

11 June 1998

SUBJECT: DETERMINATION ON THE SUITABILITY OF DREDGED MATERIAL FROM RAYONIER INC. GRAYS HARBOR DOCK, CHEHALIS RIVER (#96-2-02109) EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT (CWA) FOR OPEN-WATER DISPOSAL AT THE EITHER THE POINT CHEHALIS OR THE SOUTH JETTY DISPOSAL SITES.

1. Rayonier, Inc. routinely conducts maintenance dredging at the Grays Harbor Dock, dredging between 20,000 to 25,000 cy every 18 months. The dredged material at the Grays Harbor Dock was previously characterized in 1989, 1991, and 1994 (dioxin only). Testing results summarized below are required under the Grays Harbor/Willapa Bay recency/frequency guidelines (Grays Harbor Users Manual¹, pages 55-56) to reconfirm the sediment quality. The proposed dredged material would be disposed at either the South Jetty or the Point Chehalis dispersive disposal sites.
2. The project area is ranked low-moderate for this characterization, but the Grays Harbor Users Manual (Page 47, Table 7-2) acknowledges that the project could be ranked low with confirmatory data from one additional testing cycle. The results summarized below will be used to confirm that a low rank is substantiated, and future confirmatory testing at the Grays Harbor Dock will follow the low ranking testing requirements
3. Sampling was initiated on 24 April, 1998, and consisted of collecting grab samples from four locations, which were subsequently composited for one analysis (see figure 1). The Agencies' approved sampling and analysis plan for testing the Grays Harbor Dock was followed, and quality assurance/quality control guidelines specified by the Grays Harbor Users Manual were generally complied with. The data gathered were deemed sufficient and acceptable for decision making by the Agencies based on best professional judgment.
4. In addition to the 56 chemicals of concern routinely analyzed under the Grays Harbor Users Manual, congeners of dioxin including 2,3,7,8-TCDD were also quantified to confirm the trend of decreasing dioxin levels, previously observed in the 1991 and 1994 analyses.
5. Relevant dates for regulatory tracking purposes are included in Table 1.

Table 1. Regulatory Tracking Dates

SAP Approval date:	April 17, 1998
Sampling date(s):	April 24, 1998
Data report submittal date:	June 5, 1998
Recency Determination Date: Low Concern (7 years) (based on 1998 confirmation sampling)	April 2005

6. Sediment conventional parameters for the single composited analysis are summarized below in Table 2. Chemical analysis of the composited sample indicated that there were no detected or undetected exceedances of screening levels for all 56 chemicals of concern. Grays Harbor screening levels (SL's) are used to establish "reason to believe" levels for biological effects, where chemicals below the SL have a low level of concern. No bioassays are required based

¹ More formally known as the "Dredged Material Evaluation Procedures and Disposal Site Management Manual, Grays Harbor and Willapa Bay, Washington".

on the chemical testing results.

Table 2. Sediment Conventional Results.

Parameter	Grays Harbor Dock, Composite Sample C1
Grain Size:	
% Gravel	<0.1
% Sand	56.1
% Silt	28.4
% Clay	15.7
% Fines	44.1
% Fines (wet sieve)	
Total Solids, %	53.6
Volatile Solids, %	5.3
Total Organic Carbon, %	1.7
Total Sulfides, mg/kg	no data
Total Ammonia, mg/kg	20

7. A subsample of the composited sample was submitted to ALTA Analytical Laboratory Inc. in El Dorado Hills, California for dioxin analysis utilizing EPA method SW8290. These data are summarized in Table 3. Results indicated that 2,3,7,8 TCDD (Tetrachloro-Dibenzo-p-Dioxin) was detected at 1.6 ppt (parts per trillion). This congener is regarded by the EPA as the most toxic form of dioxin. A few other less toxic dioxin congeners were detected at low parts per trillion concentrations. In the following table, the toxicity equivalence in terms of 2,3,7,8-TCDD is shown for the nine most toxic congeners of furan and dioxin (U = detection limit for congeners that could not be quantified; A = Amount detected is below calibration limit).
8. One way to summarize potential toxicity for mammals is to calculate the toxicity equivalent concentrations (TEC) measured in tissue. Total TEC is calculated by multiplying the toxicity equivalent factor (TEF) by the congener specific concentration and summing the TEC's for all congeners. Total TEC comparisons are usually used for food ingestion, and have limited applicability to sediment because TEC **does not** consider the relative bioavailability of the congeners. Accordingly, TEC overstates toxicity to mammals when applied to sediments. TEC as a toxicity measure does not apply to fish, shellfish or birds. In summing the TEC's undetected congeners were summed at one-half their detection limits. For comparison purposes only, the TEC for the analyzed sample was 3.55.

Table 3. Native congeners of Dioxin quantitated at the Grays Harbor Dock.

NATIVE CONGENERS² (pptr)	TEF³	Concentration	TEC
2,3,7,8-TCDD	1	1.6	1.6
1,2,3,7,8-PeCDD	0.5	1.3 A	0.65
1,2,3,7,8-HxCDD	0.1	0.59 A, 1.8 A, 3.8	0.62
1,2,3,4,7,8-HpCDD	0.01	20	0.2
OCDD	0.001	160	0.16
2,3,7,8-TCDF	0.1	0.86	0.086
1,2,3,7,8-PeCDF	0.05	0.4 U	0.01
2,3,4,7,8-PeCDF	0.5	0.33 U	0.083
1,2,3,7,8-HxCDF	0.1	0.37 U, 0.36 U, 0.34 U	0.054
1,2,3,7,8-HpCDF	0.01	7.6, 0.31 U	0.08
OCDF	0.001	9.5	0.0095
TOTALS:			3.55

9. The agencies concluded that all the proposed dredged material (20,000 to 25,000 cy) is suitable for open-water placement at either the South Jetty or the Point Chehalis estuarine disposal sites.
10. This memorandum documents the suitability of proposed dredged sediments for disposal at either the South Jetty or the Point Chehalis estuarine open-water disposal sites. A dredging plan for this project must be completed as part of the final project approval process.

² TCDD = Tetrachlorodibenzodioxin
 PeCDD = Pentachlorodibenzodioxin
 HxCDD = Hexachlorodibenzodioxin
 HpCDD = Heptachlorodibenzodioxin
 OCDD = Octachlorodibenzodioxin
 TCDF = Tetrachlorodibenzofuran
 PeCDF = Pentachlorodibenzofuran
 HxCDF = Hexachlorodibenzofuran
 HpCDF = Heptachlorodibenzofuran
 OCDF = Octachlorodibenzofuran

³ Toxicity Equivalent Factor

Concur:

6/19/98

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