

**TECHNICAL REVIEW COMMENTS ON THE DRAFT TERRESTRIAL ECOLOGICAL EVALUATION  
AND THE UPLANDS REMEDIAL INVESTIGATION REPORT FOR THE RAYONIER MILL  
HAZARDOUS WASTE SITE IN PORT ANGELES WA**

Reviewer: Robert Sextro

By way on introduction, since I am a new reviewer to the Rayonier project, I have MS degrees in Analytical Chemistry and Environmental Engineering, and currently I work for a not-for-profit, conflict-free company consulting with the US DoD on investigating, remedy selection and remediation of closed military facilities. I have been working with the DoD for about 20 years, prior to that I managed analytical laboratories for over 15 years including an air quality sampling and testing laboratory. I have expertise that includes developing sampling and analysis plans and strategy using EPA guidance and the DQO process, QA/QC of sampling and analytical data, interpretation of results and data, field and laboratory audits, and optimizing remedial systems.

**General Comments**

In my opinion, our entire understanding of potential contamination at the former Rayonier mill site rests squarely on representativeness of the samples collected, the completeness of the analytical data (which implies data of known accuracy and precision) and the comparability of the various data sets collected over time at this site.

Using this statement as a back-drop for my review of the draft Terrestrial Ecological Evaluation (TEE) and the Uplands RI, neither report does an adequate job of evaluating these standard concepts of data quality and discussing the uncertainty this causes to our understanding of potential contamination at the sites and its impact on human health and the environment. After skimming over some of the main sections of these reports (given my time constraints for this review) I focused my attention on the sampling of soils and groundwater and subsequent sample analysis. Appendix F presents the limited data assessment that was done, and it appears to be just a summary of the case narratives provided by the analytical laboratory. Given the nature and magnitude of this project, I would have expected to see atleast some independent assessment of the data quality. It certainly appears to me that the authors of the two reports ignored the contents of Appendix F and the more detailed data CDs from the laboratory and just assumed that there were no data quality problems that affected the results and their subsequent interpretation and findings (such as ecological hazard indices).

All the case narratives the I reviewed for soil sample analysis by method SW 6020 on the data CDs and the data quality summaries in Appendix F indicate matrix spike recovery for antimony that is below the project's control criterion (75 to 125 percent recovery). The narratives further state that "antimony results from this procedure (digestion procedure SW 3050) should only be used as indicators of estimate(d) concentrations". My review of the data CDs indicate that this "low recovery" is around 30 to 35 percent. In my opinion, this "recovery below the project's control criterion" is a systematic error that has biased the reported antimony concentrations in soil low. Since the TEE reports that antimony is a COPEC for wildlife in the west mill area and calculates a hazard index for this element, this systematic error must be considered and discussed in the report.

I have the following recommendations based on my discussion above:

- Revise the data assessment in Appendix F to include numeric values for the cases described in the various narratives as recoveries above or below project control criteria.
- Direct the authors of the two reports to closely review the data assessments and original laboratory case narratives and then summarize any negative impacts and/or uncertainties on results of COPCs and COPECs that are being used in the reports.
- Select a representative sample delivery group with case narrative and have someone independent of the laboratory review and “validated” those data, particularly for COPC and COPECs of interest at this site.
- If additional soil sampling is to be done at this site, as Dr. deFur’s comments suggest, re-analysis for antimony should be attempted using alternate digestion procedures that I believe can overcome the poor matrix recoveries for antimony and silver.

I’m not familiar with the quality of the groundwater and samples obtained from the monitoring wells and the uplands RI does not discuss this or present the results of the stabilization parameters measured in the field prior to sample collection (the following discussion may not be germane if the monitoring wells at the Rayonier site have turbidity values when sampled that are consistently at or below 10 to 20 NTUs). Table 5.1 of the Uplands Environmental SAP of March 2004 provides the project’s groundwater stabilization criteria but does not include a maximum turbidity value (above which perhaps sampling is not allowed until the well is re-developed). The collection procedure does indicate that samples for dissolved metals will be field filtered prior to preservation and shipment to the laboratory. However, very high turbidity (at values between 25 to 100 NTU and greater) can also effect the results of some of the other analyses, depending on how the samples are handled, sub-sampled (as needed) and prepared for analysis by the laboratory. My experience indicates that samples of high, uncontrolled turbidity can result in biased high results for selected organics such as DRO, PAHs and PCBs and certainly for total metals.

I have the following recommendations based on my discussion in the previous paragraph:

- Provide the field data sheets in an Appendix that show the stabilization parameters, including turbidity, for the samples collected from the monitoring wells at the site.
- As appropriate, incorporate and discuss any information obtained from these well purging and stabilization data that might have affected the groundwater results you are interpreting in the report.
- Establish an upper limit for turbidity in the well water, such that samples cannot be collected if the turbidity is above this limit (25 to 50 NTU is commonly used on projects that I have worked with in the DoD), and apply when groundwater is sampled again at this site.

### Specific Comments on the Uplands RI Report

Item	Section	Location	Comment
1.	4.1	Page 4-1	It is stated that a sampling objective is to provide “legally defensible data”. In the EPA-world, this has a very specific meaning that generally includes a rigorous independent “validation” of the sampling and laboratory data. This has not been done with the data used in these reports, so perhaps your definition of “legally defensible data” should be provided.
2.	4.2.6	Page 4-9	Indicate if the objective of “minimum production of artificial turbidity” in the groundwater samples was achieved using micropurging techniques.
3.	4.2.7	Page 4-10	In the first paragraph, add a reference to the Appendix where the results of the field stabilization parameters will be documented.
4.	5.1.2.1	Page 5-7	Using a study of urbanized areas in New England for background PAHs does not seem applicable to an isolated town such as Port Angeles and in an area of very limited fossil-fuel power generation. Why not just assume the background for cPAHs to be ND?
5.	5.2.6	5-27	The statement “PAHs can also occur naturally in the environment” appears to try and minimize the potential impact that mill generated PAHs has on human health and environment and is not universally accepted. Either delete this sentence or provide reference to EPA publications or peer-reviewed literature from scientific journals that supports this ad-hoc claim.
6.	Appendix F	Pages F-11 & 12	The sample matrix for sample group K2303506 is defined as worms, yet the reason given for the low matrix recoveries for antimony is “soil particulate present” in the matrix. Clarify if this assessment language is just a “boiler plate” explanation, and explain how there was enough soil particulate present to affect the matrix, given that Dr. deFur’s comments on the worms seems to imply that the soil was removed from the “worm matrix” prior to sample preparation (which would seem to mean that no soil was present in this matrix to cause any of the problems encountered).

Item	Section	Location	Comment
7.	Appendix F	Pages F-17, 18, and 19	The data assessment written for sample group K2303509 is almost word for word, perhaps arranged in a different order, as what is stated by the analytical laboratory in their case narrative for the same “service request”. If this data assessment were even somewhat independent of the laboratory’s explanation of what went on with the sample group, the sentences would be written as a confirmation of the laboratory’s findings and not as just a “parrot” of what the laboratory stated. I recommend entirely re-writing this data assessment as an “independent” confirmation of what the laboratory has reported (see specific example in the next two comments).
8.	Appendix F	Page F-20	Under “other analysis notes” and metals, it states that “some analytes were analyzed by method 6010B due to elevated analyte concentrations”. Which is fine, but tell the reader which metals were analyzed via method 6010B and on which samples? Again this is exactly what the laboratory has stated in their case narrative, but the assessors should at least fill in the blanks and complete the message.
9.	Appendix F	Page F-27	For sample group K2303593, what is stated in the section “other analysis notes” under PCBs regarding Aroclor 1248 is virtually word-for-word what the laboratory has said on page 6 of their case narrative for this same service request group. The wording of the second paragraph starts by stating “a review of the sample chromatographs indicated the presence of “ etc., and I believe this is misleading because the data assessors were not the ones that “reviewed the sample chromatographs” but they just copied what the laboratory has stated. If the data assessors are not going to review these chromatographs and just accept what the laboratory has done, then the sentence should clearly state that the laboratory performed the chromatographic review and this was not verified as part of this assessment.

Note: the latter 4 specific comments on the contents of Appendix F does not reflect the complete condition of either this Appendix or the data CDs, but represents just a sampling of the types of problems and questions I encountered during my less than complete review.