditioning off-site soil sample analysis to results of adjoining on site soil samples. Such an approach lacks rigor, and would seem to assume the potential mechanisms by which contaminated soil moved from on to off-site are known, and the proposed process will accurately be predictive of off-site contaminant locations. This simply flies in the face of reason. The current site boundaries are set on artificial lines that have no basis in contaminant location or levels. Primary samples for immediate analysis are needed from outside the property boundaries to determine if this artificial, arbitrary boundary has any basis in fact, or is just a cost saving measure for the site PRP. It appears to be the Port's position that dioxin contamination can be bounded on-site by a single sample. This would assume that the dioxin concentrations in the soil are spread evenly and decrease evenly in smooth isopleths of contamination from the source to the terminus. There is no evidence that this is the case, and common sense would make it clear that there could be any number of reasons for a non-detect sample to exist between

two contaminated sample locations. Off-site sampling needs to be done independent of any on-site sampling activities. The odds are too high that disturbance along the immediate margin of the property and edge of the roadway may have disturbed soils in the twenty-three years since site construction and will yield results reflecting that disturbance, rather than the actual nature and extent of contamination from this site.

While it is obvious that the Port would want to limit its legal and monetary liability for cleanup at this site, the lack of any effective off-site monitoring which is consistent with and can be compared directly to the on-site monitoring program, should not be accepted by Ecology. Such an approach is not in the interest of the community, or the environment. It also makes it very likely, that as has already happened at this site once at some point in the future, yet another cleanup will be necessary to protect human health and the environment.

Section 8.7.2

The document discusses the Lora Lake sampling approach. As previously discussed the proposed sampling is not adequate. The document discounts any discharge to the site prior to the construction of the apartments. There is no evidence provided that prior to the apartment construction the site treated or infiltrated its stormwater. Such an assumption lacks rigor and is suspect to say the least.

The document establishes a protocol for sampling the "biologically" active layer of the sediment (ten centimeters), and apparently believes that any deeper contamination that would be present as a result of discharges from this seventy-year old site is irrelevant. Please provide citation to legal authority allowing PRP's to ignore contamination to depth in freshwater sediment. If no such citation exists the profiles of sampling of Lora Lake sediment should be equivalent to the expected time period for which discharges were likely, which would be from approximately 1940 to date. The approach describes also appears to be inconsistent with the requirements of the Clean Water Act, which requires an assessment of the pollutants which may cause or contribute to the violation of the Washington State Water Quality Standards. Since management of the stormwater discharges from this site require the implementation of AKART, if there is a potential impact to the water or sediment, detailed chemical analysis of any pollutants with this potential have to be sampled at a minimum. Explain why the Port and Ecology are ignoring the requirements of the Clean Water Act as an ARAR, for the RI/FS at this site?

The single round of bioassay sampling would seem to assume that chemical and biological conditions in Lora Lake sediment are in equilibrium year round with no seasonal variation. What is this assumption based on?

As discussed previously, the chemical sampling of the sediment in Lora Lake needs to be consistent with the sampling of soil, and sediment from within the current site boundaries. This is to, among other purposes, allow apples to apples comparison of the data downstream of the LLA site outfall, with the existing and to be collected upstream data.

October 28, 2008

Jay Manning
Director
WA Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

RE: Lora Lakes Apartment Site, Burien

Dear Director Manning,

As a coalition of environmental and community groups, we are writing to ask that you direct Ecology staff to change the status of the Lora Lake Apartment site in Burien from a VCP status to an Agreed Order Status. We believe that this site should be a high priority site for cleanup, it is complex and is not appropriate for VCP status.

While the primary focus of this letter is on problems or changes sought at the Lora Lake Apartment site, the Port of Seattle should be commended for a number of steps they have taken to date. The Port made historic and contemporary data available to the interested public on a priority basis. After initial groundwater data suggested that contaminated groundwater had moved beyond their then down gradient wells, the Port rapidly deployed a new set of wells to the east of the site to better define the down gradient extent of contamination. After seeing soil data showing the highest surface soil levels of dioxin were located on the eastern edge of the property adjacent to Des Moines Way, the Port covered the area with plastic to prevent erosion and infiltration through the contaminated soil. Also the Port has been proactive in meeting with representatives of concerned organizations to discuss Port actions and plans.

There are, in spite of this, remaining concerns we feel need to be addressed in a coordinated and integrated fashion, which is not appropriately carried out under the Voluntary Cleanup Program (VCP).

Our coalition has now reviewed documents, interviewed staff, and met with the agencies involved in the Lora Lake Apartments site. We want to provide the following observations and recommendations, followed by detailed comment.

- Ecology should place the Lora Lake Apartment site in Agreed Order rather than VCP status, similar to what was done with the Port of Olympia and the East Bay Redevelopment site in Olympia, on Budd Inlet.

- Activities of all involved agencies should be coordinated and carried out in a transparent, effective and timely manner.

- Adequate community participation at this site is a serious concern, which needs to be addressed by Ecology and the Port. This should be done through Agreed Order, with an associated Public Participation Plan.

- We request rapid and effective action to address social and environmental justice issues at this site, including notification of former residents and workers who may have been exposed to contaminants at the site. Each month that passes is going to make locating former residents and workers more difficult to accomplish.

- The existing soil sampling investigation does not adequately characterize the horizontal and vertical extent of contamination.

- The existing groundwater investigation does not adequately characterize the vertical extent of contamination. Specifically, deeper investigation is needed to determine potential contamination from historic chlorinated solvent use and disposal.

- Further investigation and sampling of the onsite stormwater collection and discharge system is needed, as well as the adjacent road drainage system.

- Point source discharge(s) from the site need to be covered under a NPDES permit.

- Sediment sampling of Lora Lake is needed on a priority basis, based on existing and historic information on site and road storm drain systems, site construction related to the apartments, and from what little is currently known of the former industrial operations on the subject property.

- Adjacent off-site potential sources of soil and groundwater contamination need to be evaluated.

VCP in an Multi-Agency Environment

While the VCP is a valuable component of the Model Toxics Cleanup Act administered by the Toxics Cleanup Program at Ecology, it is not appropriate for every site. In particular it is not appropriate for a site like Lora Lake Apartments, where there are complex inter-governmental and agency involvement issues that need to be coordinated and managed in an efficient, and transparent manner.

Primary Agencies Currently Involved at the Site

The Port of Seattle. The Port is the current property owner and operator of the site. They are taking primary responsibility for the investigation and cleanup of the Lora Lake site. The Port filed a VCP application for the site with Ecology and was accepted into the VCP program.

King County Housing Authority. The KCHA is the most recent operator of the apartment complex. They operated the apartment buildings under contract with the Port. This included what is known as Section 8, housing for low income as a significant part of their management and operation of the apartments. KCHA filed a VCP application for the site with Ecology, and was accepted into the VCP program. Since that time KCHA has cancelled its interest in the site property and has, or intends to remove itself from the VCP process for the site. KCHA's primary role and responsibility at the site relates to contacting previous residents of the site who lived there from approximately 1997 to July of 2007, during their management. KCHA has requested and received advice from Public Health Seattle King County related to issues they are responsible for.

Public Health Seattle King County. PHSKC involvement is relatively recent. PHSKC was requested by the Port and KCHA to provide input on the potential human health implications, and potential press release issues. This was in part due to a lack of such expertise in the VCP applicants and recognition of the potential need to contact former residents of this site. PHSKC has consulted with a number of other agencies in this regard, including ATSDR/Center for Disease Control, the Environmental Protection Agency, Washington State Department of Health, and Ecology. While PHSKC's role is fairly limited on a VCP site, they can generally have a broader role in providing assistance under Agreed Order or Ecology lead sites.

Department of Ecology. Ecology has had a fairly limited role at the site to date. Historically the previous industrial facilities on the site, a chemical barrel washing operation and auto wrecking yard were abandoned, and the site was purchased for development as apartments. The site was cleaned up prior to the implementation of MTCA, in a somewhat similar manner to the current VCP approach. After review of site reports provided by the property owner Ecology approved the cleanup and the apartments were built. The site then operated as apartments for approximately twenty years until a dispute over the use of the property and contractual obligations resulted in the removal of the apartment residents around July of 2007. As part of due diligence related to property use and transfer or land use the Port did additional sampling around that time, with additional sampling periodically since. Ecology's involvement since then has been primarily related to meetings, consultations, processing and managing the VCP application and related work.

Other Agencies. There are additional agencies that have either had minor involvement, or who have not been involved, but should be.

- Department of Health. DOH was mentioned above. Their role is apparently ongoing but limited.

- *Department of Labor and Industry.* L&I has not been involved to date, but they should be. L&I's role relates to toxic exposure in the work place, which will be discussed further below under recommendations.

Community Participation

The site is one of the most dioxin-contaminated residential sites in the State of Washington, with the highest detection in excess of 3,000 parts per trillion. The site is not just of local concern, but a concern on a region wide basis by groups and individuals around the Puget Sound. Unlike sites under an Agreed Order, there are no requirements or protections of community participation rights under the current VCP. While this may be appropriate for small simple sites such as gas stations, it is not appropriate for complex sites, where there is considerable public interest and issues of regional significance. Also, as described above there are multiple public agencies already involved in this site, and the VCP does not lend itself to the transparency, coordination and efficiency required to effectively manage integrating the work of multiple public agencies or authorities to accomplish necessary work.

Issues in Need of Resolution

Ecology should place this site under an Agreed Order to play a stronger and lead role in the coordination of multiple public agencies and authorities to ensure all of the ecological and human health issues at this site are dealt with in a transparent, effective and timely manner. This is not to disparage the existing work, or professional staff involved at the Port, but there are numerous issues that are either not addressed by the VCP, or not addressable under the Port's authority. They have no statutory mandate or authority to coordinate the efforts of other agencies, as Ecology does under MTCA. For example, former residents need to be contacted and informed that they were in essence living in a hazardous waste site. While the Port and KCHA clearly share this responsibility for the time the Port owned and KCHA operated the apartments, what about the residents of the apartments for the 10 years previous to that? Clearly informing as many of the former residents as can be located is an important issue of social and environmental justice that needs to be handled as part of the site activities. It is not appropriate to do this under VCP, and the Port is not the right lead agency for this effort. There is a similar situation for workers who did or may have come in contact with site soils. The Port lacks programs and authority for dealing with worker exposure issues for example related to King County, and Seattle City Light employees.

While some consideration has been given to potential exposure scenarios and contact of the previous apartment residents to date there has been no consideration of the workers. Most of these workers could have unknowingly come into contact with potentially much higher levels of contaminants due to direct contact with the soil than likely scenarios for site residents. The workers, like the residents, had either no knowledge of the potential pollution, or in the case of construction workers, were not adequately trained or equipped to protect them from exposure. The site exposed workers would potentially include at least the construction crew (while ChemWaste Management handled some of the cleanup, existing records show that a substantial portion of the identified contaminated area soil was handled by construction crews, without CWM, or Golder Associates oversight), Seattle City Light workers, King County drainage workers or related contractors, cable TV installation crews, other utility related crews, and site maintenance

and landscaping crews. This issue needs to be investigated and likely should be handled by PHSKC and L&I, in conjunction with Ecology.

As mentioned above, existing soil and groundwater data strongly suggest site contamination has migrated beyond the apartment property boundaries. The Port has recognized this (in part), and placed at least four additional shallow groundwater monitoring wells east of the site to the east of Des Moines Way. While the Port should be applauded for taking this critical and necessary step in a timely fashion their action does not adequately address site data needs, or address primary site mechanisms that would have and may be impacting contaminant migration.

The site operated as an industrial facility from at least 1940, through the 1980's. During the industrial operational period it is likely there were significant stormwater discharges that impacted off-site areas, including Lora Lake. There is no indication that stormwater was handled and treated on-site during the industrial operations, and existing records of drainage confirm this potential discharge source.

Also, it is apparent that contamination, supposedly removed from the site in 1987, was at least in part spread around the site. This is based in part on the findings of some of the highest contamination concentrations are found in soil at the eastern boundary of the site. It is generally agreed this contamination is the likely result of construction grade and fill activity during 1986-1987. This activity substantially predates the Construction Stormwater General Permit, and Best Management Practices to control erosion and stormwater at the time were spotty at best. It is likely that contaminants at the time were spread not just around the site, but to surrounding property as well particularly to the east which is down gradient in terms of topography, historical site access, surface water and groundwater. As a result additional lateral soil testing beyond the apartment property lines to determine the nature and extent of contamination is needed.

Likewise given current information, testing of sediments in Lora Lake is also necessary. The lake is between two hundred and three hundred feet from the site and is currently (and likely historically), directly connected to the site via a stormwater collection and discharge system. There is also the road drainage system adjacent to the sites eastern boundary, which is believed to discharge to Miller Creek, which needs to be investigated as well. This also brings up an additional issue. As this MTCA site (known to be contaminated), has a point source discharge to waters of the state (Lora Lake), it should be under a relevant NPDES permit, which currently it is not. The Port has an existing individual industrial NPDES permit for its airport operations. That permit is currently in the renewal process, and the draft renewed permit is scheduled for release shortly. It would be preferable if an approach could be found to provide the Lora Lake Apartment site NPDES permit coverage that does not unnecessarily complicate or delay the re-issuance of the Port's existing NPDES permit for SeaTac Airport.

Deeper sampling underneath and down-gradient of the historic site disposal system is needed to determine if chlorinated solvents used or disposed of on site have migrated vertically beyond the shallow groundwater zone. Near the center of the site there were at

least two structures related to the disposal and discharge of contaminants. The first was a buried eight to nine foot square concrete box, which lacked a bottom, and wall on the north side. From the sludge recovered from inside this structure it is apparent that it was used for disposal of waste apparently by the barrel washing facility, and perhaps the auto wrecking yard as well. There was a smaller contaminated concrete sump structure removed as well. The soil underneath the larger structure was recorded as sand and gravel at the time of the sludge removal (by Golder Associates), which would allow rapid vertical migration of chlorinated hydrocarbons. While no records of wastes handled on site have been made available, historic records from nearby industries and other barrel washing facilities operating during a similar time span make it likely that a significant amount of chlorinated hydrocarbons were handled at the site. The historic and current sampling was limited to shallow depths. Sampling just prior to construction in the late 1980's was limited to a depth of approximately eighteen feet and given more current data historic data are suspect in any case. The Port's more recent sampling was limited to fourteen feet for soils, twenty feet for groundwater, and are not sufficient to accurately describe the nature and extent of contamination for the vertical component of the site investigation.

There also needs to be further assessment of the potential for up gradient, and surrounding site contamination. For example an immediately adjacent property on the south side of the site was owned and operated by Seattle City Light, who may have stored transformers or other electric equipment there with PCB contamination. Available information is not adequate to determine if this is a concern or not. Groundwater data collected to date indicates the potential for an off-site groundwater plume moving through the site from the northwest. This potential additional off-site source needs to be further investigated as well.

We would like to meet with Ecology to discuss these issues and potential resolutions in the near future.

Sincerely,

Brett Fish, President
Citizens Against SeaTac Expansion
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Normandy Park, WA 98166

BJ Cummings, Director
Duwamish River Cleanup Coalition
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2317 EAST JOHN STREET
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(206) 860-2883, FAX (206) 860-4187

April 30, 2010

Via Certified Mail - Return Receipt Requested
Tay Yoshitani, CEO
Port of Seattle
P.O. Box 1209
Seattle, WA 98111

Re: NOTICE OF INTENT TO SUE UNDER THE CLEAN WATER ACT

Dear Mr. Yoshitani:

We represent Waste Action Project, P.O. Box 4832, Seattle, WA 98104, (253) 639-7245. Any response or correspondence related to this matter should be directed to us at the letterhead address. This letter is to provide you with sixty days notice of Waste Action Project's intent to file a citizen suit against the Port of Seattle under Section 505 of the Clean Water Act ("CWA"), 33 USC § 1365, for the violations described below concerning discharges from the Lora Lakes Apartment Site, 15001 Des Moines Memorial Drive, Burien, Washington, which is owned by the Port.

The Port discharges pollutants from the Lora Lakes Apartment Site to waters of the United States without a National Pollutant Discharge Elimination System ("NPDES") permit in violation of Section 301(a) of the CWA, 33 U.S.C. § 1311(a). The pollutants discharged include, but are not limited to, stormwater discharges associated with industrial activities, contaminated groundwater, arsenic, selenium, cadmium, chromium, copper, lead, antimony, silver, thallium, zinc, beryllium, mercury, nickel, antimony, polychlorinated biphyenyl aroclors, bolatile organic compounds, semivolatile organic compounds, petroleum hydrocarbons, dioxin/furans, carcinogenic polycyclic aromatic hydrocarbons, suspended solids, pH, and turbidity. Discharges occur on a daily basis, including but not limited to every day that at least a trace of rain falls as indicated by rainfall gauges at the adjacent Seatac International Airport, and have been continuous for at least the past five years. Discharges, including stormwater runoff and contaminated groundwater infiltration, are conveyed through the Lora Lakes Apartment Site storm sewer system and/or the City of Burien storm sewer system to Lora Lake and then to Miller Creek and the Puget Sound, all of which are waters of the United States.

Pursuant to 33 U.S.C. §§ 1311(a) and 1342(p) and 40 C.F.R. § 122.26, stormwater discharge associated with industrial activity is unlawful unless authorized by an NPDES permit. 40 C.F.R. § 122.26(b)(14) defines "stormwater discharge associated with industrial activity" to include stormwater discharges from areas where industrial activity including

hazardous waste treatment, storage or disposal facilities and automobile junkyards either take place or where such activity took place "in the past and significant materials remain and are exposed to storm water." In the past, the Lora Lakes Apartment Site was the location of the Novak Barrel Cleaning Company hazardous waste treatment, storage or disposal facility in the 1940s and 1950s, where activities included cleaning barrels that had contained chemicals, and then the Burien Auto Wrecking facility from abut 1960 to 1981. Significant materials, including substantial amounts of soil contaminated by the pollutants identified above, remain from the activities of these past site operations and are exposed to stormwater. The Port is thus discharging pollutants without an NPDES permit in violation of Sections 301(a) and 402(p) of the CWA, 33 U.S.C. §§ 1311(a) and 1342(p).

The above-described violations reflect those indicated by the information currently available to Waste Action Project. These violations are ongoing. Waste Action Project intends to sue for all violations, including those yet to be uncovered and those committed after the date of this Notice of Intent to Sue.

Under Section 309(d) of the CWA, 33 USC § 1319(d), each of the above-described violations subjects the violator to a penalty of up to $32,500 per day for violation days on or before January 12, 2009, and up to $37,500 per day for violation days after January 12, 2009. In addition to civil penalties, Waste Action Project will seek injunctive relief to prevent further violations under Sections 505(a) and (d) of the CWA, 33 USC § 1365(a) and (d), and such other relief as is permitted by law. Also, Section 505(d) of the CWA, 33 USC § 1365(d), permits prevailing parties to recover costs, including attorney's fees.

Waste Action Project believes that this NOTICE OF INTENT TO SUE sufficiently states grounds for filing suit. We intend, at the close of the 60-day notice period, or shortly thereafter, to file a citizen suit against the Port of Seattle under Section 505(a) of the Clean Water Act for violations.

During the 60-day notice period, we would be willing to discuss effective remedies for the violations addressed in this letter and settlement terms. If you wish to pursue such discussions in the absence of litigation, we suggest that you initiate those discussions within 10 days of receiving this notice so that a meeting can be arranged and so that negotiations may be completed before the end of the 60-day notice period. We do not intend to delay the filing of a complaint if discussions are continuing when the notice period ends.

Very truly yours,

SMITH & LOWNEY, PLLC

By: _____
Richard A. Smith

c: Lisa P. Jackson, Administrator, U.S. EPA
Dennis J. McLerran, Administrator, Region 10 U.S. EPA
Ted Sturdevant, Director, Washington Department of Ecology

Memorandum

Date: 15 June 2010

To: File

From: Port of Seattle Aviation Environmental – Hazardous Waste Management Program

Subject: Lora Lake Apartments Stormwater Catch Basin Sediment Waste Designation

This memorandum summarizes the waste designation that was conducted for disposal of sediment removed from storm water catch basins and conveyance piping at the Lora Lake Apartment Complex at 15001 Des Moines Memorial Drive, Burien, WA in January and February of 2010. The designation was based on soil, catch basin sediment and groundwater sampling and analysis compiled for the MTCA Agreed Order with the WA State Department of Ecology [1], [2], [3].

WASTE DESIGNATION

1. **RCRA Solid Waste:**

The catch basin sediment removed from the stormwater conveyance system met the definition of a solid waste under 40 CFR 261.2.

2. **RCRA Hazardous Waste:**

The catch basin sediment was not excluded from regulation as a hazardous waste under CFR 261.4(b); therefore the waste was evaluated to determine if the sediment met any of the criteria that would classify it as a RCRA hazardous waste.

Discarded Chemical Products List (U, P Series): Sample analysis indicated trace constituents listed in 40 CFR 261.33, *Discarded commercial chemical products, off-specification species, container residues and spill residues.* However, the original processes generating any of these trace constituents are unknown and any previously applicable waste codes are unknown. Therefore, none of the RCRA U and P Series listings are applicable.

Non-Specific Sources (RCRA F Series): Sample analysis indicated trace constituents listed in 40 CFR 261.31, *Wastes from Non-Specific Sources.* However, the original processes generating any of these trace constituents are unknown and any previously applicable waste codes are unknown. Therefore, none of the RCRA F Series listings are applicable.

Specific Sources (RCRA K Series): The original processes generating any trace constituents at the site are unknown and any previously applicable waste codes are unknown. Therefore, none of the RCRA K Series listings are applicable.

Characteristic Waste (RCRA D Series): After review and evaluation of all sample data complied, it was determined that the sediment does not meet the RCRA regulatory threshold standard for any toxic characteristics nor does it meet the RCRA regulatory threshold for characteristic codes of ignitibility, corrosivity or reactivity.

Three sediment samples contained total lead concentration above twenty times the TCLP threshold value. The total lead concentrations for these samples were 243, 270, and 322 mg/kg, respectively. TCLP analysis was conducted on these samples and lead was not detected in the TCLP extract. The method reporting limit was 0.5 mg/l. None of the other seven RCRA heavy metals exhibited total concentrations above twenty times the TCLP threshold value for their respective toxic characteristic.

Dioxin Discussion – RCRA: If a waste containing dioxin does not meet the listing criteria of F020, F021, F022, F023, F026, F027, F028, F032 or any other listing criteria, then the waste containing dioxin is by definition, not a RCRA hazardous waste. As discussed previously, no F Series listing applied to the subject sediment and therefore this waste is not a RCRA hazardous waste. However, dioxin-containing waste can be regulated in WA State under the Dangerous Waste Regulations (WAC-173-303) as a criteria waste due to toxicity, as discussed below.

3. WA State Dangerous Waste Designation

Persistent Dangerous Waste, HOCs: In accordance with WAC-173-303-100, a waste will designate as a persistent dangerous waste and carry a WA State Dangerous Waste code of WP02 if it contains a halogenated organic compound (HOC) total concentration of 0.01% - 1.0 % (100 – 10,000 ppm) and a WA State Dangerous Waste code of WP01 if HOCs exceed 1.0% (10,000 ppm). Taking a conservative screening approach, the highest individual HOC concentration reported from the available data was used to calculate the sum of the HOC's. The worksheet used to calculate the HOC mass percent value is included as an attachment to this memorandum. The worksheet displays a total HOC mass percent of 0.0000165.

Persistent Dangerous Waste, PAHs: In accordance with WAC-173-303-100, a waste will designate as a persistent dangerous waste and carry a WA State Dangerous Waste code of WP03 if it contains a total polycyclic aromatic hydrocarbon (PAH) concentration of greater than 1.0% (10,000 ppm). Taking a conservative screening approach, the highest individual PAH concentration reported from the available data was used to calculate the sum of the PAHs. The worksheet used to calculate the PAH mass percent value is included as an attachment to this memorandum. The worksheet displays a total PAH mass percent of 0.0019.

Toxic Dangerous Waste: In accordance with WAC 173-303-100, a waste will designate as toxic dangerous waste and carry a WA State Dangerous Waste code of WT02 if the waste has an equivalent concentration equal to 0.001% and less than 1.0%. Equivalent concentration calculations are based on toxicity data obtained by direct bioassay testing or by *book designation* which utilizes toxicity data available from approved sources such as the Registry of Toxic Effects of Chemical Substances (RTECS), The National Library of Medicine's Hazardous Substances Database and The USEPA's ECOTOX Database.

The book designation approach was performed using all sample data available. Instead of designating each sample individually, a conservative screening measure was used where the highest concentration reported for each analyte was included to calculate a worst case equivalent concentration.

Limited dioxin and furan toxicity data are available in the approved literature that is compatible with the book designation procedures of WAC 173-303-100. Therefore, when directly comparable dioxin and furan congener toxicity data were not available, the dioxin and furan congener in question was assigned the most toxic book designation category, Toxic Category X.

Similar to dioxin and furan, limited toxicity data is available for many of the PAHs detected. Where no comparable data was available, the PAH analyte in question was equated to benzo(a)pyrene and assigned to Toxic Category C.

Taking further conservative measures, where contaminants were not detected (those values assigned a U modifier, by the laboratory); the reporting limit value was used in the determination of the total concentration mass percent for the equivalent concentration calculations. In addition, where laboratory estimates (those values assigned a J modifier) exceeded reported values, the estimated values were used in the determination of the total concentration mass percent for the equivalent concentration calculations.

The book designation procedure for the evaluation of the subject sediment produced a calculated equivalent concentration of 0.0000983%. This value is well below the threshold for toxic criteria designation level of 0.001% under the Dangerous Waste Regulations. The worksheet used to calculate this value is included as an attachment to this memorandum along with the toxicology references.

Designation and Management Summary

Based on all available data, the sediment collected and removed from the Lora Lake Apartments site for the Stormwater Interim Action Plan was not regulated as a Hazardous Waste under RCRA or as Dangerous Waste under the WA State Dangerous Waste Regulations.

Based on the RCRA and DW evaluation, the stormwater sediment was regulated as a nonhazardous solid waste under 40 CFR 261.2 and WAC 173-350. This designation required the material to be disposed of at a facility that meets the requirements of 40 CFR 258 and WAC 173-351, which requires the facility to have a municipal solid waste handling permit. This permit is typically issued by the jurisdictional state or county health department.

Consistent with the foregoing analysis, the stormwater sediment was designated as a nonhazardous solid waste and was disposed of at the LRI Landfill in Puyallup, WA. This facility is fully licensed and permitted by the Pierce County Department of Health and meets the requirements of 40 CFR 258 and WAC 173-351.

References

1. AECOM, *Summary Report- Investigations and Data Gap Evaluation for Lora Lake Apartments*, September 2009

2. AECOM, *Lora Lake Apartments Interim Action Completion Report*, December 2009

3. Floyd|Snider, *Port of Seattle Lora Lake Apartments, Stormwater Interim Action*, February 2010

Lora Lake Sediment Halogenated Organic Compound Mass %			
Analyte	CAS	Concentration*	Concentration (mass %) X
DIOXINS/FURANS			
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	46200 ng/kg	4.62E-06
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001-02-0	3750 ng/kg	3.75E-07
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	4510 ng/kg	4.51E-07
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	1060 ng/kg	1.06E-07
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	31.8 ng/kg	3.18E-09
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	34.9 ng/kg	3.49E-09
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	43.7 ng/kg	4.37E-09
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	130 ng/kg	1.30E-08
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	22.4 ng/kg	2.24E-09
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	95.8 ng/kg	9.58E-09
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	4.70 ng/kg	4.79E-10
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	27.3 ng/kg	2.73E-09
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	6.06 ng/kg	6.06E-10
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	30.2 ng/kg	3.02E-09
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	10.7 ng/kg	1.07E-09
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	6.33 ng/kg	6.33E-10
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	5.83 ng/kg	5.83E-10
VOLATILES			
1,2-Dichloroethane	107-06-2	5 ug/kg	5.00E-07
cis-1,2-Dichloroethene	156-59-2	5 ug/kg	5.00E-07
trans-1,2-Dichloroethene	156-60-5	5 ug/kg	5.00E-07
Trichloroethene	79-01-6	5 ug/kg	5.00E-07
Tetrachloroethene	127-18-4	5 ug/kg	5.00E-07
SEMIVOLATILES			
Pentachlorophenol	87-86-5	84 ug/kg	8.40E-06
		HOC MASS %	**0.0000165**

***Dangerous Waste Designation of WP02 Requires an HOC Mass% of 0.01%**

Lora Lake Sediment PAH Mass %

Analyte	CAS	Concentration (ug/kg)	Concentration (mass %)
SEMIVOLATILES			
2-methylnaphthalene	91-57-6	550	0.00006
1-methylnaphthalene	90-12-0	520	0.00005
Acenaphthene	83-32-9	520	0.00005
Acenaphthylene	208-96-8	520	0.00005
Anthracene	120-12-7	520	0.00005
Benzo(a)anthracene	56-55-3	590	0.00006
Benzo(a)pyrene	50-32-8	1,100	0.00011
Benzo(b)fluoranthene	205-99-2	1,400	0.00014
Benzo(g,h,i)perylene	198-55-0	850	0.00009
Benzo(k)fluoranthene	207-08-9	1,400	0.00014
Chrysene	218-01-9	1,900	0.00019
Dibenz(a,h)anthracene	53-70-3	520	0.00005
Dibenzofuran	132-64-9	520	0.00005
Fluoranthene	206-44-0	2,200	0.00022
Fluorene	86-73-7	520	0.00005
Indeno(1,2,3-cd)pyrene	193-39-5	520	0.00005
Naphthalene	91-20-3	520	0.00005
Pentachlorophenol	87-86-5	84	0.00001
Phenanthrene	85-01-8	1,000	0.00010
Pyrene	129-00-0	3,200	0.00032
		PAH MASS %	**0.0019**

***Dangerous Waste Designation of WP03 Requires an PAH Mass% of 1.0%**

DW Book Designation
Lora Lake CB Sediment
Performed by: David HB, DH Environmental, Inc.

Conversions: 1 mg/kg = 10^-10 %; 1 ug/kg = 10^-7 %; 1 mg/kg = 10^-4 % (mass %)

Analyte	CAS	Concentration	Toxicity [ref]	Tode Category	Concentration (mass %) X	A	B	C	D
DIOXINS/FURANS									
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	46200 ng/kg	1 mg/kg Oral Rat LD50[2]	A		4.62E-06			
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001-02-0	3759 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	3.76E-07				
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	4510 ng/kg	6.325 mg/kg Oral Rat LD50[2]	B			4.51E-07		
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	1060 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	1.06E-07				
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	31.8 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	3.18E-09				
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	34.9 ng/kg	0.825 mg/kg Oral Rat LD50[2]	A		3.49E-09			
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	43.7 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	4.37E-09				
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	130 ng/kg	0.25 mg/kg Oral Rat LD50[1]	X	1.30E-08				
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	22.4 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	2.24E-09				
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	95.8 ng/kg	1.8 mg/kg Oral Rat LD50[2]	A		9.58E-09			
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	4.70 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	4.70E-10				
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	27.3 ng/kg	LC50 Oryzias latipes (Medaka, high-eyes) 0.027 (0.023-0.031) ug/L[3]	X	2.73E-09				
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	6.06 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	6.06E-10				
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	30.2 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	3.02E-09				
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	10.7 ng/kg	0.916 mg/kg Oral Rat LD50[2]	A		1.07E-09			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	6.33 ng/kg	0.022 mg/kg Dermal Rabbit LD50[2]	X	6.33E-10				
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	5.83 ng/kg	1.0 mg/kg Oral Rat LD50[1]	A		5.83E-10			
METALS									
Arsenic	7440-38-2	20 mg/kg	763 mg/kg Oral Rat LD50[2]	D					2.00E-03
Lead	7439-92-1	322 mg/kg	LC50 Oncorhynchus mykiss (Rainbow trout) 1170 ug/L 96hr[2].	C				3.22E-02	
VOLATILES									
1,2-Dichloroethane	107-06-2	5 ug/kg	LD50 Rat oral 670-890 mg/kg[2]	D					5.00E-07
cis-1,2-Dichloroethene	156-59-2	5 ug/kg	LC50 Lepomis macrochirus (bluegill) 135,000 ug/l/96 hr[2]	NOT APPLICABLE					
trans-1,2-Dichloroethene	156-60-5	5 ug/kg	LD50 Rat oral 1235 mg/kg[2]	D					5.00E-07
Trichloroethene	79-01-6	5 ug/kg	LC50 Pimephales promelas (fathead minnow) 40.7 mg/l-96 hr[2]	D					5.00E-07
Tetrachloroethene	127-18-4	5 ug/kg	LC50 Salmo gairdneri (Oncorhynchus mykiss - rainbow trout) 5 mg/l-96 hr[2]	C				5.00E-07	
SEMIVOLATILES									
2-methylnaphthalene	91-57-6	550 ug/kg	1630 mg/kg Oral Rat LD50[2]	D					5.50E-05
1-methylnaphthalene	90-12-0	520 ug/kg	1840 mg/kg Oral Rats LD50[2]	D					5.20E-05
Acenaphthene	83-32-9	520 ug/kg	LC50 Oncorhynchus mykiss (Rainbow trout) 1570 ug/L 96hr[2]	C				5.20E-05	
Acenaphthylene	208-96-8	520 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poecilopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				5.20E-05	
Anthracene	120-12-7	520 ug/kg	LC50 Lepomis macrochirus (bluegill) 1.27 ug/L 96hr[2]	X	5.20E-06				
Benzo(a)anthracene	56-55-3	590 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poecilopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				5.90E-05	
Benzo(a)pyrene	50-32-8	1100 ug/kg	LC50 Poecilopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				1.10E-04	
Benzo(b)fluoranthene	205-99-2	1400 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poecilopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				1.40E-04	
Benzo(g,h,i)perylene	198-55-0	850 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poecilopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				8.50E-05	
Benzo(k)fluoranthene	207-08-9	1400 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poecilopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				1.40E-04	
Chrysene	218-01-9	1900 ug/kg	LC50 Nearthes arenaceodentata (fish) > 1 mg/L96 hr[2]	C				1.90E-04	
Dibenz(a,h)anthracene	53-70-3	520 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poecilopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				5.20E-05	
Dibenzofuran	132-64-9	520 ug/kg	LC50 Pimephales promelas (fathead minnow)1050 ug/l 24-hr[2]	C				5.20E-05	
Fluoranthene	206-44-0	2200 ug/kg	LC50 Lepomis macrochirus (bluegill) 3680 ug/L 96hr[2]	C				2.20E-04	
Fluorene	86-73-7	520 ug/kg	LC50 Oncorhynchus mykiss (Rainbow trout) 820 ug/L 96hr[2]	B			5.20E-05		
Indeno(1,2,3-cd)pyrene	193-39-5	520 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poecilopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				5.20E-05	
Naphthalene	91-20-3	520 ug/kg	LC50 Oncorhynchus gorbuscha (pink salmon) 1.4 mg/L/96 hr[2]	C				5.20E-05	
Pentachlorophenol	87-86-5	84 ug/kg	LC50 Cyprinus carpio (Common carp, larvae) 0.01 mg/L for 96 hr[2]	A		8.40E-06			
Phenanthrene	85-01-8	1000 ug/kg	LC50 Oncorhynchus mykiss (Rainbow trout, larvae) 40 ug/L 27 days[2]	A		1.00E-04			
Pyrene	129-00-0	3200 ug/kg	LC50 Oncorhynchus mykiss (rainbow trout) 2000 ug/L 96hr[2]	C				3.20E-04	
Petroleum Hydrocarbons									
Diesel Range	68334-30-5	4200 mg/kg	TAKEN AS DIESEL: 7500 mg/kg Oral Rat LD50[1]	Not Applicable					
Heavy Hydrocarbon Range (Lube Oil Range)	64742-65-0	18,000 mg/kg	TAKEN AS Lube Oil Range: > 5000 mg/kg Oral Rat LD50[1]	Not Applicable					
Total (SUM)					0.0000525	0.000113	0.0000525	0.0338	0.00211

	ΣA% / 1	ΣA% / 10	ΣB% / 100	ΣC% / 1000	ΣD% / 10000	EC	Designation
Enter Toxic Category Mass % Here →	5.25E-05	1.13E-04	5.25E-05	3.38E-02	2.11E-03		
	5.25E-05	1.13E-05	5.25E-07	3.38E-05	2.11E-07	0.0000893	Non-Dangerous Waste

Sources
1 RTECS: Registry of Toxic Effects of Chemical Substances
2 HSDB: Hazardous Substances Data Bank, National Library of Medicine
3 ECOTOX Database: United States Environmental Protection Agency

*Concentration assumed from highest possible value from all samples