# Appendix A
# Comment Letters

DEPARTMENT OF ECOLOGY
State of Washington

# Port Angeles Harbor Sediments Investigation
# Public Comment Form

This form is for providing comments on the Sampling and Analysis Plan for Port Angeles Harbor. Your comments will be read by Cynthia Erickson, the Ecology Project Manager. Cynthia's response to your comments will be part of a responsiveness summary. The summary will be made public and sent to those who provided comments.

**You can submit your formal comment tonight or complete it at home and mail it to Cynthia Erickson, Southwest Regional Office, Toxics Cleanup Program, PO Box 47775, Olympia, 98504-7775. E-mail comments can be sent to ceri461@ecy.wa.gov.**

**NAME:** Daniel Lieberman

**ADDRESS:** 307 W. 6th St

**CITY:** Port Angeles, WA

**ZIP:** 98362

***Thank you for your interest in the Port Angeles Harbor Sediments Investigation!***

**COMMENTS**

***(Please use back side of this form if you need more room)***

This is an excellent opportunity for citizen and/or student science. As a teacher of High School students in Port Angeles, I (and my students) would appreciate being involved in data collection or other steps of the sampling procedures beyond simply making comments during a public comment period.

**Olympic Environmental Council Comments on the**
**Port Angeles Harbor**
**Sediment Characterization Study**
**Sampling and Analysis Plan**
**May 23, 2008**

## Summary of Issues and Recommendations

- **Tributyltin (TBT) needs to be more widely sampled in the harbor and in the tissues of fish, crabs, and clams**
- **The purpose of the bioassays needs to be more clearly defined and researchers need to acknowledge that many contaminants of concern do not adversely affect invertebrates to the same extent as other organisms**
- **Tissue samples from crabs and shrimp should also be sampled in the study**
- **Bioassay should be performed on clams and oysters to evaluate dioxins and dioxin-like compounds**
- **Perform a bioassay that runs at least one biological system through a full reproductive cycle**
- **Increase fish tissue, clam types and invertebrate sampling numbers**
- **Data on benthic invertebrate assemblage composition should be collected**
- **Ecology should provide information on the combination of Harbor conditions (toxic chemicals, hypoxia, etc.) for RA and evaluation purposes**
- **Sampling of the intertidal area needs to be performed where people use beaches**
- **Scientific literature should be reviewed along with regulatory databases for current ecological toxicity values**
- **Ecology needs to account for the combination of stressors including hypoxia in its evaluations of the harbor**

## Comments on the Main Text

Overall the Work Plan addresses most of the major concerns from Rayonier activities and general harbor degradation. It delineates an appropriate spread of sampling and rightly focuses on the activities at the former Rayonier Mill. The Sampling Analysis Plan (SAP) also extends the sampling to the full harbor for characterizing conditions related to multiple activities over many decades. However, portions of the work plan need to be strengthened to include certain types of compounds and better screen samples for further analysis.

Given the long history of the harbor marine traffic, there should be at least as much emphasis on tributyltin (TBT), and related organotin compounds, as dioxins

and furans. The study is designed to evaluate both contamination from Rayonier and conditions across the harbor. TBT has been used in anti-fouling ship paint in both recreational and commercial settings for decades, and contamination from this compound is widespread in harbors across the world. It is a well documented endocrine disruptor that can cause sex changes in invertebrates at incredibly low doses (deFur et al. 1999).To accurately measure these endpoints, more sampling for TBT is needed. TBT bioaccumulates, and therefore should be examined in tissue samples. Additional sediment samples are also required. Since TBT is listed as a constituent of potential concern in the risk assessment, as many samples as possible need to be collected. There is a known interaction between TBT and polychlorinated biphenyls (PCBs) that increases toxicity (Schmidt et al. 2004), making this sampling even more critical.

Some of the samples in the central harbor area should include organotin compounds like TBT. At the very least, the samples near the anchorage in the central harbor need to include organotin on the list. In light of the organotin contamination issues, the SAP should also collect snails and evaluate organotin in tissues, or provide some comment on how this problem may be addressed in future efforts.

Section 4 explains the sediment sampling, sediment cores, bioassays and tissue sampling. The plan refers to compositing sediment samples and tissue samples. What is the plan for discrete sampling and composite sampling? Compositing samples over a large area does not provide the spatial resolution to determine if toxic chemicals accumulated in more localized areas, but only provides data on the larger areas as a unit. Samples need to be analyzed individually for chemical composition and contamination.

Sampling for fish tissue refers to collecting two ling cod fillets and two whole fish. This sample size should be increased to cover a larger area and to better represent conditions. Two fish per sampling location would be a much better approach. Why are forage fishes not sampled for the purpose of assessing uptake/accumulation of chemicals?

Section 4.1.4 discusses the tissue sampling of clams, fish and plant materials. This plan is a good start, but there is the real possibility that important information will be missed with only these two clam species and one fish, coupled with the limited range of species used in the bioassay. The tissue sampling should include samples of all other clams, combined, and at least three samples of other invertebrates as well. The reason for additional tissues is to determine the extent to which other species or groups of invertebrates serve as avenues for uptake and accumulation of chemicals into a larger segment of the trophic system. The basic biological knowledge of invertebrates is not sufficiently comprehensive that it is possible to say all species metabolize all chemicals in a similar fashion. Indeed, knowledge of fish biology provides evidence of great diversity in how toxic chemicals such as PCBs, dioxins and chlorinated pesticides are handled.

The SAP needs to be cautious about inferences concerning specific effects of toxic chemicals on the biotic assemblages based single samples of animal tissues. The issue with this line of investigation not coupled with bioassay is the exclusion of data from animals not surviving *in situ* exposure, or that are otherwise impacted but not observed in collections. If the sediments are indeed toxic to a range of animals, or cause long term harm, then the affected animals may not survive to be collected, or may suffer an abnormality that is not measured via a limited set of samples.

The harbor survey needs to collect samples of sediment for assaying benthic (bottom dwelling) invertebrate biotic assemblage composition. This information will indicate if the area is generally degraded or not. There are several excellent reviews indicating that benthic population diversity and abundance is responsive to low oxygen (Diaz and Rosenberg 1995, see volume by Nancy Rabalais) and these data should be collected.

The specific reason for the bioassays is not clearly defined, and needs to be explained in more detail. What sort of toxicity are researchers interested in determining, specifically? The SAP should state if the intent is to identify toxic responses, uptake rates of contaminants, both, or something else. At least one bioassay should investigate toxicity effects over multiple generations. This type of assay is possible with many invertebrate species and would shed important light on the long term effects of toxic chemicals in the sediment. Multi-generational effects (impacts not on the exposed generation but their offspring) have been documented in a number of invertebrates exposed to endocrine disruptors.

Bioassays must be tailored to the chemicals of concern. Invertebrates like amphipods and polychaetes do not seem to have the same receptor (Ah) as vertebrates and respond differently to dioxins and PCBs (Rice et al. 2003). Therefore, dioxin-like compounds do not exert the same influence on these organisms. Requiring a bioassay response as the prerequisite for additional analysis of archived sediments means that any limitation of the bioassay will prevent further analysis of the samples. Unless there is some compelling reason to not analyze archived samples, then these samples need to be used as a source of important information on conditions in the harbor sediments. At the very least, additional analysis should be performed if either the sediment is confirmed by bioassays to be toxic or if toxic chemicals (notably PCBs or dioxins) are detected in a corresponding surface sample.

Bivalves (clams and oysters) may be much more appropriate for bioassay work on dioxin-like compounds. Research by R. Van Beneden (University of Maine) has demonstrated toxic biochemical responses by the marine clams *Mya arenaria* and *Mercenaria mercenaria* to dioxin-like compounds. Additionally, recent research in the lab of J. Levine at North Carolina State University has demonstrated the sensitivity of freshwater bivalves to low level PCB exposure,

and similar responses may occur in marine bivalves. These two lines of investigation indicate that bivalve bioassays may be better suited to detect responses of invertebrates to dioxin and PCB sediment contamination.

Bioassays also need to include one biological system that is carried through a full reproductive cycle. Several compounds like TBT, dioxins, PCBs, bis-phenol-A (BPA), phthalates, and pesticides alter both reproductive function and structure in invertebrates. The appropriate endpoints need to be included in the assays. Including reproductive effects can be accomplished by selecting the correct assay and/or insuring that the assay extends through reproduction and assessing fertility, reproductive rates, and gonadal indices (see deFur et al., 1999 for more details).

The SAP should include assessments of the benthic invertebrate community diversity and abundance in the harbor for use in the ecological risk assessment. These samples should be collected on a transect from the inner to outer harbor using a grab sampler (van Veen, Ponar, etc.), sieved (0.45 mm) and preserved in the field and all organisms identified at least to family, if not genus and species. The purpose of these data is to assess the current condition of the benthic fauna, gauge the impact of multiple current conditions on the benthos, and estimate the food available to higher trophic levels that rely on the benthos as food. One of the consequences of the conditions in the harbor may likely be a diminished benthic biomass available as prey for benthic feeding fish, crabs, shrimp and even mammals. This reduction would be a serious risk factor in an ecological risk assessment.

Is the water in the Port Angeles Harbor clear enough to justify the intensity of light proposed in some of the bioassays in the work plan? The SAP is correct that some PAHs are activated by UV light and the opposite is true. Other organic compounds (including PCBs) are actually deactivated by UV light. Given that light does not penetrate more than a few centimeters into the sediment even in the most brightly lit of waters, this protocol may only apply to a few locations.

Table 6-6 does not clearly state the criteria of these bioassays.

Are all tissues being sampled for total PCBs, or only whole animals? Text and tables do not match descriptions. Some portions of the text refer to only 10 congeners of PCBs being sampled but Table 6-3 lists total PCBs as an analyte.

The SAP should seek to provide information on the combination of conditions in Port Angeles Harbor, hopefully for use in a risk assessment or other evaluation of the responses of the ecosystem. The harbor is stressed with both low oxygen and chemical contamination. The low oxygen is attributed to accumulation of excessive wood waste that decomposes and consumes oxygen. This condition is akin to (but not exactly the same as) eutrophication observed in many waterways around the country. Such conditions are set up by excessive nutrients fueling

biological (usually algae) growth that cannot be sustained. When the biomass dies, it sinks, decays and the decay process consumes oxygen. Presumably the wood waste decomposition fuels the process in Port Angeles. In eastern waters, the low oxygen is accompanied by production of carbon dioxide that depresses water pH, further stressing the biota. Thus, marine life in Port Angeles is exposed to chemical contamination, low oxygen, elevated carbon dioxide and low pH, all at once.

Sampling in the near shore area in front of the Red Lion Inn needs to include samples in the intertidal area, if not already contemplated. The SAP does not indicate the tidal height of these sample locations and the public use of the beach requires sampling of the intertidal area where people recreate.

**Comments on Appendix D- Human Health and Ecological Risk Assessment Plan**

The risk assessment appendix gives far too much discretion in selecting Indicator Hazardous Substances. It is not enough to say that compounds with “low frequencies of detection” will be eliminated. Ecology needs to select a specific value for this sort of screening for consistency.

Ecology should not just rely on government databases to establish ecological toxicity values. A review of the scientific literature should also be conducted. Many of the entries in the government databases have not been updated in many years and may not reflect the actual risks associated with compounds.

Again, the plan suffers by not referring to or collecting data for crabs or shrimp. If the analysis will rely on existing data from earlier surveys, then the SAP needs to acknowledge this approach. This omission is a problem since there are no receptors listed that actively consume larger benthic organisms and crabs are a significant component of seafood consumption for humans in the area. Shrimp forage on the bottom and are sensitive to both water and sediment quality. Notwithstanding the previous sampling efforts, crab and shrimp sampling in the harbor-wide investigation would indicate both presence/abundance and characteristics of the crustacean populations.

The Ecological risk assessment will need to account for the combined stressors of toxic chemicals, low oxygen, altered biotic community and physical disturbance from deposition of materials such as wood waste. Low oxygen (hypoxia) causes metabolic stress, limits growth, reproduction and causes mortality. Chronic hypoxia reduces the abundance or benthic fauna and changes the species composition in a predictable pattern (Diaz and Rosenberg, 1995).

## References

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Diaz RJ, Rosenburg R. 1995. Marine benthic hypoxia: A review of its ecological effects and the behavioral responses of benthic macrofauna. Oceanogr. Mar. Biol. Ann. Rev. 33: 245-303.

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Nakayama K, Y Oshima, T Yamaguchi, Y Tsuruda, IJ Kang, M Kobayashi, N Imada, and T Honjo. 2004. Fertilization success and sexual behavior in male medaka, *Oryzias latipes*, exposed to tributyltin. Chemosphere. 55(10): 1331-7.

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Rice, CP, PW O'Keefe, and TJ Kubiak. 2003. Sources, Pathways, and Effects of PCBs, Dioxins, and Dibenzofurans. Handbook of Ecotoxicology: Second Edition. Ed. DJ Hoffman, BA Rattner, GA Burton Jr., and J Cairns Jr. Lewis Publishers. New York, NY. Pg 501-573.

Schmidt K, CEW Steinberg, S Pflugmacher, and GBO Staaks. 2004. Xenobiotic substances such as PCB mixtures (Aroclor 1254) and TBT can influence swimming behavior and biotransformation activity (GST) of carp (Cyprinus carpio). Environmental Toxicology. 19(5): 460-70.

**Disclaimer:**

Funding for this product was provided by a Public Participation Grant from the Washington State Department of Ecology. These materials were reviewed for consistency with the purposes of the grant only; grant funding does not constitute endorsement of opinions or recommendations expressed herein.

**LEKT Comments on *Port Angeles Harbor Sediment Characterization Study Sampling and Analysis Plan* (SAP), appendices, and supporting documents.**

## 1. Comments on SAP

Section 3.2.2

"If an analyte is not detected in any samples for a particular medium, then it will be assumed that the chemical is not present, and it will not be considered further in the risk assessment"

**Will this approach be used independently for harbor areas and background areas? For example, all 17 of the dioxin and furan congeners have been detected in sediments in the harbor, but only a subset of them (5) have been detected in any sediment samples in Freshwater Bay. Would these data sets be treated differently for evaluating sample TEQ concentrations?**

See Sec. 4.1.1, 4.1.2, 4.1.4

"The chemical analyte list, analytical methods, target detection limits, and comparative criteria are discussed in Section 5.1."

**These are not discussed in Section 5.1; the reference should be to Section 6.1**

Section 5.1 line 5 Page 67

**Change the parenthetical reference "and set line fishing for the lingcod" to divers will be used to collect lingcod.**

Section 8.1

"Non-detected values will be assessed as half of the sample reporting limit for data evaluation purposes, except for compliance calculations, which will be assessed as zero"

**Can you explain this concept a little more? What are "data evaluation purposes"? Will the procedures described in Section 3.2.2 (discussed above) be employed when a particular analyte has not been detected in a particular medium? If non-detects will be assessed as zero for compliance calculations, getting adequately low detection limits for dioxins and furans will be critical.**

## 2. Comments on SAP Appendix D

Section 2.2.6, p. 7

**The whole first paragraph reference to the Shea et al. 1981 is incomplete and misleading. The Shea report states starting on the bottom of page 463 and continuing to page 464:**

> **"It is clear that a definite possibility exists that the plume separates into distinct components while in the near field region, and that certain of these components may travel in the subsurface waters, or precipitate out onto bottom sediments. Unfortunately, neither laboratory (separation and settling experiments) nor field (detailed subsurface and sediment sampling) studies have been carried out to investigate this phenomenon. It is important to note that the separation of the plume into components implies the possibilities that 1) toxic components may be present with little or no detectable SSL and 2) that toxic components may be carried by subsurface currents to areas much different than those indicated by surface current analysis."**

**The net flow in the harbor is in question and no conclusive studies have been done to map the bottom currents in the harbor, which we contend are significantly different than the surface currents. Our contention is based on observations in the harbor during dives, and they indicate that the bottom currents within the harbor are consistently clockwise and that this is unaffected by the tidal changes. It appears that the harbor bottom currents are more affected by fluid dynamics and the harbor shape than anything else. Malcom Pirnie's conclusions are conjecture and are not supported so we don't believe it is appropriate to use their statements.**

Section 3.3.1.4

"The reference area for this investigation is Dungeness Bay. Site-specific background samples from Dungeness Bay will be used to compare reference and site investigation data, as appropriate. Additional discussion of the use of any reference data will be provided in the risk assessment report."

**The use of an area for reference sediment samples (as defined in the SMS) and as site-specific background, which may be the basis for setting cleanup levels, are not exactly the same thing. Is Dungeness Bay sediment intended to be used for both purposes? (See also comment below on SEIDG Sec. 3.1.3)**

Section 5.4.1.4, p. 36

**The harbor seal is an opportunistic feeder and is not limited to bottom-dwelling fish,**

**invertebrates and pelagic species. They also eat clams and crab, both of which are plentiful and known to be significant bioaccumulators of PCBs and dioxins in Port Angeles Harbor.**

**FOOD PREFERENCES AND RESOURCES :**

**1. Adult harbor seals eat squid, crustaceans, molluscs, and a variety of fish; including, rockfish, herring, flounder, salmon, hake, and sand lance.**

**2. A harbor seal's diet varies seasonally and regionally and often is subject to local prey availability. "Harbor seals don't chew their food. They swallow their food whole or tear it into chunks. With their back molars, they crush shells and crustaceans."**

***SeaWorld/Busch Gardens Animals***

**"The harbor seal diet varies seasonally and regionally. They primarily feed on crustaceans, mollusks, squid, and fish. The food is torn into chunks swallowed whole. The molars crush shells and crustaceans for swallowing, but food is generally not chewed. Adults consume 5-6% of their body weight or 4 to 6 kg of food per day. The diet of Ungava seals has not been well studied, but they are known to prey on salmonids such as small Brook trout, feeding usually takes place near the shore in shallow water they dive to over 200m deep, most often 100m for periods of a few minutes. However, harbor seals have sometimes been known to dive more than 500m for more than 25 minutes."**

***/Phoca vitulina/* , Harbor Seal - MarineBio.org. Retrieved Wednesday, April 30, 2008, from http://marinebio.org/species.asp?id=158.**

**3. Comments on *Summary of Existing Information and Identification of Data Gaps* (SEIDG) *Report***

Section 3.1.3, p. 3-5

"Dungeness Bay is considered an appropriate reference area for dioxins in Port Angeles Harbor, as it has some of the lowest dioxin/furan concentrations sampled to date in the Strait of Juan de Fuca or Puget Sound"

**Dungeness Bay was one of two background locations used in the Marine RI and Phase II Addendum sampling events; the other was Freshwater Bay. The Freshwater Bay location was added at the Tribe's request, as certain information existed (see Shea et al., 1981) that indicated Dungeness Bay may be within the area**

**of influence of historic mill effluents. There do appear to be differences in sediment concentrations for both dioxins/furans and PCBs between these two locations. Concentrations of both dioxin TEQ and total PCBs are consistently lower in Freshwater Bay than in Dungeness Bay. Mean TEQ concentrations, based only on detected values, were more than 20 times lower in Freshwater Bay as compared to Dungeness Bay; mean TEQ concentrations, treating non-detects at half the detection limit, were three times lower at Freshwater Bay; and mean total PCB concentrations were four to five times lower in Freshwater Bay. (Note: at the 90$^{th}$ percentile [the value used for establishing background] the difference in values for these two locations is even greater.) For dioxins/furans, only 5 of the 17 congeners were detected in any sediment samples from Freshwater Bay, while 13 of 17 were detected at Dungeness Bay.**

**The Tribe continues to assert that Freshwater Bay is a more appropriate location for determining background sediment concentrations.**

Section 3.1.2, p. 3-5

"Concentrations for PCBs and dioxins/furans in tissue at the site increased from initial sample collections of the RI. This was most likely due to changes in tissue separation methodology and labs reporting lower detection limits for sediment."

**While there were some differences in tissue separation methodologies, specifically for horse clams and geoduck, we believe there are other explanations for increased concentrations. The highest detected concentrations of dioxins/furans from around the Mill site were found in log pond sediments. This area was traditionally used for rafting logs and was also the location of one of the historic nearshore outfalls. Following closure of the Mill, log rafting ceased in this area, and the existing log booms and part of the existing jetty structure were removed. This immediately resulted in significant erosion within the log pond and the adjacent shoreline. In fact, one of the first actions that Rayonier took following site deferral was an emergency action to armor the log pond shoreline to address this issue.**

**In 2000, Rayonier's consultant conducted a survey of the log pond area, including collecting 6 sediment samples that were analyzed for dioxins and furans. The total TEQ for these samples ranged from 20 to 90 ppt, with an average concentration of 50 ppt (and an average TOC of more than 20%). During sampling for the Marine RI (2002), which was more extensive, TEQ concentrations ranged from 0.6 to 53 ppt (with an average of less than 10 ppt). Finally, during sampling conducted for the Phase II RI Addendum (2006) TEQ concentrations ranged from 0.4 to 46 ppt. Between these successive events, dioxin concentrations, as well as woodwaste accumulations have decreased significantly in all but the most protected areas of the log pond. We believe that if this material was re-suspended due to erosion, and available to be taken up by organisms in the harbor, this may be one explanation for increased concentrations.**

**Among the most significant increases between the RI and the Phase II sampling events were concentrations of dioxins/furans in Dungeness crab. There were not changes in tissue separation methodologies for Dungeness crab samples, and the increased concentrations are evident in samples analyzed by the same laboratory using the same analytical procedures. Also, it is not apparent that lower detection limits for sediment had any effect on increasing concentrations in tissue.**

Section 2.1, Paragraph 2

"Prior to the advent of the CWA, untreated process effluent from the mill facilities was discharged to the harbor through the early 1970's (table2) (Shea et al. 1981). After passage of the CWA, industrial wastewater discharges to the harbor from mills required treatment. Pulp and paper mill treated effluents continue to be discharged in to the harbor until 2008…"

**We are not aware that any pulp and paper treated effluents were discharged into the harbor subsequent to the closure of the Rayonier Mill. What treated pulp effluents are being discharged into the harbor currently? Nippon discharges pulp and paper effluents outside of the harbor; Fiberboard has been closed for decades; and Rayonier has been closed for nearly a decade now. K ply wasn't a pulp or paper mill and had no documented waste effluent discharge. We know of no other sources in the harbor, if there are we would be interested in their location and identity.**

Section 3.2.1.1

"Nippon, formerly Diashowa and Georgia Pacific, still operates a large mill on the western end of the Harbor at the base of Ediz Hook. Process wastewater was discharged into the Harbor until the 1960s, at which point a new discharge pipe was built that redirected effluent to the Strait of Juan de Fuca."

**1) Nippon has only had two previous owners according to records, one was Diashowa and the other was Zellerbach who founded the mill in 1921.**

**2) the waste stream for Zellerbach was split before the 1960's, according to a report:** ***Investigation of pollution in Port Angeles area; summer, 1957, Washington Pollution Control Commission***

> **"Crown Zellerbach, Inc. Located on the north side of the closed end of the harbor, the Crown Zellerbach integrated mill produces approximately 450 tons of ground wood and 95 tons of sulfite pulp daily. About 12,000,000 gallons of water are used per day in the production of pulp and paper. Pulping process wastes are discharged on the Straits side of the mill; wastes from the paper mill are discharged on the harbor side. ... A recently constructed**

**lagoon system effectively reduces solids losses from hydraulic barker wastes." (emphasis added)**

**So it appears that Zellerbach was more knowledgeable about waste streams than Rayonier, discharging the pulping process wastes outside of the harbor, so their dioxin should have been dumped on the outside of the harbor, not in it. We wouldn't want chemical contamination from the pulping process blamed on Nippon or their predecessors if they didn't contribute to them.**

**Comments provided by:**
Larry Dunn, LEKT
Bill Beckley, RIDOLFI Inc.

**From:** Eycke Strickland [mailto:eycke1@olypen.com]
**Sent:** Sunday, May 18, 2008 4:31 PM
**To:** Aoyagi, Hannah (ECY)
**Subject:** Public Comment PA Harbor

**Dear Dr. Aoyagi,**

**I believe that the Olympic Environmental Council has done an exhaustive study of the strength and gaps of the plan to clean**

**up our harbor. I therefore add my voice to theirs: See the talking points below:**

**Respectfully submitted.**

**Eycke Strickland**

**613 Cedar Park Drive**

**Port Angeles, Wa 98362**

**360-417-2984**

**www.eyckestrickland.com**

**PLAN STRENGTHS**

•Overall the Work Plan is good.
•It calls for an appropriate spread of sampling and rightly focuses on the activities at the former Rayonier Mill.

**PLAN GAPS**

•Omissions of certain types of compounds and screening of samples for further analysis.
• More sampling for tributyltin (TBT) is needed.

•Because of the Harbor's heavy marine industry, more sampling of TBT should be done.

TBT builds up (bioaccumulates) in tissue samples and is listed as a constituent of potential concern in the risk assessment, so as much data as possible needs to be collected.

•Interaction between TBT and polychlorinated biphenyls (PCB) increases toxicity making this sampling critical.

•The specific reason for the bioassays is not yet clearly defined.

• What toxicity are researchers interested in specifically?

• At least one bioassay should investigate toxicity effects over multiple generations.

Multi-generational effects have been documented in a number of invertebrates exposed to endocrine disruptors such as PBTs. This is possible with many invertebrate species and would shed important light on long term effects of toxins in the sediment
•Bioassays must be tailored to the chemicals of concern.

•Amphipods and polychaetes do not contain the receptor to uptake dioxins and PCBs. Therefore they do not exert the same amount of influence on these organisms. Making this the requirement for additional analysis of archived sediments is unnecessary.

•Without supporting evidence, there is no reason that all archived samples shouldn't be analyzed. At the very least, additional analysis should be performed if either the sediment is confirmed by bioassays to be toxic or if PCBs or dioxins are detected in a corresponding surface sample.

Is the water in the Port Angeles Harbor clear enough to justify the intensity of light proposed by the work plan?
UV light deactivates most organic compounds (including PCBs). Given that light does not penetrate more than a few centimeters into the sediment even in the most brightly lit of waters, this protocol seems unnecessary.
Are all tissues being sampled for total PCBs?
Text and tables do not match descriptions. Portions of the text refer to *only* 10 congeners of PCBs being sampled, but Table 6-3 lists *total* PCBs as an analyate.

Table 6-6 does notclearly state the criteria of the bioassays.

**Comments on Appendix D**
**Human Health and Ecological Risk Assessment Plan**
The risk assessment appendix Indicator Hazardous Substances.
Ecology should select a *specific value* for hazardous substances for screening consistency, rather than saying compounds with "low frequencies of detection" will be eliminated..
Ecology should not just rely on government databases to establish ecological toxicity values.
A review of the scientific literature should also be conducted. Many of the entries in the government databases have not been updated in years and may not reflect the actual risks associated with compounds.
Sampling crabs should be included.
Crabs are a significant component of human seafood consumption in the area and there are no receptors listed that actively consume larger benthos organisms.

# Rayonier

*Corporate Headquarters*

May 28, 2008

Ms. Cynthia Erickson, Project Manager
Washington Department of Ecology
SWRO Toxics Cleanup Program
P. O. Box 47775
Olympia, WA 98504-7775

Re: Port Angeles Harbor Sediment Characterization Study: Sampling and Analysis Plan

Dear Ms. Erickson:

Rayonier appreciates the opportunity to comment on Ecology's proposed Sampling and Analysis plan ("Plan").

As a threshold matter, Ecology proposed the additional sampling presented in the draft Plan for the "Rayonier Area" in a January 9, 2008 letter to the company. Our response then and now is that further sampling in the "Rayonier Area" is unnecessary because sufficient sampling and characterization has been completed to complete the feasibility study and prepare a cleanup action plan. EPA sampled and studied sediments in the Harbor in 1999. In 2002 and 2006 Rayonier performed two extensive sediment studies including preparation of a marine remedial investigation and ecological risk assessment under Ecology Agreed Order DE02SWFAPSR-4570.

We have raised and documented our objections and reasoning in previous letters and at a meeting with the Toxics Cleanup Program staff on March 14, 2008. Yet, Ecology continues to assert that the former mill area is not adequately characterized. After 159 samples collected in three separate sampling events, this Plan proposes to collect another 122 samples in the same areas previously sampled for a total of 281. At the same time, only 143 samples are proposed to characterize the "Harbor-wide" sediments – an area over three times as large as the "Rayonier Area."

We have provided technical comments from Malcolm Pirnie, Inc. on the specific content of the Sampling and Analysis Plan, as enclosed.

Sincerely,

Carla E. Yetter
Director, Environmental Affairs

50 N Laura Street • Jacksonville, FL 32202
Telephone (904) 357-9100 • Fax (904) 357-9101

**Comments on the Sampling and Analysis Plan for the Port Angeles Harbor Sediment Characterization Study, Port Angeles, Washington (Ecology 2008a)**

**1. The amount of sampling and analyses proposed in the SAP (Ecology 2008a) is unnecessary to accomplish the goals as set forth in Section 2.3.**

*Previous Sampling*

The "Rayonier Area" has been sampled and characterized multiple times; first by EPA in 1999, and then later is two separate studies by Rayonier in 2002 and 2006. The results of the proposed sampling may add data to an already abundant database, but is unnecessary to conduct a feasibility study and will not change the selected remedy as would be reported in the cleanup action plan for the area around the former Rayonier Mill. 159 samples have already been collected and analyzed and this study proposes an additional 122 samples taken over the same area.

*Precedents:*

Previous investigations by Ecology and EPA Region 10 in coordination with Ecology have finalized cleanup action plans and records of decision with substantially less data than this document proposes to collect around the former Rayonier Mill. For reference, see:

- EPA 2000. Asarco Site, Tacoma, Washington. Record of Decision.
- EPA 1999. Pacific Sound Resources, Seattle, Washington. Record of Decision.
- EPA 2000. Puget Sound Naval Shipyard, Bremerton, Washington. Record of Decision.
- Ecology 2001. Concentrations of selected chemicals in sediments from harbors in the San Juan Islands. Publication No. 01-03-007. Washington State Department of Ecology. March.
- Ecology 2000. Concentrations of chemical contaminants and bioassay response to sediments in Salmon Bay, Seattle. Results of phase III sampling. Publication No. 00-03-053. Washington State Department of Ecology. December.
- Ecology 2000. Reconnaissance survey of inner Shelton Bay harbor sediments. Chemical screening of nearshore sites and evaluation of wood waste distribution. Publication No. 00-03-014. Washington State Department of Ecology. May.
- Ecology 1999. Lower Budd Inlet sediment characterization study. Midwest site evaluation and chemical screening of selected point sources. Publication No. 99-305. Washington State Department of Ecology. February.
- Ecology 1999. Grays harbor estuary sediment evaluation. Chemical screening and station cluster analysis of selected locations. Publication No. 99-300. Washington State Department of Ecology. January.
- Ecology 1999. Investigation of chemical contamination at Whitmarsh landfill and Padilla Bay lagoon. Publication No. 99-306. Washington State Department of Ecology. February.
- Ecology 1997. Survey of petroleum and other contaminants in the sediments of Fidalgo Bay. Publication No. 97-338. Washington State Department of Ecology. November.
- Ecology 1996. Chemical contaminants in Salmon Bay sediments. Publication No. 96-343. Washington State Department of Ecology. November.

*Sediment cores:*

One-foot interval cores (as proposed in SAP Sections 4.1.2 and 4.2.2) are not required for determining subsurface exposure to chemicals that are in the sediments below the biologically active zone[i]. Subsurface exposures to human receptors will be unlikely to occur except in the intertidal areas where clams may be present and people may dig

below the surface In this exposure scenario, people are not exposed to discrete intervals during harvesting activities. This is particularly true assuming the exposure occurs over a period of years and a variety of areas within an intertidal zone for the harvesting of several species. In practice, data collected at discrete subsurface intervals are averaged together when risk assessments are performed to represent an upper bound estimate of the average exposure. This estimate can be as precise using larger core intervals, thereby reducing the number of samples required Many of the proposed sampling locations are depositional and subtidal. Human exposure to chemicals in sediments from these areas below the biologically active zone would be *de minimus* since access to these sediments would require divers wearing wet/dry suites and special breathing apparatus given the cold water temperatures characteristic of the region.

The biologically active zone for sediments is generally considered to be the top 10 cm. This corresponds with the presence of dissolved oxygen which is required for biological activity. While some organisms may exist below this interval, such organisms (e.g., horse clams, geoducks) have evolved adaptations to feed in the oxygenated layer and, therefore, the exposure to the chemicals occurs at there. Dermal exposure to subsurface bivalves is assumed to be minimal since the shell encloses and protects the siphon, and the external surface of the siphon protected by a relatively impermeable layer.

One-foot interval cores are not required for evaluating remedial alternatives. Dredging typically occurs within a tolerance of 18" intervals. In areas like the log pond near the former Rayonier Mill where the depth to glacial till appears to be three feet, one foot intervals are unnecessary for evaluating cleanup options In areas where more than three feet of sediments overlay glacial till, a larger interval of sampling could delineate the contaminant layer while significantly reducing costs.

The samples proposed for delineating wood debris around the former Rayonier Mill (SAP Section 4.2.2) are unnecessary since the wood debris has been characterized adequately for the purposes of developing a cleanup action plan by the following:

- Ecology led wood waste study in Port Angeles Harbor (SAIC 1999)
- Diver survey and video of the log pond (Foster Wheeler 2001)
- Summary of 29 surface samples collected from the log pond, 41 surface samples collected from around the mill dock, and characterization of 22 cores collected from the log pond and mill dock areas (see the former Rayonier Mill Marine Remedial Investigation (MRI) Section 6.2 – Sediment Physical Characteristics, MRI Table 6-1 for sample descriptions, Phase 2 MRI Section 3.2.2 – Sediment Cores, Appendix A – Sample Collection Forms, Appendix F – Sediment Sample Photo Log, and Appendix H – Sediment Core Processing Logs (Malcolm Pirnie 2007ab)).

***Sediment Bioassays***

Ecology and the Lower Elwha Klallam Tribe (LEKT) agreed to a sampling program to characterize risks around the former Rayonier Mill Site which included 15 bioassay test locations[ii]. All three of these previous bioassay tests performed around the mill dock

failed to identify risk. Therefore, additional bioassay testing in the vicinity of the mill dock is unnecessary. Furthermore, additional sampling in the log pond will not further delineate the area requiring remediation since only one sample is proposed and previous samples already indicated the need for remediation. Given that sediment investigations around the deepwater outfall have shown no SMS numeric exceedances or the presence of wood waste, further bioassay testing in this area is also unnecessary

Section 4.2 – There is no sub-section in this section that discusses the bioassay samples that are intended for collection and analyses.

***Ennis Creek***

Interim removal actions were performed at the former Finishing Room between August 9th and 12th 2002[iii]. As part of this action, soil and sediment samples from banks and streambed of Ennis Creek adjacent to the removal area were characterized for total petroleum hydrocarbons (TPH) and PCBs.

At the completion of both the Finishing Room removal action and the MRI for the former Rayonier Mill sediment sampling, two sediment samples were collected from the alluvial fan of Ennis Creek just north of the bridge. Analytical results showed that PCBs were not detected and TPH concentrations were below levels of concern[iv].

As part of the characterization of the Mill Dock area during the MRI, 12 surface sediment samples were collected between August 15th and 20th 2002[v] and analyzed for PCBs. In September 2006, an additional 16 surface sediment samples were collected east of the Mill Dock as part of the MRI Phase 2 Addendum[vi]. Collectively we believe these data support an adequate characterization of both PCBs and TPH in the marine environment related to operations of the former mill.

Figure 4-9. Sample locations "EC02", "EC03", and "EC05" appear to be terrestrial although presumably they are intended for collection in Ennis Creek. If this is the case the water of Ennis Creek as shown on the figure should be extended to cover these locations.

Section 6.2 – For the two samples in Ennis Creek where bioassay testing is proposed, salinity conditions may required toxicity testing with freshwater species. Additional reference sediments from similar freshwater areas may also need to be collected

***Appendix D – Human Health and Ecological Risk Assessment***

The ecological risk assessment CSM, sampling, and analyses as proposed in Appendix D is substantially duplicative of the work already provided to Ecology and is unlikely to provide information that would result in a different cleanup action. With respect to bioaccumulation, the additional modeling proposed uses largely the same receptors and any small variation in receptors (wildlife species) are nothing more than a theoretical change in a mathematical model and would not represent a "different" evaluation of these specific species than could be extrapolated from the previous assessment. Additionally, many of the tissue samples already collected and reported for the harbor (e.g., shrimp,

fish, crab) integrate exposure to harbor-wide contaminants spatially as both the receptor and the sediment-borne chemicals move throughout the harbor

Appendix D, Section 2.2.7, Fish, 5th ¶, 2nd sentence – "East" Hook should be changed to "Ediz" Hook

Appendix D, Table 5-1 – Information presented in the "Measures", "Data Needs", and "Are recent data available" columns of the table appear to be switched for carnivorous birds, omnivorous birds, and herbivorous birds. The information for omnivorous birds should be move to herbivorous birds, the information for herbivorous birds should be moved to carnivorous birds, and the information for carnivorous birds should be moved to omnivorous birds. The information in this table should match the narrative description provided in Section 5.4.1.

Appendix D, Section 5.4.2, Exposure equation – Exposure Duration (ED) is not a term commonly used in exposure modeling for wildlife receptors.

**2. Analytical Chemistry Approach –**
The QA/QC plan identifies Sediments and Tissue Reporting Limits in units of pg/Kg. We are unsure if this is a typo and was meant to be (ppt) or not. The unit pg/Kg is femtogram levels and describes reporting limits about a 1000 fold lower than published methods.

Assuming the plan meant pg/g, the levels noted will likely result in sediment validation issues as a result of instrument calibration for both PCBs and Dioxins in sediments as a result of the range of concentrations that will be detected for the specific congeners. For example, OCDD may be detected at concentrations above 1000 ng/Kg while 2,3,7,8-TCDD may be detected at levels of 0.01 ng/Kg in a sediment matrix. The instrument cannot be calibrated to meet the QA/QC requirements of EPA method 1668A for such a large range of concentrations. The plan does not specify if multiple runs are, therefore, proposed for each sample, and if so how biases associated with splitting the sediment samples for different dilutions and instrument runs will be interpreted in calculating the 2,3,7,8-TCDD TEQ for both PCBs and TCDD.

**3. Absence of Information to Allow for Review –**
In general we find the level of detail provided in several aspects of the SAP (Ecology 2008a) to be insufficient to allow for review and comment.

***Fingerprinting***
SAP Page 106. 3rd full Paragraph. In discussing the fingerprinting analyses, the text states that TPH, dioxins/furans, and PAHs will be evaluated from potential source areas, but notes: "...to provide qualitative screening for guidance regarding the utility of the data for source differentiation" and "quantitative evaluation of the data on a statistically significant basis will likely not be possible." Given the implications of any conclusions drawn from these data sets, Ecology should consider conducting these analyses in a

definitive approach stating clearly the methods for both collection and interpretation thereby facilitating a final path forward for Harbor cleanup.

***Bivalves***

Section 5.4, 2nd ¶, last sentence – Ecology should clearly state what is meant by "edible tissues" of clams. Since the risk assessment intends to evaluate multiple human receptors, Ecology needs to collect data that allows chemical exposure to be calculated for these different receptors. The bivalve siphons sheath, gut ball, and tissues inside the shell are not consumed by every receptor. Previous analyses showed that the majority of the chemicals in the bivalves, and, therefore, human exposure and excess risk would occur for only those receptors that consumed the gut ball. Thus, if the gut ball is not analyzed separately, the risks to shellfish harvesters following the preparation methods detailed at the Washington State Department of Wildlife's web site will be extensively overestimated as the gut ball is instructed to be discarded. Additionally, the siphon's sheath is composed of several metals which occur naturally in an organic form. However if the specific form of the metal is not quantified and the sheath is included as an edible tissue, significant risks may be erroneously determined following standard risk methodologies. Thus, there is insufficient information in the plan to know what exactly is meant by "edible tissues" and what specific forms of metals may be analyzed prevents agreement and suggests an inappropriate screening level approach which will raise additional questions requiring yet further investigation and thus slowing down the cleanup process.

***Radioisotope Analyses in Cores***

Section 4.1.2.2 –It is unclear what sampling apparatus will be used for the collection of these cores. A vibracore, through its shaking action will mix the top sediment intervals and hinder the delineation of the radioisotopes and chemical analytes. Furthermore, the core catcher apparatus may additionally disturb the sediment as it is being collected by transferring sediments along the sidewall from upper to lower layers. This will bias and confound radioisotope interpretation.

Section 5.3.2, 2nd ¶, general procedure #9 – The cores intended for radioisotope testing should be maintained in a vertical position while being shipped to the lab for processing so that the 2 cm intervals are not inadvertently mixed. This may be an unreasonable expectation given the cores will be shipped to Winnipeg, Manitoba, Canada.

Section 4.2.2, 1st ¶ – For clarity, as was done for the Harbor-wide investigation in Section 4.1.2, a substructure to this section should be provided that discusses the rationale for why these cores are collected and the differences in collection and analyses between the 4 ft cores and 12 ft cores. If the approach and analyses are the same as section 4.1.2, this section can be referenced rather than repeating the text.

***Current Meter Study***

In Malcolm Pirnie's meeting with Ecology on April 15, 2008 we learned that Ecology has initiated a current meter study in Port Angeles Harbor to supplement the data being collected as part of the Sediment Trend Analysis Implementation Plan (Ecology (2008a)

SAP Appendix E). This aspect of the study was not discussed in the SAP and, therefore, cannot be reviewed and commented on.

***Core Intervals and Archiving***

Sections 4.1.2 and 4.2.2 – The statement "based on sampler judgment" should be more clearly defined with regard to selecting sediment core intervals to represent individual samples. Without an objective and clearly defined set of criteria, a reviewer can not agree or disagree with the plan. Additionally, given the scope of sampling proposed, it is unlikely that the same person will collect and process each sample and, therefore, sampler bias can be introduced and be inconsistent between samples.

Section 4.2.2, 4th ¶, last sentence – The text is unclear. The depth of the first interval needs to be clarified.

***Change Order***

It is anticipated that from the large scope of the sampling plan, particularly the sediment core collection, that changes to the plan will need to be made by field personnel. The process for approval of these field change decisions is incompletely described in the SAP other than reference in SAP Appendix C (Standard Operating Procedures), Section 2.2 (Work Plan Changes/Deviation) which indicates that these changes will be documented in the field log book.

**4. Other General Comments –**

Section 4.2, last sentence – Reference to Figure 2-4 should be changed to 4-9, since there is no Figure 2-4.

Section 5.3, 3rd sentence – This sentence states that Table 5-1 lists the samples that will be collected , but no sample IDs are provided in this table. Also, bioassay sample information is excluded from this table.

Section 7.3.1 – There are additional performance criteria for the juvenile polychaete test: a mean individual growth rate of at least 0.72 mg dw/ind/day with a minimum individual growth rate of 0.38 mg dw/ind/day. However, rather than repeat these performance standards the reader could be referenced to Section 6.2 for performance standards as was done in section 7.3.2.

**References**

Ecology. 2008a. Port Angeles Harbor Sediment Characterization Study Sampling and Analysis Plan. Washington State Department of Ecology. Contract Number C0700036. April 25.

Ecology. 2008b. Letter dated January 9, 2008 from Marian L. Abbett, Washington State Department of Ecology to Carla Yetter, Rayonier Properties, LLC regarding Ecology

Comments on the Remedial Investigation for the Marine Environment, Port Angeles Rayonier Mill Site.

Malcolm Pirnie, Inc. 2007a. Remedial Investigation for the Marine Environment Near the Former Rayonier Mill Site, Port Angeles, Washington. Public Review Draft. February.

Malcolm Pirnie, Inc. 2007b. Phase 2 Addendum Remedial Investigation for the Marine Environment Near the Former Rayonier Mill Site, Port Angeles, Washington. Agency Review Draft. February.

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[i] From Ecology 2008. Sediment sampling and analysis plan appendix. Guidance on the development of sediment sampling and analysis plans meeting the requirements of the sediment management standards (Chapter 173-204 WAC) (Ecology publication No. 03-09-043):
" In SMS situations, the exposure potential and sediment unit of concern is generally the surface, specifically the **"biologically active zone" (often the top 10 cm)**." (page 11)
"Past studies in Puget Sound have demonstrated that the majority of benthic macroinvertebrates are generally found within the **uppermost 10 cm of the sediments**. While some species may be found at deeper depths below the sediment surface, **10 cm is generally assumed to represent a reasonable estimate of the biologically active zone**. Although information such as the vertical distribution of benthic macroinvertebrates or the depth to anoxic sediments could be gathered for each site to be investigated to attempt to delimit the biologically active zone, **this procedure is generally not practical**. In the absence of site-specific information to the contrary, **Ecology has routinely been requiring sampling of the uppermost 10 cm of sediments** for comparisons with the applicable criteria." (page 47 and 48)

[ii] Foster Wheeler Environmental Corporation. July 2002. Management Plans for the Remedial Investigation of the Marine Environment, Former Rayonier Pulp Mill, Port Angeles, Washington Volume I, Section 3, Page 3-32 identifies the following: 4-methylphenol, LPAHs, HPAHs, dioxins and furans, PCBs, resin and fatty acids, guiacols, arsenic, cadmium BHC isomers, PCBs, pentachlorophenol, Pyridine, copper, mercury, selenium, zinc, 2,4' DDT, DDE, and DDD

[iii] Based on confirmation samples collected on these dates as reported in Table 5-2 and the dates of sediment monitoring as reported in Table 5-4 of the Interim Actions Report.

[iv] Diesel range organics (DRO) were not detected and residual range organics (RRO) were detected in both samples at concentrations of more than an order of magnitude below the cleanup level (see Interim Action Report Table 5-4).

[v] With the exception of MD-16 sampled in August 6, 2002 and located under the mill dock.

[vi] One of the phase 2 addendum samples was collected from the same location where the PCB exceedance was found in the 2002 RI sampling.

NIPPON PAPER
INDUSTRIES USA

May 29, 2008

Cynthia Erickson
WA Department of Ecology
PO Box 47775
Olympia, WA 98504-7775

RE: Comments on Draft Sampling and Analysis Plan
Port Angeles Harbor, April 25, 2008

Dear Ms. Erickson:

Nippon Paper Industries USA thanks the Department of Ecology for the opportunity to provide comments on the Draft Sampling and Analysis for the Sediment Characterization of Port Angeles Harbor. We commend the Department for the active and thorough role they have taken in investigating the environmental condition and addressing technical issues in the harbor. We are pleased to be able to submit these comments and look forward to working with the Department not only in facilitating the investigation effort but on important matters of concern to our company.

In general the Sampling and Analysis Plan (SAP) is quite comprehensive and thorough in areal extent and data types. Since Ecology has diligently covered the bases our comments are quite focused on potential limitations that could impact data analysis.

## 1. Limited Dioxin/Furan Source Analysis

There is an under-emphasis on dioxin/furan analysis in areas with active combined sewer outfalls (CSOs). This will limit the understanding of source contributions of these compounds in the harbor. For example, the sampling and analysis plan (SAP) lists only "current CSOs" in the Landing Pier (Ferry Terminal) area of concern (AOC) as potential sources of interest (Table 4-4), which includes active CSOs #6, 7, and 8. However, there are no dioxin/furan samples for the Landing Pier (Ferry Terminal) AOC included in the sample location summary (Table 4-3). Sediments adjacent to CSO #10 are also not specifically listed to be sampled for dioxin/furan analysis. Additionally, the one other outfall area listed, the Port Angeles Waste Water Treatment Plant Outfall, does not include any dioxin/furan analysis, and only one sample has been proposed for collection within this AOC. Dioxins/furans are associated with CSOs, storm water overflows, and water pollution control facilities, and analysis of them should be included for a full understanding of the multiple possible sources of these contaminants in the harbor. The E&E data gaps report (2008) also does not include dioxins/furans as chemicals of concern associated with residential activities. Dioxins/furans are commonly associated

with backyard burning and other residential/anthropogenic activities. The under-emphasis of the dioxin/furan sampling at these other locations biases the outcome of the dioxin/furan source data by not including all possible (and common) sources of dioxin/furans to the harbor. As outlined in the SAP, only former CSO locations will be analyzed for dioxin/furans (inner harbor area, former CSO Outfalls #2 and #4), which does not provide a current estimate of dioxin/furan inputs from all CSO sources.

**2. Representativeness of Radioisotope Dating Cores**

The two sediment cores proposed to be collected for sediment age-dating and mixing are not likely to be representative of the entire harbor area. The results from locations in the northern section (i.e., Marina Area) and the southern section (i.e., Red Lion Area) of the harbor cannot be applied to the inner harbor area or other areas of the harbor where the bathymetry or currents alter sedimentation/mixing rates. The data from the proposed core locations may result in a skewed analysis of sediment accumulation in the harbor. It may be difficult to get sufficient Cs-137 and Pb-210 data using only 4 ft sediment cores, and, although the proposed locations are not within the documented wood waste areas, there may be wood pulp presence and gelatinous silt deeper than 4 ft.

**3. Alternative Sampling for Fish Samples**

There are no alternative plans included in the SAP in the event that no lingcod are caught. It is unclear whether Ecology will attempt to collect different fish species for chemical analyses if they cannot catch lingcod. In light of the current fish consumption issues and discussion about potentially changing the current Model Toxics Control Act default values, the four proposed sampling locations for fish tissue collection are important. There should be consideration for including pelagic as well as benthic fish species and additional biota samples, if necessary. Benthic and pelagic tissue concentrations will most likely become a critical component of the risk assessment.

**4. Use of Full Spectrum Lighting**

Ecology's approach of using full spectrum lighting for "most" of the bioassays may result in a high bias of toxicity in the bioassay samples. Selected PAHs become more toxic when exposed to UV light (i.e., photo-activation) and UV light penetrates only to a depth of approximately 12 ft. Many of the sampling locations are in water depths greater than 12 ft deep, even near-shore samples. The bathymetry of the inner harbor area indicates a steep drop-off relatively close to shore. The high-bias of toxicity in the bioassay samples will result in more chemical analysis from archived samples. Although not outlined in detail in the SAP, the inclusion of full-spectrum lighting for the bioassays should only be included when the measured water depth at the time of sediment sampling is less than 12 ft deep.

**5. Appendix D, Human Health Ecological Risk Assessment Work Plan**

Paragraph 2.2.1 History, refers incorrectly to pulp and paper mill discharges to the harbor continuing to 2008. Nippon Paper constructed a deep water outfall in 1971 that

discharges towards the northwest on the outside of Ediz Hook. The Rayonier mill ceased pulping operations on or about February 28, 1997.

Paragraph 2.2.2 Demographics and Land Use should recognize that throughout development of the marine harbor and the City of Port Angeles various infrastructure has been created that impacts intertidal uses. Structures such as wharfs, piers, a marina and shoreline armoring have changed the natural environment. Specifically, these developments may have impacts upon habitat productivity and type of biota available and may continue to impact biota availability for the foreseeable future.

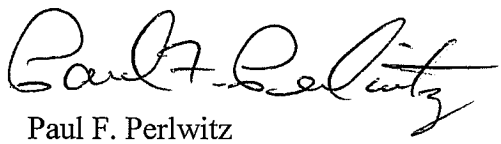
**6. Data Needs for the Human Health Risk Analysis.**

There is a need for a current, independent shellfish habitat assessment and survey to be conducted to evaluate the locations and quantity of shellfish beds in Port Angeles Harbor. This information could be used to determine whether a havestable and sustainable shellfish resource exists to support the proposed LEKT fish consumption rate.

There is no current plan included in the SAP for a shellfish habitat survey, despite the inclusion of a conceptual site model for human receptors in the Human Health and Ecological Risk Assessment Work Plan (Appendix D), which includes subsistence fishing by the LEKT.

My contact information is paul.perlwitz@npiusa.com and 360-565-7045.

Sincerely,



Paul F. Perlwitz
Environmental Manager

cc: Rebecca Lawson, Dept. of Ecology
Harry Grant, Riddell Williams
Mark Johns, Exponent

May 29, 2008

Cynthia Erickson - Project Manager
WA Department of Ecology
SWRO Toxics Cleanup Program
P.O. Box 47775
Olympia, WA 98504-7775
E-mail: ceri461@ecy.wa.gov

**RE: Port Angeles Harbor Sediment Characterization Study: Draft Sampling and Analysis Plan**

To Ms. Erickson,

We are writing to comment on *Port Angeles Harbor Sediment Characterization Study: Draft Sampling and Analysis Plan*, dated February 26, 2008.

People For Puget Sound is a nonprofit, citizens' organization whose mission is to protect and restore Puget Sound and the Northwest Straits.

The harbor is contaminated with wood debris/creosote, dioxins and furans, and polychlorinated biphenyls (PCBs). Our comments follow:

1. **Sampling analysis.** Our experience has been that almost every sediment cleanup site in Puget Sound has had inadequate sampling that required more sampling to fill in later. We suggest that the sampling site selection be reviewed to ensure that this round of sampling will be definitive. We have had years of sampling in the Port Angeles Harbor area and the process should not drag out for many more years.

2. **CSO and sewage treatment plant.** Special attention should be paid to these outfalls. We do not think that adequate sampling has occurred in these areas to date, especially for dioxin.

3. **Biotic community.** We believe that analysis of biotic community should be conducted as well as bioassays. This would yield better data about benthic long-term health.

Thank you for the opportunity to comment on the draft plan. Please contact me with questions at (206) 382-7007 X215.

Sincerely,

Heather Trim
Urban Bays and Toxics Program Manager

DEPARTMENT OF ECOLOGY
State of Washington

# Port Angeles Harbor Sediments Investigation
# Public Comment Form



This form is for providing comments on the Sampling and Analysis Plan for Port Angeles Harbor. Your comments will be read by Cynthia Erickson, the Ecology Project Manager. Cynthia's response to your comments will be part of a responsiveness summary. The summary will be made public and sent to those who provided comments.

**You can submit your formal comment tonight or complete it at home and mail it to Cynthia Erickson, Southwest Regional Office, Toxics Cleanup Program, PO Box 47775, Olympia, 98504-7775. E-mail comments can be sent to ceri461@ecy.wa.gov.**

**NAME:** North Olympic Timber Action Committee

**ADDRESS:** P.O. Box 1057

**CITY:** Port Angeles, WA. 98362

**ZIP:**

***Thank you for your interest in the Port Angeles Harbor Sediments Investigation!***

## COMMENTS

***(Please use back side of this form if you need more room)***

Your Port Angeles Harbor sediment investigation is of interest to our industry because we use the waters of the Straits of Juan de Fuca and Puget Sound to transport logs. It is an integral part of log movement to control costs and reduce the carbon footprint by reducing the number of log trucks on our highways. At a recent PSP, Water Quality meeting, a statement was made "that wood waste is toxic". Naturally that would be a concern for several reasons: 1. Since the industry spends significant dollars placing large woody debris in rivers and streams which is required. 2. We must be able to move large volumes of logs by barge or log raft. The timber industry has made dramatic changes over decades to reduce wood waste with new log handling equipment and logs with less bark significantly reduce the amount of wood waste left on the ground and falling into the water as logs are transported by barge or log rafts.

We are interested in knowing the results of the harbor surveys.

Carol Johnson
Executive Director

RECEIVED
JUN 02 2008
Washington State
Department of Ecology