

**Port Angeles Rayonier Mill Site
Permanent to the Maximum Extent Practicable (PMEP)
Re-Evaluation of Disproportionate Cost Analysis for Soil Alternatives**

To: Port Angeles Rayonier Mill Site File

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1.0 Purpose

Under the Model Toxics Control Act (MTCA), the state's environmental cleanup law enacted by the Legislature, cleanups of contaminated sites must not only be protective, but also "use permanent solutions to the maximum extent practicable" (RCW 70A.305.030(1)(b)). To select the remedy which is "permanent to the maximum extent practicable" (PMEP), we review a disproportionate cost analysis (DCA). The DCA compares the costs and benefits of different cleanup remedies.

In 2024, Ecology's revisions to the MTCA Cleanup Rule, [Chapter 173-340 WAC](#)¹, went into effect, and, in 2025, Ecology published new guidance for conducting a PMEP evaluation, [Guidance for Making Cleanups Permanent to the Maximum Extent Practicable \(PMEP\)](#).² (To learn more about permanent and non-permanent cleanups, visit Ecology's [Evaluating cleanup options webpage](#)³ or download the focus sheet [Making cleanups as permanent as practicable](#).⁴)

In 2019, under Agreed Order No. DE 6815, Rayonier A.M. Properties LLC (RAMP) completed the public review drafts of the first three volumes of an Interim Action Report which are the Remedial Investigation and Feasibility Study for the Port Angeles Rayonier Mill Study Area. These reports were finalized in 2021 after a round of public comment. The Volume III report is the feasibility study and includes the DCA.

¹ <https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340>

² <https://apps.ecology.wa.gov/publications/summarypages/2509059.html>

³ <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-cleanup-tools/evaluating-cleanup-options>

⁴ <https://apps.ecology.wa.gov/publications/summarypages/2509058.html>

During the 2025 public comment on the draft Interim Action Plan (IAP), many commenters requested a re-evaluation of the DCA using Ecology’s 2025 guidance. This memo summarizes the re-evaluation, specifically for the soil alternatives.

2.0 Summary of Volume III DCA

RAMP produced the Interim Action Report Volume III (Volume III) to meet the requirements of the 2017 version of the MTCA regulations that were in effect at that time. Volume III developed and evaluated remedial alternatives for the Study Area, including both the upland and marine environments, to enable interim actions to be selected for the upland and marine portions of the Study Area. Section 6 of Volume III presents the DCAs for the soil, groundwater, and sediment remediation alternatives.

MTCA (2017) required that the DCA specified in WAC 173-340-360(3)(e) be used to ensure that permanent solutions are used to the maximum extent practicable (WAC 173-340-360(3)(b)). In the DCA, costs are considered to be disproportionate to benefits “if the incremental costs of the alternative over that of a lower cost alternative exceed the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative” (WAC 173-340-360(3)(e)(i)).

To perform the DCA, the overall benefits score for a particular alternative is combined with the alternative’s estimated present-value cost to calculate a benefit-to-cost ratio. The benefit-to-cost ratios for all of the alternatives are then compared to determine whether any alternatives have costs that are disproportionate to benefits.

Each alternative is scored for the following benefits criteria:

- Protectiveness
- Permanence
- Long-term effectiveness
- Short-term risks
- Implementability
- Public concern

In Volume III, a weighting factor was applied to the benefits criteria reflecting the relative importance of each benefit. The weighting factors used are consistent with other cleanup sites. Each alternative was costed in 2019 present costs.

The soil alternatives compared in Volume III:

SL1 – Cover in Place All Soil Above Unrestricted Use Cleanup Levels

SL2 – Consolidate and Cover All Soil Above Remediation Levels

SL3 – Consolidate and Cover All Soil Above Unrestricted Use Cleanup Levels

SL4 – Excavate and Dispose Offsite All Soil Above Remediation Levels

SL5 – Excavate and Dispose Offsite All Soil Above Unrestricted Use Cleanup Levels

Table 1. Volume III – Upland Soil Remediation Alternatives

		SL1	SL2	SL3	SL4	SL5
Cost (\$ in millions)		11.00	7.40	10.00	28.00	37.00
DCA Benefit Criteria	Weight (%)					
Protectiveness	30%	8.0	6.0	9.0	7.0	10.0
Permanence	20%	5.0	6.0	7.0	8.0	9.0
Long-term effectiveness	20%	6.0	7.0	8.0	8.0	10.0
Short-term risks	10%	9.0	8.0	7.0	6.0	5.0
Implementability	10%	9.0	9.0	9.0	6.0	6.0
Public concerns	10%	4.0	1.0	5.0	1.0	10.0
Total weighted degrees of benefit	100%	6.8	6.2	7.8	6.6	8.9
Cost Effectiveness (B/\$)		6.2	8.4	7.8	2.4	2.4

Two alternatives, SL2 and SL4, required engineering action when soil contamination was above a remediation level (e.g., 40 ppm) rather than when soil contamination was above the unrestricted land use cleanup level (e.g., 10 ppm). This effectively meant a smaller footprint would have an engineering action, and a larger footprint would require institutional controls.

MTCA requires that the cleanup action “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.” It is technically possible to use an engineering control for the contaminated soil exceeding unrestricted land use cleanup levels. Therefore, in developing the 2025 IAP from Volume III, Ecology dropped alternatives SL2 and SL4 from further consideration in the DCA. This is reflected in Table 1 above with the red dot format.

In comparing Alternatives SL1, SL3, and SL5, SL3 has the highest benefit to cost ratio and is the PMEP alternative. Based on the results of the DCA, the selected soil remediation alternative is Alternative SL3 as presented in the draft IAP.

3.0 Using 2025 PMEP Guidance

The approach for conducting a PMEP evaluation under the 2025 guidance still involves a DCA and is very similar to the evaluation done for the DCA in Volume III.

A relevant change under the 2025 guidance and in the 2024 MTCA rule revision is that Public Concern criterion is no longer a defined benefit. Instead, Public Concern is now incorporated into the scoring and weighting of benefits.

• MTCA criteria before 2024

- Threshold Criteria
 - Protect human health and the environment
 - Comply with cleanup standards
 - Comply with other laws
 - Provide for compliance monitoring
 - Reasonable restoration time frame
- DCA Ranking Criteria
 - Protectiveness
 - Permanence
 - Long term effectiveness
 - Short term risks
 - Implementable
 - **Public Concern**
- Cost

• MTCA criteria 2024

- Threshold Criteria
 - Protect human health and the environment
 - Comply with cleanup standards
 - Comply with other laws
 - Provide for compliance monitoring
 - Reasonable restoration time frame
- DCA Ranking Criteria
 - Protectiveness
 - Permanence
 - Long term effectiveness
 - Short term risks
 - Implementable
- Cost

In addition, under the 2025 Guidance, the alternatives are compared in a stepwise fashion of most permanent to the next most permanent. **The alternative with the lowest cost to benefit ratio is selected.** As part of the 2025 Guidance, Ecology developed a spreadsheet tool to help in performing this evaluation.

A very large number of public comments were submitted on the draft IAP, and a significant majority of these have identified the relative importance of Permanence, Protectiveness, and Long-term effectiveness with a particular emphasis on Permanence. Because Public Concern is no longer a benefit criterion, its weight (10%) was applied to the Permanence criterion. The Permanence criterion weight was 20% in the Volume III DCA, and is now set at 30%. All other benefit scores and costs are the same as used in Volume III.

Table 2. 2025 PMEP tool – using Volume III costs and benefit scores

		SL1	SL3	SL5
Cost (\$ in millions)		11	10	37
DCA Benefit Criteria	Weight (%)			
Protectiveness	30%	8.0	9.0	10.0
Permanence	30%	5.0	7.0	9.0
Long-term effectiveness	20%	6.0	8.0	10.0
Short-term risks	10%	9.0	7.0	5.0
Implementability	10%	9.0	9.0	6.0
Total weighted degrees of benefit	100%	6.90	8.00	8.80
Cost Effectiveness (\$/B)		1.59	\$1.25	\$4.20

Alternative SL3 has the lowest cost to benefit ratio, and SL3 is therefore the PMEP alternative – a result consistent with Ecology’s draft IAP.

4.0 City and Integral comments

In an August 7, 2025 letter, the City of Port Angeles and their consultant, Integral, provided comments on Ecology’s draft IAP.

The comments assert that the SL3 cost estimate is almost certainly too low.

“It does not account for additional contaminated material that may be found and removed from the shoreline. It also fails to account for the complexity of design, engineering, operation, and long-term maintenance for SL3. And the estimated costs for long-term monitoring and maintenance are unrealistically low and do not meet regulatory standards for ensuring long-term protectiveness.”

The comments also assert that the SL5 costs are likely overestimated.

“In particular, indirect costs for SL5 are likely overestimated, as the calculation method is not representative of how straightforward excavation and off-site disposal is as a remedy.”

In addition, the comments assert that the benefit scoring for SL3 is likely inflated, particularly regarding technical and administrative implementability, while SL5’s straightforward approach is undervalued. It was suggested that SL3’s implementability score should be lowered from its current score of 9.

The comments from the city and Integral did not attempt to conduct a DCA to illustrate how their preferred Alternative SL5 could actually turn out to be the PMEP alternative. As an exercise, to test Integral’s comments, Ecology has made the following adjustments (highlighted in blue in the table):

- SL3 – increased cost from \$10M to \$15M
- SL3 – reduced Implementability benefit score from 9 to 5
- SL5 – reduced cost from \$37M to \$35M
- SL5 – increased Implementability benefit score from 6 to 10

Note: these adjustments were made to reflect the comments and are not necessarily supported by a re-evaluation of costs or benefits. It is an exercise to see how the adjustments would impact the identification of the PMEP alternative using the 2025 PMEP tool. In addition, SL1 is not carried forward in the comparisons as it is the least permanent of the three alternatives.

Table 3. 2025 PMEP tool – Integral comments

		SL3	SL5
Cost (\$ in millions)		15.00	35.00
DCA Benefit Criteria	Weight (%)		
Protectiveness	30%	9.0	10.0
Permanence	30%	7.0	9.0
Long-term effectiveness	20%	8.0	10.0
Short-term risks	10%	7.0	5.0
Implementability	10%	5.0	10.0
Total weighted degrees of benefit	100%	7.60	9.20
Cost Effectiveness (\$/B)		\$1.97	\$3.80

Alternative SL3 still has the lowest cost to benefit ratio and is the PMEP alternative.

5.0 Sensitivity Analysis

As part of a sensitivity analysis, Ecology ran more scenarios to determine the extent to which the costs and benefit scoring for Alternatives SL3 and SL5 would have to be manipulated in order for Alternative SL5 to become the PMEP alternative.

- A. First – Ecology made further adjustments on benefits. Lowered benefits scores for SL3, and increased benefits scores for SL5 (shown as darker blue). This is just a sensitivity analysis and not necessarily a realistic evaluation of benefits.

Table 4. 2025 PMEP tool – further adjustments on benefits

		SL3	SL5
Cost (\$ in millions)		15.00	35.00
DCA Benefit Criteria	Weight (%)		
Protectiveness	30%	7.0	10.0
Permanence	30%	5.0	10.0
Long-term effectiveness	20%	6.0	10.0
Short-term risks	10%	5.0	6.0
Implementability	10%	5.0	10.0
Total weighted degrees of benefit	100%	5.80	9.60
Cost Effectiveness (\$/B)		\$2.59	\$3.65

Alternative SL3 still has the lowest cost to benefit ratio and is the PMEP alternative.

- B. Next – Ecology made further adjustments to the costs. Increased the cost of SL3 to \$18M from an original cost of \$10M (which is not supported) and decreased the cost of SL5 to \$30M from an original cost of \$37M (which is not supported).

Table 5. 2025 PMEP tool – further adjustments to costs

		SL3	SL5
Cost (\$ in millions)		18.00	30.00
DCA Benefit Criteria	Weight (%)		
Protectiveness	30%	7.0	10.0
Permanence	30%	5.0	10.0
Long-term effectiveness	20%	6.0	10.0
Short-term risks	10%	5.0	6.0
Implementability	10%	5.0	10.0
Total weighted degrees of benefit	100%	5.80	9.60
Cost Effectiveness (\$/B)		\$3.10	\$3.13

Alternative SL3 still has the lowest cost to benefit ratio and is the PMEP alternative.

- C. Finally, after adjusting the cost of SL3 to \$19M, the spreadsheet tool selects SL5 as the PMEP alternative.

Table 6. 2025 PMEP tool – final adjustment to cost, SL5 is now PMEP

		SL3	SL5
Cost (\$ in millions)		19.00	30.00
DCA Benefit Criteria	Weight (%)		
Protectiveness	30%	7.0	10.0
Permanence	30%	5.0	10.0
Long-term effectiveness	20%	6.0	10.0
Short-term risks	10%	5.0	6.0
Implementability	10%	5.0	10.0
Total weighted degrees of benefit	100%	5.80	9.60
Cost Effectiveness (\$/B)		\$3.28	\$3.13

Alternative SL5 has the lowest cost to benefit ratio and is the PMEP alternative.

Table 7. For ease of comparison, this table shows all the runs side by side.

		Volume III		Integral Comments		More benefit adjustments		More cost adjustments		Change needed to get to SL5	
		SL3	SL5	SL3	SL5	SL3	SL5	SL3	SL5	SL3	SL5
Cost (\$ in millions)		10.00	37.00	15.00	35.00	15.00	35.00	18.00	30.00	19.00	30.00
DCA Benefit Criteria	Weight (%)										
Protectiveness	30%	9.0	10.0	9.0	10.0	7.0	10.0	7.0	10.0	7.0	10.0
Permanence	30%	7.0	9.0	7.0	9.0	5.0	10.0	5.0	10.0	5.0	10.0
Long-term effectiveness	20%	8.0	10.0	8.0	10.0	6.0	10.0	6.0	10.0	6.0	10.0
Short-term risks	10%	7.0	5.0	7.0	5.0	5.0	6.0	5.0	6.0	5.0	6.0
Implementability	10%	9.0	6.0	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Total weighted degrees of benefit	100%	8.00	8.80	7.60	9.20	5.80	9.60	5.80	9.60	5.80	9.60
Cost Effectiveness (\$/B)		\$1.25	\$4.20	\$1.97	\$3.80	\$2.59	\$3.65	\$3.10	\$3.13	\$3.28	\$3.13

Using the 2025 PMEP tool, in order for SL5 to be identified as the PMEP alternative, every single one of the following elements would have to exist:

- the cost for SL5 would need to be lowered from \$37M to \$30M. In other words, the costs would have been overestimated by \$7M in Volume III. This much of an overestimate is unrealistic.
- the benefit scores for Permanence and Implementability for SL5 would need to be increased from 9 to 10, and from 6 to 10, respectively. In other words, the benefits would have been underestimated in Volume III.
- the cost for SL3 would need to be increased from \$10M to \$19M. In other words, the costs would have been underestimated by \$9M in Volume III. This much of an underestimate is unrealistic.
- the benefit scores for all criteria for SL3 would need to be lowered. Again, an unrealistic estimation of the benefits of SL3.

6.0 Conclusion

Ecology used the 2025 PMEP guidance and tool to evaluate the soil Alternatives SL3 and SL5. Using the tool with the costs and benefits in Volume III DCA, the PMEP alternative is Alternative SL3. Ecology made some adjustments to costs and benefits as suggested by Integral, and the PMEP alternative remains Alternative SL3. A sensitivity analysis shows how further adjustments and manipulations to costs and benefits could in theory lead to the PMEP alternative being Alternative SL5. However, the adjustments and manipulations necessary to achieve this are extremely and highly unrealistic. Using the 2025 PMEP guidance and tool, the PMEP alternative is Alternative SL3.