



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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September 18, 2017

Electronic Copy

Warren Snyder PE  
Senior Manager, Environmental Engineering  
Rayonier Advanced Materials  
1301 Riverplace Blvd, Suite 2300  
Jacksonville, FL 32207

Re: Ecology Comments on the Agency Review Draft Interim Action Report Volume III

Dear Mr. Snyder:

The Washington State Department of Ecology (Ecology) is providing its final comments on the Agency Review Draft Interim Action Report Volume III, submitted February 27, 2015. We provided draft general comments on July 24, 2015, and draft specific comments on October 8, 2015.

Since the 2015 submittal of the Volume III report and Ecology's draft comments, Ecology has issued several decision documents and guidance related to sediments in Port Angeles Harbor. We finalized our comments on the Volume III report incorporating these decisions and guidance. Our comments are enclosed.

As we have discussed in several meetings, and in accordance with the agreed order, Rayonier has agreed to revise the Volume III report to incorporate our comments. Rayonier has 75 calendar days from receipt of these comments to revise the Volume III report into the public review draft. We recognize the revisions may be substantial, and Rayonier may need to request an extension. Please follow provision VIII.K of the agreed order for any request for extension of schedule.

After you review these comments, we expect to have a discussion to ensure our mutual understanding of the comments and revisions needed for Volume III. If you have any questions, I may be reached at (360) 407-6257.

Sincerely,

Marian L. Abbett, P.E.  
Project Manager  
Toxics Cleanup Program, Southwest Regional Office

MLA: kb

By Certified Mail: [91 7199 9991 7037 0277 7576]

Enclosure – Agency Comments

cc: Carla Yetter, Rayonier Advance Materials  
Matt Beirne, Lower Elwha Klallam Tribe  
Rebecca S. Lawson, P.E., LHG, Ecology



**Agency Review Draft Interim Action Report**  
**Volume III: Evaluation of Alternatives**  
**Agency Comments**

**Report Format**

In our meetings on January 31 and February 1, 2017, we discussed potential revisions to the report format that should reduce confusion about the two scenarios and cleanup alternatives. We discussed adding more summary information from the appendices to the main body of the report. We also discussed changing the format such that there would be two scenarios presented – one that assumes industrial redevelopment of the former mill site, and another that assumes construction of a restoration project on the site. The report will describe a separate set of remedial alternatives for each environmental media under each scenario.

**Mitigation**

Any remediation that involves in-water fill may trigger habitat mitigation in accordance with Chapter 220-660 WAC, Hydraulic Code Rules. For example, armoring shoreline may trigger habitat mitigation. The Volume III report should identify and evaluate the need for habitat mitigation with the various alternatives. If mitigation is required, then the cost of mitigation should be reflected in the cost of the alternative presented.

**Sediments**

Ecology issued a revised Sediment Management Standards (SMS, Chapter 173-204 WAC) in 2013 and revised Sediment Cleanup User's Manual II in 2015. Since Rayonier submitted the Agency Review Draft of Volume III report (February 2015), Ecology has evaluated different sediment issues in Port Angeles Harbor related to interpretation under the revised rule and guidance. In light of these decisions and guidance, Rayonier should revise the Volume III report to incorporate these decisions.

*Regional Background*

Ecology issued the North Olympic Peninsula Regional Background Sediment Characterization Report in February 2016. This provides sediment regional background values to be used in Port Angeles Harbor. Please revise Volume III using these final regional background values.

*Total TEQ*

Ecology issued a site-specific rationale memo "Port Angeles Harbor: Total TEQ" (November 29, 2016). This memo was provided to Rayonier by email on November 30, 2016.

The memo provides Ecology's rationale regarding sediment cleanup levels protective of human health and the environment for dioxins, furans, and PCBs. Ecology's site-specific decision is to use the combined dioxin/furan TEQ and PCB TEQ metric, Total TEQ, for the establishment of sediment cleanup levels representative of the combined risk to human health from dioxins/furans and PCBs in Port Angeles Harbor. Please revise Volume III to incorporate the use of sediment cleanup levels for Total TEQ rather than the individual sediment cleanup levels for dioxins/furans and PCBs. Total TEQ only applies to the assessment of human health. Sediment cleanup levels for the protection of benthic organisms should be based on the chemical parameters listed in SMS Table III (WAC 173-204-562) (e.g., Total PCBs). Total PCBs from Aroclors or total PCBs from congener analyses can be compared to the benthic criteria provided in the SMS. For this purpose, Total PCBs from Aroclors or from congeners may be combined into a single database.

#### *Preliminary Sediment Cleanup Levels*

Preliminary cleanup screening levels (CSLs) should be set for all risk drivers (Table A-7). Therefore Ecology requests a table that lists preliminary sediment cleanup levels (SCLs) for all the contaminants of concern including the basis (SCO or CSL, benthic or risk driver). Reminder - the preliminary sediment cleanup level should be the sediment cleanup objective (SCO) unless an argument is made to adjust upward to the CSL (see note below). Even if a contaminant is likely to meet the SCO at the completion of the remedial action, it should have a preliminary sediment cleanup level set. For confirmational monitoring, we will need sediment cleanup levels to evaluate against. Final cleanup levels will be established by Ecology in the Final Interim Action Plan.

Note: SCUM II, Section 7.2.3.2 states that if regional background has been established, approved, and determined by Ecology to be applicable to a particular site, it could represent the concentration in sediment that is technically possible to maintain. In Port Angeles Harbor, Ecology expects to allow upwards adjustment of the SCL to the CSL for those contaminants where an approved and applicable regional background has been established as the final CSL; however, a blanket conclusion that the SCL for all bioaccumulative chemicals will be established at the CSL cannot be made. Full documentation of arguments for adjusting the SCO upward and support for the proposed SCL should be included in the Volume III report.

#### *Sediment Datasets*

As part of a dispute resolution process, Ecology and Rayonier discussed datasets for Port Angeles Harbor and the Rayonier Mill Site, and interpolation methods. Resolution was documented in an email on October 28, 2016. A summary of the resolution is as follows:

Ecology determined that the following studies constitute the Port Angeles Harbor dataset.

Study Name	EIM Study Name	Year (Field collection)	Notes
Rayonier Pulp Mill Expanded Site Inspection (ESI)	<b>RPMESI97</b>	1997	cPAH and metals only
SEDIMENT GRAB SAMPLING AND LOG DENSITY SURVEY - NIPPON PAPER INDUSTRIES USA PULP AND PAPER MILL	<b>NIPPON PAPER MILL05</b>	2000	
LEKT analyzed 4 splits (RayPA 2002 LEKT Sed)	<b>RAYONR05 LEKT Split</b>	2002	
Former Rayonier Mill Site	<b>RAYONR05</b>	2002	
The Puget Sound Assessment and Monitoring Program's (PSAMP) Spatial/Temporal Monitoring 2002-Present	<b>PSAMP_SP</b>	2002	cPAH and metals only
Port Angeles NPDES Sediment Analysis	<b>PA_STP04</b>	2004	
Former Rayonier Mill Phase 2 Addendum RI	<b>PAMILLRI</b>	2006	
Port Angeles Harbor Sediment Characterization Study	<b>PASED08</b>	2008	
Environmental Baseline Investigation DNR Lease 22-077766	<b>PORT ANGELES DNR08</b>	2008	
City of Port Angeles 2010 NPDES Permit WA-0023973 Sediment Characterization	<b>PA_STP10</b>	2010	
K Ply, Port Angeles, WA	<b>AODE9546</b>	2013	
2013 Western Port Angeles Harbor RI/FS Sediment Sampling	<b>WPAH13</b>	2014	

Ecology requests Rayonier describe in Volume III which of the studies were used and the rationale for use.

*Interpolation Methods*

Ecology and Rayonier also discussed two different interpolation methods. Rayonier has been using the Natural Neighbors (NN) method and Ecology has been using the Inverse Distance Weighted (IDW) method. While Ecology acknowledges that the NN method is potentially valid, Ecology prefers the IDW method as it is a more robust interpolation method. Although Rayonier disagrees with Ecology's preference for IDW, Rayonier has agreed to display both IDW and NN in Volume III, and to base decisions on IDW.

*Site Boundary and Sediment Cleanup Unit Boundary*

To provide clarification on site boundaries and sediment cleanup units, the Site boundary is delineated at the point where the concentration of all contaminants of concern meet the site specific sediment cleanup standards (the proposed sediment cleanup levels (SCL) at the point(s) of compliance, WAC 173-204-550(6)(d)(ii); Section 2.3, Final Sediment Cleanup User's Manual II (SCUM II), March 2015, Publication No. 12-09-057). A sediment cleanup unit (SCU) is defined as a discrete subdivision of a sediment site designated by the department for the purpose of expediting cleanups (WAC 173-204-505(20)). Ecology is looking to set a SCU for the Rayonier Mill area and for the Western Port Angeles Harbor area. The Rayonier Study Area boundary is an administrative boundary set by Ecology. Ecology is proposing to use this administrative boundary to separate the two SCUs in Port Angeles Harbor. The SCU is the area used for calculating the surface area-weighted average concentrations (SWAC). The SWAC area is used to determine compliance with the sediment cleanup standards which occurs in the cleanup action plan. So the SCU will be set along with the cleanup standards in the Interim Action Plan for the Study Area.

*Selenium dataset*

Ecology has reviewed the selenium results and the impact on the SCU. We have concerns with the selenium dataset for spatial interpolation to create the SCU. The data show sediment stations with selenium above the proposed sediment cleanup level of 0.6 ppm (based on PQL) in the log pond and to the east of the mill dock. Stations just beyond these elevated stations have selenium detections below the proposed cleanup level or non-detect, indicating that the selenium contamination near the mill may be localized.

Sediment station SD-67, located off the city's original wastewater treatment plant outfall, has a selenium result of 0.93JQ (estimated below contract reporting limit). This result may not be contiguous with the other data. We recognize further discussion is necessary to resolve how best to utilize the selenium data in setting SCU(s) in the Volume III report.

*Compliance with Sediment Cleanup Standards*

Evaluation to determine whether compliance monitoring data meets sediment cleanup standards based on benthic marine criteria should use point-by-point comparison (WAC 173-204-560(7)(c); SCUM II Chapter 13, Section 13.6.1). However, evaluation to determine whether compliance monitoring data meets sediment cleanup standards based on bioaccumulative-based criteria can be based on area weighted averages (WAC 173-204-560(7)(c); SCUM II Chapter 13, Section 13.6.1). This is because human exposure to bioaccumulative chemicals in the subtidal environment is largely through ingestion of fish and crab that average their exposures over the area of concern.

Ecology issued a memo on "Port Angeles Harbor: Compliance for Bioaccumulative Chemicals Using Sediment Data in Port Angeles Harbor: (November 29, 2016). This memo was provided by email on November 30, 2016. The memo documents Ecology's evaluation of compliance methods for bioaccumulative chemicals in sediment of Port Angeles Harbor. For protection of human health, compliance will be evaluated by comparing a surface-weighted average concentration (SWAC) over an appropriate spatial extent to the sediment cleanup standard. Ecology considered whether there are special exposure areas within Port Angeles Harbor where a sediment management area (SMA) should be defined. Ecology determined that sessile shellfish beds in Port Angeles Harbor warrant an SMA designation. In this memo, Ecology defined a broad area of the harbor with the potential for future habitat to support sessile shellfish species. This SMA area included from mean higher high water (MHHW) to an elevation of -70 feet mean lower low water (MLLW).

After further consideration of the industrial nature of portions of the harbor, vessel traffic, and diver safety, Ecology has defined the SMA into a smaller, more practical area where future shell fishing is likely or possible. The revised SMA is limited to intertidal areas within the anticipated SCUs where there is, or may be in the future, reasonable access to the shoreline for shellfish harvest by the public. These areas are shown on the map below for all of Port Angeles Harbor. The Volume III report should acknowledge the SMA designation and where it is in relation to the Rayonier SCU.



### *Point of Compliance*

Under the SMS, the sediment point of compliance means the locations within a site or sediment cleanup unit where sediment cleanup levels must be met (WAC 173-200-505). The sediment point of compliance shall be established at a location that is protective of both aquatic life and human health. To protect aquatic life, the point of compliance shall be established within the biologically active zone. If that location is not sufficient to protect human health, then the point of compliance shall be established at a different location that is also protective of human health (WAC 173-200-560(6)).

The Volume III report proposes a 10 cm point of compliance for protection of human health from seafood consumption, and for protection of benthic invertebrates. Volume III proposes a deeper point of compliance (45 cm) for protection of human health from direct contact, such as during clamming. This deeper point of compliance was only for the intertidal area.



Ecology supports the use of the 10 cm point of compliance throughout the SCU for both protection of aquatic life and protection of human health through ingestion of fish and mobile shellfish. And we support the use of the 45 cm point of compliance throughout the intertidal area for protection of human health through direct contact.

However, we request use of a point of compliance of 45 cm for human health through ingestion of bivalves in the intertidal areas (as shown on map above), a typical depth from which clams would be collected during intertidal clam-digging.

To clarify expectations, please use the following table outlining the points of compliance in Port Angeles Harbor when preparing the Volume III report.

Area	Definition of area	Exposure Route	Point of Compliance	Applicable Indicator hazardous substances (IHS)	Comparison to standards
Entire SCU	MHHW to boundary defined by all contaminants of concern (COC) $\geq$ SCL.	Protection of human health - Ingestion of fish and mobile shellfish (crab, shrimp)	10 cm	All	SWAC
Entire SCU	MHHW to boundary defined by all COC $\geq$ SCL.	Protection of aquatic life (benthic organisms)	10 cm	All	Point by point
SMA	MHHW to MLLW	Protection of human health - Ingestion of sessile shellfish (bivalves)	45cm	Includes All (cPAHs, metals, etc.) except Total TEQ <sup>1</sup>	SWAC (SWAC beach segments separately)
Intertidal Area	MHHW to MLLW	Protection of human health - Direct contact (contact with and ingestion of sediment)	45 cm	All	SWAC

<sup>1</sup>. Total TEQ combines dioxin/furan and PCB TEQs

*Enhanced Natural Recovery (ENR)*

Based on our interpretation of sediment transport, Ecology has reservations with the cleanup technology of enhanced natural recovery (ENR) for the Rayonier Mill Site in areas that may be subject to wave-induced resuspension.

Ecology and Rayonier have had differences of opinion on sediment transport and the conceptual site model near the Rayonier facility. These differences were documented in the Volume II report.

Rayonier conducted a hydrodynamic and sediment transport investigation independently, without input from Ecology. Rayonier provided the Hydrodynamics and Sediment Transport Investigation report (Integral, February 20, 2015) separate from the Volume III report. Ecology reviewed this report along with Volume III. Our interpretation is for a potential to have wave-induced resuspension of silt and sand, especially in the log pond.

If this hydrodynamic study is the basis for Rayonier's position that ENR will be successful, then the study should be incorporated into the Volume III report with detailed discussion on how the hydrodynamics support the success of ENR.

The Draft Interim Action Plan for the Study Area will include performance criteria such as sediment cleanup levels to be met at a point of compliance within a defined restoration timeframe. If performance criteria are not met, then a contingency plan will need to be implemented. Because of Ecology's concerns that ENR may not be successful, as part of any alternative involving ENR, Rayonier should include an outline of the details that would go into a contingency plan which will need to be implemented if performance criteria are not met.

For the ENR option, Rayonier needs to better defend why ENR will work (i.e., meet potential performance criteria), especially in the log pond. Rayonier should provide the assumptions and modeling used to support ENR as a viable option. Please include such factors as bathymetry, resuspension, and restoration timeframe.

For all of the sediment alternatives, Volume III considers "ENR or Dredge" under the dock and for Alternative S-2 considers "ENR or Dredge" in the western portion of the Log Pond. We can't have alternatives with dredge or ENR because we can't compare costs properly. Volume III should present a range of sediment alternatives reflecting single technologies in each area. Also explain how the line in Maps C-1 and C-2 is drawn between dredge and ENR in the log pond.

*Monitored Natural Recovery (MNR)*

As we hone in on the sediment cleanup unit boundary and remediation footprint for the Rayonier Mill Study Area, we recognize that Rayonier may want to evaluate the sediment cleanup technology of monitored natural recovery (MNR) in the sediment cleanup alternatives. Just as a reminder, cleanup actions for a site shall not rely exclusively on monitored natural recovery or institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action (WAC 173-204-570(3)(h)). The evaluation of MNR should include evidence that natural recovery will effectively reduce risks within an acceptable time period such as 10 years.

*Source Control*

Source control is an important component of sediment cleanup. SCUM II describes source control, in combination with other cleanup technologies, as a necessary and critical part of any sediment cleanup action alternative where sources have not already been eliminated or controlled. Examples of sources to be addressed include existing creosote pilings and structures (SCUM II 12.4.3.1). The sediment cPAH results are highest close to the dock indicating that the creosote dock pilings have been, and may continue to be, a source of contamination to the sediments. The Volume III report should include cleanup alternatives that include source control for creosote pilings and structures, such as the dock and jetty, should they remain after cleanup.

**Groundwater**

*Cleanup Levels*

Ecology agrees that the highest beneficial use and reasonable maximum exposure for groundwater is the discharge of groundwater to surface water and sediments. Groundwater cleanup levels should be protective of both marine surface water and sediments.

*Point of Compliance*

The standard point of compliance for groundwater is throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site (WAC 173-340-720(8)(b)). When it is not practicable to meet the cleanup levels throughout the site within a reasonable restoration timeframe, then a conditional point of compliance may be approved as close as practicable to the source of hazardous substances, not to exceed the property boundary (WAC 173-340-720(8)(c)). Note this conditional point of compliance is within the groundwater.

The point of compliance will be set in the Interim Action Plan. A feasibility study must include alternatives with the standard point of compliance for each environmental media containing hazardous substances, and may include alternatives with conditional points of compliance (WAC 173-340-350(8)(c)(F)).

Volume III must evaluate groundwater cleanup alternatives that meet the cleanup levels throughout the site. If this is not practicable within a reasonable restoration timeframe, then present those arguments in Volume III. After presenting those arguments, Volume III must present at least one alternative under each scenario that meets cleanup levels at a conditional point of compliance within the groundwater before entering the surface water – such as in shoreline monitoring wells.

#### *Groundwater Remediation Alternatives*

In our meetings on January 31 and February 1, 2017, we discussed more clearly defining the groundwater remediation alternatives under the two scenarios. For example, under Scenario 2 (Industrial Redevelopment) provide the groundwater options by specific areas. For Scenario 1 (Open Space Redevelopment) explain the differences from Scenario 2 because there may be a new shoreline configuration.

The groundwater data shows very high levels of ammonia, pH, and low redox. Ecology agrees that these conditions are the likely reason for much of the elevated metals in groundwater, as the condition would cause metals to move from the formation into groundwater. It appears that there is a slug of ammonia between the acid plant and the marine environment near MW 56. While the ammonia concentrations have decreased some over time, they are still elevated above levels of concern. It would appear that the sheet pile wall just down gradient of MW56 is holding back the ammonia plume. Volume III should include a discussion of potential impacts from removing the sheet pile wall (planned to be removed as part of restoration). What measures are proposed to ensure the ammonia plume is not released with the removal of the sheet pile wall?

For the Nearshore Sand Filter (NSF) alternative, add a conceptual sketch that shows the NSF constructed on the CSM cross section. This is a fairly new application of the technology. Ecology assumes monitoring wells will be placed within the sand filter. The thickness of the sand filter will influence the amount of dilution that occurs within the sand filter. This should be considered when conceptually designing the thickness of the filter and may impact costs.

#### **Soil**

##### *Cleanup Levels vs Remediation Levels*

Ecology wants to make sure there is a clear understanding on the difference of cleanup levels versus remediation levels. Cleanup levels define how clean is clean. They are the levels determined to be protective of human health and the environment under specified exposure conditions. Remediation levels help define where different remedial technologies may be required as part of a cleanup action at a site. They can be based on risk or technology or physical characteristic.

Volume III proposes setting risk-based remediation levels for open space scenario. While the term remediation level is consistently used, some of the tables and discussion imply that the remediation level is being treated as a cleanup level. To be clear, in areas where remediation levels are proposed, there will be cleanup levels that are either the unrestricted cleanup levels or industrial depending on the zoning and potential future use. We recommend a table that captures both cleanup levels and remediation levels for the different areas based on the 2 scenarios. The following table is an example, only partially filled out.

	Scenario 1				Scenario 2			
	Unrestricted Area: West Mill, East Mill, Ennis Creek....		Industrial Area: City Parcel		Unrestricted Area: Shoreline buffer, East Mill, Ennis Creek ....		Industrial Area: West Mill (not shoreline buffer); City Parcel	
Ind Haz Sub	Clean up Level	Remediati on Level	Clean up Level	Remediati on Level	Clean up Level	Remediati on Level	Clean up Level	Remediati on Level
As	20	20	100					
Lead	250	800	1000					
PCBs								
PAHs								
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dioxin								

For each scenario and each area of the property, the report should describe the zoning and potential future use which defines the cleanup levels. For example, under Scenario 1 (Restoration), the West Mill area is zoned industrial. However, the potential future use may be open space with connection to habitat restoration areas which is not a typical characteristic of industrial use (WAC 173-340-745(1)(a)(i)). Therefore the cleanup levels would be unrestricted cleanup levels (not industrial).

Also for each scenario and each area of the property, the report should describe the likely exposure scenario for setting risk-based remediation levels.

*Direct Contact Remediation Levels*

Rayonier proposes setting remediation levels protective of direct contact under a different exposure scenario than the unrestricted use scenario – under the assumption that there will be institutional controls, such as fencing and signs.

Please keep in mind that cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site (WAC 173-340-360(2)(e)(iii)). Volume III needs to provide support for the conclusion that it is not technically possible to implement a more permanent cleanup action for portions of the site where Rayonier proposes to use institutional controls and a remediation level to meet cleanup standards. In addition, Rayonier should include an alternative that involves active remediation for all areas exceeding cleanup levels.

There appears to be some confusion on “open space.” For Ecology, this term means park scenario with some access by the public. If this is the likely exposure scenario being used to set remediation levels, then Ecology recommends the exposure frequency be set at 104 days per year. If the likely exposure scenario is something less because Rayonier is proposing to use institutional controls, such as fencing and signs, plus remediation levels to address areas where soils exceed cleanup levels (see WAC 173-340-355(2)), then an exposure frequency of 48 days per year may be appropriate.

#### *Compliance Statistics*

Ecology disagrees with using area-average to evaluate the soil dataset for the open-space remediation levels. The area-averaging method does not provide enough certainty that there are limited areas of unacceptable exposure, and the existing data set does not appear to be adequate to make such a demonstration. The dataset is a biased dataset and does not lend itself well to area-averaging. As the proposed remediation levels are risk-based, we recommend using the MTCA compliance statistics (WAC 173-340-740(7)).

#### *Soil to Groundwater Pathway*

As we have noted previously, the groundwater to surface water/sediment pathway is a pathway of concern. Therefore the soil to groundwater should be fully assessed and evaluated. It is not acceptable to dismiss the soil to groundwater pathway because you think the groundwater to surface water/sediment pathway is not a concern based on dilution/attenuation.

#### *Terrestrial Ecological Pathway*

The Terrestrial Ecological Evaluation (TEE) is incomplete. The TEE assumes the West Mill area which is zoned industrial will have limited habitat value. Under Scenario 1 (Restoration), however, the West Mill area would have open space with connection to habitat. This potential future use indicates the TEE needs to consider wildlife, plants, and other biota as would be expected to be present under the restoration scenario. Also TEE should be considered when setting remediation levels.