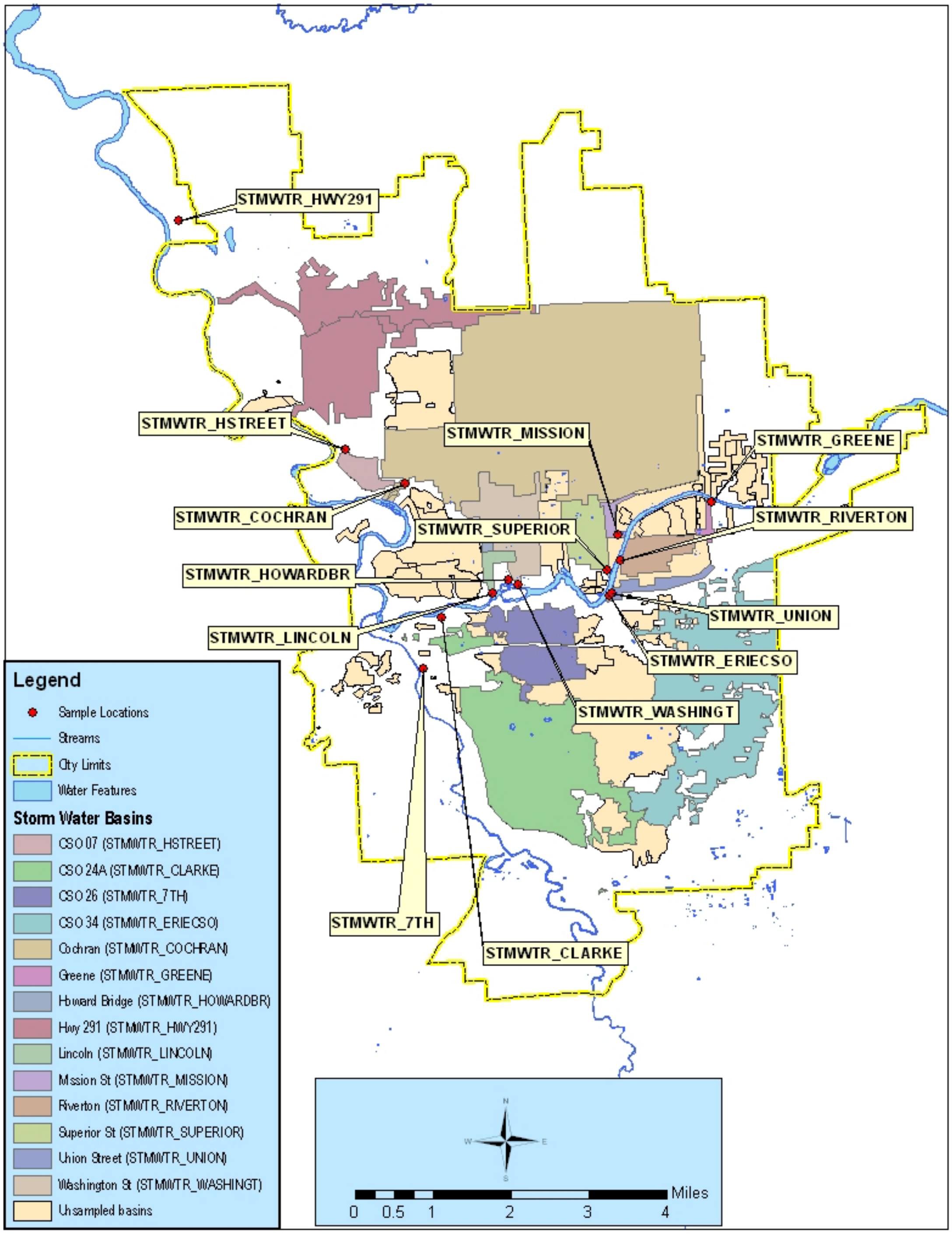


Figure 15. Stormwater Basins in the City of Spokane, Parsons, (2007).

Table 27. Total PCB Results, Impervious Fraction, and Runoff for Spokane Stormwater Basins.

Location_ID[1]	Total PCB (ng/L)[2]	Impervious Fraction	Drainage Area (acre)	Annual Runoff Volume (in)[3]
Sampled Stormwater Basins (High CSO Load Scenario)				
Above Monroe St Dam				
GREENE	19.5	0.365	34	6.1
MISSION	16.5	0.277	55	4.8
RIVERTON	22.3	0.217	233	4
SUPERIOR	17.8	0.376	294	6.3
UNION	97	0.323	109	5.5
ERIECSO (CSO 34)	177	0.24	2,060[4]	4.3
WASHINGT	4.05	0.417	465	6.9
HOWARDBR	8.74	0.407	57	6.7
Below Monroe St Dam				
LINCOLN	4.36	0.544	69	8.7
CLARKE (CSO 24A)	2.56	0.267	1,863	4.7
7TH (CSO 26)	3.38	0.439	609	7.2
COCHRAN	12.9	0.274	5,164	4.8
HSTREET (CSO 7)	2.49	0.247	121	4.4
HWY291	0.978	0.248	1,578	4.4
Totals			**12602**	**79**
29 Un-Sampled Stormwater Basins (Low CSO Load Scenario)				
Average Conc.	23			
Totals		**varied**	**4652**	**147**

Green shading represents CSO basins.
[1] In EIM these Locations IDs have the prefix STMWTR_; CSO number in parentheses is not part of the EIM Location ID.
[2] Average of all the samples collected in the 2007 Parsons study; the PCB average was updated by Ecology.
[3] Calculated for stormwater basins only, using Equations (6) and (7) and an annual rainfall amount of 18 inches.
[4] Includes Union area (109 acres).

PCB stormwater concentrations were found to be related to TSS concentrations in the Parsons study. TSS concentrations were substantial in stormwater (2-298 mg/L, Tables 22-25). Based on the high octanol-water partitioning coefficients (K_{ow}) for PCBs and the high TSS concentrations, it can be assumed that most of the PCBs were adsorbed to the solids fraction in stormwater. Approximately 85%-95% of the PCBs were estimated to be bound to the solid phase (i.e., attached to the suspended sediment) when the partitioning formula Eq. 3, described previously, was applied and an organic carbon fraction of 0.05 used. If this is the case, the suspended sediment carried in stormwater would have average dry weight t-PCB concentrations ranging from approximately 150 to 1,000 ng/g, or about two to 15 times the levels seen in suspended particulate matter in the Spokane River at Ninemile.

PCBs in Spokane River Bottom Sediments

Bottom sediment sampling site locations and dates are shown in Table 28. These sites were selected to investigate the possibility of PCB enriched sediments behind Monroe St. Dam, assess the longitudinal PCB concentration gradient in Lake Spokane, evaluate the potential of the un-surveyed Little Spokane River as a significant PCB source, and measure PCB concentrations in previously sampled Spokane River reaches downstream of Lake Spokane.

Table 28. Bottom Sediment Locations and Sampling Dates.

Station Location	Sample Name	RM	Dates
Spokane River above Monroe St.	MonroeSed	74.8	4/14/04
Upper Lake Spokane	LongLkUp	54.3	5/11/04
Middle Lake Spokane	LongLkMid	44.3	11/4/03
Lower Lake Spokane	LONGLKLOW	38.4	10/2/03 11/4/03 4/13/04
Spokane River above Little Falls Dam	Littlefls	29.9	11/4/03
Spokane River at Porcupine Bay	SPOK-1	11.3	11/06/03
Little Spokane River above SR291	LitlSpokSed	1.1	12/10/03
Buffalo Lake	BUFFALO REF	--	11/5/03

Due to the lack of bulk fine-grained deposits in the Spokane River, sampling was limited to a smaller number of sites than originally planned. Sampling the fine-grained sediment deposit behind Upriver Dam was deemed unnecessary due to the intensive investigation and cleanup being completed at this site.

Grain size composition and PCBs in surficial (top 2 cm) sediments from various Spokane River locations and one reference site (Buffalo Lake) are shown in Tables 29 and 30, respectively.

Table 29. Grain Size in Bottom Sediments (%).

Sample Name	Sample Number	Sand	Gravel	Silt	Clay
MonroeSed	04168149	47.1	52	0.8	0.0
LongLkUp	04208147	22	0.1	73.6	4.3
LongLkMid	03454111	3.6	0	76.3	20.2
LONGLKLOW	03454112/4*	7.0	0.1	59.1	34.0
Littlefls	03454113	88.2	0	9.4	2.3
SPOK-1	03458100	9.7	0	66.5	23.8
LitlSpokSed	03504060	84	0.2	13	2.8
BUFFALO REF	03458103	23.3	0.3	25.4	50.9

*Mean of replicate analysis.

Table 30. PCB Concentrations Grouped by Homologues in Surficial (top 2 cm) Bottom Sediments (ng/g, dw).

Station Name	Sample Number	TOC (%)	1-Cl	2-Cl	3-Cl	4-Cl	5-Cl	6-Cl	7-Cl	8-Cl	9-Cl	10-Cl	Total PCBs
MonroeSed	4168149	0.36	<0.01	<0.01	0.04	0.15	3.00J	1.79	0.90	0.24J	0.05J	<0.02	6.17J
LongLkUp	4208147	2.8	0.17J	0.90	5.99	16.1	13.1J	8.52J	3.50	1.06	0.23	0.12	49.7J
LongLkMid	3454111	2.98	<0.24	0.30	3.05	7.31	5.54	5.23	1.76	0.86	0.27	0.08	24.4
LONGLKLOW	3454112/4*	2.81	0.09J	0.37	2.80	8.49	6.89	4.22	2.23	0.94	0.22	0.08	26.3
Littlefls	3454113	0.61	<0.05	0.10	0.24	0.52	0.62	0.35	0.05	<0.05	<0.05	<0.05	1.90
SPOK-1	3458100-S	1.71	<0.05	0.20	0.72	3.61	3.08	1.59	0.89	0.28	0.07	<0.05	10.4
LitlSpokSed	3504060	0.85	<0.05	<0.05	0.06	0.16	0.31	0.24	0.25	0.75	0.30	<0.05	2.06
BUFFALO REF	3458103-S	8.24	<0.05	0.06	0.07	0.30	0.82	0.81	0.30	0.12	0.23	0.16	2.88

*Mean of replicate analysis.
Detected values are in green highlight.
<: The analyte was not detected at or above the reported result.
J: The analyte was positively identified. The associated numerical value is an estimate.

Concentrations ranged from 50 ng/g total PCB at upper Lake Spokane to 1.9 ng/g at Little Falls. Upper Lake Spokane sediments have total PCB concentrations similar to suspended particulate matter concentrations at Ninemile, suggesting that this material is deposited in this reach. Surficial sediment PCB levels from the lower and middle reaches of Lake Spokane were one-half those in the upper reach.

The river sediments at Monroe St. had low PCB concentrations (6.2 ng/g total PCB) as did the Little Spokane River (2.1 ng/g) and Little Falls. The low concentrations probably reflected a lack of organic carbon-enriched fine material in these reaches. When PCB concentrations among sites were compared on an organic carbon normalized basis, the Lake Spokane stations retained the same relative PCB levels, Little Falls and the Little Spokane River were comparatively low, and Monroe St. total PCB concentrations were as high as those from upper Lake Spokane (Figure 16).

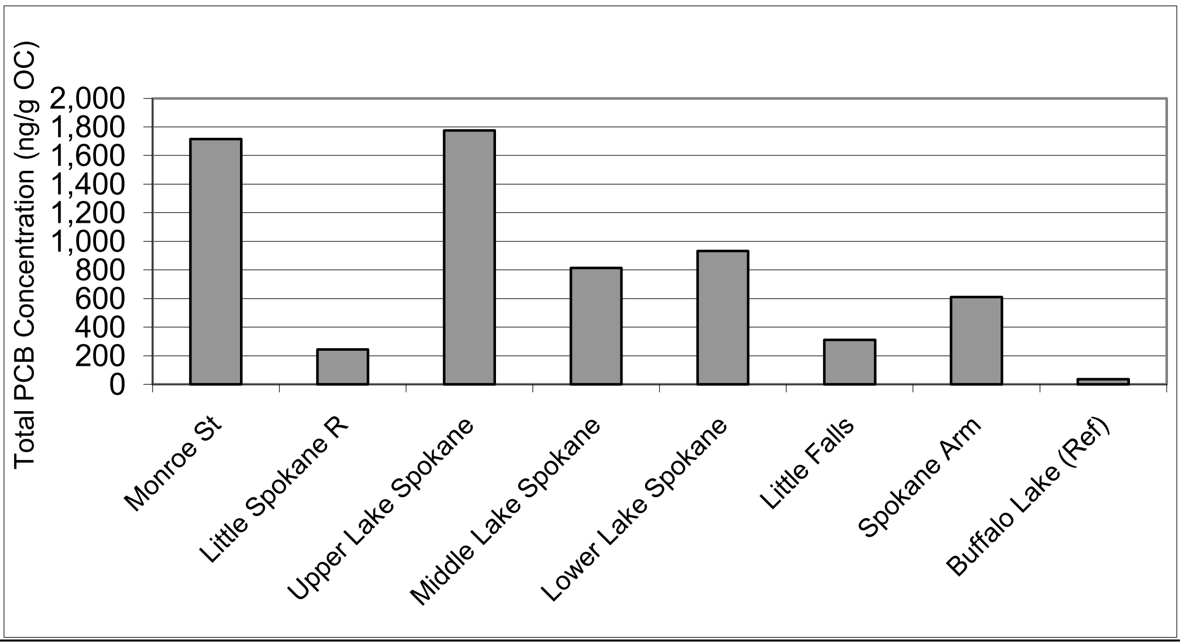


Figure 16. Surficial (Top 2 cm) Sediment PCB Concentrations in Spokane River and Little Spokane River Sediments Normalized to Organic Carbon (Buffalo Lake is a reference location).

TOC-normalized total PCB concentrations at Monroe St. and Upper Lake Spokane sediments were elevated 50 times the reference sediment from Buffalo Lake. Middle and lower Lake Spokane sediments were one-half that elevation. Little Spokane River and Little Falls sediments were more than nine times above PCBs in the reference sediments, while Spokane Arm (Porcupine Bay) levels were 18 times higher.

Temporal trends in sediment PCBs are difficult to establish due to the higher reporting limits in the Aroclor analysis of previous studies. For instance, Johnson and Norton (2001) found TOC-normalized total PCB concentrations of 400, 740, and 3,800 ng/g organic carbon at upper, middle, and lower Lake Spokane, respectively, but few Aroclors were detected and reporting limits were often >10 ng/g. In 1993, Ecology found 1,400 ng/g organic carbon at lower Lake

Spokane, using essentially the same analysis and near the same location (Ecology, 1995). Spokane Arm (Porcupine Bay) sediments from the same survey showed 770 ng total PCB/g organic carbon, representing the only other comparable data for sediments.

To more closely examine the historical record of PCB deposition in Spokane River sediments, PCBs were analyzed at various depths in a 30-cm core collected in upper Lake Spokane and in a 44-cm core from lower Lake Spokane. Table 31 shows total PCB concentrations at various depths in each core. Figures 17 and 18 show the chronology of PCB deposition based on radionuclide (^{210}Pb) decay in sediments (Appleby and Oldenfield, 1978).

Table 31. Total PCB Concentrations in Sediment Cores from Upper and Lower Lake Spokane (ng/g, dw).

Station/Sample ID	Depth (cm)	TOC (%)	Total PCB
LONGUP2			
04268382	0-1	2.82	8
04268383	1-2	2.38	14
04268384	3-4	2.27	16
04268385	5-6	1.81	16
04268386	7-8	1.94	19
04268387	9-10	1.79	33
04268388	11-12	1.85	32
04268389	14-15	1.85	28
04268390	24-25	2.01	51
04434079	28-29	1.87	32
04268391	29-30	2.58	30
LONGLOW2			
04268372	0-1	3.08	28
04268373	1-2	2.76	75
04268374	3-4	2.83	42
04268375	5-6	2.48	40
04268376	7-8	2.41	27
04268377	9-10	2.36	32
04268378	11-12	2.69	54
04268379	14-15	2.74	59
04268380	24-25	2.70	233
04268381	34-35	2.70	1,000
04434078	41-42	2.70	701

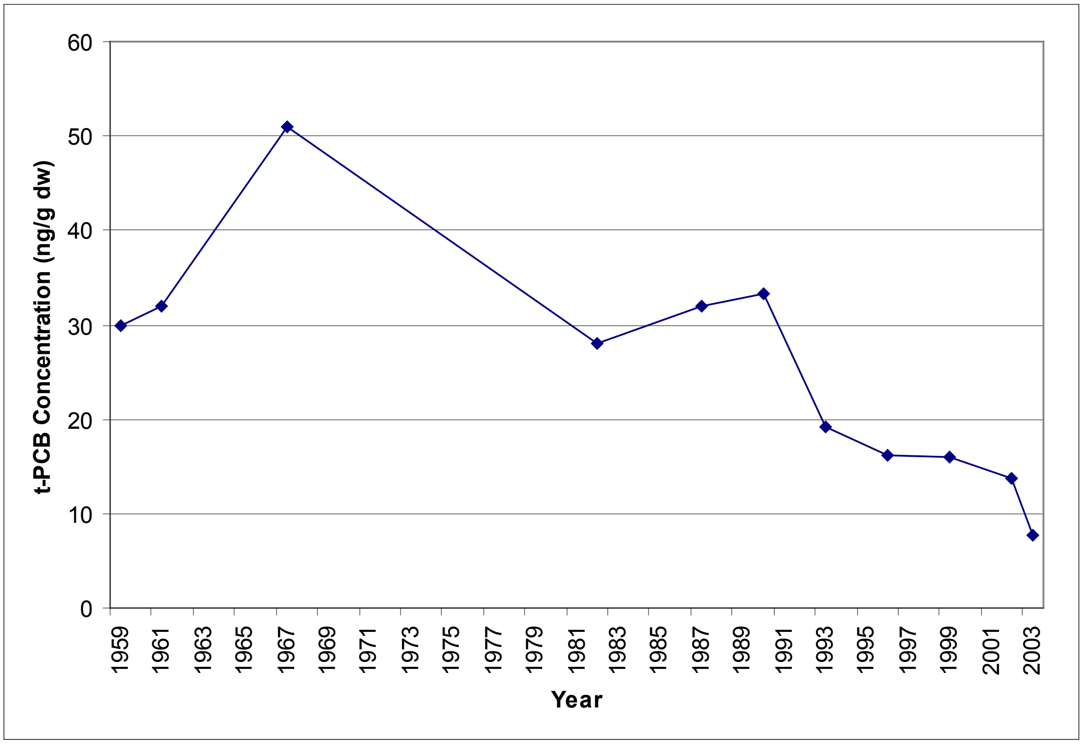


Figure 17. Chronology of PCB Concentrations in Upper Lake Spokane Sediments.

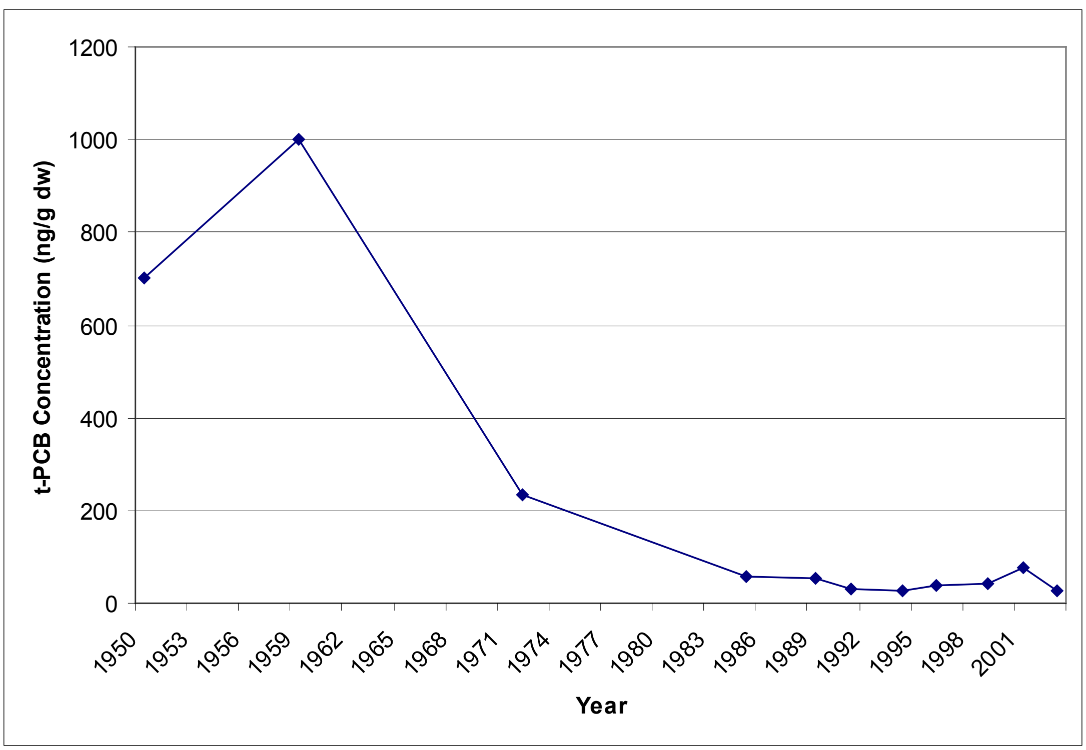


Figure 18. Chronology of PCB Concentrations in Lower Lake Spokane Sediments.

The sediment core from upper Lake Spokane was not as deep as desired due to coarser material preventing maximum corer penetration, and therefore PCB history could only be traced to circa 1959. The PCB profile showed a declining trend from 1959 to 2003, with a 1967 peak (51 ng/g), nearly coinciding with peak domestic PCB production in 1970.

The shape of the PCB profile from lower Lake Spokane had similarities to the upper lake. The peak occurred earlier with 1,000 ng/g circa 1959, but no horizons deposited between 1959 and 1972 were analyzed for PCBs, raising the possibility that the peak PCB concentration in this core was more than 1,000 ng/g and may have occurred later than 1959. PCB concentrations in sediment deposits have leveled off significantly in the past two decades, a pattern that has been observed at other locations in Washington (e.g., Serdar, 2003).

Cores from upper and lower Lake Spokane differ vastly in PCB levels, with peak years showing at least a 30-fold higher concentration at the lower lake. Lower Lake Spokane had post-peak total PCB concentrations 2-5 times higher than those deposited the same years in the upper lake, except during the early 1990s when PCB levels were nearly identical.

The surficial sediments and those normalized to TOC show upper Lake Spokane has higher PCBs. However, the sediment core samples and other studies indicate lower Lake Spokane historically had higher PCBs. This most likely has to do with the complex sedimentation history of the Lake Spokane Dam reservoir and sedimentation patterns from the tributaries to the lake.

The differences in PCB concentrations between upper and lower Lake Spokane and the apparent variability in PCB concentrations in upper lake sediments indicate that these locations receive sediments at proportionally different rates over time and possibly from different sources. The high level of PCBs historically deposited in the lower lake most likely originate from PCB contamination sources in and around Spokane, whereas the upper lake sediments are probably diluted with comparatively clean sediments from the Little Spokane River and Latah Creek, the latter providing large volumes of clean sediment (Johnson and Norton, 2001; SCCD, 2002).

The ^{210}Pb profile in the lower lake shows a steady input of newly formed material and little perturbation of sediments, while upper lake sediments appear to contain older material near the surface, presumably delivered from Little Spokane River and Latah Creek, and an inconsistent decay profile suggesting physical disturbance. Future analysis of upper lake sediments should be conducted with caution and consideration for the dynamics of sedimentation in this reach.

PCBs in Spokane River Fish

2003-2004

As part of the PCB source assessment, several species of fish were collected from multiple locations in the Spokane River from the state line through Lake Spokane. Table 32 shows concentrations of PCBs in rainbow trout fillets and in gut contents. Male rainbow trout from Plante Ferry had a somewhat higher PCB concentration than females, even though female fish were larger on average (391 vs. 363 mm). One possible explanation for the difference in concentrations at this location is that female fish may have mobilized PCBs along with lipids to egg production, since all female trout from this location were gravid. However, lipid content was nearly identical between sexes, suggesting other factors at play. Ninemile rainbow trout had slightly lower PCB concentrations than Plante Ferry possibly due to the smaller length (311 vs. 377 mm), exposure history, or lower lipids (1.3 vs. 1.7%) on average.

The Ninemile rainbow trout, having been analyzed individually, offer an opportunity to examine some of the factors determining PCB levels in tissue for fish collected from this location. Upon initial inspection, it appears that sex differences play a large role in PCB concentrations since females have twice the average PCB levels compared to males. However, the median age of the female fish was three years versus one year for the male fish, and the females were 20% longer on average. Another possible factor is the origin of the specimens; the larger females were all wild fish while the majority of male specimens were hatchery-raised based on the pattern of scale checking (John Sneva, WDFW, written communication). Differences in PCB levels of wild versus hatchery fish also may be due to foraging habits or prey selection.

PCB concentrations in rainbow trout gut contents were approximately 15%-30% those in tissue. Many of the specimens collected at both Plante Ferry and Ninemile were engorged with filamentous plant material. This material holds insects and other aquatic organisms, which are digested while the plant material remains undigested. Aquatic organisms extracted from Ninemile trout stomachs were mostly Corixidae (water boatman) adults, Chironomidae larvae, and Trichoptera larvae (probably Hydropsychidae). The gut contents of Plante Ferry rainbow trout were not examined closely, but casual observation suggested that contents were similar to Ninemile specimens; and PCB concentrations were similar as well. Crayfish or crayfish parts were also observed in the guts of some Plante Ferry trout.

Table 33 shows congener and total PCB concentrations (sum of detected congeners) in suckers analyzed whole and in gut contents. Crayfish from the Upriver Dam cleanup site are also included in Table 33. Suckers were composited by size to assess growth dilution as a potential factor in PCB concentrations. Growth dilution occurs when a fish grows faster than the accumulation rate of the contaminant of concern, lowering the contaminant concentration as the fish size increases.

Table 32. 2003-2004 PCB Concentrations in Rainbow Trout from Plante Ferry and Ninemile (ng/g, ww)

Station-Tissue	Sample ID	Composite	Sex	Lipid	1-Cl	2-Cl	3-Cl	4-Cl	5-Cl	6-Cl	7-Cl	8-Cl	9-Cl	10-Cl	Total PCB
Fillet															
PLANTE-F	4188308	Y	M	1.7%	0.004N	0.03	0.14	7.15	13.4	9.08J	10.2J	0.83	0.15J	0.02	40.9 J
	4188309	Y	F	1.7%	0.01J	0.06J	0.09	5.13J	6.35J	9.97J	5.82J	0.81	0.11	0.02	28.4 J
														mean=	**34.7**
Ninemile (WSTMP)[2]	084281	N	M	1.5%	<0.02	0.02	0.14	1.81	3.29	3.08	1.12	0.25	<0.02	<0.02	9.7
	084282/308 *	N	F	2.7%	0.02	0.03	1.01	6.45	19.8	20.4	6.45	1.73	0.16	0.02	56.0
	084283	N	M	1.3%	<0.02	0.03	0.13	2.35	5.04	4.25	1.41	0.26	0.03	<0.02	13.5
	084284	N	M	1.9%	<0.02	0.03	0.72	4.96	13.1	10.3	4.44	0.83	0.08	<0.02	34.4
	084285	N	F	1.1%	<0.02	<0.02	0.08	4.58	16.9	19.4	7.74	1.88	0.30	0.04	50.9
	084286	N	M	1.0%	<0.02	0.02	0.12	2.18	4.43	3.65	1.04	0.14	0.02	<0.02	11.6
	084287	N	M	0.4%	<0.03	<0.03	0.53	1.73	4.87	3.68	1.24	0.30	<0.03	<0.03	12.3
	084288	N	M	1.9%	<0.03	0.04	1.03	3.09	6.17	4.86	1.66	0.40	<0.03	<0.03	17.3
	084289	N	F	0.7%	<0.02	0.02	0.61	3.80	12.8	15.4	7.06	2.44	0.19	0.03J	42.4
	084290	N	M	3.3%	<0.02	0.04	1.70	9.48	31.2	19.0	10.7	2.20	0.15	<0.02	74.5
	084291	N	F	2.5%	<0.02	0.04	1.36	7.33	19.5	16.3	5.95	1.25	0.16	0.03	51.9
	084292	N	M	2.0%	<0.02	0.03	1.13	6.27	17.0	13.6	5.56	1.04	0.12	<0.02	44.8
	084293	N	M	1.8%	<0.02	0.03	0.39	3.75	9.98	8.96	3.23	0.65	0.09	<0.02	27.1
	084294	N	M	1.0%	<0.02	0.03	0.14	1.86	4.00	2.65	0.79	0.23	<0.02	<0.02	9.7
	084295	N	M	0.6%	<0.02	0.03	0.14	2.70	4.91	4.59	1.94	0.27	0.03	<0.02	14.6
	084296	N	M	0.4%	<0.02	0.03	0.11	2.20	4.18	2.72	1.16	0.25	0.02	<0.02	10.7
	084298	N	M	0.9%	<0.02	0.03	0.72	2.55	4.90	4.94	1.94	0.46	0.03	<0.02	15.6
	084299	N	M	0.2%	<0.02	0.03	0.07	2.62	7.16	4.67	1.84	0.39	0.02	<0.02	16.8
	084301	N	M	1.5%	<0.02	0.03	0.89	5.72	13.6	15.7	5.37	1.59	0.16	0.02	43.2
	084302	N	M	0.8%	<0.02	0.03	0.77	3.04	6.48	6.48	2.76	0.53	0.03	<0.02	20.1
	084303	N	F	0.9%	<0.02	0.03	0.60	3.29	9.30	10.7	3.28	1.35	0.11	0.02	28.7
	084304	N	M	0.3%	<0.02	<0.02	0.23	1.58	4.05	3.15	0.97	0.38	0.02	<0.02	10.4
	084305	N	M	0.5%	<0.03	0.04	0.55	1.89	4.29	3.35	1.66	0.33	<0.03	<0.03	12.1
	084306	N	M	1.6%	<0.02	0.03	1.00	4.32	11.9	12.8	3.38	1.03	0.10	<0.02	34.6
														mean of males =	**22.8**
														mean of females =	**46.0**
Gut Contents														**mean overall =**	**27.6**
PLANTE-F	4188311	Y			0.01N	0.03	0.06	0.11	1.77	0.97J	0.99J	0.14	0.02N	<0.02	4.1 J
NINEMILE-F	4188310	Y			<0.01	0.03	0.04	0.06	2.42	2.02J	1.35	0.21	0.03N	<0.01	6.2 J

[1] These Ninemile fish were collected under the station name "Spokane-F" as part of a concurrent WSTMP study and were analyzed as individuals.

*Mean of replicate analysis.

Detected values are in green highlight.

U: The analyte was not detected at or above the reported result.

J: The analyte was positively identified. The associated numerical value is an estimate.

NJ: There is presumptive evidence that the analyte is present. The associated numerical result is an estimate.

Table 33. 2003-2004 PCB Concentrations in Suckers and Crayfish Tissue from the Spokane River (ng/g, ww).

Station/Tissue	Sample ID	Size	Mean Length (mm)	Lip	1-Cl	2-Cl	3-Cl	4-Cl	5-Cl	6-Cl	7-Cl	8-Cl	9-Cl	10-Cl	Total PCB
Whole Body Suckers*															
STATELINE-F	4324442	Lg	513	4.5%	<0.02	<0.02	0.67	20.7	43.2	39.7	30.8J	5.78J	0.49	0.12	141.5 J
	4324443	Sm	445	3.4%	<0.02	<0.02	0.08	3.77	14.6	20.1J	16.8	3.02	0.40	0.10	59.0 J
														mean=	**100.2**
PLANTE-F	4324440	Lg	479	4.6%	<0.02	0.03	2.26J	30.2	52.4	25.0	25.9J	3.98	0.28	0.05	140.2 J
	4324441	Sm	453	3.3%	<0.02	0.02	0.76	9.71	19.0	12.7J	8.16	2.87J	0.24	0.04	53.5 J
														mean=	**96.9**
NINEMILE-F	4324447/8†	Lg	431	2.6%	<0.02	0.03	0.56J	3.33J	9.22J	11.0J	4.91J	1.27	0.21 J	0.05	30.6 J
	4324450	Sm	355	4.8%	<0.02	0.06	1.01J	3.86	8.77	9.66	3.49	0.79	0.16	<0.04	27.8 J
														mean=	**29.2**
LONGLOW-F	4324444	Lg	463	7.7%	<0.02	0.06	3.41J	43.4	59.7J	53.9J	25.5	8.17J	1.11	0.11	195.4 J
	4324446	Sm	433	9.1%	<0.02	0.06	4.08J	54.7	74.4J	78.0J	32.0	8.59	1.05	0.18	253.1 J
														mean=	**224.2**
Sucker Gut Contents															
PLANTE-F	4324445	--	485	na	<0.02	0.03	1.38	27.6	44.2	26.8J	14.1	3.40	0.28	0.04	117.8 J
NINEMILE-F	4324449	--	396	na	<0.02	0.02	0.03	0.29	1.13	1.48	0.28	0.05	0.02	<0.04	3.3
Crayfish Tail Muscle															
Upriver Dam	4208148	--	40	na	<0.006	0.02	0.01	0.03	0.036	0.05	0.54	0.18J	0.01	<0.01	0.87 J

*Largescale suckers except bridgelip suckers at NINEMILE-F.
†Mean of replicate analysis.
Detected values are in green highlight.
U: The analyte was not detected at or above the reported result.
J: The analyte was positively identified. The associated numerical value is an estimate.

Largescale suckers from Stateline and Plante Ferry had similar PCB concentrations. Composites of large fish had three times the PCB level of the smaller fish composites at both sites even though average lengths were not substantially different (513 vs. 445 mm at Stateline; 480 vs. 453 mm at Plante Ferry). The higher PCB concentrations in the large fish samples from these sites may be due to the 50% higher lipid content, yet even on a lipid-normalized basis, growth dilution does not appear to be a controlling factor in PCB concentrations.

The Lake Spokane largescale suckers had the highest PCB levels. Size disparity was similar (463 vs. 433 mm), and the sample of smaller fish had 30% higher PCB levels, but here again, the difference is not necessarily due to growth dilution since the sample composed of smaller fish had a 20% higher lipid content.

Bridgelip suckers from Ninemile had much lower PCB concentrations than suckers at other locations, possibly due to species difference or the smaller size of fish at Ninemile (large and small composites averaged 431 and 355 mm, respectively). However, PCB contamination of food items also appears to be a major factor since differences in PCB concentrations in whole fish from Plante Ferry and Ninemile reflect differences in PCB levels in gut contents.

Both rainbow trout and suckers appear to show drastic reductions in PCB concentrations compared to previous sampling. PCBs in rainbow trout fillet from Plante Ferry and Ninemile, when compared on a lipid-normalized basis to reduce covariability, have decreased an order of magnitude from 1999. Largescale suckers analyzed in 2003-2004 have approximately one-fifth the PCB concentrations compared to the previous sampling at Plante Ferry (1996) and lower Lake Spokane (2001). Bridgelip suckers collected from Ninemile in 2004 had much lower total PCB concentrations than the previous [largescale] sucker sampling at this location (880 ng/g lipid in 2004 vs. 31,000 ng/g lipid in 1999).

PCB concentrations in largescale suckers from Plante Ferry and lower Lake Spokane appear to be similar to "boundary conditions" at Stateline when compared on a lipid-normalized basis. This may suggest, generally, that PCB concentrations in certain Washington reaches of the Spokane River are in essence equilibrating to general conditions upstream in Idaho. A recent study of PCBs in Lake Coeur D'Alene fish (SAIC, 2003b) found a total PCB concentration of 1,580 ng/g lipid in whole largescale sucker, similar to the levels in Stateline suckers (2,440 ng/g lipid) as well as other locations analyzed during the present survey (2,340 ng/g lipid at Plante Ferry and 2,660 ng/g lipid at lower Lake Spokane).

An industrial or commercial legacy of PCB contamination is evident in the northern portion of Lake Coeur D'Alene. The SAIC study collected suckers (combined long-nose and large-scale) specifically around the area known as Blackwell Island, just outside the City of Coeur D'Alene. This location is the start of the Spokane River and has a long industrial history. The whole body sucker composites (combined long-nose and large-scale) ranged from 158 to 443 ug/Kg total PCBs. Large-scale sucker fillets collected more broadly from the north quadrant of the lake ranged from 52 to 124 ug/Kg. Much lower levels of 9 to 15 ug/Kg were found in kokanee and largemouth bass fillets more widely composited from the north quadrant of the lake.

Crayfish from the Upriver Dam fine-grained sediment site showed low levels of PCBs in tail muscle (0.87 ng/g total PCB). Previous analyses of muscle tissue from Spokane River crayfish also found mostly undetectable or low (≤ 7 ng/g total PCB) concentrations, indicating crayfish muscle is a poor sentinel of PCB contamination. Whole crayfish have not been analyzed and could have higher PCB concentrations due to gut contents or accumulation in hepatopancreas or other organs.

2005

Table 34 summarizes the data obtained on PCB levels in Spokane River fish during 2005, (Serdar and Johnson, 2006). Mean concentrations of total PCBs (sum of detected Aroclor-equivalents) ranged from 37-234 ug/Kg in sport fish fillets and 56-1,823 ug/Kg in whole largescale suckers.

Table 34. Summary of PCB Concentrations Measured in Spokane River Fish Collected in 2005.

Reach	Species	N* =	Total PCBs (ng/g, wet weight)	
			Mean	Range
Fillet Samples				
Plante Ferry	Rainbow Trout	3	55	48 - 68
Mission Park	Rainbow Trout	3	153	118 - 220
	Mountain Whitefish	3	234	203 - 280
Ninemile	Rainbow Trout	3	73	46 - 94
	Mountain Whitefish	3	139	86 - 172
Upper Lake Spokane	Mountain Whitefish	3	43	36 - 55
	Brown Trout	1	130	- -
	Smallmouth Bass	1	37	- -
Lower Lake Spokane	Mountain Whitefish	6	76	<9.6 - 190
	Smallmouth Bass	3	67	49 - 82
Whole Body Samples				
Stateline	Largescale Sucker	3	56	16 - 77
Plante Ferry	Largescale Sucker	3	122	91 - 180
Mission Park	Largescale Sucker	3	1,823	1,100 - 3,000
Ninemile	Bridgelip Sucker	3	69	52 - 94
Upper Lake Spokane	Largescale Sucker	3	327	160 - 510
Lower Lake Spokane	Largescale Sucker	3	254	109 - 396

*Composites of 4-5 individual fish each, except lower Lake Spokane mountain whitefish were analyzed individually.

In both types of samples, concentrations gradually increased between the Stateline and Mission Park reaches, then decreased from Mission Park down into lower Lake Spokane. The concentrations in Lake Spokane were higher than in the upper part of the river at Stateline and Plante Ferry.

Fish tissue studies often differ in sample size, use of composites vs. individual fish samples, and in other ways and are not appropriate for statistical testing for long-term trends. Therefore a qualitative, weight-of-evidence approach was taken for identifying long-term changes in PCB levels, coupled with a statistical test for significant differences for the limited instances where comparable data exist.

The data were examined to determine if it would be appropriate to normalize to the lipid content of the samples, since concentrations of PCBs and other organochlorines sometimes vary directly with lipid content. For the majority of species and locations, there was not a good correlation between total PCBs and percent lipids (Serdar and Johnson, 2006).

Serdar and Johnson (2006) identified seven data sets, by river reach, where the same fish species and tissues were analyzed for two or more time periods and where the sample size and type was sufficient for statistical analysis (Table 35). They found substantial decreases in fish tissue PCB concentrations for the following reaches:

- Plante Ferry
- Mission Park
- Ninemile
- Upper Lake Spokane

Table 35. Significant Changes Identified in Total PCB Concentrations in Spokane River Sportfish Fillets: Results from Analysis of Variance on Comparable Data Sets, 1994-2005.

Reach	Species	Sample Type	Time Period	p value (Probability)	Significant Change? ($p < 0.10$)
Plante Ferry	Rainbow Trout	composites	1994-1996	1.00	No
			1996-2005	0.34	
			1994-2005	0.01	Decrease
Mission Park	Rainbow Trout	composites	1994-2005	0.85	No
	Mountain Whitefish			0.02	Decrease
Ninemile	Rainbow	composites	1994-1996	0.07	Decrease
			1996-2005	1.00	No
			1994-2005	0.06	Decrease
		individuals	1996-2005	0.00	
	Mountain Whitefish	composites	1994-1996	0.01	Increase
			1996-2005	0.01	Decrease
Upper Lake Spokane	Mountain Whitefish	composites	2001-2005	0.05	Decrease

Appendices D and E of Serdar and Johnson (2006) have the total PCB data for all Spokane River fish tissue samples analyzed by Ecology from 1993 to 2005.

Results of this analysis suggest that, at least for these two species, there has been a significant decrease in PCB concentrations between 1994 and 2005. Evidence for a similar decrease in the Mission Park reach was equivocal. The general picture that emerges from the historical data on the Spokane River is one of decreasing PCB concentrations in fish from all areas of the river since 1994, except perhaps Mission Park.

The long-term declines in PCBs noted along the upper Spokane River both statistically and qualitatively are consistent with recent Ecology regulatory and investigatory actions that are yielding reductions in PCBs entering the river from NPDES discharges and remedial actions associated with cleanups at a major industrial facility. Lake Spokane may also be responding to the actions taken in the upper river. The apparent lack of a decline in PCB levels in fish from the Mission Park reach is consistent with stormwater discharge being the largest current source of PCBs to the river.

Table 36 compares the 2005 results with statewide data on PCBs in freshwater fish, based on fillet data reported by Seiders and Kinney (2004) and whole fish data reported by Davis et al. (1994, 1995, 1996, 1998). The fillet samples were primarily collected during 1995-2002; the whole fish samples are from 1992-1995. To avoid biasing the statewide results high, data for Spokane River fish were excluded. The statewide data do not represent "background" sampling from waters generally free of human influences, but are from various waters around the state including lakes, rivers, and streams also impacted by industrial and municipal discharges.

Table 36. Total PCB Concentrations in Spokane River Fish vs. Statewide Data (ug/Kg, wet weight).

Total PCBs	Spokane River 2005		Statewide	
	Fillet N=24	Whole Body N=24	Fillet N=98	Whole Body N=28
Mean	104	442	155	151
Median	78	135	28	87
Minimum	36	16	1.2	7.1
Maximum	280	3,000	1,943	622
90th percentile	213	1,181	297	334

For the most part, PCB concentrations in the 2005 Spokane River fillet samples are in the range of the statewide mean and median for fillets. The whole fish results for Mission Park and Lake Spokane are at or above the upper end of the range of whole fish statewide values.

Ecology recently completed an assessment of PCB levels in fish from background lakes, rivers, and streams throughout Washington (Johnson et al., 2010). Table 37 compares the results with the 2005 Spokane River edible fish tissue data. Whole body samples were not analyzed for the background study.

Statewide data obtained through the background study suggest that Spokane River fish are elevated by about an order of magnitude over other waterbodies with no obvious sources of contamination. It should be recognized, however, that the local background in the Spokane region may differ from these statewide results.

Table 37. Total PCB Concentrations in Spokane River Fish vs. Statewide Freshwater Background (ug/Kg, wet weight; fillet samples).

Total PCBs	Spokane River 2005 N=24	Statewide Background N=52
Mean	104	4.9
Median	78	1.4
Minimum	36	0.04
Maximum	280	88
90^{th} percentile	213	6.5

Assessment of PCB Sources

The following section contains an assessment of PCB sources to the Spokane River, which include industrial and municipal effluents, stormwater, the Spokane River at the state line with Idaho, and the Little Spokane River. Loads from other sources are considered inconsequential (Ecology, 1995; Golding, 1996, 2001, 2002).

Deep Creek was initially considered for source assessment in the present study, but the lower section of the creek appears to be a hydraulically losing reach, and no water was present. Previous monitoring of Latah Creek detected no PCBs in the sediments (Johnson and Norton, 2001). The potential for other small tributaries to deliver PCBs to the Spokane River was considered low, and they were not sampled.

Other possible secondary sources to consider are groundwater and atmospheric deposition.

Groundwater has previously been monitored at the Kaiser Trentwood facility to assess its potential as a source of PCBs to the Spokane River, but Hart Crowser (1995) concluded that groundwater inflow was not a primary PCB transport pathway to the river from the facility. In addition, Ecology's Toxics Cleanup Program currently is overseeing the cleanup of PCBs at Kaiser Trentwood to ensure groundwater contamination will not impact the river.

Atmospheric deposition of PCBs is known to be pronounced in areas where cold condensation occurs, such as in the mountains of southern British Columbia and Alberta (Blais et al., 1998). This phenomenon holds the potential to deposit measurable quantities of PCBs in the mountains in the eastern portion of the Spokane River basin, eventually delivering PCBs to Lake Coeur D'Alene through the St. Joe, St. Maries, and Coeur D'Alene Rivers and, excluding industrial sources in Idaho, may partially explain higher than expected concentrations of PCBs in fish from Lake Coeur D'Alene. Delivery of PCBs to Washington from this source would be integrated to a single channel: the Spokane River at Stateline.

The Spokane River basin downstream of the Idaho border would not be ideal for atmospheric deposition due to aridity of the region, and PCBs that are deposited in the area would theoretically be integrated into delivery systems already considered, such as the Little Spokane River and urban stormwater. Deposition of PCBs directly to the surface of the Spokane River would be minimal due to its small surface area relative to the basin area. Atmospheric deposition is an un-quantified source of PCBs to the Spokane River.

Loss of PCBs to the atmosphere through volatilization has also not been quantified. PCB budgets for the Great Lakes area have shown atmospheric flux to be an order of magnitude greater than input and output through surface waters, with loss through volatilization approximately five times greater than atmospheric deposition (EPA, 1993).

PCB Loading Calculations

PCB loads calculated for the present 2003-07 study only include surface water inputs and outflow, generally using the following formula:

Equation 6. Daily Load (mg/day) = C_w x (10^{-9} mg/pg) x Q x (86,400 s/day)

Where:

- C_w (concentration in whole water) = concentration of PCBs in water (pg/l).
- Q (discharge) = flow of the delivery system being considered (L/sec).

To simplify the data presentation and maintain consistency with applicable criteria, loads are calculated for total PCBs only.

Industrial and Municipal Effluents

Table 38 shows PCB loads in effluents identified as PCB sources in this study. PCB loads from Liberty Lake WWTP, Inland Empire, and the Spokane WWTP were calculated using a combination of results from the present survey and previous sampling (Table 21). For the Liberty Lake and Spokane WWTPs, loads were calculated using the mean total PCB concentrations and instantaneous flows from 2001 and 2003-2004. For Inland Empire, loads were calculated using the mean total PCB concentrations and instantaneous flows from 2001, 2002, and 2003-2004. In samples where no PCBs were detected, reporting limits were used to calculate the average.

PCB loads from Kaiser were based on total PCB concentrations and instantaneous flows from nine samples collected during 2004 and 2005 (Table 20) since these represent the most current data on PCBs in Kaiser effluent.

Table 38. Estimated PCB Loads in Industrial and Municipal Effluents Discharged to the Spokane River.

Facility	RM	Total PCB (pg/l)	Discharge (ML/day)	Total PCB Load (mg/day)
Liberty Lake WWTP	92.7	1,121	2.5	2.9
Kaiser Trentwood	86.0	1,080	60	65
Inland Empire Paper	82.5	2,544	18	45
Spokane WWTP	67.4	1,364	143	194
			Total =	307

ML/day = megaliters/day [0.264 MGD (million gallons per day)].

Urban Stormwater Runoff

For the sampling conducted in 2004, PCB loads delivered to the Spokane River through stormwater were calculated using the "Simple Method" model to estimate runoff volume and calculate contaminant loads (www.stormwatercenter.net/).

For 2007, Parsons calculated the loads from sampled and un-sampled drains in the City of Spokane using two different discharge estimates: (1) calculated by the Simple Method to be consistent with the 2004 data, and (2) the reported discharge volumes from the City of Spokane's CSO Annual Report for fiscal year 2005. Both loading scenario calculations for the un-sampled drains used the average concentration from the sampled drains. Parsons concluded that the actual loading of PCBs to the river from stormwater is likely somewhere between the two estimates.

For the source assessment study, the loads from the stormwater sewer network were calculated as the sum of the load determined by the Simple Method for the sampled storm drains and the load using the 2005 discharge volumes for the un-sampled storm drains. The magnitude of stormwater discharge plays a large role in the loading calculations. Parsons stated that because direct untreated CSO discharges may occur only during large runoff events, the Simple Method was considered an upper bound.

The sum load from the sampled stormwater basins using the Simple Method was 557 mg/day total PCBs, and the un-sampled stormwater basins using the discharge records from the City of Spokane was 133 mg/day total PCBs.

The Simple Method uses the formula:

Equation 7 $L = 0.226 * R * C * A$

Where:

- L = Annual load (lbs).
- R = Annual runoff (inches).
- C = Pollutant concentration (mg/L).
- A = Area (acres).
- 0.226 = Unit conversion factor.

Annual runoff and runoff coefficient were previously presented as Equations 4 and 5.

Tables 39 and 40 show the estimated PCB stormwater loads in the sampled and un-sampled stormwater basins (data from Parsons, 2007).

The total stormwater load (691 mg/day) from the City of Spokane is considered to be the sum of the high load scenario for the sampled stormwater outfalls above and below Monroe St. Dam (557 mg/day) Table 39, and the low load scenario (133 mg/day) for the un-sampled stormwater outfalls, Table 40. The locations of the un-sampled stormwater outfalls were assumed to be half above and half below the Monroe St Dam.

Table 39. PCB Load from Sampled Stormwater Basins based on Simple Method Discharges, Parsons (2007).

Location_ID[1]	Average t-PCB (ng/L)[2]	Annual t-PCB Load (lb)[3]	Daily t-PCB Load (mg/day)[4]	Annual t-PCB Load/Acre (mg/acre)
Sampled Stormwater Basins (High CSO Load Scenario)				
Above Monroe St Dam				
GREENE	19.5	0.001	1	12.2
MISSION	16.5	0.001	1.2	8.2
RIVERTON	22.3	0.005	6	9.1
SUPERIOR	17.8	0.007	9	11.5
UNION	97	0.013	16	54.8
ERIECSO (CSO 34)	177	0.336	417	78
WASHINGT	4.05	0.003	3.6	2.9
HOWARDBR	8.74	0.001	0.9	6
Below Monroe St Dam				
LINCOLN	4.36	0.001	0.7	3.9
CLARKE (CSO 24A)	2.56	0.005	6	1.2
7^{TH} (CSO 26)	3.38	0.003	4	2.5
COCHRAN	12.9	0.072	90	6.3
HSTREET (CSO 7)	2.49	<0.001	0.4	1.1
HWY291	0.978	0.002	2	0.4
Totals		0.45	**557**	198

[1] In EIM these Locations IDs have the prefix STMWTR_; and CSO # in parentheses is not part of Location ID.
[2] Average of all the samples collected in the 2007 Parsons study; the PCB average was updated by Ecology.
[3] Calculated using Equation (5).
[4] Daily PCB load (mg/day) = Annual load (lb/yr)*453000 mg/lb /365.
Rows highlighted in green correspond to CSO basins.

Table 40. PCB Load from Un-Sampled Stormwater Basins based on 2005 City Discharge Data, Parsons (2007).

Location_ID[1]	Average t- PCB (ng/L)[2]	Annual t-PCB Load (lb)[§]	Daily t-PCB Load (mg/day)[#]	Annual t-PCB Load/Acre (mg/acre)
29 Un-Sampled Stormwater Basins (Low CSO Load Scenario)				
I05 Upper	23	0.014	17.82	8.7
I04	23	0.007	8.57	18.0
I07	23	0.004	5.01	10.1
CSO 33B	23	0.022	27.80	9.2
CSO 06	23	0.012	14.90	11.3
CSO 12	23	0.010	13.02	12.4
I03	23	0.001	0.73	1.9
CSO 23	23	0.005	5.96	13.3
CSO 41	23	0.002	2.37	9.7
CSO 16B	23	0.002	2.41	7.4
CSO 25	23	0.001	1.08	18.7
CSO 33D	23	0.002	2.41	17.9
CSO 14	23	0.002	1.95	10.0
CSO 10	23	0.001	1.79	11.9
CSO 15	23	0.003	3.64	10.8
CSO 42	23	0.000	0.37	22.5
CSO 40	23	0.002	1.92	12.3
CSO 39	23	0.001	1.60	11.4
CSO 33A	23	0.001	1.77	9.7
CSO 38	23	0.002	2.19	11.2
CSO 24B	23	0.003	3.54	18.2
CSO 33C	23	0.001	0.85	19.3
CSO 20	23	0.005	6.65	9.6
CSO 02	23	0.002	1.95	11.1
CSO 19	23	0.001	0.99	10.6
CSO 16A	23	0.001	0.76	10.7
CSO 03C	23	0.000	0.34	12.3
CSO 18	23	0.000	0.22	6.1
CSO 34TOSVI	23	0.000	0.15	10.9
Totals		0.11	133	347

[1] In EIM these Locations IDs have the prefix STMWTR_; and CSO # in parentheses is not part of Location ID.
[2] Average of all the samples collected in the 2007 Parsons study; the PCB average was updated by Ecology.
[3] Calculated using Equation (5).
[4] Daily PCB load (mg/day) = Annual load (lb/yr)*453000 mg/lb /365.
Rows highlighted in green correspond to CSO basins.

Parsons found the largest stormwater PCB loads to the Spokane River originate from the Cochran, CSO 34, Union Street, and I05 Upper stormwater basins under both discharge scenarios.

Instream Loads

Harmonic Mean Flow

The harmonic mean flow is recommended by EPA (1991a) for use in assessing a river's loading capacity for long-term exposure to carcinogens such as PCBs. Harmonic mean is the appropriate measure of central tendency when dealing with rates, in this case rates of flow. The harmonic mean is less than the arithmetic mean and is expressed as $Q_h = n/\sum(1/Q_i)$, where n is the number of recorded flows and $\sum(1/Q_i)$ is the sum of the reciprocals of the flows.

As noted by EPA (1991b), the harmonic mean "provides a more reasonable estimate than the arithmetic mean to represent long-term average river flow. Flood periods in rivers bias the arithmetic mean above the flows typically measured. This overstates available dilution. The calculation of the harmonic mean, however, dampens the effect of peak flows. As a result, bias is reduced. The harmonic mean is also an appropriate conservative estimate of long-term average flow in highly regulated river basins, such as the Columbia. In a regulated river basin, the harmonic mean and the arithmetic average are often much closer numerically."

PCB Loads in the Spokane River at the Idaho Border

PCB loads at the Idaho border were calculated using the average dissolved total PCB concentration from 2003-2004 Stateline SPMD data and historic harmonic mean flow at USGS Gage 12419500 (Spokane River above Liberty Bridge). Two methods were used to calculate the whole water PCB concentrations: (1) extrapolation using the dissolved fraction estimated from Equation 3 and (2) addition of the solid component measured in Harvard Rd. suspended particulate matter (Table 41). Both methods yield an estimated total PCB load of approximately 480 mg/day. Results using the two methods are nearly identical since the theoretical dissolved fraction (0.92) is similar to the measured dissolved fraction (0.91).

Table 41. PCB Loads in Spokane River at Idaho Border.

Station	RM	Harmonic Mean Flow (L/sec)	Method for Calculating C_w	Component	Mean Total PCB C_w (pg/l)	Total PCB Load (mg/day)
Stateline	96.1	52,151*	Stateline SPMD (C_d) /diss fraction (0.92) from Equation 3	**C_w=**	**106**	**477**
Harvard	92.8	52,151*	Stateline SPMD (C_d) + Harvard suspended particulate matter (C_s)	Diss. (C_d)	97	439
				Solid (C_s)	10	43
				Total (C_w)=	**107**	**482**

* Flow from USGS Station 12419500: Spokane River above Liberty Br (RM 93.9).
C_w Concentration in whole water.

PCB Loads in the Little Spokane River

PCB loads in the Little Spokane River were calculated using the average Little Spokane SPMD data from 2003-2004 and historic flows at USGS Gage 12431000 (Little Spokane River at Dartford). Equation 3 was used to estimate dissolved and solid-phase fractions based on TSS concentrations in the Little Spokane River.

The estimated average total PCB load in the Little Spokane River is 97 mg/day (Table 42). Approximately 74% of this load is in the dissolved phase, based on estimation using Equation 3 and an average TSS of 5 mg/L.

Table 42. PCB Loads in the Little Spokane River.

Location	RM	Harmonic Mean Flow (L/sec)	Mean Total PCB C_d (pg/l)	Fraction C_d	Mean Total PCB C_w (pg/l)	Total PCB Load (mg/day)
Little Spokane R.	56.3	5,619*	147	0.74	199	96.6

* Flow from USGS Station: 12431000 Little Spokane River @ Dartford.

PCB Loads in the Mainstem Spokane River

PCB loads estimated from the 2003-2004 monitoring are shown in Table 43. Loads were calculated as described previously, i.e., using harmonic mean flows (from Figure 3), mean data collected using SPMDs, and application of Equation 3 to estimate total PCB concentrations from the dissolved fraction.

Table 43. Instream PCB Loads in Spokane River Reaches and the Little Spokane River.

Location	RM	Harmonic Mean Flow (L/sec)	Mean Total PCB C_d (pg/l)	Fraction C_d	Mean Total PCB C_w (pg/l)	Total PCB Load (mg/day)
Stateline	96.1	52,151[a]	97	0.92	106	477
Upriver Dam	80.3	53,081[b]	68	0.88	77	354
Upriver Dam (bottom)	80.3	53,081[b]	138	0.88	157	721
Monroe St.	74.8	82,239[c]	179	0.90	199	1,413
Ninemile	63.6	82,758[d]	265	0.85	311	2,281
Lower Lake Spokane	38.4	106,329[e]	332	0.83	399	3,664
Little Spokane R.	56.3	5,619[f]	147	0.74	199	97

[a] Flow from USGS Station 12419500: Spokane River above Liberty Br. (RM 93.9).
[b] Flow from USGS Station 12419500: Spokane River above Liberty Br. (RM 93.9) plus sum of flows from municipal and industrial facilities.
[c] Flow from USGS Station 12422500: Spokane River at Spokane (RM 72.9).
[d] Sum of Flows from USGS Station 12422500: Spokane River at Spokane (RM 72.9) and Station 12424000 – Latah (Hangman) Creek at Spokane (RM 72.2).
[e] Flow from USGS Station 12433000: Spokane River at Lake Spokane (RM 33.8).
[f] Flow from USGS Station 12431000: Little Spokane River at Dartford (RM 56.3).

In the mainstem Spokane River, PCB loads spanned an order of magnitude, from 350 mg/day at Upriver Dam to 3,700 mg/day at lower Lake Spokane (Figure 19). Higher PCB concentrations occurred in reaches with higher flows, compounding the increase in estimated loads traveling downstream. One exception to this pattern occurs at Upriver Dam (mid-depth), where all of the PCB loading can be attributed to loads moving downstream from the Idaho border (Stateline). Although PCB loads estimated at the bottom of the water column are twice those in the middle column, the mid-column loads are probably more representative of the actual river conditions whereas the bottom loads are influenced by localized conditions as discussed previously. With successful completion of the Upriver Dam cleanup, lower bottom-water concentrations of PCBs would be expected.

Loads were not calculated for Little Falls reservoir or the Spokane Arm due to the absence of PCB data from these reaches. However, it is reasonable to assume that instream loads at Little Falls are identical to those at Lake Spokane since there are no known additional PCB sources to the Little Falls reservoir, flow contributions or losses to the reservoir are minor, and residence time is short since Little Falls is a run-of-the-river dam.

These conditions are also true for the upstream half of the Spokane Arm which is free-flowing. The assumption of identical loads in the lower half of the Spokane Arm (approximate delineation at Porcupine Bay [RM 13]) is tenuous due to the influence of Lake Roosevelt which backs up the water in this reach during most of the year and has an undetermined effect on PCB concentrations and loads. Limited evidence suggests that Lake Roosevelt itself contributes at most a small portion of the PCBs to the Spokane Arm and more likely has a diluting effect. PCB concentrations in Lake Roosevelt fish tissues have been low compared to fish from the lower reaches of the Spokane River (EVS, 1998; Munn, 2000).

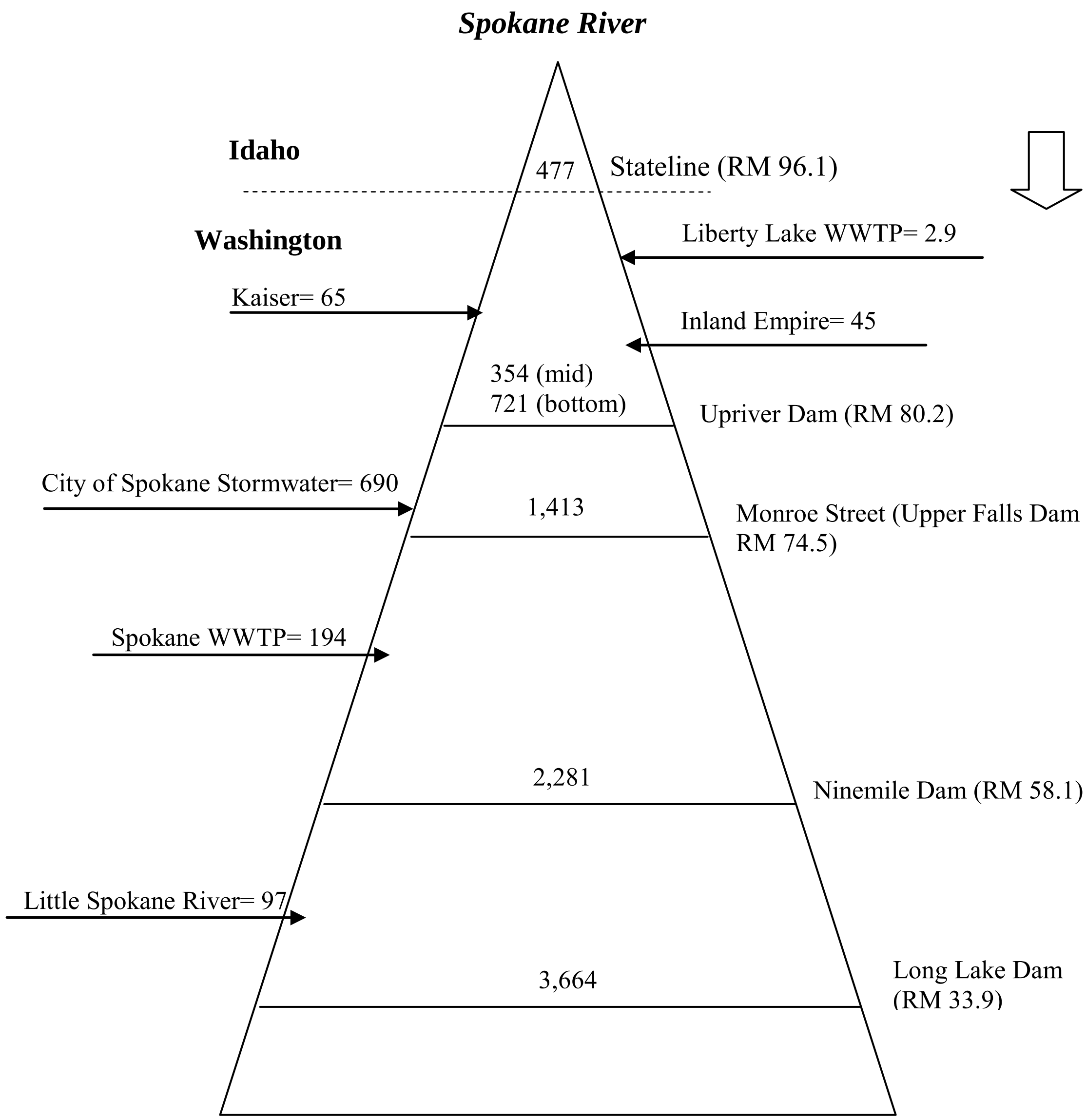


Figure 19. Schematic of PCB Sources and Instream Loads in the Spokane River (total PCB, mg/day).

Load Reductions Needed to Meet Human Health Criteria

Table 44 shows estimates of the reduction in PCB loads that would be needed to meet NTR and Spokane Tribe human health water quality criteria in the mainstem Spokane River and Little Spokane River. The "current" PCB loads were calculated in the preceding section of this report.

Table 44. Estimates of PCB Load Reductions Needed to Meet Human Health Water Quality Criteria in the Spokane River (based on 2003-04 water column data).

Location on Spokane River	Harmonic Mean Flow[a] (l/d)	Current t-PCB Conc.[a] (pg/l)	Current t-PCB Load (mg/day)	Target t-PCB Load (mg/day) at Water Quality Criterion		t-PCB Load Reduction Required to Meet Water Quality Criterion	
				NTR (170 pg/l)	Spokane Tribe (3.37 pg/l)	NTR	Spokane Tribe
Stateline	4.51E+09	106	477	766	15	none required	97%
Upriver Dam	4.59E+09	117	537	780	15		97%
Monroe St.	7.11E+09	199	1,413	1,208	24	15%	98%
Ninemile	7.31E+09	311	2,281	1,243	25	46%	99%
Little Spokane River	4.85E+08	199	97	83	2	15%	98%
Lake Spokane (lower)	9.19E+09	399	3,664	1,562	31	57%	99%
Little Falls	9.19E+09	399	3,664	1,562	31	57%	99%
Spokane Arm	9.19E+09	399	3,664	1,562	31	57%	99%

[a] From Table 43

During 2003-04, the Spokane River was meeting the NTR criterion for water (170 pg/l) between Stateline and Upriver Dam but not further downstream. Load reductions of 15-57% would be required to meet this criterion throughout the river, with the largest reductions needed in and below the Ninemile reach. A 15% reduction is called for in the Little Spokane River.

Very large reductions in loading would be required to meet the much more restrictive Spokane Tribe criterion (3.37 pg/l). These range from 97% at Stateline to 99% by Ninemile.

In order for the Spokane River to achieve compliance with human health water quality criteria, reduction of similar magnitude may be needed in loading from municipal and industrial discharges that have been identified as PCB sources. In the Washington reaches of the river, stormwater carries the largest PCB load and is thus the most important source to reduce.

Food Web Bioaccumulation Model

Fish accumulate PCBs through a variety of pathways including bio-concentration (direct uptake of dissolved PCBs in water through the gills and skin), diet, and, in some cases, direct ingestion of sediment. Both the NTR and Spokane Tribe water quality criteria may underestimate the PCB concentrations that will result in a fish because bio-concentration is the only accumulation mechanism considered in the NTR. Previous studies in the Spokane River have found the bio-concentration factor (BCF) of 31,200 L/kg used to derive this criterion to be a poor link between PCB concentrations in water and fish tissue. For instance, Jack et al. (2003) estimated that the BCF explained no more than 23% of the PCB accumulated in Spokane River fish tissue. To accurately relate water concentrations to fish tissue, all pathways must be considered including direct and indirect contributions from sediments.

It is widely recognized that bioaccumulation factors (BAFs) describe a much more meaningful relationship between water and tissue concentrations than BCFs (EPA, 2000b). Like BCFs, BAFs numerically describe the link between water concentrations and accumulation in tissue, but they integrate all exposure pathways (bio-concentration, diet, other sources) and therefore more accurately reflect the water-tissue relationship. Using a simplified computation method, BAFs for the Spokane River were estimated to be in the range of 10^5 - 10^6 L/kg (Jack et al., 2003).

In some cases, sediment may be a more important pathway for PCB exposure in fish, either through consumption of benthic organisms as prey or through direct ingestion of sediments. In instances where sediment exposure is important, the relationship is described as the biota-sediment accumulation factor (BSAF), a tissue concentration divided by a sediment concentration and usually normalized to lipid in tissue and organic carbon in sediment. If a BSAF is much better than a BAF at describing the link between contaminants in the aquatic environment and fish tissue concentrations, then sediment recovery rates (either natural or through cleanup actions) applied to BSAFs may be used to predict contaminant declines in fish tissues. In Lake Spokane, the sediment BSAF calculated from mean sediment and fish tissue concentrations was 10.9 (Jack et al., 2003).

Neither the BAF nor the BSAF by themselves can accurately describe the link between PCBs in the aquatic environment and fish tissue. Because of the interactions among water, sediments, and biota (prey items), it is impossible to account for fish tissue concentrations resulting from exposure to these sources when they are considered independently. Therefore, a mathematical food web bioaccumulation model was used to estimate PCB concentrations in fish tissue and prey items from concentrations in water and sediment.

Water or sediment quality targets based on the model have no regulatory standing without first meeting procedural requirements of site-specific criteria development. However, model development may be a useful exercise to determine if the existing numerical approach is adequate and if site-specific criteria are warranted.

The Model

A food web bioaccumulation model developed by Arnot and Gobas (2004) was selected to predict the PCB concentrations in fish tissues. This model calculates site-specific concentrations of hydrophobic organic chemicals in multiple aquatic ecosystem compartments and is a refinement of a widely used model previously developed by Gobas (1993). The model cannot only be used to predict PCB concentrations in fish tissue, BAFs, and BSAFs using relatively few input parameters, but more importantly, the model can be used to back-calculate PCB concentrations in water and sediment from target PCB concentrations in fish tissue.

A model such as this has potential value for affirming targets for both tribal and non-tribal fish consumers in specific localized areas of the river. In this way, local targets can be set to guide immediate efforts at improving conditions nearer sources, within the realm of practicability.

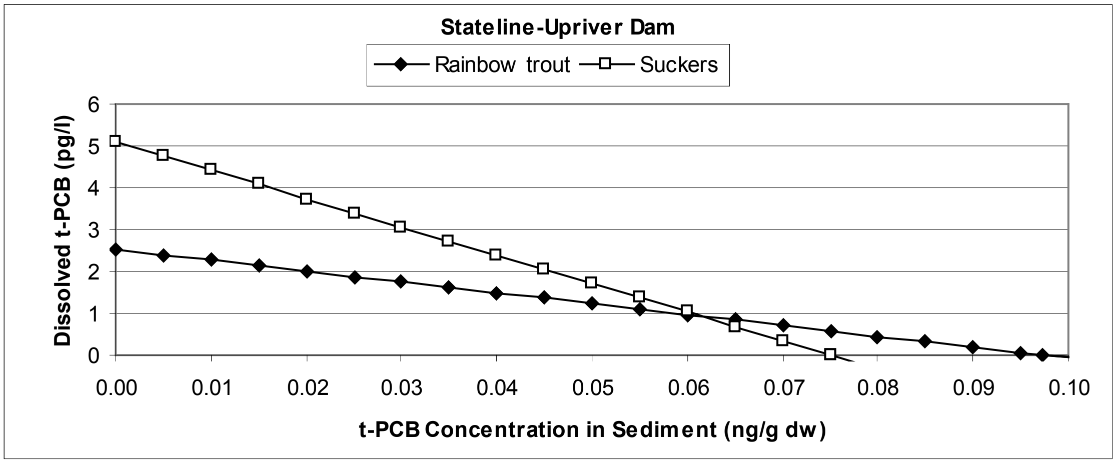
Details of the Arnot/Gobas model are in Appendix H.

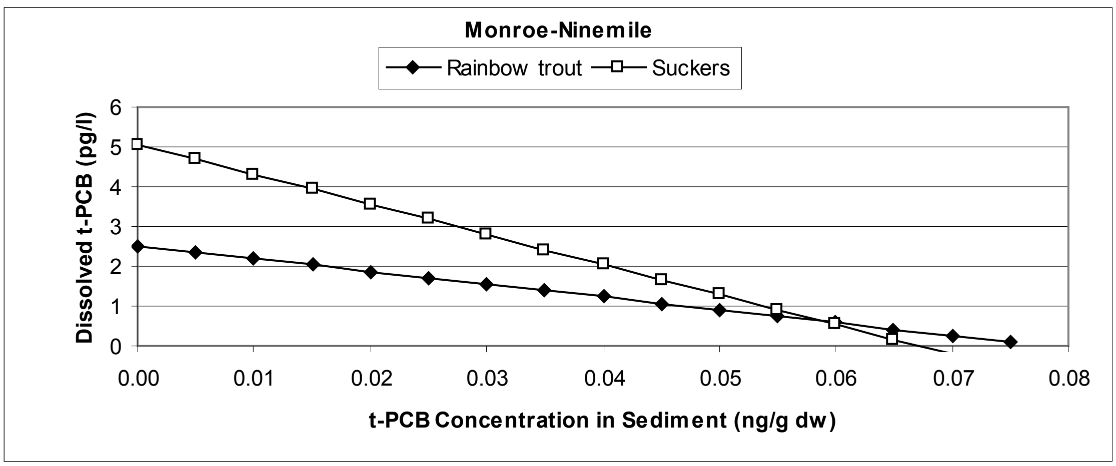
Target Water and Sediment Concentrations

The Spokane Tribe fish tissue criterion for PCBs (0.1 ng/g) was used to calculate target PCB concentrations in water and sediment. The study area was divided into five reaches to establish target PCB loads: Stateline-Upriver Dam, Monroe Street-Ninemile, Lake Spokane, Little Falls, and Spokane Arm. The four reaches upstream of Lake Spokane were collapsed into two – Stateline-Upriver Dam and Monroe Street-Ninemile – due to the lack of input parameters for individual reaches. The Monroe Street-Ninemile reach includes the section from Upriver Dam to Monroe Street dam. Some of the input parameters for Little Falls and Spokane Arm were out-of-date; Lake Spokane input parameters were used for these reaches with the exception of sediment TOC data which were collected at all locations for the present study. Table H-1 shows input parameters used in the model.

Dissolved water and sediment total PCB concentrations predicted to yield the Spokane Tribe criterion of 0.1 ng/g for total PCB in rainbow trout and sucker fillet are shown in Figures 20 and 21. Results show that PCB concentrations in water and sediment one to four orders of magnitude lower than present would be required to achieve the Spokane Tribe fish tissue criterion. The model illustrates the influence of PCBs in sediments on fish tissue, either through the food web or through direct ingestion, and offers a striking contrast to the simple BCF model which ignores PCBs in sediments and diet. When sediment PCB concentrations are set to zero, effectively reducing the food web model to the BCF model, rainbow trout fillet is predicted to have 0.1 ng/g total PCB at whole-water concentrations similar to the BCF model (3.37 pg/l).

Selection of water concentration targets for PCBs is subjective because it depends on sediment PCB concentrations, and conversely, target levels of PCBs in sediments depend on water PCB concentrations. In essence, both water and sediment critical values for PCBs are "moving targets" at an established tissue concentration. This is further complicated by differences in the two fish species being considered at each reach. As a practical matter, the recommended approach to establish target values is to select water and sediment concentrations where lines for rainbow trout and suckers intersect on each of the water-sediment plots in Figures 20 and 21.





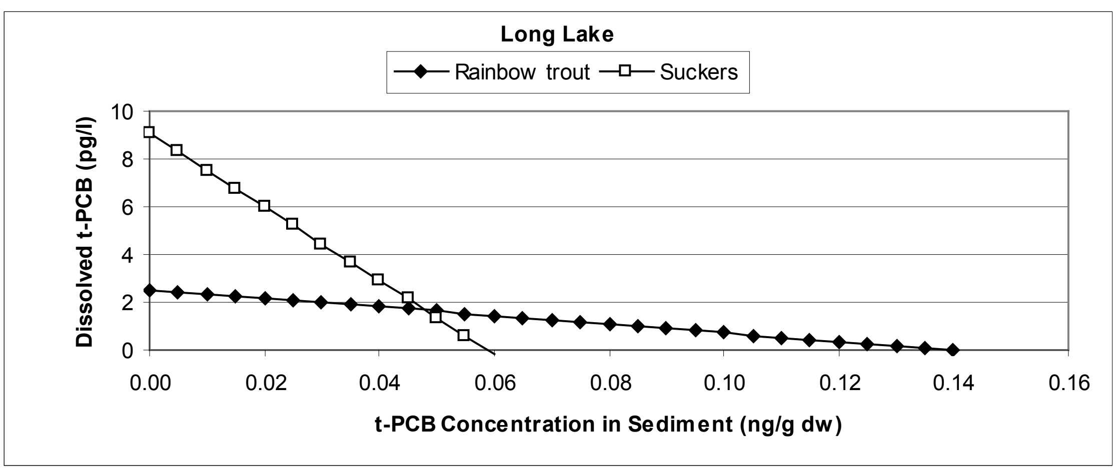
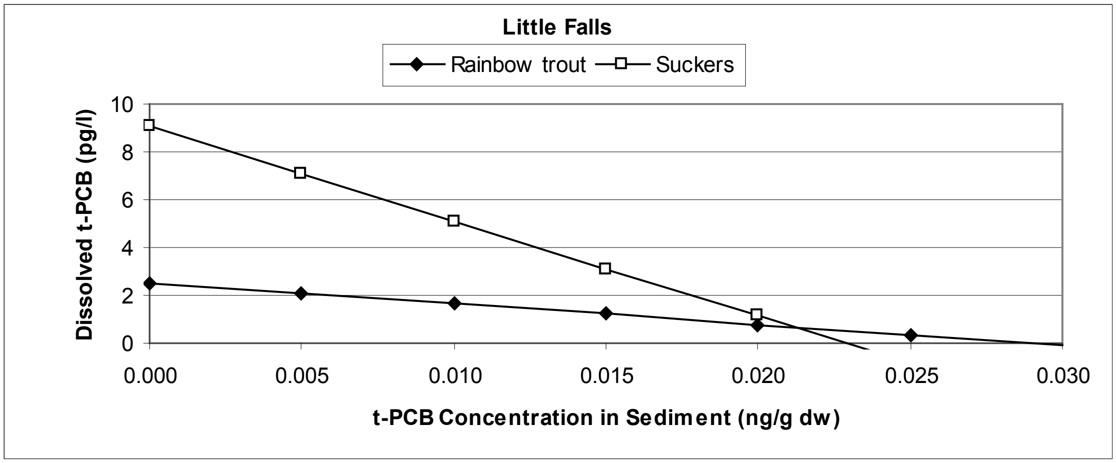


Figure 20. Dissolved Water and Sediment Total PCB Concentrations Predicted to Yield 0.1 ng/g in Rainbow Trout and Sucker Fillet (Stateline to Lake Spokane).



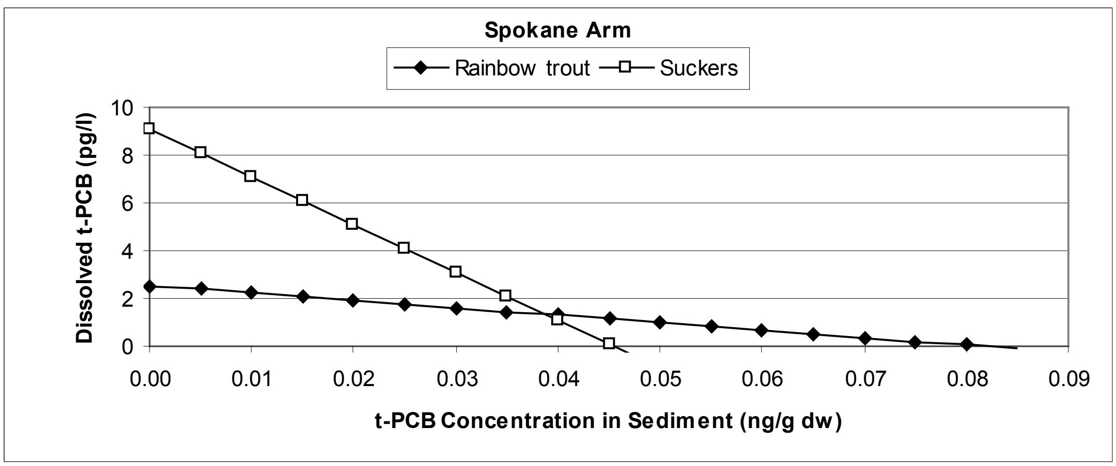


Figure 21. Dissolved Water and Sediment Total PCB Concentrations Predicted to Yield 0.1 ng/g in Rainbow Trout and Sucker Fillet (Little Falls and Spokane Arm).

By using the intersection of two disparate species, the resulting targets will likely be protective of other species that might be consumed. The target water and sediment values may then be computed by setting the equations for each line equal to one another ($[m \times C_s + b]_{Rainbow} = [m \times C_s + b]_{Sucker}$) and solving first for sediment concentration (C_s) and then for water concentrations ($C_d = m \times C_s + b$). This approach effectively halves the number of target values required.

Table 45 shows water and sediment targets for PCBs in the Spokane River, calculated using the food web bioaccumulation model. The targets for water are two to five times lower than those established using the Spokane Tribe water criterion.

Here again, the reductions needed in PCB concentrations and loads to meet the model-based targets would be very large. All discharges would require PCB load reductions of ≥99%. In addition, concurrent reductions of ≥99% are indicated for sediment PCB concentrations.

Table 45. Target Sediment and Water Total PCB Concentrations Needed to Yield the Spokane Tribe Fish Tissue Criterion (0.1 ng/g) in the Spokane River, Based on the Arnot-Gobas Food web Bioaccumulation Model.

Reach	Target Tissue Total PCB Conc. (ng/g)	Target Sediment Total PCB Conc. (ng/g dw)	Target Dissolved Water Total PCB Conc. (pg/l)	Dissolved PCB Fraction	Target Whole Water Total PCB Conc. (pg/l)	Target Total PCB Load (mg/day)
Stateline-Upriver Dam	0.1	0.06	0.9	0.90	1.0	4.5
Monroe-Ninemile	0.1	0.06	0.6	0.88	0.7	4.9
Lake Spokane	0.1	0.05	1.7	0.83	2.0	18.7
Little Falls	0.1	0.02	0.7	0.83	0.8	7.7
Spokane Arm	0.1	0.04	1.3	0.83	1.6	14.3

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Conclusions

The overall goal of the Spokane River PCB Source Assessment was to gather representative data to quantify PCB contamination in Washington reaches of the Spokane River. Data were collected in a series of studies conducted between 2003 and 2007. The information collected is being used to (1) identify necessary reductions in PCB sources to meet applicable water quality criteria and (2) develop a strategy for reducing sources to the river.

Specific components of the study included:

- Obtain representative data on PCB concentrations and ancillary parameters in the Spokane River water column, NPDES- permitted discharges, bottom sediments, and fish tissue.
- Assess trends and recovery rates for PCBs in Spokane River sediments.
- Determine the Spokane River's loading capacity for PCBs.
- Evaluate a food web bioaccumulation model to predict the PCB concentrations in Spokane River fish.

Results of sampling during 2003 and 2004 indicate that average PCB concentrations in river water increase with successive reaches from the Idaho border (106 pg/l) to lower Lake Spokane (399 pg/l), with a corresponding eight-fold increase in loads (477-3,664 mg/day). Overall, PCB loading to Washington reaches of the river can be divided into the following source categories: City of Spokane stormwater (44%), municipal and industrial discharges (20%), and Little Spokane River (6%). In addition, PCB loading from Idaho at the state line represented 30% of the overall loading.

Current PCB concentrations in fish tissue are lower than they have been historically. This may be due in part to natural attenuation and significant reductions in point-source PCB contributions over the past 10 to 15 years. The lack of decline in PCB levels in fish from the Mission Park reach of the river supports the conclusion about the importance of stormwater as a PCB source. A food web bioaccumulation model was used to predict PCB concentrations in fish tissue from PCB levels in water and sediments. This model indicates that significant reductions in sediment PCB concentrations would be required to reduce fish tissue to a Spokane Tribe target concentrations at their reservation.

Analysis of sediment cores suggests that PCB concentrations at the sediment surface will decrease by one-half approximately every ten years in upper Lake Spokane, although patterns of material deposition upstream of Lake Spokane require further evaluation. Lower Lake Spokane may be the ultimate sink for fine sediments. In lower Lake Spokane, PCBs have decreased by one-half over two decades after steep declines during the 1960s to mid-1980s.

A load-reduction scenario exercise was developed to show the reductions in water PCB concentrations that would be required to meet the Spokane Tribe's target criterion of 3.37 pg/l at the point where the river runs through the Spokane Tribe's reservation. The scenario requires a 95% PCB load reduction in the Spokane River at the Idaho border. Industrial and municipal discharges between the Idaho border and Lake Spokane require PCB load reductions greater than

99%. Stormwater from the City of Spokane also requires a load reduction of >99%. A 97% PCB load reduction is required in the Little Spokane River.

The food web bioaccumulation model is a useful tool to back-calculate water and sediment concentrations that will result in a target fish tissue PCB concentration. This model was used to develop alternative water and sediment quality goals. The model predicts target PCB concentrations in water and sediment after a target PCB concentration in fish tissue has been established, which in this exercise was the Spokane Tribe PCB tissue criterion of 0.1 ng/g. Based on model-derived targets, all discharges would require PCB load reductions of ≥99% to meet target loads.

According to the food web model, water reductions of PCBs may not be enough to achieve the tribal goal. Large PCB reductions in sediments would also be required to meet a fish tissue target of 0.1 ng/g. Even with large reductions in PCBs, it seems unlikely that the Spokane Tribal target of 0.1 ng/g is achievable. This concentration is approximately an order of magnitude lower than the median level (1.4 ng/g) reported in fish tissue from background areas in a 2010 statewide study conducted by Ecology (Johnson et al., 2010). Despite the extremely low tribal criteria, it is clear that further reductions in PCB loading are probably achievable.

Recommendations

Even though significant reductions in PCB levels have been measured in the Spokane River since the 1980s, achieving further reductions in PCBs and other toxic chemicals will be a challenging long-term process. This process requires a comprehensive strategy which uses a combination of activities to reduce toxic chemical loading to the river. To start meeting this challenge, Ecology has drafted a long-term strategy for reducing PCBs and other toxic chemicals in the Spokane River watershed. This plan is called *Reducing Toxics in the Spokane River Watershed* (Ecology, 2009). This strategy can be found at the following link: www.ecy.wa.gov/geographic/spokane/images/clean_up_strategy_toxics_in_srws_82009.pdf.

The Spokane River Toxics Reduction Strategy requires coordination across several Ecology programs, including the Spokane River Urban Waters Program (UWP) which was formed in 2007, to identify and eliminate toxic chemicals at their source. The UWP also works cooperatively with local governments including the City of Spokane and the Spokane Regional Health District.

Under the reduction strategy, PCB source identification and control will largely be carried out by the UWP. The strategy uses a three-pronged approach (prevention, management, and cleanup) to reduce sources. Priority is placed on using a systematic step-wise process to identify potential PCB sources within a conveyance system; then reducing or eliminating sources as they are located. This approach has been used successfully by other cities on the West Coast including San Francisco and Portland.

The conceptual approach to reduce PCBs discharged to the Spokane River should continue to focus on:

5. Identifying PCB sources and reducing or eliminating them from stormwater and wastewater effluents.
6. Examining treatment alternatives for effluent PCB removal.
7. Implementing necessary treatment plant controls.
8. Characterizing PCB transport through groundwater.

In addition, PCB source reduction efforts should be coupled with an ongoing effectiveness monitoring program to evaluate progress in reaching water quality targets. Effectiveness monitoring data will be useful in implementing an adaptive management framework for the watershed.

Future Characterization Activities

Extensive work to characterize PCBs in the Spokane River has been conducted since 1999. Future sampling should consider how the data will be used to either reduce PCB concentrations in fish tissue or to determine how and where PCB reductions may occur. Several activities to consider include the following:

Source Tracing

The UWP and other groups should continue systematic PCB source tracing activities in high-priority conveyance systems (stormwater and municipal/industrial) to identify and eliminate sources where possible. Implementation of an adaptive management approach using narrative limits in NPDES permits should be explored as an option to establish a set of achievable targets for toxic chemical reductions.

Effectiveness Monitoring

Design and implement a coordinated effectiveness monitoring program to track progress in meeting water quality targets. This program should include periodic assessment of PCB concentrations both instream (in water, sediments, and fish tissue) and in discharges to the river.

Food Web Modeling

Refinement of the Arnot-Gobas food wed bioaccumulation model is needed to predict conditions necessary to reach PCB target outcomes in priority reaches of the river. Specifically, the model should be examined to determine if modifications to the organism component (both benthic and fish) of the model would yield more accurate outcomes.

The model should be examined to identify critical input parameters that need refinement. Fish diet is a particular area where data refinement is needed. Site-specific field data are preferred to literature values where available.

Output parameters (i.e., fish tissue) should also be analyzed concurrently to assess the model's accuracy. This appears to be particularly important considering the apparent rapid change in fish tissue PCB concentrations.

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Appendices

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Appendix A: Spokane River Basin NPDES Permits

Table A-1. Spokane River Basin NPDES Permits (active during Ecology's 2003-2007 PCB studies).

Facility Name	Permit Type	Permit Number	WRIA
Industrial Facilities			
Newman Lk Flood Control Zone Dist	Minor	WA0045438A	57
B F Goodrich	POTW	ST0008068A	57
Columbia Lighting Inc	POTW	ST0005222B	57
Group Photo	POTW	ST0005378A	57
Johnson Matthey Electronic	POTW	ST0005350B	57
Novation Inc	POTW	ST0005355B	57
Inland Empire Paper Co	Major	WA0000825B	57
Kaiser Trentwood	Major	WA0000892B	57
Dawn Mining Company	State	ST0005230C	54
Avista Corp Headquarters	Minor	WA0045195B	57
Johnson Matthey (Cheney)	POTW	ST0008055A	56
Key Tronic Corp (Spokane)	POTW	ST0005284B	57
Olympic Foods	POTW	ST0008051A	57
Spokane Co Util. (Mica Landfill)	POTW	ST0005356B	56
Wilcox Farms Inc. (Milk Plant)	POTW	ST0005399A	56
Municipal Facilities			
Badger Lake Estates	State	ST0008057B	56
Clayton Sewer District	State	ST0005392A	55
Freeman School District #358	Minor	WA0045403A	56
Liberty School District #362	State	ST0005397A	56
Mullen Hill Terrace Properties	State	ST0008041A	57
Snowblaze Condominiums	State	ST0008039A	57
Spokane Co Util. (Hangman Hills)	State	ST0008045A	56
Upper Columbia Academy	State	ST0008034A	56
Deer Park WWTP	State	ST0008016B	55
Diamond Lake WWTP	State	ST0008029C	55
Medical Lake RWTP	Minor	WA0021148A	54
Liberty Lake Sewer Dist #1	Minor	WA0045144B	57
Spokane AWWTP	Major	WA0024473A	54
Cheney WWTP	Minor	WA0020842B	56
Tekoa WWTP	Minor	WA0023141B	56
Fairfield Town of WWTP	Minor	WA0045489B	56
Rockford Town of WWTP	Minor	WA0044831B	56
Spangle Town of WWTP	Minor	WA0045471A	56

WRIA: Water Resource Inventory Area.
POTW: Publicly-Owned Treatment Works.
WWTP: Wastewater Treatment Plant.
RWTP: Rural Wastewater Treatment Plant.
AWWTP: Advanced Wastewater Treatment Plant.

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Appendix B: Sampling Locations for Spokane River PCB Source Assessment Study

Table B-1. Sampling Locations.

Station ID[1]	Sampling Dates	Sample Type	Location Description	RM	Latitude North					Longitude West				
Stateline	10/1-29/2003	SPMD	Just downstream of the I-90 bridge at the Idaho state line	96.1	47°	41'	52	"		117°	2	'	29	"
	1/28-2/24/2004			"	"	"	"	"		"	"	"	"	"
	4/14-5/12/2004			"	"	"	"	"		"	"	"	"	"
STATELINE-F	7/14/2004	Fish	Idaho state line boundary to first downstream riffle (coordinates at midpont)	96.0	47°	41'	54	"		117°	2	'	33	"
Harvard	10/20-22/2003	SPM/Water	Near right bank below Harvard Road Bridge	92.8	47°	41'	2	"		117°	6	'	34	"
LIBLAKE	10/21/2003	Effluent	Liberty Lake Wastewater Treatment Plant effluent*	92.3	47°	40'	40	"		117°	6	'	44	"
KaiserEff	10/21-22/2003	Effluent	Kaiser effluent before discharge to river	86.0	47°	41'	5	"		117°	13	'	16	"
	2/2-3/2004			"	"	"	"	"		"	"	"	"	"
	4/26-27/2004			"	"	"	"	"		"	"	"	"	"
KaiserFilt	10/21/2003	Effluent	Kaiser at Filter Outlet	86.0	47°	41'	6	"		117°	13	'	17	"
	2/2/2004			"	"	"	"	"		"	"	"	"	"
	4/26/2004			"	"	"	"	"		"	"	"	"	"
KaiserLag	10/21/2003	Effluent	Kaiser Lagoon	86.0	47°	41'	6	"		117°	13	'	16	"
	2/2/2004			"	"	"	"	"		"	"	"	"	"
	4/26/2004			"	"	"	"	"		"	"	"	"	"
PLANTE-F	9/15/2003	Fish	⅛ mi. upstream of RR bridge to riffle at lava boulders below park (coordinates at midpoint)	85.0	47°	41'	41	"		117°	14	'	18	"
PLANTEFRY	10/28-30/2003	SPM/Water	Off right bank at Plante Ferry Park	84.8	47°	41'	52	"		117°	14	'	41	"
Inland Emp	10/21/2003	Effluent	Inland Empire effluent*	82.6	47°	41'	13	"		117°	17	'	2.8	"
	2/2-3/2004			"	"	"	"	"		"	"	"	"	"
	4/26/2004			"	"	"	"	"		"	"	"	"	"
Upriver Dam	10/1-29/2003	SPMD	⅛ mi. upstream of Upriver Dam, off right bank	80.3	47°	41'	13	"		117°	19	'	29	"
	1/28-2/25/2004			"	"	"	"	"	"	"	"	"	"	"
	4/14-5/12/2004			"	"	"	"	"	"	"	"	"	"	"
	5/13/2004	Crayfish		"	"	"	"	"	"	"	"	"	"	"

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Table B-1 (Cont'd). Sampling Locations.

Station ID[1]	Sampling Dates	Sample Type	Location Description	RM	Latitude North					Longitude West				
UPRIVER BOT	10/1-29/2003	SPMD	Above Upriver Dam, off right bank, 2 feet from bottom of riverbed	80.3	47°	41'	13	"		117°	19	'	29	"
	1/28-2/25/2004			"	"	"	"	"	"	"	"	"	"	"
	4/14-5/12/2004			"	"	"	"	"	"	"	"	"	"	"
STMMISSBR	6/10/2004	Stormwater	Stormwater pipe near intersection of Mission and Perry on right bank	76.5	47°	40'	20	"		117°	23	'	20	"
STMSUPOUT	6/10/2004	Stormwater	Stormwater pipe at Superior Street near Cataldo on right bank	75.7	47°	39'	36	"		117°	23	'	32	"
CS034	6/10/2004	CSO	Combined sewer overflow (CSO) outfall at Erie Street	75.8	47°	39'	41	"		117°	23	'	30	"
MonroeSed	4/14/2004	Sediment	Approximately 60 feet off left bank at first bend upstream of Monroe Street Dam	74.9	47°	39'	52	"		117°	24	'	22	"
Monroe St	10/2-29/2003	SPMD	Upstream of Monroe Street Dam	74.8	47°	39'	48	"		117°	24	'	31	"
	1/28-2/25/2004			"	"	"	"	"	"	"	"	"	"	"
	4/14-5/12/2004			"	"	"	"	"	"	"	"	"	"	"
STMWASHBR	6/10/2004	Stormwater	Stormwater pipe at west side of Washington Street Bridge on right bank	74.3	47°	39'	51	"		117°	25	'	0.8	"
SPOKWWTP	10/21/2003	Effluent	Spokane Wastewater Treatment Plant effluent*	67.4	47°	41'	51	"		117°	28	'	32	"
	2/2/2004			"	"	"	"	"	"	"	"	"	"	"
	4/26/2004			"	"	"	"	"	"	"	"	"	"	"
Ninemile1	10/1-29/2003	SPMD	Ninemile reservoir above Plese Flats boat launch	63.6	47°	43'	15	"		117°	30	'	29	"
	1/28-2/24/2004			"	"	"	"	"	"	"	"	"	"	"
NINEM SPM	11/3-5/2003	SPM/Water	Off of right bank at Plese Flats, Riverside State Park	63.2	47°	43'	35	"		117°	30	'	43	"
Ninemile2	4/14-5/12/2004	SPMD	Ninemile Pool, downstream of boat launch at Plese Flats	62.4	47°	44'	9	"		117°	30	'	40	"
NINEMILE-F	9/16/2003	Fish Gut Contents	Ninemile reservoir near Seven Mile Bridge	61.7	47°	44'	35	"		117°	31	'	14	"
	7/13/2004	Fish		"	"	"	"	"	"	"	"	"	"	"
Spokane-F	9/16/2003	Fish		"	"	"	"	"	"	"	"	"	"	"
LongLkUp	5/11/2004	Sediment	Upper Long Lake (Lake Spokane)	54.3	47°	47'	38	"		117°	34	'	11	"

Table B-1 (Cont'd). Sampling Locations.

Station ID[1]	Sampling Dates	Sample Type	Location Description	RM	Latitude North					Longitude West				
LONGUP2	6/9/2004	Sediment Core	Upper Long Lake (Lake Spokane)	49.2	47°	50'	6	"		117°	39	'	3	"
LongLkMid	11/4/2003	Sediment	Middle Long Lake (Lake Spokane)	44.3	47°	53'	10	"		117°	41	'	28	"
Tum Tum	1/29-2/24/2004	SPMD	Long Lake right bank near Tum Tum	44.2	47°	53'	10	"		117°	41	'	38	"
Littlefls	11/4/2003	Sediment	Spokane River at pool above Little Falls Dam	29.9	47°	50'	10	"		117°	54	'	38	"
LONGLOW-F	7/13-14/2004	Fish	Lower Long Lake (Lake Spokane) off left bank approx. 1 mi. upstream of DNR launch	39.4	47°	49'	40	"		117°	44	'	39	"
LongLkLow	10/2-11/4/2003	SPMD	Lower Long Lake (Lake Spokane)	38.4	47°	49'	44	"		117°	46	'	8.2	"
	4/13-5/11/2004			"	"	"	"	"	"	"	"	"	"	"
	11/4/2003	Sediment		"	"	"	"	"	"	"	"	"	"	"
LONGLOW2	11/4/2003	Sediment Core	Lower Long Lake (Lake Spokane)	36.0	47°	48'	56	"		117°	48	'	25	"
SPOK-1	11/6/2003	Sediment	Porcupine Bay - NE of boat launch (upstream)	12.6	47°	53'	3	"		118°	8	'	59	"
LitlSpokSed	12/10/2003	Sediment	Little Spokane River approximately 1 mi. above SR291 bridge[2]	2.3	47°	46'	45	"		117°	31	'	0.9	"
LitlSpokBr	1/29-2/24/2004	SPMD	Little Spokane River @ SR291 bridge[2]	1.1	47°	46'	59	"		117°	31	'	44	"
	4/14-5/12/2004			"	"	"	"	"	"	"	"	"	"	"
LitlSpokR	10/2-30/2003	SPMD	Little Spokane River left bend in river, adjacent to SR291[2]	0.5	47°	47'	13	"		117°	31	'	38	"
BUFFALO REF	11/5/2003	Sediment	Buffalo Lake near lake center east of boat launch		48°	3'	56	"		118°	53	'	20	"

* Location coordinates in North American Datum 1983 (NAD83).
[1] Site identification as used in Ecology's Environmental Information Management System (EIM).
[2] The mouth of Little Spokane River is at Spokane River mile 56.3.
SPM: suspended particulate matter.
SPMD: semipermeable membrane device.
RM: river mile.

The additional fish collection locations and stormwater stations can be found in Tables 12 and 15 and the original reports, Serdar and Johnson (2006) and Parsons (2007) respectively.

Appendix C: Method Used to Convert PCB Concentrations in SPMD to Water

Background on SPMDs

Semipermeable membrane devices (SPMDs) are used to concentrate dissolved hydrophobic contaminants from the water column. Each SPMD consists of a 91 x 2.5 cm lay-flat, low-density polyethylene tube filled with 1 mL of highly purified triolein. The tube is thin-walled and generally considered nonporous except for small (≤ 10 Å) cavities created by the random thermal motions of the polymer chains (see Figure D-1). Freely dissolved hydrophobic contaminants are able to pass through the pores and are sequestered and concentrated in both the triolein and the polyethylene itself.

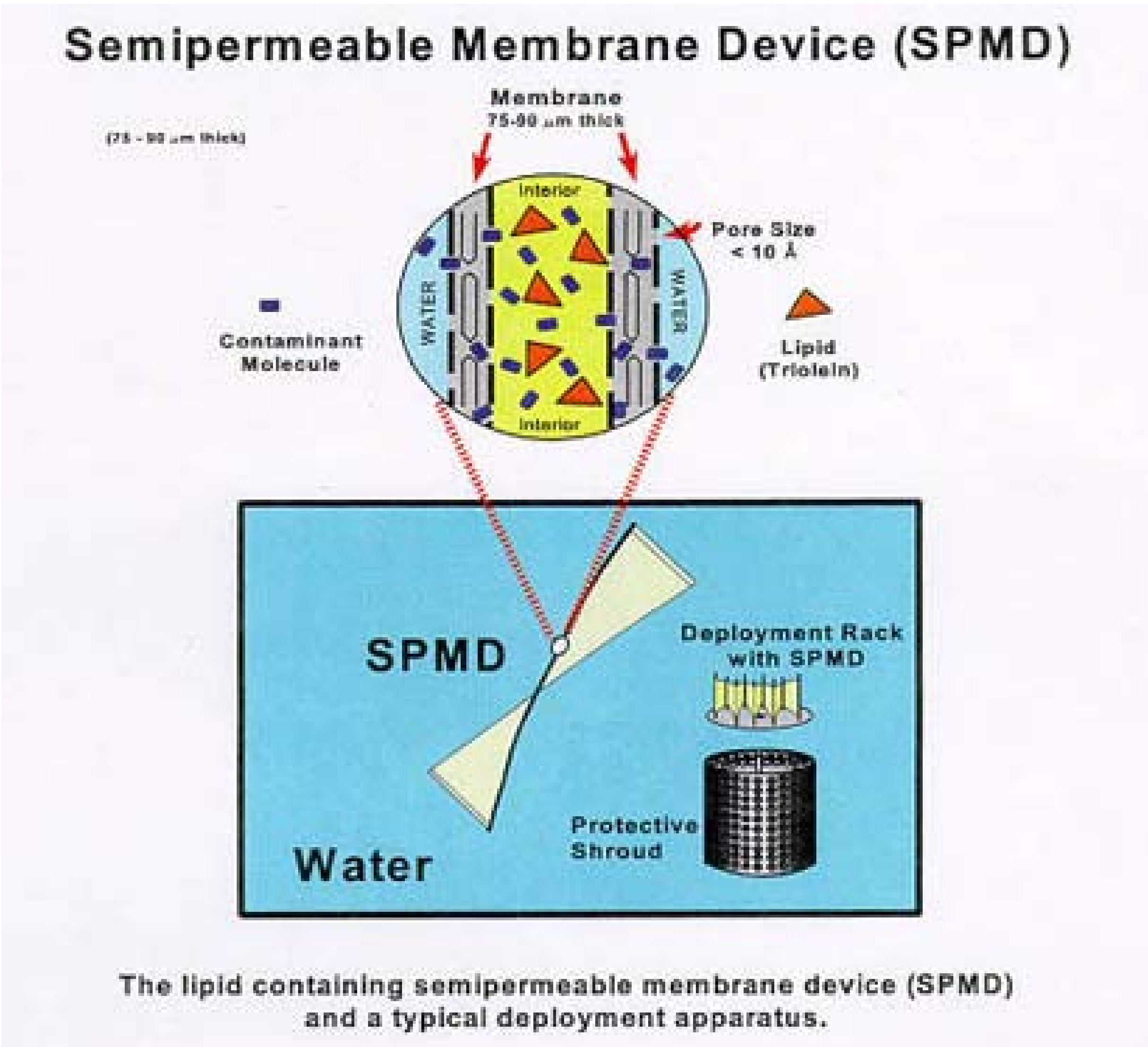

Figure C-1. Illustration of SPMD theory and mechanical design (*from* Duane Chapman, USGS Columbia Environmental Research Center, www.aux.cerc.cr.usgs.gov/spmd/index.htm)

The SPMDs are mounted on deployment racks (a.k.a. spider carriers) which permit nearly full exposure to surface water. From one to five spider carriers are then mounted inside a protective mesh-skinned stainless steel canister which is placed in the water column for approximately one month.

After removal from the water column, SPMDs are sent to a laboratory for dialytic extraction of the solutes. Prior to dialysis, material coating the SPMD (e.g., periphyton, sediments) is removed, and the membrane is inspected for holes and tears. The dialysate is concentrated to approximately 4 mL in a hexane solvent and stored in an ampule until it is ready for chromatographic or other analysis.

SPMDs are potent samplers of atmospheric organics which present major challenges in avoiding contamination while preparing, deploying, and dialyzing these samplers. To minimize contamination due to air exposure, SPMDs are stored in argon-filled cans following preparation except during their water deployment. Field blank SPMDs are also used to assess the degree of on-site contamination by exposing them to the atmosphere for the same duration as the inevitable exposure of the water sampling SPMDs. Laboratory blank SPMDs are also prepared and analyzed to assess the degree of contamination from the lab environment.

Performance reference compounds (PRCs) are spiked into each membrane prior to deployment to assess sampling rates. The recovery of PRCs, along with other factors such as temperature, water velocity, degree of biofouling, and exposure duration, is used to adjust the site/event-specific sampling rate from sampling rates determined in a laboratory setting. This adjustment factor, commonly referred to as the exposure adjustment factor (EAF), can be applied to the algorithms used to translate chemical concentrations in membrane extract to concentrations in the waterbody sampled.

Methods Used for the 2003-2004 Spokane River PCB Source Assessment Study

Field Blanks

Field (air) blanks were used to adjust SPMD results to account for laboratory and field contamination. The field blank was used for this purpose because it integrates contamination stemming from the field as well as the laboratory. Results for field blanks used during each round of sampling were subtracted (on a per membrane basis) from the sample results.

Exposure Adjustment Factors

PRCs were spiked into all membranes prior to deployment. Selection of PCB congeners for PRCs was based on the congeners found during recent effluent and fish tissue sampling in the Spokane River (Golding, 2002; Jack and Roose, 2002). Four congeners, which were absent or only present in very small amounts in these previous analyses, were used for the spiking solution: PCB-23, 55, 106, and 161. A total of 50 ng of each PRC was spiked into each membrane.

Average PRC recovery was higher than anticipated at 94%. More than a quarter of the PRCs were recovered at ≥100%. Subsequent consultation with Dr. David Alvarez and Dr. Jim Huckins of the USGS Columbia Environmental Research Center indicated that the fugacity of these congeners is too low to be suitable for calculation of EAFs (PCB-4 and 23 were recommended). Instead, they proposed using laboratory-derived sampling rates to calculate water concentrations.

Calculation of PCB Concentrations in Water

The following equation is the formula, in its simplest form, used to translate chemicals in SPMDs to water column concentrations:

$$C_W = C_{SPMD} / K_{SPMD} (1\text{-exp } [-k_e t])$$

Where:
C_W = analyte concentration in water
C_{SPMD} = analyte concentration in the SPMD
K_{SPMD} = equilibrium SPMD-water partition coefficient
k_e = first-order loss rate constant
t = time

Derivation of each term is beyond the scope of the present report but can be found at:

wwwaux.cerc.cr.usgs.gov/spmd/SPMD-Tech_Tutorial.htm#MODELING

or in:

Huckins, J.N. Petty, J.D., Priest, H.F., Clark, R.C., Alverez, D.A., Orazio, C.E., Lebo, J.A., Cranor, W.L., and Johnson, B.T, 2000. A Guide for the Use of Semipermeable Membrane Devices (SPMDs) as Samplers of Waterborne Hydrophobic Organic Contaminants. Report for the American Petroleum Institute (API), Washington, D.C. API Publication No. 4690.

To facilitate translation of SPMD analyte concentrations to water, David Alvarez has developed a spreadsheet which requires relatively few input parameters to make the necessary calculations. Necessary input parameters are temperature, exposure duration, volume and mass of SPMD, total mass of analyte in SPMD, and EAF if PRCs are used to adjust sampling rates. The spreadsheet includes default values for Log K_{ow} and for laboratory sampling rates in cases where EAFs are not used (Table C-1). All calculations are made using the input parameters and the default values in Table C-1 and using the river conditions and exposure periods described earlier in this report. Total analyte mass by PCB homologue group is shown in Table C-2.

Table C-1. Log K_{ow} and Sampling Rates Used to Calculate PCB Concentrations in Water.

Individual PCB Congeners	Log K_{ow}		Laboratory Sampling Rate (L/d)
4	5.1	k,m	12.8
5	5.1	k,m	12.8
6	5.1	g	12.8
7	5.1	k,m	12.8
8	5.1	k,m	12.8
9	5.1	k,m	12.8
10	5.1	k,m	12.8
11	5.1	k,m	12.8
15	5.1	k,m	12.8
16	5.5	k,m	6.7
17	5.5	k,m	6.7
18	5.2	g	9.2
19	5.0	g	5.3
20	5.5	k,m	6.7
22	5.6	g	5.7
24	5.5	k,m	6.7
25	5.7	g	5.7
26	5.7	g	5.7
27	5.5	k,m	6.7
28	5.7	g	8.4
31	5.7	g	7.0
32	5.5	k,m	6.7
33	5.5	k,m	6.7
34	5.5	k,m	6.7
35	5.5	k,m	6.7
37	5.5	k,m	6.7
40	5.7	g	6.6
41	5.7	g	6.2
42	5.8	g	6.2
43	5.8	g	6.2
44	5.8	g	7.5
45	5.5	g	7.9
46	5.5	g	4.4
47	5.8	g	7.5
48	5.8	g	3.5
49	5.8	g	5.3
51	5.6	g	4.8
52	5.8	g	6.2
53	5.6	g	4.8
54	5.9	k,m	5.7

Table C-1 (Cont'd). Log K_{ow} and Sampling Rates Used to Calculate PCB Conc. in Water.

Individual PCB Congeners	Log K_{ow}		Laboratory Sampling Rate (L/d)
55	5.9	k,m	5.7
56	5.9	k,m	5.7
57	5.9	k,m	5.7
58	5.9	k,m	5.7
59	5.9	k,m	5.7
60	5.9	k,m	5.7
63	6.2	g	5.3
64	6.0	g	7.5
66	6.2	g	5.3
67	6.2	g	5.3
69	5.9	k,m	5.7
70	6.2	g	7.0
71	5.9	k,m	5.7
72	5.9	k,m	5.7
74	6.2	g	6.2
75	5.9	k,m	5.7
77	6.2	a, h	2.9
78	6.4	a, h, k	4.4
79	6.4	a, h, k	5.1
81	6.4	g, h	4.3
82	6.2	g	4.4
83	6.3	g	4.8
84	6.0	g	4.4
85	6.3	g	4.8
86	6.4	k,m	4.7
87	6.3	g	5.3
90	6.4	g	6.2
91	6.1	g	4.4
92	6.4	g	5.3
95	6.1	g	6.2
96	6.4	k,m	4.7
97	6.3	g	4.4
99	6.4	g	4.4
101	6.4	g	6.2
102	6.4	k,m	4.7
105	6.6	g	4.0
107	6.7	g	5.3
109	6.4	k,m	4.7
110	6.5	g	5.7
112	6.4	k,m	4.7
113	6.4	k,m	4.7

Table C-1 (Cont'd). Log K_{ow} and Sampling Rates Used to Calculate PCB Conc. in Water.

Individual PCB Congeners	Log K_{ow}		Laboratory Sampling Rate (L/d)
114	6.6	g	4.4
115	6.4	k,m	4.7
117	6.4	k,m	4.7
118	6.7	g	4.8
119	6.6	g	4.4
122	6.4	k,m	4.7
123	6.4	k,m	4.7
126	6.7	a, h, k	2.2
127	6.7	a, h, k	1.6
128	6.7	g	4.4
129	6.7	g	3.5
130	6.8	g	4.0
131	6.8	k,m	4.1
132	6.8	k,m	4.1
133	6.8	k,m	4.1
134	6.6	g	4.8
136	6.2	g	5.3
137	6.8	g	3.5
138	6.8	g	4.8
139	6.8	k,m	4.1
141	6.8	g	4.8
144	6.8	k,m	4.1
146	6.9	g	4.8
147	6.8	k,m	4.1
149	6.7	g	5.7
151	6.6	g	5.3
153	6.9	g	3.2
156	7.2	g	2.6
157	7.2	g	2.6
158	7.0	g	3.5
163	6.8	k,m	4.1
164	6.8	k,m	4.1
166	6.8	k,m	4.1
167	6.8	k,m	4.1
169	7.4	a, h	2.1
170	7.1	k,m	2.6
171	7.1	k,m	2.6
172	7.3	g	1.3
173	7.1	k,m	2.6
174	7.1	g	3.1
175	7.1	k,m	2.6

Table C-1 (Cont'd). Log K_{ow} and Sampling Rates Used to Calculate PCB Conc. in Water.

Individual PCB Congeners	Log K_{ow}		Laboratory Sampling Rate (L/d)
176	6.8	g	2.2
177	7.1	k,m	2.6
178	7.1	g	3.1
179	6.7	g	2.2
180	7.4	g	2.6
183	7.2	g	3.1
185	7.1	k,m	2.6
187	7.2	g	3.5
189	7.1	k,m	2.6
190	7.1	k,m	2.6
191	7.1	k,m	2.6
193	7.1	k,m	2.6
194	7.8	g	1.3
195	7.6	k,m	1.6
196	7.6	k,m	1.6
197	7.6	k,m	1.6
198	7.6	k,m	1.6
199	7.6	g	1.6
200	7.6	k,m	1.6
201	7.3	g	1.6
202	7.6	k,m	1.6
203	7.6	k,m	1.6
205	7.6	k,m	1.6
206	7.7	k,m	1.6
207	7.7	g	1.6
208	7.7	k,m	1.6
Total PCB [g, h]	6.4	g, h	4.8

Compounds are listed in general order of their chromatographic elution on a DB-35MS and a DB-5 GC-column for the organochlorine pesticides and PAHs respectively.

The linear model of estimation was used in cases where a compound's log K_{ow}>6.

This calculator applies only to SPMDs which conform to the surface area-to-volume ratio of a standard SPMD.

If multiple log K_{ow} values were found in the literature, a mean value was selected using the t test at 95% Confidence for rejection of outliers.

[a] Mackay, D.; Shiu, W-Y; Ma, K-C. Illustrated Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals. Volume V, Lewis Publishers, Boca Raton, 1997.

[g] Meadows, J.C.; Echols, K.R.; Huckins, J.N.; Borsuk, F.A.; Carline, R.F.; Tillit, D.E. Environ. Sci. Technol., 1998, 32, 1847-1852.

[h] Rantalainen, A.L.; Cretney, W.; Ikonomou, M.G. Chemosphere, 2000, 40, 147-158.

[k] Log K_{ow} values estimated from similar congeners.

[m] R_s values estimated as the average of known R_s values of similarly substituted congeners

Table C-2. PCB homologue groups in SPMDs (pg per membrane)

Station Name	Sample Number	1-Cl	2-Cl	3-Cl	4-Cl	5-Cl	6-Cl	7-Cl	8-Cl	9-Cl	10-Cl	Total PCBs
October												
STATELINE	474155	42	729	2,117	2,557	7,628	2,173	602	108	0	0	15,957
UPRIVER DAM	474156	74	2,385	4,787	4,196	4,194	970	237	0	0	0	16,843
UPRIVER DAM(REP)	474157	71	2,301	5,208	4,272	4,565	1,324	323	0	0	0	18,063
UPRIVER BOT	474158	35	1,994	6,125	7,974	5,888	1,476	365	35	0	0	23,891
MONROEST	474159	64	4,159	6,224	9,594	9,033	4,940	1,312	128	0	0	35,454
NINEMILE	474160	39	6,847	12,144	10,254	13,492	5,864	1,605	144	0	0	50,389
LONGLOW	474161	80	7,395	14,935	51,689	32,233	10,102	2,747	484	30	0	119,693
LITTLSPOK	474162	0	634	3,605	5,814	5,191	2,321	849	514	69	0	18,998
LITTLSPMS	474163	41	154	1,336	3,217	4,352	1,415	989	450	74	0	12,030
February												
STATELINE	194130	0	24	359	767	1,982	1,007	373	0	0	0	4,511
UPRIVER DAM	194131	7	337	1,126	2,089	2,025	441	1,384	0	0	0	7,409
UPRIVER DAM(REP)	194132	0	125	86	271	338	62	6	0	0	0	888
UPRIVEBOT	194133	2	176	2,087	6,796	3,158	486	69	0	0	0	12,774
MONROEST	194134	0	561	1,903	3,596	2,873	1,552	841	0	0	0	11,326
TUMTUM	194135	4	698	2,317	3,834	2,368	988	895	6	0	0	11,109
LSPOKBR	194136	10	274	2,323	6,929	7,818	2,096	1,146	598	84	0	21,278
LSPOKBRMS	194137	14	83	1,063	4,342	5,711	1,388	639	477	60	0	13,778
April												
STATELINE	208134	0	61	1,564	2,781	8,261	3,737	2,022	88	0	0	18,513
UPRIVER DAM	208135	0	0	411	2,663	2,001	748	350	36	0	0	6,208
UPRIVER BOT(REP)	208137	75	432	5,345	11,499	6,211	1,898	758	48	0	0	26,266
UPRIVER BOT	208136	343	184	4,330	14,517	9,800	2,144	902	0	0	0	32,219
MONROE ST	208138	17	815	4,211	8,830	11,189	4,663	2,299	176	0	0	32,198
NINEMILE2	208139	49	1,202	4,870	9,609	9,742	4,747	2,079	174	0	0	32,470
LONGLKLOW	208133	62	3,086	5,083	15,707	12,072	4,026	1,211	143	0	0	41,389
LITLSPOKBR	208140	0	261	3,560	8,285	9,617	2,779	1,424	720	131	0	26,778
LSPOKBRMS	208141	65	367	3,491	4,126	5,386	1,464	2,071	581	91	70	17,712

REP: replicate.

Appendix D: Ancillary Parameters for Suspended Particulate Matter Sampling

Table D-1. Ancillary Data Taken at Centrifuge Locations During Suspended Particulate Matter Sampling (mg/L).

Station Name	Sample Number	Collection Date	TOC		DOC		TSS	
			inlet	outlet	inlet	outlet	inlet	outlet
Harvard								
	3438100	10/20/03	1.2	---	---	---	2	---
	3438101	10/21/03	1.1	---	---	---	1 U	---
	3438102		1.2	---	---	---	1	---
	3438103		1.1	---	---	---	1	---
	3438104		---	1.2	---	---	---	1 U
	3438105	10/22/03	1.1	---	---	---	1	---
	3438106		1.2	---	---	---	1 U	---
	3438107		---	2.3	---	---	---	1 U
PLANTEFRY								
	3448100	10/28/03	1.1	---	1.1	---	1	---
	3448101	10/29/03	1.1	---	1	---	3	---
	3448102		1.1	---	1	---	1	---
	3448103		---	1.1	---	1 U	---	1 U
	3448104		1.1	---	1	---	2	---
	3448105	10/30/03	---	1	---	1 U	---	1 U
	3448106		1.1	---	1	---	2	---
NINEM SPM								
	3454105	11/3/03	1	---	1 U	---	1	---
	3454106	11/4/03	1 U	---	1 U	---	1	---
	3454107		1 U	---	1 U	---	1	---
	3454108		---	1 U	---	1 U	---	1 U
	3454109		1 U	---	1 U	---	2	---
	3454128	11/5/03	1 U	---	1 U	---	1	---
	3454129		---	1 U	---	1 U	---	1 U

U: Undetected at value shown.

Appendix E: Biological Data for Fish and Crayfish Specimens Used for PCB Analysis

Table E-1. Biological Data for Plante Ferry Rainbow Trout Fillet Specimens.

Fillet Sample No.	Field ID	Date Collected	Total Length (mm)	Fork Length (mm)	Weight (g)	Fillet Weight (g)	Sex	Age (yrs)	Comments on Sex
188308	PF6	9/15/03	404	387	640	206	M	nd	
	PF8		365	350	552	190	M	nd	
	PF11		407	394	714	214	M	4	
	PF14		359	342	454	206	Imm. M?	3	
	PF15		323	308	363	126	M	3	
	PF16		300	284	291	106	M	2	
	PF17		380	364	582	212	M	3	
	PF18		422	401	782	202	M	3	
	PF23		345	328	452	126	Imm. M?	2	
	PF27		321	301	332	136	Imm. M?	2	
		Mean=	**363**	**346**	**516**	**172**		**3**	
188309	PF4	9/15/03	385	363	551	196	F	3	eggs visible
	PF5		410	387	670	208	F	4	eggs visible
	PF13		388	369	585	238	F	3	eggs visible
	PF19		412	385	667	210	F	4	eggs visible
	PF20		427	408	760	258	F	3	eggs visible
	PF21		376	356	583	178	F	3	eggs visible
	PF22		387	366	560	178	F	4	eggs visible
	PF24		378	359	517	220	F	3	eggs visible
	PF25		401	387	663	216	F	3	eggs visible
	PF26		345	325	427	202	F	2	eggs visible
		Mean=	**391**	**371**	**598**	**210**		**3**	

Imm. = Immature

Table E-2. Biological Data for Plante Ferry Rainbow Trout Gut Content Specimens.

Gut Content Sample No.	Field ID	Date Collected	Total Length (mm)	Fork Length (mm)	Weight (g)	Gut Contents (g)*	Sex	Age (yrs)
188311	PF4	9/15/03	385	363	551		F	3
	PF5		410	387	670	7	F	4
	PF6		404	387	640	1	M	nd
	PF8		365	350	552	15	M	nd
	PF11		407	394	714	1	M	4
	PF13		388	369	585	9	F	3
	PF14		359	342	454	5	Imm. M?	3
	PF15		323	308	363	1	M	3
	PF16		300	284	291	4	M	2
	PF17		380	364	582	3	M	3
	PF18		422	401	782	19	M	3
	PF19		412	385	667	12	F	4
	PF20		427	408	760	11	F	3
	PF21		376	356	583	14	F	3
	PF22		387	366	560	nm	F	4
	PF23		345	328	452	1	Imm. M?	2
	PF24		378	359	517	nm	F	3
	PF25		401	387	663	empty	F	3
	PF26		345	325	427	nm	F	2
	PF27		321	301	332	nm	Imm. M?	2
		Mean=	**373**	**355**	**546**			**3**

* Total sample weight = 16 g.

Table E-3. Biological Data for Ninemile Rainbow Trout Fillet Specimens.

Fillet Sample No.	Field ID	Date Collected	Total Length (mm)	Fork Length (mm)	Weight (g)	Lipids (%)	Sex	Age (yrs)	Origin
084281	NM1	9/16/03	334	321	413	1.5	Imm. M?	1	hatchery
084282	NM2		357	340	454	2.6	F	2	wild
084283	NM3		320	307	306	1.3	Imm. M?	1	hatchery
084284	NM4		308	290	306	1.9	M	1	wild
084285	NM5		350	332	471	1.1	F	3	wild
084286	NM6		300	282	289	1.0	Imm. M?	1	hatchery
084287	NM7		290	272	290	0.4	Imm. M?	1	hatchery
084288	NM8		333	321	425	1.9	M	1	hatchery
084289	NM9		377	365	483	0.7	F	3	wild
084290	NM10		328	315	380	3.3	M	3	wild
084291	NM11		333	316	376	2.5	F	3	wild
084292	NM12		342	325	421	2.0	Imm. M?	1	hatchery
084293	NM13		296	281	266	1.8	Imm. M?	1	wild
084294	NM14		289	273	257	1.0	M	1	hatchery
084295	NM15		283	273	268	0.6	Imm. M?	1	hatchery
084296	NM16		295	280	251	0.4	Imm. M?	1	hatchery
084298	NM18		296	285	320	0.9	M	1	hatchery
084299	NM19		275	261	227	0.2	Imm. M?	1	hatchery
084301	NM21		297	282	255	1.5	Imm. M?	1	wild
084302	NM22		282	269	250	0.8	Imm. M?	1	hatchery
084303	NM23		362	352	503	0.9	F	2	wild
084304	NM24		265	251	231	0.3	Imm. M?	1	hatchery
084305	NM25		286	270	244	0.5	Imm. M?	1	hatchery
084306	NM26		268	252	201	1.6	M	1	wild
		Mean=	**311**	**296**	**329**	**1.3**		**1**	

Table E-4. Biological Data for Ninemile Rainbow Trout Gut Content Specimens.

Gut Content Sample No.	Field ID	Date Collected	Total Length (mm)	Fork Length (mm)	Weight (g)	Gut Contents (g)*	Sex	Age (yrs)
188310	NM3	9/16/03	320	307	306	1	Imm. M?	1
	NM5		350	332	471	2	F	3
	NM6		300	282	289	4	Imm. M?	1
	NM9		377	365	483	1	F	3
	NM11		333	316	376	1	F	3
	NM13		296	281	266	3	Imm. M?	1
	NM14		289	273	257	5	M	1
	NM17		260	245	190	1	Imm. M?	
	NM18		296	285	320	5	Imm. M?	1
	NM19		275	261	227	5	Imm. M?	1
	NM23		362	352	503	2	F	2
	NM25		286	270	244	2	Imm. M?	1
	NM26		268	252	201	1	M	1
		Mean=	**309**	**294**	**318**			**2**

* Total sample weight = 22 g.

Table E-5. Biological Data for Stateline Largescale Sucker Whole Body Analysis Specimens.

Whole Body Sample No.	Field ID	Date Collected	Total Length (mm)	Weight (g)	Age (yrs)
328442	SL-5	7/14/04	556	1584	13
	SL-6		566	1618	18
	SL-7		483	984	11
	SL-8		521	1168	13
	SL-12		492	1070	8
	SL-15		499	1028	10
	SL-16		476	979	8
		Mean=	**513**	**1204**	**12**
328443	SL-4	9/17/03	460	909	9
	SL-9	7/14/04	459	940	11
	SL-10		457	973	11
	SL-11		427	707	7
	SL-13		433	765	7
	SL-14		471	868	9
	SL-17		408	731	6
		Mean=	**445**	**842**	**9**

Table E-6. Biological Data for Plante Ferry Largescale Sucker Whole Body Analysis Specimens.

Whole Body Sample No.	Field ID	Date Collected	Total Length (mm)	Weight (g)	Age (yrs)
328440	PF-32	9/15/03	463	1093	10
	PF-33		515	1325	8
	PF-38		458	1099	8
	PF-40		485	1117	7
	PF-42		502	1210	7
	PF-43		465	1061	7
	PF-46		440	981	6
	PF-47		501	1250	9
	PF-50		476	1095	9
	PF-51		489	1097	8
		Mean=	**479**	**1133**	**8**
328441	PF-28	9/15/03	475	1094	11
	PF-31		454	1082	8
	PF-35		477	992	7
	PF-36		435	903	5
	PF-41		416	797	6
	PF-48		433	800	7
	PF-49		442	843	9
	PF-52		454	1127	7
	PF-53		460	1043	8
	PF-54		482	963	7
		Mean=	**453**	**964**	**8**

Table E-7. Biological Data for Plante Ferry Largescale Sucker Gut Content Specimens.

Gut Content Sample No.	Field ID	Date Collected	Total Length (mm)	Weight (g)	Gut Contents (g)*	Age (yrs)
328445	PF-29	9/15/03	443	775	5	8
	PF-34		506	1205	17	10
	PF-37		460	893	8	9
	PF-39		424	704	2	6
	PF-44		532	1599	12	10
	PF-45		544	1379	9	8
		Mean=	**485**	**1093**		**9**

* Total sample weight = 53 g.

Table E-8. Biological Data for Ninemile Bridgelip Sucker Whole Body Analysis Specimens.

Whole Body Sample No.	Field ID	Date Collected	Total Length (mm)	Weight (g)	Age (yrs)
328447/8	NM-31	7/13/04	475	980	15
	NM-33		414	820	6
	NM-34		442	693	10
	NM-40		432	881	7
	NM-41		406	673	9
	NM-47		427	616	9
	NM-51		421	826	8
		Mean=	**431**	**784**	**9**
328450	NM-36	7/13/04	358	466	5
	NM-42		356	468	5
	NM-43		351	476	5
	NM-44		358	511	6
	NM-48		355	426	6
	NM-49		357	486	6
	NM-50		351	460	5
		Mean=	**355**	**470**	**5**

Table E-9. Biological Data for Ninemile Bridgelip Sucker Gut Content Specimens.

Gut Content Sample No.	Field ID	Date Collected	Total Length (mm)	Weight (g)	Gut Contents (g)*	Age (yrs)
328449	NM-32	7/13/04	393	695	3	5
	NM-35		401	631	8	5
	NM-37		411	665	6	7
	NM-38		408	732	16	6
	NM-39		408	626	4	6
	NM-45		366	533	6	6
	NM-46		385	536	12	7
		Mean=	**396**	**631**		**6**

* Total sample weight = 55 g.

Table E-10. Biological Data for Lake Spokane Largescale Sucker Whole Body Analysis Specimens.

Whole Body Sample No.	Field ID	Date Collected	Total Length (mm)	Weight (g)	Age (yrs)
328444	LL-2	7/13-14/2004	463	950	10
	LL-7		475	897	10
	LL-14		458	1155	11
	LL-17		445	1003	7
	LL-18		444	897	7
	LL-19		457	934	6
	LL-21		501	1335	9
	LL-23		466	986	5
	LL-24		473	1004	9
	LL-25		450	966	8
		Mean=	**463**	**1013**	**8**
328446	LL-1	7/13-14/2004	440	733	8
	LL-4		425	707	7
	LL-5		439	895	8
	LL-9		416	742	8
	LL-10		433	950	8
	LL-11		442	881	9
	LL-15		439	856	6
	LL-16		458	939	11
	LL-20		415	700	6
	LL-22		425	799	5
		Mean=	**433**	**820**	**8**

Table E-11. Biological Data for Crayfish Tail Muscle Analysis Specimens.

Sample No.	Field ID	Carapace Length (mm)	Date Collected	Weight (g)	Tail Muscle Weight (g)	Sex
208148	1	37	5/12-13/2004	41	5	F
	2	42		53	5	M
	3	39		53	4	M
	4	36		46	4	M

Appendix F: Fish Tissue Preparation, 2003-2005

Whole Body

Suckers for whole body analysis were prepared by removing them from the freezer and allowing them to partially thaw. Plans to composite specimens by sex were abandoned after numerous specimens were opened and gonads were either not found or of indeterminate type. As an alternative, specimens were grouped by length to form a small composite sample and a large composite sample, although size did not vary appreciably among fish. This allowed composites to be formed according to EPA recommendations where the smallest fish in the composite was at least 75% of the length of the largest fish (EPA, 2000a).

Scales and opercula were removed from suckers and mounted or stored for subsequent aging according to Washington Department of Fish and Wildlife (WDFW) protocols. The partially thawed fish were chopped or sawed into pieces on aluminum foil, then ground one at a time in a Hobart commercial meat grinder. After each individual was ground, tissue was mixed well using a stainless steel bowl and spoon. A 50 g aliquot from each specimen was combined to form the composite samples. The combined tissue was then passed twice more through the grinder and thoroughly mixed after each pass.

Composites of Plante Ferry and Lake Spokane suckers consisted of ten specimens each, and composites of Stateline and Ninemile suckers were made from seven specimens each. Homogenized tissue was placed in an appropriate sample container and returned to -20ºC until analysis.

Fillet

Rainbow trout fillets were prepared by removing specimens from the freezer and allowing them to partially thaw. Scales and otoliths were removed and mounted or stored for subsequent aging according to WDFW protocols. Specimens were scaled, rinsed with deionized water, and sex was determined by visual inspection of gonads.

Plante Ferry rainbow trout were prepared as ten-fish composite samples, grouped by sex. Ninemile rainbow trout were analyzed individually. Tissue was prepared by removing a skin-on fillet from one side of the fish while on aluminum foil. Composite samples were formed in the same manner as described for whole body samples except that a Kitchen Aid® food processor was used to homogenize tissue rather than a Hobart grinder. Homogenized tissue was placed in an appropriate sample container and returned to -20ºC until analysis.

Gut Contents

Gut contents were obtained from suckers other than those used for whole body analysis and from rainbow trout used for fillet samples. Thawed specimens were opened, and the entire gastrointestinal tract was removed, rinsed with deionized water, gently patted dry with a paper towel, and the contents of the stomach was extruded into a pre-cleaned glass jar. In some cases, rainbow trout stomach contents could only be obtained by slicing open the stomach wall and removing the contents. For suckers, the gut did not have distinctive anatomical components (stomach, intestine), were extremely long (approximately 3 m), and narrow. Therefore, contents from the upper half of the gut were removed for analysis.

Once removed, gut contents were weighed and visual observations were made. Approximately one-half of the rainbow trout had large masses of filamentous plant material in the stomach. In these cases, bugs, mucous bolus, or other food-like material was extracted, and plant material was discarded. Entire gut contents from each specimen were combined for a composite sample, since total mass of material was small and near the minimum amount of material required for analysis. Several grams of material from each species were placed in 20% formalin for subsequent stereoscopic evaluation. The remainder of the collected material was frozen at -20ºC until analysis.

Crayfish Tail Muscle

Crayfish (*Pacifastacus leniusculus*) collected from Upriver Dam were allowed to partially thaw. Sex was determined and the entire tail muscle (4-5 g) was removed from the exoskeleton. All tissue from the four specimens obtained were placed together in a pre-cleaned jar, finely chopped and mixed using a clean scalpel, and frozen at -20ºC until analysis.

Equipment Cleaning

Prior to sampling, all sampling implements and equipment were cleaned by sequentially:

1. Washing in Liquinox detergent and hot tap water.
2. Rinsing with hot tap water.
3. Rinsing with deionized water.
4. Rinsing with pesticide grade acetone.
5. Air-drying.
6. Rinsing with pesticide grade hexane.
7. Air drying.

After drying, equipment was wrapped in aluminum foil (dull side in) until used in the field. Sampling equipment was dedicated to each station or each sample. Fish processing and tissue homogenization equipment was cleaned between each sample using the described procedure. Persons preparing tissue samples wore non-talc polyethylene or nitrile gloves and worked on aluminum foil. Gloves and foil were changed between samples.

All sample containers were pre-cleaned according to EPA (1990) quality assurance/quality control specification. Samples for PCB analysis were placed in glass jars with Teflon-lined lids. All samples were cooled on ice immediately after collection and transported under chain-of-custody protocols.

Appendix G: Results on Quality Control Samples for 2003-2005

Results of quality control samples analyzed to estimate precision and accuracy are shown in Tables G-1- G-3. Laboratory duplicate analysis of PCB congeners and Aroclors show generally good precision, with relative percent differences (RPDs), the difference as a percentage of the mean, less than 20% when detected.

Equation: $$RPD = \left(\frac{difference\ of\ 2\ results}{mean}\right) \times 100$$

Table G-1. Precision of Laboratory Duplicates (Mean RPD of Individual PCB Congeners or Aroclors*).

Station	Sample type	Sample number	RPD
Harvard	Surface water	3438100	ND
LIBLAKE	Water (effluent)	4064113	ND
Litlfls	Sediment	3454113	19%
LONGUP2 *		4268384	8%
Spokane-F	Tissue fillet	03084282	5%

ND: not detected at the reporting limit.

Precision of field replicates, which integrates environmental, sampling, and laboratory variability, is shown in Table G-2. Results show that there is substantial variability in SPMD results (average RPD of 28%). Other matrices show lower variability and can be largely accounted for by variation in laboratory analysis.

Table G-2. Precision of Field Replicates (Mean RPD of Individual PCB Congeners).

Station	Sample type	Sample number	Replicate sample number	RPD
Upriver Dam	SPMD	3474156	3474157	9%
		4194131	4194132	55%
UPRIVER BOT		4208136	4208137	20%
LitlSpokR		3474162	3474163	26%
LitlSpokBr		4194136	4194137	25%
		4208140	4208141	35%
SPOKWWTP	Water (effluent)	4188204	4188206	6%
KaiserEff		4064105	4064106	ND
NINEMILE-F	Tissue fillet	4324447	4324448	8%
Spokane-F		3084282	3084308	20%
LongLkLow	Sediment	3454112	3454114	20%

ND: not detected at the reporting limit.

Replicate samples for conventional parameters showed little variation in most cases (Table G-3). Instances of high RPD results were due to small absolute differences at low concentrations which have the effect of amplifying RPDs.

Table G-3. Precision of Field Replicates for Conventional Analytes.

Station	Sample type	Parameter	Sample number	Replicate sample number	RPD
Ninemile 1	Surface water	TOC DOC TSS	4058115	4058114	0% 17% 0%
PLANTEFRY		TOC DOC TSS	3448102	3448101	0% 0% 100%
Upriver Dam		TOC DOC TSS	4208136	4208135	0% 10% 0%
Harvard		TOC TSS	3438103	3438102	9% 0%
Upriver Dam		TOC DOC	3408967	3408972	22% 8%
NINEM SPM		TSS	3454107	3454106	0%
Upriver Dam		TOC DOC	4094045	4094044	15% 0%
		TOC DOC TSS	4164043	4164042	12% 18% 0%
SPOKWWTP	Water (effluent)	TSS	4188204	4188206	18%
KaiserEff		TSS	4064105	4064106	0%
LongLkLow	Sediment	Grain size TOC % solids	3454112	3454114	8%* 0% 1%
NINEMILE-F	Tissue fillet	% Lipids	4324447	4324448	8%

*Mean RPD of individual size fractions.

Accuracy of the PCB congener data in sediments was assessed through analysis of the National Institute of Standards & Technology (NIST) standard reference material (SRM) 1944 - New York/New Jersey Waterway Sediment. Results are shown for 12 of the 25 PCB congeners for which SRM 1944 is certified; other individual congeners in SRM 1944 match co-eluting congeners reported by Pace and were not compared (Table G-5). Five of the 12 congeners were within the 95% confidence level of the certified values. Other results were 20%-25% below the certified value, suggesting a low bias for PCB congener results in sediments.

Table H-5. Analysis of NIST 1944 Standard Reference Material (New York – New Jersey Waterway Sediment) by Pace Analytical Services, Inc. (ng/g, dw).

Analyte	Certified concentrations*	Pace Result	% Difference from mean
PCB-008	22.3. ± 2.3.	23.4	5%
PCB-031	78.7. ± 1.6	77.6	-1%
PCB-052	79.4. ± 2.0	80.3	1%
PCB-066	71.9 ± 4.3	57.1	-21%
PCB-095	65.0 ± 8.9	48.1	-26%
PCB-099	37.5 ± 2.4	29.7	-21%
PCB-105	24.5 ± 1.1	23.5	-4%
PCB-118	58.0 ± 4.3	52.9	-9%
PCB-194	11.2 ± 1.4	9.35	-17%
PCB-195	3.75 ± 0.39	3.91	4%
PCB-206	9.21 ± 0.51	7.09	-23%
PCB-209	6.81 ± 0.33	5.43	-20%

*Mean and range of 95% confidence levels.
Shading: Outside certified range of values.

Appendix H: Details of Arnot-Gobas Food Web Bioaccumulation Model

Overview of Arnot-Gobas Food Web Bioaccumulation Model

Models to track hydrophobic organic chemicals through the food web have increased in their accuracy and complexity as investigators have built upon previous models to make iterative improvements. One of the most recently available models, the food web bioaccumulation model developed by Arnot and Gobas (2004), was selected for the present study for several reasons:

1. The model was built upon a widely accepted kinetic model developed to predict bioaccumulation of hydrophobic organic compounds in the food web of Lake Ontario and other lakes (Gobas, 1993).
2. The model is programmed in Excel spreadsheets and is simple to use, make adjustments, and perform backward calculations (find values for input parameters needed to derive a defined model output).
3. Validation runs indicated the model could predict PCB concentrations in at least two Spokane River fish species with a fairly high degree of accuracy.

The model accounts for major routes of PCB accumulation through diet and the gills, while depuration occurs through elimination by the gills and feces and by metabolic transformation (Figure H-1). The model also accounts for decreases in contaminant concentration through growth dilution.

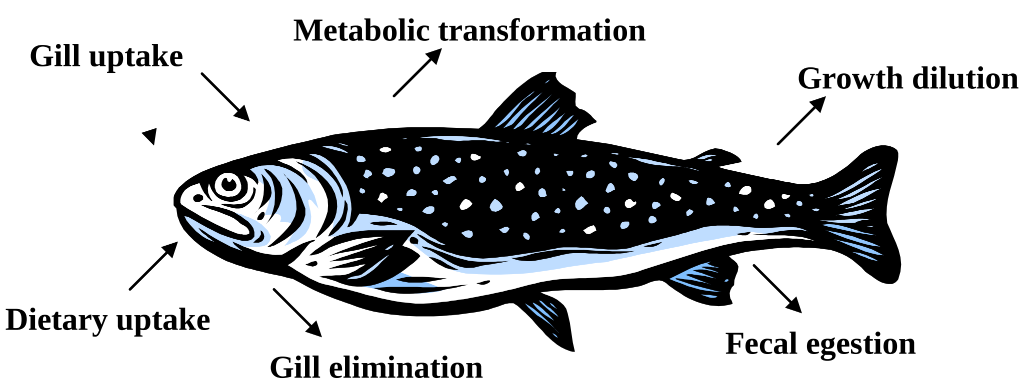

Figure H-1. Conceptual Diagram of the Major Routes of Contaminant Uptake and Depuration (Adapted from Arnot and Gobas, 2004).

The basic equation which describes the general model is:

$$dM_B/d_t = \left\{ W_B \bullet \left(k_1 \bullet [m_o \bullet \Phi \bullet C_{wT,0} + m_p \bullet C_{wD,S}] + K_D \bullet \Sigma(P_i \bullet C_{d,i}) \right) \right\} - (k_2 + k_E + k_M) \bullet M_B$$

Where:

M_B = mass of the chemical in the organism (g)
t = time (d)
dM_B/d_t = net flux of chemical in the organism at any point in time
W_B = weight of the organism at t (kg)
k_1 = clearance rate constant for the chemical uptake via gills and skin (L/kg • d)
M_o = fraction of respiratory ventilation in overlying water
M_p = fraction of respiratory ventilation in pore water
Φ = fraction of total chemical concentration that is freely dissolved in overlying water
$C_{wT,0}$ = total chemical concentration in water above sediments (g/L)
$C_{wD,S}$ = chemical concentration freely dissolved in pore water (g/L)
K_D = clearance rate constant for the chemical uptake via diet (kg/kg • d)
P_i = fraction of diet consisting of prey item i
$C_{d,i}$ = chemical concentration in prey item i (g/kg)
k_2 = rate constant for the chemical elimination via gills and skin (d^{-1})
k_E = rate constant for the chemical elimination via fecal egestion (d^{-1})
k_M = rate constant for metabolic transformation of the chemical (d^{-1})

The general equation can be simplified by assuming steady-state conditions (i.e., $dM_B/d_t = 0$), which results in a re-expression of the equation to:

$$C_B = \left\{ k_1 \bullet \left(m_o \bullet \Phi \bullet C_{wT,0} + m_p \bullet C_{wD,S}) + K_D \bullet \Sigma(P_i \bullet C_{d,i}) \right) \right\} / (k_2 + k_E + k_M + k_G)$$

Where:

C_B = chemical concentration in the organism (M_B/W_B)

The steady-state assumption necessitates a growth dilution term (k_G) which can be represented by a constant fraction of the organism's body weight. The reader is referred to Arnot and Gobas (2004) for detailed explanations of the sub-models used to derive all of the terms in the general equation. Assumptions and input parameters used to apply the model to the Spokane River are discussed below. All other environmental characteristics were those used for Lake Erie modeling and were supplied by J. Arnot.

Environmental characteristics

Environmental characteristic input parameters for the Spokane River model included mean annual water temperature, DOC, TSS, particulate organic carbon (POC), and sediment TOC. Table H-1 shows the values used. Mean annual temperatures, DOC, and TSS were mean values of the reaches modeled from data collected during SPMD deployment and recovery. One-half the detection limits were used for non-detects. Since January-February data for temperature were lost at Ninemile, the Monroe-Ninemile model was run using mean temperature data only from Monroe St. POC was calculated as the fraction organic carbon (f_{oc}) in suspended particulate matter (0.15, see Eq. 3) multiplied by TSS.

Table H-1. Input Parameters for the Arnot-Gobas Food Web Bioaccumulation Model.

	Reach				
	Stateline-Upriver	Monroe-Ninemile	Long Lake	Little Falls	Spokane Arm
Water					
Mean annual water temperature (°C)	9.2	8.9	10.0	10.0	10.0
DOC (mg/L)	1.2	1.0	1.1	1.1	1.1
TSS (mg/L)	1.6	2. 2	2.8	2.8	2.8
Particulate organic carbon (mg/L)	0.24	0.33	0.42	0.42	0.42
Sediment					
TOC (%)	2.0	1.6	2.9	0.6	1.7
Zooplankton					
Diet	100% phytoplankton				
Benthic Species					
Diet	50% phytoplankton, 50% sediment				
Rainbow Trout					
Weight (kg)	0.5				
Lipid (%)	5.6				
Diet	50% zooplankton, 12.5% each may-fly larvae, chironomid larvae, *Gammarus*, crayfish				
Sucker					
Weight (kg)	0.918				
Lipid (%)	3.8				
Diet	33% phytoplankton, 33% chironomids, 34% sediment		50% chironomids, 50% sediment		
Chemical (Total PCBs)					
Log K_{ow}	6.4				
Henry's Law Constant (Pa. m^3/mol)	3.9				

OC = organic carbon.
Pa = Pascals

Sediment TOC concentrations were more difficult to estimate due to lack of depositional material in the upstream reaches. For the Stateline-Upriver model run, the TOC was the mean of five sediments from RM 81.5-94.8 analyzed by Ecology (1994). Sediments from the Upriver Dam PCB "hot spot" were not used to derive this value. For the Monroe-Ninemile model run, the TOC value was the mean TOC of five Monroe St. (RM 74.9-78.7) sediments collected during 1994 averaged with a single Ninemile sediment collected during 1993 (Ecology, 1994).

Species characteristics

Fish species used for target PCB concentrations were rainbow trout and suckers. The model has output parameters built in for rainbow trout. The sucker species built into the model is white sucker (*Catostomus commersoni*). This species has similar habits and foraging characteristics as largescale and bridgelip suckers, and may even interbreed with largescale suckers where their ranges overlap (Wydoski and Whitney, 1979), and was therefore deemed a suitable substitute.

The model also allows for yellow perch, smallmouth bass, and largemouth bass as target endpoints (criteria). These species are found in Lake Spokane and the Spokane Arm, with limited populations of smallmouth bass in upstream reaches. However, these species were not selected to establish critical PCB concentrations because they generally have much lower PCB concentrations than lipid-rich species such as trout and sucker (e.g. Ecology, 1995; Jack and Roose, 2002). For these species, the target tissue concentration of 0.1 ng/g would be achieved with much higher water and sediment PCB levels.

Rainbow trout lipid content used in Table H-1 was the average of rainbow trout analyzed whole from four Spokane River locations. Weight was an approximation of present and historical Spokane River rainbow trout collected for analysis. For largescale suckers, lipid fraction in Table H-1 was an average of whole bodies from all available Spokane River samples, historic and present. Weight was the average of all suckers analyzed whole for the present study.

Diet of target fish species in Table H-1 was based on observations of gut contents. Diet composition of fish prey items (zooplankton and benthic species) was based on likelihood rather than site-specific observations.

Whole body to fillet conversion

The model produces a whole organism output for PCB concentrations in fish, which assumes that the chemical is distributed homogeneously among tissues of an organism. This limitation of the model may be an over-simplification when applied to complex organisms such as fish. To achieve the target concentration in fillet tissue, a conversion factor of 1.47 was applied based on the work of Amrhein et al. (1999). Limited data on paired whole fish-fillet data from the Spokane River (Johnson, 2000) yielded a conversion factor of 1.18 for rainbow trout and 2.73 for largescale suckers. This indicates that the water and sediment PCB concentrations used in the model along with the published conversion factor may be conservative for predicting target concentrations in suckers, while those used to predict rainbow trout targets may contain a slightly high bias.

Chemical characteristics

Total PCB was analyzed as the chemical of interest in the model to provide a simplified method of calculating PCB endpoints. The log K_{ow} and Henry's Law constant for total PCB used for the model were the same as those used to translate SPMD concentrations to water concentrations (Table H-1). For SPMDs, these parameters yield values similar to total PCBs calculated by summing individual congeners separately.

Validation and sensitivity

Prior to use, the model was validated using input parameters representative of the Spokane River and reach-specific fish weight and lipid data from recent sampling. Predicted and observed tissue concentrations were similar (Table H-2).

Table H-2. PCB Concentrations in Fish Tissue Predicted Using the Arnot-Gobas Food Web Bioaccumulation Model vs. Observed PCB Concentrations.

	Reach				
	Stateline-Upriver	Monroe-Ninemile	Lake Spokane	Little Falls	Spokane Arm
Measured PCB concentrations in water and sediment					
Dissolved total PCB conc. in water (pg/l)	83	222	332	na	na
total PCB conc. in sediment (ng/g dw)	54	78	33	1.9	10
Total PCB concentrations in whole rainbow trout (ng/g ww)					
Predicted	87	31**	55	--	--
Observed*	51	40**	na	na	na
Total PCB concentrations in whole suckers (ng/g ww)					
Predicted	110	26**	98	--	--
Observed*	99	29**	224	na	na

*PCB concentrations in fillet converted to whole fish by multiplying by 1.47.
**Ninemile only. Recent tissue data not available for Monroe St.
na: not available.

The model was not calibrated by adjusting the algorithms to match predicted and observed results. The decision to apply this model was made only after sampling had been completed. However, the necessary input parameters were easily obtained from current or historical data, and default values for physical, chemical, and species characteristics – originally used to model PCBs in the Lake Ontario food web – are applicable to the Spokane River.

A cursory assessment of model sensitivity was done by inserting ranges of values for the input parameters discussed in previous sections. The model is somewhat sensitive to changes in POC, sediment TOC, percent lipid in target fish, and prey composition for target fish. A 50% change in these model parameters results in an approximate 15% change in the target fish PCB concentrations when other model parameters are held at values typical for the Spokane River.

The model is particularly sensitive to log K_{ow} values, which can be expected due to the log K_{ow} as one of the most important factors driving the partitioning of PCBs between water and lipid soluble compartments. The response to changes in log K_{ow} is an approximate 10% decrease in target fish PCB concentrations with each 0.1 decrease in log K_{ow} around the value used for the Spokane River (log K_{ow} = 6.4). Increases of 0.1 in log K_{ow} result in approximately 10% increases in fish PCB concentrations. Of course, these responses are not linear, and the limited information provided here cannot be used to calculate target fish PCB concentrations, but they offer a glimpse at how the model output responds to certain input parameters.

Appendix I: Glossary Acronyms, Symbols, and Units

Ambient: Surrounding environmental condition (for example, surrounding air temperature).

Benthic: Bottom-dwelling organisms.

Best Management Practices (BMPs): Physical, structural, and/or operational practices that, when used singularly or in combination, prevent or reduce pollutant discharges.

Clean Water Act: Federal act passed in 1972 that contains provisions to restore and maintain the quality of the nation's waters. Section 303(d) of the Clean Water Act identifies water quality impaired waterbodies.

Composite sample: A representative sample created by the homogenization of multiple fish.

Congener: In chemistry, congeners are related chemicals. For example, polychlorinated biphenyls (PCBs) are a group of 209 related chemicals that are called congeners.

Designated uses: Those uses specified in Chapter 173-201A WAC (Water Quality Standards for Surface Waters of the State of Washington) for each waterbody or segment, regardless of whether or not the uses are currently attained.

Discharge: The rate of streamflow at a given instant in terms of volume per unit of time, typically cubic feet per second.

Effluent: An outflowing of water from a natural body of water or from a man-made structure. For example, the treated outflow from a sewage treatment system.

Exceeded criteria: Did not meet criteria.

Harmonic mean flow: One of several methods of calculating an average rate of flow. The harmonic mean is defined as $Q_h = n/\Sigma(1/Q_i)$ where n is the number of recorded flows Q_i. The harmonic mean is never larger than the geometric mean or the arithmetic mean.

Grab: A discrete sample from a single point in the water column or sediment surface.

Homologue: A chemical compound from a series of compounds that differs only in the number of repeated structural units.

Legacy pesticides: Banned pesticides no longer used but that persist in the environment.

National Pollutant Discharge Elimination System (NPDES): National program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under the Clean Water Act. The NPDES program regulates discharges from wastewater treatment plants, large factories, and other facilities that use, process, and discharge water back into lakes, streams, rivers, bays, and oceans.

Parameters: Water quality constituent being measured (analyte). A physical, chemical, or biological property whose values determine environmental characteristics or behavior.

Point source: Sources of pollution that discharge at a specific location from pipes, outfalls, and conveyance channels to a surface water. Examples of point source discharges include municipal wastewater treatment plants, municipal stormwater systems, industrial waste treatment facilities, and construction sites that clear more than 5 acres of land.

Pollution: Such contamination, or other alteration of the physical, chemical, or biological properties, of any waters of the state. This includes change in temperature, taste, color, turbidity, or odor of the waters. It also includes discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state. This definition assumes that these changes will, or are likely to, create a nuisance or render such waters harmful, detrimental, or injurious to (1) public health, safety, or welfare, or (2) domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or (3) livestock, wild animals, birds, fish, or other aquatic life.

Reach: A specific portion or segment of a stream.

Sediment: Solid fragmented material (soil and organic matter) that is transported and deposited by water and covered with water (example, river or lake bottom).

Stormwater: The portion of precipitation that does not naturally percolate into the ground or

evaporate but instead runs off roads, pavement, and roofs during rainfall or snow melt. Stormwater can also come from hard or saturated grass surfaces such as lawns, pastures, playfields, and from gravel roads and parking lots.

Surface waters of the state: Lakes, rivers, ponds, streams, inland waters, salt waters, wetlands, and all other surface waters and water courses within the jurisdiction of Washington State.

Suspended particulate matter (SPM): Particulates suspended in the water column.

Total Maximum Daily Load (TMDL): A distribution of a substance in a waterbody designed to protect it from exceeding water quality standards. A TMDL is equal to the sum of all of the following: (1) individual wasteload allocations for point sources, (2) the load allocations for nonpoint sources, (3) the contribution of natural sources, and (4) a Margin of Safety to allow for uncertainty in the wasteload determination. A reserve for future growth is also generally provided.

Total suspended solids (TSS): The suspended particulate matter in a water sample as retained by a filter.

Watershed: A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation.

303(d) list: Section 303(d) of the federal Clean Water Act requires Washington State periodically to prepare a list of all surface waters in the state for which beneficial uses of the water – such as for drinking, recreation, aquatic habitat, and industrial use – are impaired by pollutants. These are water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next two years.

Acronyms, Symbols, and Units of Measurement

303(d):	Section 303(d) of the federal Clean Water Act
BAF:	bioaccumulation factor
BCF:	bioconcentration factor
BSAF:	biota-sediment accumulation factor
BW:	body weight
CFR:	Code of Federal Regulations
CSO:	combined sewer overflow
DOC:	dissolved organic carbon
dw:	dry weight
Ecology:	Washington State Department of Ecology
EIM:	Environmental Information Management (Ecology database accessible through internet)
EPA:	U.S. Environmental Protection Agency
FS:	feasibility study
GC/ECD:	gas chromatography/electron capture detection
GC/MS:	gas chromatography/mass spectrometry
MTCA:	Model Toxics Control Act
N:	number of samples
NIST:	National Institute of Standards and Technology
NPDES:	National Pollutant Discharge Elimination System
NTR:	National Toxics Rule
PCB:	polychlorinated biphenyl
RF:	risk factor
RI:	remedial investigation
RM:	river mile
RPD:	relative percent difference
SPM:	suspended particulate matter
SPMD:	semi-permeable membrane device
SRM:	standard reference material
SV:	screening value
TMDL:	Total Maximum Daily Load
Total PCB:	the sum of PCB congeners or Aroclors (also t-PCB)
TOC:	total organic carbon
TSS:	total suspended solids
UWP:	Spokane River Urban Waters Program
USGS:	U.S. Geological Survey
WAC:	Washington Administrative Code
WC:	water consumption
WDFW:	Washington Department of Fish and Wildlife
WDOH:	Washington State Department of Health
WQS:	water quality standard(s)
WRIA:	Water Resource Inventory Area

WSTMP:	Washington State Toxics Monitoring Program
ww:	wet weight
WWTP:	waste water treatment plant
C_d :	concentration in the dissolved phase
C_s :	concentration in sediment or solids
C_t :	concentration in tissue
C_w:	concentration in whole water
f_{oc}:	fraction of organic carbon
f_s:	fraction of solid in water
K_{oc}:	sediment-water partition coefficient normalized for organic carbon
K_{ow}:	octanol-water partitioning coefficient
Q:	discharge
q1*:	cancer slope factor
Pb:	lead
g:	gallon
cm:	centimeter
kg/day:	kilograms per day
L/kg:	liters per kilogram
MGD:	million gallons per day
mg/day:	milligrams per day
mg/L:	milligrams per liter (parts per million)
ML:	megaliter (one million liters)
mm:	millimeter
ng/g:	nanograms per gram (parts per billion)
ng/L:	nanograms per liter (parts per trillion)
pg/g:	picograms per gram (parts per trillion)
pg/l:	picograms per liter (parts per quadrillion)
Pa m3/mol:	Pascals cubic meter/mole

Nos: 13-35474 and 13-35519

UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

UNITED STATES OF AMERICA, et al.

v.

STATE OF WASHINGTON

DECLARATION OF SUSAN BARRAGAN

I, Susan Barragan, hereby declare as follows:

1. I am over 18 years of age and reside at 430 NE 4th Street, North Bend, WA 98045.
2. I am a legal assistant at the law offices of Tupper Mack Wells PLLC.
3. I declare that I transcribed the Ninth Circuit Court of Appeals Oral Argument that took place on October 16, 2015, in the case of *U.S.A. v. State of Washington*, Case Nos. 13-35474; 13-35519, to the best of my ability and believe the attached document to be a true and correct transcription of the proceedings.

I declare under penalty of perjury that the foregoing is true and correct.

Dated at Seattle, Washington this 15th day of December, 2015.

Susan Barragan

Susan Barragan

4816-4655-2876, v. 1

Nos: 13-35474

UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

UNITED STATES OF AMERICA, et al.

v.

STATE OF WASHINGTON

Transcript of Ninth Circuit oral argument that took place on October 16, 2015

PURCELL: May I please the Court, I am Washington Solicitor General Noah Purcell on behalf of the State. I'd like to reserve five minutes for rebuttal.

JUDGE FLETCHER: Okay – keep your eye on the clock. It counts down and we'll try to help.

PURCELL: Will do. Thank you. Your Honors, salmon are vital to Washington's people, culture and economy and the State has spent hundreds of millions of dollars over the course of decades to preserve and restore salmon runs. The District Court here nonetheless felt it necessary to create a new treaty-based protection for salmon even though that treat right has no basis in the treaty language, goes far beyond any right ever recognized by this court or the Supreme Court. Even though the District Court acknowledged that it was unintended by the parties and even though it's sure to lead to endless future litigation. So we're asking this court to reverse the creation of that new right or at the very least to remand to the District Court for consideration of the State's counterclaim and waiver defense as well as for a significantly narrower injunction and narrower definition of the treat right.

JUDGE FLETCHER: Let me understand your first point…I think it's your first point…uh, when you say there's nothing in the treaty that speaks to this issue. I want to understand what your reading of the treaty is. Would the state have the right consistent with the treaty to dam every salmon stream in Puget Sound?

PURCELL: Your Honor, we would never and could never do that. We would never do it…

JUDGE FLETCHER: I'm asking a different question, would you have the right to do that under the treaty?

PURCELL: Your Honor, the treaty would not prohibit that and there was no reason for the treaties to need to prohibit that because the State would never do that because the State has every incentive….

JUDGE FLETCHER: So let me make sure I get a straight answer. You're saying consistent with the treaties that Governor Stevens entered into with the Tribes, you could block every salmon stream in the Sound.

PURCELL: Your Honor, the treaties would not permit that and that is not an absurd result for a number of reasons. Number one, the District Court here itself found that the parties did not

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intend to create any protection for the salmon. Number two, this Court's decision in 1985 and the Supreme Court's decision in Fishing Vessel made clear that the treaties did not guarantee the Tribes any minimum allocation of salmon. So the position of the plaintiffs here is just entirely inconsistent with those holdings. The claim here is essentially that they have a right to restoration of some unknown prior number of salmon, and this court has already said no, there is no minimum requirement, and there doesn't need to be. Most importantly, Your Honor, there doesn't need to be. Because the State, as I've said has already spent hundreds of millions of dollars, has every incentive to continue to do that to preserve and restore salmon runs. So the other side is essentially asking you to read in a treaty right here because they think it's necessary and it just simply is not. The State, as I've said, has every incentive to maximize salmon runs for...

JUDGE FLETCHER: There's something in the record that says that if the State were to proceed at the current rate of what the State is voluntarily proceeding, it would take a hundred years for the State to take care of all of the culverts that have, I think, 200 meters above them of potential spawning grounds. Is that right?

PURCELL: Two points about that, Your Honor, first of all...

JUDGE FLETCHER: No, is that right?

PURCELL: It's a correct representation of what the pace for the state Department of Transportation... it ignores the other departments that are at issue here, all of which will have fixed every single one of their barrier culverts by next year under State law and we're going to do that regardless of the injunction, so, so...

JUDGE FLETCHER: Those are relatively few, I think.

PURCELL: Those are...there were several hundred of them, Your Honor, they're just much less expensive to fix than the WSDOT, Department of Transportation culverts because they're not under things like interstate 5. They're under forest roads and such. So the Washington Department of Transportation has been working aggressively for decades to repair culverts that are a significant problem. The District Court found that it had already, before trial, fixed the majority of priority culverts where the state culvert was the only one on the waterway. But the... requiring the State Department of Transportation to replace all these culverts in many instances is an enormous waste of resources. It's an extraordinarily expensive proposition, Your Honor, and time consuming. To replace a culvert under, for example, under Interstate 5, with a bridge or stream simulation culvert, requires shutting down the highway for some extended period of time, extensive permitting, enormous labor, heavy equipment and the like, and in many instances for very little gain. I mean, the 200 meters, keep in mind that 200 meters ignores if there are other manmade barriers on either side. So the District Court's order requires us to replace a culvert even if there is literally...

JUDGE FLETCHER: I don't think it ignores whether there are manmade barriers upstream. That is to say it requires 200 meters upstream that is not obstructed, is that right?

PURCELL: 200 meters to the next natural barrier. Not to the next manmade barrier, Your Honor. There could literally be a County road or a Tribal road or a federal culvert ten yards away and we would still need to replace that culvert. So that's an important point and that's part of why this injunction is so enormously, you know, wasteful and overbroad. It's going to require us to replace culverts that will truly make no difference because of other culverts, because the habitat is degraded in other ways. So, I mean, that just goes to the enormous overbreadth of this injunction, Your Honor.

So getting back to why this is a new right. The Supreme Court and this Court have recognized three distinct rights under the treaty related to taking fish. The right of access to usual and accustomed fishing grounds, a right to be free of many State regulations, and a right to take a fair share of the available fish. And the right the District Court declared here goes far beyond any of those. And again the District Court itself acknowledged that the parties didn't intend it, and it goes against, it goes far beyond the treaty language or any other prior holding of this Court or the Supreme Court.

JUDGE GOULD: Is there any prior right recognized to a certain quantitative level of fish harvest?

PURCELL: Absolutely not, Your Honor, not in this court's…I mean this Court expressly held in the 1995 *en banc* opinion that the Tribes are entitled to at most fifty percent of the available harvest, whatever that number might be, so specifically rejected the idea that they were entitled to a minimum quantity of fish. And in *Fishing Vessel* itself, if you look back at that opinion. At the beginning of the opinion the Supreme Court lays out the parties' positions and the Tribe's position was that they were entitled to make a moderate living from fishing and that whatever was left over after that everyone else could take. And the Supreme Court explicitly rejected that position and instead adopted the position that the Tribes were entitled to, at most, fifty percent of the available harvest. And that's what this Court recognized in its 1985 *en banc* opinion. So there is not a case saying that and it's a holding that's not only not supported by the treaties or the intention, it's not necessary, as I was saying. In 2007, don't get me wrong, salmon runs have declined over time for a number of reasons. But the State, including I would add in large part because of federal actions that have decimated salmon runs in this area, such as building the Lake Washington ship canal that wiped out completely the Black River and millions of salmon that used to live there. That sort of thing. But the point, Your Honors, is that this goes far beyond any right that has ever been clear and it's not necessary. In 2007, the last year in the record, the Tribes harvested over 1.5 million salmon in the case area and by 2013 that number had increased to 4 million. There are fish there. The State is doing a lot to bring them back and it was doing a lot long before the District Court entered the injunction here. So there's just no need for this Court to declare a new broad right that as I said is sure to lead to endless future litigation when the State is already taking these enormous steps. I mean, essentially what is happening here is that the State is, in a way, being punished for the good deeds it's already taken. Washington has been a national leader in recognizing the challenges posed by barrier culverts. We're the only state in the country with a stand-alone program to find them and repair them.

The state identified its own barrier culverts long before anyone else had and that then became Exhibit A in the lawsuit against us for the efforts we were undertaking to fix them.

So what we really have here is this incredibly inequitable situation where the federal government gave us the design for these culverts and said here's how we want you to build the culverts under state highways. They said that for decades. Now today...

JUDGE FLETCHER: Was this just a general highway standard or was it specific to the State of Washington?

PURCELL: It was a general highway standard, Your Honor, that all states were required to use, as I understand it. And it was not specific to Washington...

JUDGE FLETCHER: When I say required, meaning I don't think there would have been anything in those days for you to have built culverts that would comply with this injunction. It's just you didn't have to and what you did under the federal standard was perfectly permissible at that time.

PURCELL: The federal government specified the design, Your Honor, that we used, and now they turn around and say, decades later, that design violates the treaty.

JUDGE FLETCHER: Now my point is a little different.

PURCELL: I'm sorry.

JUDGE FLETCHER: They speci...I know they specified a design and that was certainly a permissible design. I don't see the record as saying that if the state had chosen to build a design of...to design and then build a culvert that would allow free passage of fish that that would have been impermissible under federal law. That's just not the record one way or the other, I think.

PURCELL: Your Honor I don't know that the record is entirely clear about that, in part because a lot of these directions were made in the 1950's and '60's and the people who would have done them weren't/aren't around. But in any event, the federal government for decades gave us this design and said use this. It also permitted many of these culverts specifically under the Clean Water Act. I mean it reviewed specific applications for culverts and said, yes, go ahead and build that. While it had a fiduciary obligation to the Tribe. So if those culverts violated the treaties, at the very, very least the federal government should have said that, hey, you know, wait a minute.

Another point I'd like to... I'll get to our counterclaims in just a second... but to that end, the federal government now is saying that *Winans* stands for the proposition that no one can block access to salmon getting up or downstream. And *Winans* does not stand for that proposition for at least two reasons. First of all, in that case there was a non-tribal landowner who was refusing to give a Tribe access to usual and accustomed grounds and was taking all of the fish in the river with a fish wheel. So that case involved two rights that are now very well recognized under the treaty: a right of access to usual and accustomed fishing grounds; and a right to the fair share of the available fish. This case goes far beyond that and the point, though, that I want to get back to the federal government is that if *Winans* means what they now claim then they just flatly ignored that decision for decades. That decision that they...They brought that case. They then built dams on the Columbia River, many of which have no fish passage mechanism whatsoever, such as Grand Coulee Dam, Chief Joseph Dam. So if *Winans* now means what they say…what they say here, they were just, just, you know, in obvious violation of it for decades.

And that brings me, Your Honors, to my counterclaim, our counterclaim and equitable considerations of the injunction. So first of all I want to be very clear. We think that there should be no new treaty right declared. It's not supported by the text, by the intent, by the case law. But even if there is, Your Honors, at the very least our counterclaim against the federal government should be reinstated. It's a classic recoupment counterclaim, it arises out of the same transaction…

JUDGE FLETCHER: What precisely are you asking from the federal government in your counterclaim?

PURCELL: In our counterclaim, Your Honor, the heartland of our counterclaim is that the federal government gave us the design for these culverts, approved these culverts, and now are saying they violated the treaty. So we're asking that they be required…if these culverts violate the treaties, that they be required to cover part of the cost of replacing them. And it was dismissed at the motion to dismiss stage so we never had an opportunity to develop facts about that at any length or, you know, exactly what percentage we would ask for, or any of that sort of thing. It was just dismissed quite early in this case. I think it was fourteen years ago now. Quite some time ago before we had an opportunity to do any of that based on sovereign immunity. And that was just a clear legal error. This is a recoupment counterclaim.

Now in our answer. In our…in our responsive pleadings we've also made all sorts of other allegations about things the federal government has done. Those don't go so much for our counterclaim as they do to the equities here. You know, for example, the fact that the federal government built the Lake Washington ship canal and lowered Lake Washington by ten feet and wiped out this massive amount of salmon habitat, completely wiped out the Black River. That goes to is it fair? Is it fair to hold the state entirely responsible for the declines in salmon that have happened over time through a variety of natural and manmade factors.

JUDGE FLETCHER: The United States has an odd position. Or maybe I should say an unusual position in this litigation. It's not suing really on its own behalf so much as it is suing on behalf of the Tribes. And, of course, it's not the Tribes who built the Lake Washington ship canal, it's not the Tribes that did the things that which you are now objecting.

PURCELL: Right. Yes.

JUDGE FLETCHER: And to hold against the Tribes actions of the United States merely because the United States because of the 11th Amendment is required to bring the suit on behalf of the Tribes strikes me as odd.

PURCELL: I'm not asking you to rule against the Tribes because of actions of the federal government. We have sort of two separate arguments here. We're arguing that there is no treaty right based on the language, intent and such, what I already talked about. But if there is one at the very least the remedy should take into account that we might not even be here today if not for the federal actions that decimated salmon runs because the Tribes might still be making a fine living from fishing if not for those federal actions. I mean, we don't know. But the federal government itself has taken actions that decimated Washington salmon runs and then to then sue the state which has been a national leader in repairing culverts and restoring salmon and has been doing for decades this wide range of activities...

JUDGE FLETCHER: You know I have to say I'm sympathetic with the state vis-à-vis the federal government but to the extent that this is a suit by the Tribes as a practical matter the Tribes did not do what the federal government did.

PURCELL: I agree, Your Honor, I'm not disputing that. But, two points. First of all, again the fact that the Tribes didn't do anything wrong does not mean, as the Supreme Court made clear in *Fishing Vessel* does not mean that the treaty guarantees them everything that in retrospect would have been helpful to the Tribes. I mean you have to still look at the treaty language. You can't, as the court said, the Supreme Court said in the *Choctaw Indian Nation*, you can't add terms to a treaty later to correct a perceived injustice. And I'm not saying that the Tribes did anything wrong. Just that there is no treaty right here and there doesn't need to be because the state already has every incentive...

JUDGE EZRA: You're asking us to reinstate the counterclaim against the government...federal government.

PURCELL: Yes. If you hold that there is a treat right and...then we're asking you to remand and reinstate our counterclaim.

JUDGE EZRA: That's right.

JUDGE GOULD: And based on your counterclaim is the basic idea there that the state would like to be indemnified in whole or in part if you're liable for costs of repairing culverts.

PURCELL: Yeah, indemnification, contribution, you could call it either one but we think the federal government should have to pay part of costs of replacing the culverts that they told us to install.

The last point, just going to the equities, Your Honor, and then I'll try to reserve the remainder of my time is that we're not saying that the Tribes have done anything wrong, but even the Tribes recognize that fixing culverts is not, sort of in and of itself, is not the best way to fix salmon. I mean, if you look in the record we highlighted this in our briefing, one of the Tribe's experts talked about a water shed restoration project that they undertook with state funding and they fixed about half of the culverts in the watershed and then moved on to other projects that would have a bigger impact.

Here the District Court has ordered us to spend an enormous amount of money with a single-minded focus on culverts and that's not what any expert testified in the record would be a good idea. So, again Your Honors I'd like to reserve the remainder of my time, but we're asking the Court to reverse the District Court's creation of this new treaty right, or at the very least to remand for reconsideration, Your Honor.

JUDGE GOULD: On that last issue, the technical matter, do we...asking us to vacate the permanent injunction and remand for more findings and proceedings?

PURCELL: If you agree with us about the treaty right? I'm sorry, I didn't understand the question.

JUDGE GOULD: On the issue of whether the federal government has some responsibility...

PURCELL: I see. So first and foremost we're asking you to vacate the court's finding on the new treaty right and that would be the end of the case. But if you don't do that, then yes, we'd ask you to vacate the injunction, remand for a narrower injunction, and then also reinstate our counterclaim.

JUDGE GOULD: Okay and on the basic question of whether there's a treaty right, this may be too hopeful a question, I guess, but if we were to somehow assemble every single that Isaac Stevens had either said about his negotiations or that some other biography writer had quoted somebody saying he said, would that really help us to know whether the right of taking fish under the treaty includes a right to have barriers removed like culverts?

PURCELL: Well, Your Honor, the intent of the parties is certainly relevant, so if there was some clear intent there to prohibit anything that might diminish salmon runs I think that would be quite relevant. But there just is not and in fact the District Court found the opposite. That there was no intent to create a treaty-based protection for salmon. So we're not saying that history is irrelevant, we're just saying it doesn't support the other side.

I'd like to reserve the remainder of my time...

JUDGE FLETCHER: We won't take away from your time. You're trying to reserve and to some extent we're intruding into that time, so we'll give you a chance to respond, so don't worry.

PURCELL: I appreciate that, wells then if...

JUDGE FLETCHER: I want to come back to my earlier question which is to some degree implicated by Judge Gould's questions, and that is under your interpretation of the treaty the State of Washington has the right entirely to destroy the fishery.

PURCELL: Your Honor, the treaties do not prohibit that unless it was done in a discriminatory way, as we've said in the briefing.

JUDGE FLETCHER: No I just want to make sure that I understand your interpretation of the treaty. That is to say the treaty could guarantee to the Tribes the right to fish at their usual and accustomed places. That's been interpreted to say they get up to fifty percent of the available fish up to the need and the amount necessary to satisfy a need to make a moderate living. But you say it's consistent with the obligation upon the state to allow that that the state may destroy the fishery entirely. That's the position of the state.

PURCELL: Your Honor, the treaties had no need to regulate that because the state had every incentive to maximize the number of salmon available for everyone. Neither side anticipated…

JUDGE FLETCHER: I know but I think your answer is yes, that's your argument. The treaty would allow the state entirely to destroy the fishery.

PURCELL: The treaties, Your Honor.

JUDGE FLETCHER: I think your answer is yes.

PURCELL: The answer is yes, but it's not an absurd result. Your question seems to imply that's an absurd result and it's not for a number of reasons. Number one, again neither side anticipated that development could impact salmon runs. Number two, neither side intended for the treaties to create a protection for salmon. And number three, the District Court here found that they specifically did not intend to create a protection for salmon, and again this court and the Supreme Court have already held that the treaties don't guarantee the Tribes any minimum number of fish, but as I said that's not an absurd result because the state would never do that. I mean an absurd result…it's not absurd if no one would ever do it, right? And no one would ever do that here because the state, as I said, salmon are vital to our people, culture and economy.

JUDGE FLETCHER: Now it's very clear that the state has acted on its own to preserve this fishery and it has spent a lot of money on its own. I understand that. Yes.

PURCELL: So what they're essentially asking you to do now is read this right in. If it's necessary they're asking you to read it in 160 years after the treaties were signed, when there are countless other state and federal laws that protect salmon, and when the state is already spending hundreds of millions of dollars to preserve and restore salmon. So I guess that all goes to why this is not…they're asking to imply right and they're asking you to imply a right that's not necessary. And so we'd ask you not to do that.

JUDGE FLETCHER: Okay well we've taken you to the end of your time. You sought to reserve 5 and when you stand up again we'll put 5 minutes on the clock.

PURCELL: I appreciate that very much, Your Honor. Thank you.

SLEDD: I hope you can hear. May it please the Court. I am John Sledd on behalf of the Appellees Tribes. I hope to use 12 minutes and leave the balance of Appellees' time to Mr. Sheldon for the United States. Your Honor the District Court's injunction and summary judgment should be affirmed for three reasons. First, it is consistent with prior precedent of this Court and the U.S. Supreme Court. This court held in affirming Judge Boldt in his 1974 decision, neither side may destroy the resource that is the subject of these treaties. The State's legal position carried to its logical extreme would allow exactly that. This decision below is also consistent with the specific understandings of the parties regarding blockages to fish passage and it is consistent with prior cases that have held that non-Indians cannot put devices in the streams that exclude the fish from the habitat they need to reproduce and thereby deprive the Tribes of the fish they need to make a livelihood.

JUDGE EZRA: Now the big problem with all of these cases, and I've had a few, is that we're trying to look back and then look forward from 1854 and '55 when no one who was involved in the creation of these treaties had any envisioning, seer of the future, that Interstate 5 and all of these culverts and all of the various developments that we have in the City of Seattle, being what it is, and all of these other cities in the Pacific Northwest, and yet you want us to suggest that the treaty envisioned culverts, and not blocking culverts and not doing this, that or the other thing to roads. As a specific matter. Not as a general matter, and this is always difficult and that's the difficulty in these cases, and that's why they end up in the Supreme Court frequently.

SLEDD: But keeping promises that were made 150 years ago in very different circumstances...

JUDGE EZRA: Well nobody promised that they would have salmon-free culverts. Because they didn't have culverts. So... under freeways, because they didn't have freeways. So what is the general promise that you are suggesting that the State of Washington made?

SLEDD: As Judge Boldt found, the Tribes left the treaty ground understanding that there would be nothing that the non-Indians would do that would impair their pre-existing fisheries. Obviously that's not what has happened. And in resolving that tension between what has happened with settlement and what the Tribes were promised, the Supreme Court in the *Winans* case said we're not laying down a bright-line rule. It remanded to the circuit court, what would now be the district court, for an adjustment and accommodation, saying that what is necessary in order to accommodate the session of land to non-Indians is not a taking away of the Tribes' pre-existing rights, but a limitation of them, and that's an equitable process that is not subject to a lot of bright-line rules. In this case we have the benefit...

JUDGE EZRA: It's pretty amorphous, I mean, what does that mean?

SLEDD: Well there's a lot amorphous in property law in terms of, you know, a nuisance action, I mean, what is reasonable and that's developed through the case law and that's exactly what this court said in Phase II as we read the *en banc* decision, when the state intentionally interferes with the fish supply, it's subject to immediate judicial action, but there's that second clause at the end of the Phase II opinion saying if it's not intentional then the rights of the Tribes and the duty of the State are determined on a case-by-case, fact-by-fact basis. And that's what we have done here. That is the genesis of this case. And the particular facts here make it an easier one for a couple of reasons. One, it is very similar to a couple of prior cases. One from the Supreme Court and one from this Court. And the *Winans* case, you know, it's foundational. There was much more to that than just the question of access or the excessive harvest. If you read the summary of argument of the U.S. Solicitor before the Supreme Court, he was complaining that the runs themselves were threatened. The reproduction of the fish was threatened, as well as upstream fishers. And the remand was intended to remove some of wheels for both purposes. Um, the second case that we point to would be the *Adair* decision from this court back in about 1984, which makes clear that it's not just actions directed directly at or intentionally at the fishery. Because that can be restricted under the treaties to protect the Tribes' rights. In that case it's a water rights case. People are diverting water from a river system on which treaty fisheries exist. They're not intending to destroy the fishery. It's incidental, contrary to what the

State argues, that this court said that there's an implied water right there for the Tribes to have sufficient water remain in those rivers to provide a fishery that would give them a moderate living. So, in this case we've got those two cases that are very similar, establishing a principle that you can't put a device in the stream that prevents the salmon from using the waters they need to reproduce if the consequence is that the Tribes don't have an adequate fishery.

JUDGE FLETCHER: I'm interested in how far the underlying principle for which you're arguing, and I think the principle upon which the District Court based its decision, how far this goes. Would the same principle support an order requiring the State and any state controlled entity to remove dams on the rivers that feed into the Sound or dams within the so-called case area?

SLEDD: I think the question would have to be answered case-by-case. That is what Phase II says. The principle certainly could be applicable there, but there are a number of facts. Again, going back to Phase II. Look at the specific facts that would need to be asked. I'll assume that a dam has more than a *de minimis* impact on the fish run and that....

JUDGE FLETCHER: Some of them, of course, do.

SLEDD: Right and that would be the first question. We would look to the specific understanding of the parties and this case, as we've indicated, the Tribes had customs that you couldn't block fish passage. You had to remove your fishing wheels in order to allow fish to spawn. And the U.S. had laws that said you can't block streams. The Oregon Territory Organic Act says as much. So you look to that...you look at the extent of the impact on the non-Indian development. Here they can build their road system. The roads were clearly contemplated by the treaties. We would need to ask how severe is the impact on new development. Um, I think you would look at similarities to past cases. What Phase II is suggesting is a common law process. We're at...we don't have a lot of precedent but you would look to what were the facts on the prior cases. Um, proximate causation is another thing I think we would have to ask. If there are multiple defendants involved that had a part of that dam and multiple things happening, how much of the harm is really attributable...

JUDGE FLETCHER: What are we supposed to do with the argument that the State makes that, I confess, has some force for me, that this order, while it may be beneficial to the salmon has limited impact in certain areas, certainly for streams in which there are other impediments, either other culverts or other impediments that are human made and that there are a lot of better ways to do this. But how do you respond to that?

SLEDD: Well I'll talk about the other barriers first, and then we'll talk about sort of the overall better ways to do it. The state did not give the District Court the benefit of recommendations on how to accommodate these concerns. When it was asked at trial, at closing, tell me how long it would take you to come up with your own plan how to remedy this problem. State's counsel twice declined to do so and said no injunction should issue. It's hard to fault the District Court for then proceeding without some of these more specific ideas that are being advanced now...

JUDGE EZRA: Your position is kind of an all...Look, I'm not unsympathetic to these issues. I mean, I'm the judge that issued the order blocking the damming of the Snake River which the United States never appealed. So we don't have dams on the Snake River in the manner that they were going to be. But in this case you're taking the position that any action by the State that impedes in any way salmon violates a treaty. Period. No ifs, ands or buts. Aren't you?

SLEDD: I think the position is it has to be a legally significant violation. We're not saying every little, trivial thing and it has to be that...

JUDGE EZRA: Where do you draw that line? And that gets where...that actually arches right back to Judge Fletcher's question – what about these culverts, which under the injunction will have to be fixed, that have a *de minimis*... the fixing of the culvert at some great expense would have a *de minimis* impact on saving salmon.

SLEDD: I think if you examine the record as a whole you'll be hard pressed to find any biological support for the notion that there is a culvert out there that doesn't adversely affect the fishery.

JUDGE EZRA: Well that puts you right back to where we started again. Adverse to what degree? And that's the problem. You're taking the position, as I suggested before, that to any degree is sufficient, which would, as I think...and I'm not going to speak for Judge Fletcher, but, you know, you could then attack, if we were to rule for you and uphold that principle, you could attack in the courts for years to come the construction of virtually every dam in the State of Washington. Virtually every hydro-electric plant. Virtually every construction site. Every bridge on the theory that "a" fish, or some fish might not get down it. And then, what are you litigating? Whether it's *de minimis*. And what is *de minimis*?

SLEDD: I think that the *de minimis* is the threshold question. There's also a question of what the moderate living is, which is the State did not attempt to argue here, but it's certainly a defense available. But even assuming, and this is the first injunction that's come up under this theory in 45 years that's been pending in *U.S. v. Washington*. I don't think the Tribes are leaping to jump on every little problem out there. This is a major problem. It's described by the biologists as the number one priority after protecting adequate habitat. What the District Court did, it factored in exactly those concerns. If you look at the injunction with regard to the state Department of Transportation, it is tailored so the State can decide which culverts makes most sense to fix. It can set aside, Department of Transportation, of its 800 that block more than 200 meters, up to 10 percent of the blocking habitat. And the evidence is that's about 250, almost a third of the culverts. The State can set them aside. They're not subject to a deadline. They'll get corrected if the State goes in and builds a new one, or if state law requires them to be corrected. So the judge had specific evidence and drew that equitable line about what is appropriate and not appropriate to require to be fixed under the schedule he set, so that's I think exactly what *Winans* calls for and that's the job you, as a District Judge, I know it's not always easy to look at all that evidence and someone has to draw a line.

JUDGE EZRA: You're saying that injunction took culvert by culvert?

SLEDD: The judge had before him…

JUDGE EZRA: It didn't call…well, should it be culvert by culvert?

SLEDD: Testimony by the state biologist, Mr. Benson, with the Department of Fish and Wildlife was that you cannot ascertain the impact of these culverts individually, one at a time, because the system's too complex. You have to look at it in the aggregate. It's a statewide road network and the design of the culverts is driven by statewide policies and their correction driven by statewide funding and statewide policies, and so a statewide remedy is appropriate under the case law, like the *Lewis* case in that circumstance.

JUDGE FLETCHER: I've read the injunction, of course. We all have. And it is true that the State is under different obligations depending on the situation of the culvert and how much upstream water is available, the 200 meters line, and if it falls into a certain category they must do the work by a certain period. If it falls into the other category, which is obviously drawn in order to allow much slower replacement because the adverse impact on the fish is less. That only happens when the culvert is otherwise going to be replaced or the road redone. I get that. But those are pretty crude lines. Is there anything in the injunction that allows the state to come back in and to say, I understand that this culvert comes within the scope of the mandatory replacement, but in fact it's silly to do it. Can the State do that under the terms of the injunction with respect to sort of a particular culvert?

SLEDD: The State could do two things. First, it could obviously go to the Tribes and say this doesn't make sense. We're all in this business together. But they could also make a motion under Rule 60 under the *Ruffo* decision to come in and modify. That is there for precisely those sort of things where…

JUDGE FLETCHER: And has the District Judge indicated or invited such motions? I understand that such motion would be possible.

SLEDD: The District Judge delayed his injunction for three years after trial, and if you read his Memorandum of Opinion, indicates he was hoping the parties would settle. There was a substantial amount of time for the State to come in during that period and make a recommendation for something different which it did not do. If anything, it slowed down the path it was already on.

JUDGE FLETCHER: Did you want to save some time for the Government?

SLEDD: I want to save the time for my colleague with the United States, so if there are no further questions, that will be all. Thank you.

SHILTON: May it please the Court, I'm David Shilton, representing the United States. The United States is here in its capacity as trustee for the Tribes, as it has acted throughout the *U.S. v. Washington* litigation, and we agree here that the treaties do impose a duty to refrain from building or maintaining road culverts so that they block passage of fish in a way that diminishes the fish that are available for harvest by the Tribes and I agree with Mr. Sledd that the critical thing is to look at what the Indians would have understood was the promise made to them.

When they reserved the right of taking fish they were told that they would have this right to sustain themselves from the fish runs in perpetuity. And the Supreme Court I think has made clear that what that meant is that other parties cannot crowd them out of their right to take fish and rely on those fish. That means that the State cannot allow overfishing, cannot allow other fishermen to take more than half because that takes away from the Indians' right to sustain themselves. And this is really not so different, I think. If the State is maintaining culverts which block the fish, that takes the fish in the same sort of way. They're not available for continued harvest by the Tribes

JUDGE FLETCHER: Let me ask the same question to you that I asked Mr. Sledd. Why doesn't the principle that supports this injunction also go to dams? Can the Tribes or the United States acting as representative or trustee litigating on behalf of the Tribes come in and ask that dams owned or controlled by the State or localities of the State be removed?

SHILTON: We agree with Mr. Sledd that it could mean that. It will depend on the facts. As Phase II indicates, each case has to be taken on its own facts. So it will depend on is the effect more than *de minimis*. Road culverts, you know, can be built in a way that pass fish without harming them. Dams might be a slightly different factual situation, and that by necessity they'd have to block the stream in order to accomplish what they're going to do. It's...I can't predict how a court will interpret the right in that case. The court would also have to look at whatever legislation authorized the dam. Some of that legislation for the federal dams does specifically abrogate treaty rights. Others may not. It will be a case-by-case inquiry, but I think the same principle probably does apply.

JUDGE FLETCHER: You know it strikes me as at least anomalous. I understand the law on the point, that the State is forbidden from doing anything that would violate its treaty obligations or from abrogating the treaty. The United States, however, as a party to the treaty can abrogate the treaty and build any dam it wants to.

SHILTON: Well, Congress does have that ability to abrogate. It generally does so with compensation. But the United States, of course, is subject to the treaty duties...

JUDGE FLETCHER: But by the very nature of a treaty, the United States can abrogate its treaty obligation.

SHILTON: It can, but with regard to culverts the federal agencies recognize that they need to repair their barrier culverts and they are working on that. The question, though, of whether what the United States is doing affects the Tribes'...the liability of the State. It's simply not relevant to that...

JUDGE FLETCHER: Is the United States in this suit in any other capacity than as trustee representing the Tribes?

SHILTON: No. Just as trustee. That's why we're here...

JUDGE FLETCHER: Is that the answer to the recoupment question?

SHILTON: Well that's one answer, is that we are forwarding the Tribes' right and the Tribes' right should not be affected by the United States' action. But the other answer is the only type of counterclaim you can bring against the United States in any suit is a recoupment one and the counterclaim here was not one that sounds in recoupment. If you look at the counterclaim, which is found in the excerpts of record at ER997-1000, what the State was asking for is affirmative relief. Is declarations that the United States has not repaired its culverts and should be required to do so.

JUDGE EZRA: I thought what they were asking for is if they have to go out and spend this money having followed plans and specifications mandated by the federal government for the building of highways, back in the interstate highway days under the Eisenhower Act, that they should be able to recoup from the United States the cost and expenses of those remediations that were caused as a direct result of the United States requiring them to do something that the United States now says they shouldn't have done.

SHILTON: So, two answers to that. That sort of indemnification or contribution sort of action I don't think is what was the plan and what was before the District Court when it dismissed the counterclaims, but in any event, I don't think that would qualify as recoupment. To be recoupment it has to arise from the same transactions as what the United States is suing over. We are suing over failure to maintain the culverts and I think the counterclaims relate to a different set of transactions and the exception to the rule, that you need a waiver of sovereign immunity to sue the United States, is a narrow one, and I've never seen it applied in cases except where the United States is directly seeking some sort of monetary relief.

JUDGE EZRA: Would they go to the Court of Claims or something?

SHILTON: The state... I don't think they would have a cause of action because only the Tribes would have standing to say that the United States is not fixing its culverts and we want compensation. I can't think of any other cause of action they might have to deal with actions of the United States back before the 1990's in approving culverts.

JUDGE FLETCHER: We've got two questions going on here, at least as I see it, under recoupment. As I looked at the original claim for recoupment by the State of Washington, it was really kind of a sauce for the goose, sauce for the gander argument. Look, United States, if you want us the take care of our culverts you'd better take care of yours. That's pretty clearly not recoupment in the sense required for getting out from under sovereign immunity. But they're now arguing, we're not trying to get you to remove your culverts, we're trying to get you to pay for at least part of the cost of redoing our culverts. Now, was that ever plead?

SHILTON: I don't believe that one was ever plead. Their plea was, yes, sauce for the goose, sauce for the gander. But in any event, even if it was plead, I don't think there's an indemnification claim like that. I don't know what it would... line of authority it would rely on.

JUDGE FLETCHER: Well and part of that goes back to my question of whether the United States is suing in any other capacity than as representative of the Tribes.

SHILTON: No, and it's not. And for that reason the waiver defense doesn't work. It's well established in this Court's cases, including the *Shellfish* case and the *City of Tacoma* case that when the United States sues on behalf of the Tribe as trustee that the actions of the agents of the United States can't be held to estop the United States from bringing that suit and that was part of the *Winans* case, in fact.

JUDGE FLETCHER: The question I'm now asking would assume that somehow that some version of the recoupment would be allowed to go forward, which I'm not sure is true, but I want to ask the question about what the United States either required or permitted with respect to culverts. It's clear from the record that the United States said "these" culverts would satisfy any requirements that we have and the State complied with those requirements. Does the record tell us anything about whether or not culverts that would have protected the fish would have been forbidden by the United States or was the United States merely saying if you do this, you will take care of the requirements that we have. You might do something else. What do we know?

SHILTON: I believe that the record would show that the United States, the Federal Highway Administration was simply saying that if you comply with our standards you meet our requirements, which were basically for safety and for preventing flooding, that sort of thing. But was not saying you can't go beyond this. It was a minimum standard…

JUDGE FLETCHER: At least my present sense of the record is there's nothing in the record that would show that the State was forbidden at the time of constructing these culverts, from making culverts that would allow free passage of fish. That's my reading of the record and it's a big record and I've not read the whole thing.

SHILTON: I believe that is a correct reading, Your Honor.

JUDGE GOULD: So I have a procedural issue request. If, on some theory or another, we were to hold that the State of Washington should be entitled to proceed against the federal government, under some sort of contribution or recoupment theory that did get passed, sovereign immunity with that. Where would that leave the federal government in its ability to bring this suit on behalf of the Tribes?

SHILTON: Well, I presume it wouldn't keep us from bringing the suit, but it would seem that such a… that sort of claim would have to be brought in the Court of Claims. It's a mon… if they want to bring a monetary claim. I don't think that would affect our ability to sue on behalf of the Tribes for injunctive relief. So I think we could still do that and certainly the Tribes could sue for injunctive relief whatever our actions have been or whether or not the State has a claim against us.

JUDGE GOULD: Ok. Thank you.

SHILTON: Thank you.

JUDGE FLETCHER: This is another question that goes to the possible scope of the underlying principles. There's evidence in the record that the culverts are a so-called number two priority. Number one priority being protection and preservation of habitat. How far does this go? For example, can the State be required under this theory of you cannot unduly interfere with the fishery. Can the state be required to adopt regulation that prohibits development close to streams, that requires the preservation of trees that shade the streams. I mean, how far does this go? Not with respect to blocking access to the streams, but otherwise protecting the streams?

SHILTON: As we see this right, it's a purely negative one. It says to the State you can't take action which blocks fish passage. It's not a positive right that says the State is responsible for restoring habitat or restoring the fish. The District Court did not put it in those terms at all. This is only about actions of the State that have a direct effect on the fish runs by blocking a certain amount of habitat. And it's limited because the District Court only included culverts that were on the State's own list of culverts that needed to be fixed.

JUDGE FLETCHER: And culverts under state owned or operated roads.

SHILTON: That's right. The State has no obligation for culverts of other entities. It only needs to fix its own culverts that it recognized need fixing. This is really only about the fact that the State has not proceeded in an expeditious enough manner and as the District Court said at the present pace the State would not be fixing the culverts for over a hundred years. So that's really I think what it comes down to.

Thank you.

JUDGE FLETCHER: Thank you very much. Now we took the other side over as I very much expected. Let's put five minutes on the clock, that is overtime for you, too.

PURCELL: Thank you, Your Honor. I have four points I'd like to make if time allows, but I understand if that's impossible.

So first I'd like to talk about the recoupment counterclaim. I'm going to quote from excerpts of record 993. The State described the U.S. role in funding and approving culverts. Not quoting yet, sorry. And then went on to say "if the State's actions do not satisfy some treaty–based duty, the State has reasonably relied to its detriment on the actions of the United States. The United States has a duty to pay all costs incurred by the State to identify and fix any and all barrier culverts." So the United States was on notice that we were…

JUDGE FLETCHER: What were you reading from?

PURCELL: From our counterclaim and answer at ER993. And we went on to say …

JUDGE EZRA: You were seeking indemnification, basically, is what you were doing?

PURCELL: I mean, to be fair we were seeking a lot of things, Your Honor. We didn't know exactly how the case was going to take shape…

JUDGE EZRA: You're seeking indemnification and contribution?

PURCELL: Yes. In that particular place. We also later in our counterclaim asked for any other relief that the court deemed equitable, which it certainly could include this, as well, if we hadn't said it specifically. So we made a wide range of points, again, because we didn't know how the case was going to shape up. Now also on recoupment, the fact... first of all, the U.S. is bringing this case on its own behalf and as representative of the Tribes. That's very clear from the original Boldt opinion 384 F.Supp. at 327. That's how they've always portrayed this. Even if they were only bringing it on behalf of the Tribes, there's no...they haven't cited any case that says you can't then bring a recoupment claim against the United States in that posture. There's no case that says that so I'm not even sure why that would be relevant. And the last thing on recoupment, Your Honor, Judge Fletcher, you've asked several times about whether we were required or just allowed and I'm honestly not sure but again keep in mind this claim was dismissed before we had any chance to develop evidence about it. So we should at the very least have a chance to develop some evidence about whether it was required or simply approved. So, moving on. Another point, Your Honor...

JUDGE GOULD: On that point, though...

PURCELL: Yes.

JUDGE GOULD: The government it seemed to me was arguing that if you had such a claim you might have to assert it in the Court of Claims, not in this action. And I take it if I've read the government's statement right, that you don't agree with that.

PURCELL: Absolutely not, Your Honor, this Court and many other courts have held that you can bring a recoupment counterclaim. The federal government, by suing us waived its sovereign immunity as to recoupment counterclaims. This is a recoupment counterclaim under this court's tests, and it can be brought here.

JUDGE GOULD: So you want us to say that the federal government can be invited to join the party if there's liability under the treaty?

PURCELL: Well again, Your Honor, they designed the culvert. They told us to use this design...

JUDGE GOULD: So what's the answer to the question? I asked the government...if that were the case where would that leave their ability to bring this suit on behalf of the Tribes?

PURCELL: It wouldn't diminish the right of the Tribes, Your Honor, it would just go to who has to bear the burden of paying for fixing these culverts. I mean, we're not saying that...As part of our counterclaim, we're not saying the government can't sue us about this. We're saying that if these culverts violate the treaties they should have to pay part of the cost of fixing them because they specifically gave us the design to improve them. That's the heart of our...

JUDGE GOULD: If that were the case, would the government not have a conflict of interest in bringing the suit?

PURCELL: Well it might.... I suppose it might have a... It's already brought the suit, Your Honor, I mean I think it's already brought the suit. I mean the federal government has already decided to take that chance. By filing this case it opened itself up to recoupment counterclaims.

JUDGE GOULD: Okay.

PURCELL: The next point, Your Honor, is that Judge Fletcher asked about could the State completely destroy the fish, and I guess I want to go back to one…excuse me. Sorry [walks away from dais and returns]. In this Court's 1975 panel decision before it went up to the Supreme Court in *Fishing Vessel*, this Court said, and this is at 520 F.2d 685. This Court said "neither the treaty Indians nor the State on behalf of its citizens may permit the subject matter of these treaties to be completely destroyed." And that was based on some sort of property law concept. It's unclear whether that reasoning survives the *Fishing Vessel* decision, but we would be entirely comfortable with the Court adopting that principle here that neither side can completely destroy the rez…the fish. But again there's no need why you need to impose that rule because the State would never do that anyway. I mean, we have …

JUDGE FLETCHER: I think you've just gone back on your previous answer.

PURCELL: Well, Your Honor, I'm saying you could go back and adopt this rule. I'm saying it's not supported by the current caselaw. This isn't…

JUDGE FLETCHER: Just a…I think I heard you just say the State would be perfectly comfortable with our adopting that idea that neither side has the right completely to destroy the fishery. Did I misunderstand you?

PURCELL: I'm saying that the State would…that would be an acceptable principle to the State for the current trial. I'm not saying that is supported by the treaties. I'm saying that would be a reasonable approach. Much more reasonable than what the District Court did. I'm not advocating it. I'm just saying if the Court feels that there needs to be some backstop, we would suggest that it be that instead of this…the last point I'd like to make…this…

JUDGE FLETCHER: Actually you said you had four. You're five minutes in, but please make the other two that you'd like to make.

PURCELL: Thank you, Your Honor. You're right. I do have two more, actually. The second to last is line drawing. You've asked a number of questions about line drawing. And it's a major, major problem with the District Court's injunction. Line drawing is really, primarily a policy decision for the federal Congress, executive agencies, and state government specifying the design for culverts or choosing, you know, in the future, logging rules or development rules or zoning patterns. Those are policy decisions. The federal government has the power to effect those through law, through regulations, through funding. They should be left to be worked out through those mechanisms, not through the District Court. This case has been going on for 45 years. Under the District Court ruling it's going to go on for at least 45 more. And every one of those things is going to be the subject of litigation. So that's just yet another reason to not find a treaty obligation when it's not necessary.

And the last point I'll add, Your Honor, is that the other side has talked a lot about that the evidence of direct effect from culverts on salmon. And the reality is if you look through the record you will find that there is truly no compelling evidence that state culverts have contributed significantly to the diminishment in salmon runs that have happened over time. The first large declines happened in the late 1800's and early 1900's, long before the State was building culverts. And if you look... Could I just point you to the Sockeye salmon harvest...

JUDGE FLETCHER: There are many ways to destroy a salmon run. Culverts is only one.

PURCELL: And I guess I'd just say, Your Honor, if you look at the Sockeye harvest. 90 percent of that harvest comes from the Frasier River in Canada. And in 1985 the Tribes harvested, where the State has never built a culvert, the Tribes harvested 1.5 million Sockeye in 1985. They harvested 20,000 in 1999. So a 1.5 million swing in fish with not a bit of it attributable to State culverts. That's, I mean, that's just one piece of evidence of how there truly is no evidence that state culverts on their own have contributed significantly to the diminishment in salmon.

So those are the points I wanted to make, Your Honor. If you have any other questions, I'm happy to answer them.

JUDGE GOULD: I have one question. If we were to vacate the permanent injunction and remand to the District Court to answer some more questions, what would be your position as to what would be the questions that have to be answered that weren't answered in the prior proceedings?

PURCELL: I hope you'll forgive me if my answer's a little bit long. First, I guess we'd say the treaty right needs to be defined. If the Court's going to define the treaty right, which again we would disagree with. It needs to be defined far more clearly and far more narrowly. It needs to focus on specifically on state culverts where there is some showing that the state culvert itself is blocking salmon from getting to a usual and accustomed fishing area because otherwise there's really no evidence that the state culvert is causing any meaningful harm to the Tribes. So the first would be to narrow the injunction to focus on where state culverts are by themselves.... Sorry, not narrow the injunction. Narrow the right, the treaty right to where state culverts by themselves are actually causing harm. Blocking access to a usual and accustomed fishing area.

The second would be to reinstate our counterclaim.

The third would be to narrow the scope...to direct the court to narrow the injunction to focus on...to defer to give far more deference to the State's priority system and to culverts that will actually make a difference.

JUDGE FLETCHER: Now on to that one. Is it...did I mishear or was it misstated? I thought I heard that you had been invited in the litigation before the District Court to say precisely that, or do precisely that and you declined to ask for any of that.

PURCELL: Well, two points on that, Your Honor. First of all, we were opposed to any injunction. We remain opposed to any injunction.

JUDGE FLETCHER: My question is not that. My question is when you were invited to ask about how the injunction ought to be structured my understanding is you said we're not going to play that game because we think that the injunction is improper. Am I wrong?

PURCELL: We did oppose the entry of any injunction. We did not propose a narrow injunction. But that has not…

JUDGE FLETCHER: So I'm right. You did not ask in the District Court for a different form of injunction. You just said no injunction.

PURCELL: We did not propose a narrow injunction, Your Honor, but there's no case…the Plaintiffs have not.

JUDGE FLETCHER: So you want the chance now to do something that you declined previously to do.

PURCELL: Well, Your Honor, the other side is claiming that we waived the right to make this argument here and they have not cited a single case holding that, and that…

JUDGE FLETCHER: I'm not asking about waiver, but I just want to make sure. You're asking now for a right to do something you previously declined to do.

PURCELL: Well, Your Honor, I don't think…

JUDGE FLETCHER: Is that right?

PURCELL: We did not know that the District Court was going to rubberstamp the injunction that the other side proposed. That is widely overbroad, and we shouldn't lose the opportunity to challenge the overbreadth and wastefulness of the injunction.

JUDGE FLETCHER: You had no idea of what the State was proposing for an injunction?

PURCELL: I'm sorry?

JUDGE FLETCHER: You had no idea as to what the State was proposing for an injunction?

PURCELL: Of what the..sorry of what the other side was proposing?

JUDGE FLETCHER: Excuse me, I misspoke. You had no idea of what the Tribes and the government were proposing for an injunction?

PURCELL: Well, Your Honor, we had…

JUDGE FLETCHER: You never saw it?

PURCELL: Your Honor, I apologize that I was not part of the trial team. I do not know that level of detail about the…

JUDGE FLETCHER: I would be astounded if your trial people never saw that injunction and the first time they saw it was when it was signed and issued.

PURCELL: I agree with that, Your Honor, but the District Court had already promised us that equitable considerations would play a role in any injunction. We had already made a lot of the points about how fixing culverts makes no difference if there's another culvert ten meters upstream and ten meters downstream. We had already made a lot of the points that we hoped would inform the District Court's entry of the injunction in the remedies faced so it's not as though we just invented all this stuff later. This stuff is all in the record. All these problems are in the record. We just thought that no injunction was warranted and we opposed any injunction and… but that doesn't mean that the District Court didn't get it wrong. So that's our argument on that, Your Honor.

So, in conclusion we just ask that you reverse the District Court's creation of this new treaty right, or at the very least that you remand for consideration of our counterclaims and for a significantly narrower injunction and narrower definition of the treaty right. Thank you.

JUDGE FLETCHER: Ok. Thank you very much Thanks for very good argument on both sides for a very difficult case. *United States vs. State of Washington* now submitted for decision and we are in adjournment.

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Table 217. **Per Capita Consumption of Major Food Commodities**

[In pounds, retail weight, except as indicated. Consumption represents the residual after exports, nonfood use and ending stocks are subtracted from the sum of beginning stocks, domestic production, and imports. Based on Census Bureau estimated resident population plus Armed Forces overseas for most commodities. For commodities not shipped overseas in substantial amounts, such as fluid milk and cream, the resident population is used]

Commodity	Unit	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Red meat, total (boneless, trimmed weight) \1, \	Pounds	126.4	124.9	112.2	113.6	113.7	111.4	114.1	111.7	112.2	110.2	109.9	110.5	106.6	105.7
Beef	Pounds	72.1	74.6	63.9	63.5	64.5	63.1	64.5	61.9	63.0	62.5	62.8	62.1	59.6	58.1
Veal	Pounds	1.3	1.5	0.9	0.8	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3
Lamb and mutton	Pounds	1.0	1.1	1.0	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7
Pork	Pounds	52.1	47.7	46.4	48.4	47.8	47.0	48.2	48.5	47.9	46.6	46.0	47.2	45.9	46.6
Poultry (boneless, trimmed weight) \2	Pounds	40.8	45.6	56.2	62.1	67.9	67.8	70.8	71.3	72.8	73.7	74.2	73.7	72.6	69.4
Chicken	Pounds	32.7	36.4	42.4	48.2	54.2	54.0	56.8	57.5	59.3	60.5	60.9	59.9	58.7	56.0
Turkey	Pounds	8.1	9.1	13.8	13.9	13.7	13.8	14.0	13.7	13.5	13.2	13.3	13.8	13.9	13.3
Fish and shellfish (boneless, trimmed weight)	Pounds	12.4	15.0	14.9	14.8	15.2	14.7	15.6	16.3	16.5	16.2	16.5	16.3	16.0	15.8
Eggs	Number	271	255	234	232	251	252	255	255	257	256	258	250	247	246.1
Shell	Number	236	216	186	172	172	175	175	178	177	173	177	171	170	172.9
Processed	Number	35	39	48	60	79	77	79	77	80	83	81	79	77	73.2
Dairy products, total \3	Pounds	543.1	593.6	568.0	576.2	591.1	585.2	585.7	594.0	591.2	597.5	606.1	603.1	603.7	607.1
Fluid milk products \4	Gallons	27.9	27.1	26.2	24.6	23.2	22.8	22.8	22.5	22.3	22.2	22.2	22.0	22.1	22.0
Beverage milks	Gallons	27.6	26.7	25.7	23.9	22.5	22.0	21.9	21.6	21.3	21.0	20.9	20.6	20.7	20.6
Plain whole milk	Gallons	16.5	13.9	10.2	8.3	7.7	7.4	7.3	7.2	7.0	6.6	6.5	6.1	5.9	5.7
Plain reduced fat milk (2%)	Gallons	6.3	7.9	9.1	8.0	7.1	7.0	7.0	6.9	6.9	6.9	6.9	6.9	7.3	7.3
Reduced fat milk (1%) and skim milk	Gallons	3.1	3.2	4.9	6.1	6.1	5.9	5.8	5.6	5.5	5.6	5.7	5.7	5.7	5.7
Flavored whole milk	Gallons	0.6	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2
Flavored milks other than whole	Gallons	0.6	0.7	0.8	0.8	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.4	1.4	1.4
Buttermilk	Gallons	0.5	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Yogurt (excluding frozen)	1/2 pints	4.6	7.3	7.8	11.4	12.0	13.0	13.7	15.2	17.1	19.1	20.4	21.3	21.8	23.1
Fluid cream products \5	1/2 pints	10.5	13.5	14.3	15.6	18.3	20.0	19.7	22.2	23.5	24.0	24.2	24.7	23.8	23.6
Cream \6	1/2 pints	6.3	8.2	8.7	9.4	11.6	12.8	12.1	13.9	14.8	14.9	15.4	15.7	15.1	15.0
Sour cream and dips	1/2 pints	3.4	4.3	4.7	5.4	6.1	6.5	6.7	7.5	7.9	8.3	7.9	8.2	7.9	7.8
Condensed and evaporated milks	Pounds	7.0	7.5	7.9	6.8	5.8	5.4	6.0	5.9	5.4	5.9	6.4	7.6	7.3	7.1
Whole milk	Pounds	3.8	3.7	3.1	2.3	2.0	2.0	2.3	2.6	2.2	2.2	2.2	2.0	2.2	2.2
Skim milk	Pounds	3.3	3.8	4.8	4.5	3.8	3.5	3.7	3.3	3.2	3.7	4.2	5.6	5.1	5.0
Cheese \7	Pounds	17.5	22.5	24.6	26.9	29.8	30.1	30.5	30.6	31.3	31.7	32.6	33.1	32.7	32.8
American \8	Pounds	9.6	12.2	11.1	11.7	12.7	12.8	12.8	12.5	12.9	12.6	13.1	12.8	13.1	13.4
Cheddar	Pounds	6.8	9.8	9.0	9.0	9.7	9.9	9.6	9.2	10.3	10.3	10.4	10.0	10.1	10.1
Italian \8	Pounds	4.4	6.5	9.0	10.3	12.1	12.4	12.5	12.6	12.9	13.3	13.8	14.3	13.9	13.9
Mozzarella	Pounds	3.0	4.6	6.9	8.0	9.3	9.7	9.7	9.7	9.9	10.2	10.5	11.0	10.6	10.6
Other \8	Pounds	3.3	3.9	4.3	5.0	5.0	4.8	5.2	5.4	5.4	5.6	5.8	6.0	5.6	5.5
Swiss	Pounds	1.3	1.3	1.4	1.1	1.0	1.2	1.1	1.2	1.2	1.3	1.3	1.3	1.1	1.2
Cream and Neufchatel	Pounds	0.9	1.2	1.6	2.2	2.4	2.3	2.4	2.3	2.4	2.4	2.5	2.6	2.5	2.5
Cottage cheese, total	Pounds	4.5	4.0	3.4	2.7	2.6	2.6	2.6	2.6	2.7	2.6	2.6	2.6	2.3	2.4
Lowfat	Pounds	0.8	1.0	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.3	1.3
Frozen dairy products	Pounds	26.4	27.9	28.5	29.0	30.0	28.5	28.1	28.6	25.5	25.7	26.0	25.5	25.2	24.4
Ice cream	Pounds	17.5	18.1	15.8	15.5	16.7	16.3	16.7	16.4	13.8	14.6	14.7	14.2	13.8	13.4
Lowfat ice cream	Pounds	7.1	6.9	7.7	7.4	7.3	7.3	6.5	7.5	7.3	6.7	6.9	7.0	6.9	6.8
Sherbet	Pounds	1.2	1.3	1.2	1.3	1.2	1.2	1.3	1.2	1.1	1.2	1.2	1.3	1.2	1.1
Frozen yogurt	Pounds	(NA)	(NA)	2.8	3.4	2.0	1.5	1.5	1.5	1.3	1.3	1.3	1.1	1.2	1.1
Fats and oils:															
Total, fat content only	Pounds	56.9	64.1	62.3	64.2	81.7	82.7	87.3	86.8	86.4	85.5	84.5	84.8	85.2	78.6
Butter (product weight)	Pounds	4.5	4.9	4.4	4.4	4.5	4.4	4.4	4.4	4.5	4.6	4.7	4.7	5.0	4.9
Margarine (product weight)	Pounds	11.3	10.8	10.9	9.1	8.2	7.0	6.5	5.3	5.2	4.0	4.6	4.5	4.2	3.7
Lard (direct use)	Pounds	2.3	1.6	0.9	0.4	0.8	1.1	1.3	1.3	0.8	1.6	1.7	1.6	1.0	1.5
Edible beef tallow (direct use)	Pounds	1.1	2.0	0.6	2.7	4.0	3.0	3.4	3.8	4.0	3.8	3.9	2.9	2.9	0.7
Shortening	Pounds	18.2	22.9	22.2	22.2	31.5	32.5	32.8	32.5	32.5	29.0	24.8	20.9	18.0	15.9
Salad and cooking oils	Pounds	21.2	23.5	25.2	26.5	33.7	35.6	39.7	40.2	40.0	42.7	44.6	50.2	54.2	51.9
Other edible fats and oils	Pounds	1.5	1.6	1.2	1.6	1.5	1.4	1.4	1.3	1.5	1.6	2.1	1.7	1.6	1.7
Flour and cereal products \9	Pounds	144.9	156.7	181.0	188.7	199.2	194.9	192.5	193.1	191.5	191.3	193.5	196.3	196.6	194.5
Wheat flour	Pounds	116.9	124.6	135.9	140.0	146.3	141.0	136.8	136.7	134.5	134.3	135.7	138.1	136.5	134.6
Rye flour	Pounds	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Rice, milled	Pounds	9.5	9.2	15.8	17.1	18.9	19.2	20.3	20.2	20.2	19.9	20.1	19.9	21.2	21.2
Corn products	Pounds	12.9	17.2	21.4	24.9	28.4	29.0	29.7	30.3	30.9	31.4	31.9	32.4	33.0	33.0
Oat products	Pounds	3.9	4.0	6.5	5.5	4.3	4.5	4.5	4.6	4.6	4.6	4.6	4.7	4.8	4.6
Barley products	Pounds	1.0	1.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Caloric sweeteners, total \10	Pounds	120.2	126.2	132.4	144.1	148.9	147.1	146.2	141.5	141.7	142.2	139.0	135.5	136.1	130.7
Sugar, refined cane and beet	Pounds	83.6	62.7	64.4	64.9	65.5	64.5	63.2	60.9	61.6	63.1	62.4	61.4	65.5	63.5
Corn sweeteners \11	Pounds	35.3	62.2	66.8	77.9	81.8	81.3	81.5	79.1	78.8	77.6	75.0	72.8	69.1	65.7
High fructose corn syrup	Pounds	19.0	45.2	49.6	57.6	62.6	62.5	62.8	60.9	59.8	59.1	58.2	56.1	53.0	50.1
Other:															
Cocoa beans	Pounds	3.4	4.6	5.4	4.5	5.9	5.6	4.8	5.3	6.0	6.5	6.4	6.0	5.6	5.5
Coffee (green beans)	Pounds	10.3	10.5	10.3	7.9	10.3	9.5	9.2	9.5	9.6	9.5	9.5	9.6	9.5	9.1
Peanuts (shelled)	Pounds	5.1	6.5	6.1	5.7	5.8	5.8	5.8	6.3	6.6	6.6	6.5	6.2	6.3	6.5
Tree nuts (shelled)	Pounds	1.8	2.5	2.5	1.9	2.6	2.9	3.3	3.5	3.5	2.6	3.3	3.5	3.5	3.7

SYMBOL:
NA Not available.
FOOTNOTES:
\1 Excludes edible offals.
\2 Excludes shipments to Puerto Rico and the other U.S. possessions.
\3 Milk-equivalent, milk-fat basis. Includes butter.
\4 Fluid milk figures are aggregates of commercial sales and milk produced and consumed on farms.
\5 Includes eggnog not shown separately.
\6 Heavy cream, light cream, and half-and-half.
\7 Excludes full-skim American, cottage, pot, and baker's cheese.
\8 Includes other cheeses not shown separately.
\9 Includes rye flour and barley products not shown separately. Excludes quantities used in alcoholic beverages.
\10 Dry weight. Includes edible syrups (maple, molasses, etc.) and honey not shown separately.
\11 Includes glucose and dextrose not shown separately.

Source: U.S. Department of Agriculture, Economic Research Service, "Food Availability (Per Capita) Data System."

For more information:
http://www.ers.usda.gov/
http://www.ers.usda.gov/Data/FoodConsumption/
Internet release date: 09/30/2011

Fact Sheet for NPDES Permit WA0000124

Weyerhaeuser Longview

October 15, 2014

Purpose of this Fact Sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Weyerhaeuser Longview.

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for Weyerhaeuser Longview; NPDES permit WA0000124, are available for public review and comment from November 18, 2013 until January 17, 2014. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

Weyerhaeuser reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as **Appendix E - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Summary

Weyerhaeuser NR Company operates two separate wastewater treatment plants at Weyerhaeuser Longview which discharge to the Columbia River. The industrial wastewater treatment plant utilizes primary and secondary treatment for process wastewater and stormwater. The sanitary wastewater treatment plant utilizes anaerobic digestion, an overflow aeration lagoon, and disinfection for sanitary wastewater streams. The wastewater treatment facilities accept wastewater generated on the site and from off-site facilities. Ecology issued the previous NPDES permit on May 11, 2004.

Changes to the existing permit include: a stormwater pollution prevention plan; a water supply plant discharge AKART analysis; a cooling water intake report; an outfall evaluation report; a sediment sampling and analysis report; and an outfall 003 and 004 AKART study. The WET characterization required during the first year of the existing permit has been replaced with WET testing once in the last winter and once in the last summer prior to submission of the application for permit renewal.

Parameters with effluent limit changes include: BOD_5 (001/002), TSS (001/002 and 005), AOX (001/002), TCDD (001/002), and chloroform (001/002).

Parameters with new effluent limits include: BOD_5 (003 and 004), fecal coliform (003 and 004), dissolved oxygen (003 and 004), total residual chlorine (005).

Additional stormwater benchmarks have been established for outfalls 001/002 Ditch, Adjacent to Export Dock, Cargo Dock, Export Dock, Raw Water Ditch, and RW Office.

Table of Contents

I. Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to industrial NPDES permits

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC)
- Water quality criteria for ground waters (chapter 173-200 WAC)
- Whole effluent toxicity testing and limits (chapter 173-205 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC)

These rules require any industrial facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A-Public Involvement Information** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in **Appendix E**.

II. Background Information

Table 1 General Facility Information

Facility Information	
Applicant	Weyerhaeuser NR Company
Facility Name and Address	Weyerhaeuser Longview 3401 Industrial Way Longview, Washington 98632
Contact at Facility	Name: Brian Wood Telephone #: (360) 636-7080
Responsible Official	Name: Tim Haynes Title: VP/Mill Manager – Longview Operations Address: PO Box 188, Longview, Washington, 98632 Telephone #: (360) 425-2150 FAX #: (360) 636-6354
Industry Type	Bleached Kraft Pulp and Paper Mill Thermo-Mechanical Pulping, De-Inking, and Newsprint Manufacturing Lumber and Wood Products
Categorical Industry	40 CFR Part 430 Subpart B, G, and I (Pulp & Paper)
Type of Treatment	Industrial: Primary Clarification, Aeration, Secondary Clarification Sanitary: Secondary treatment via anaerobic digestion/overflow aeration lagoon and disinfection
SIC Codes	26 (Pulp and Allied Products) 24 (Lumber and Wood Products)
NAIC Codes	322130 (Paperboard Mills) 322122 (Newsprint Mills) 322110 (Pulp Mills) 321113 (Sawmills)

Facility Information	
	321999 (All Other Miscellaneous Wood Product Manufacturing)
Facility Location (NAD83/WGS84 reference datum)	Latitude: 46.130833 Longitude: -122.990556
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	<u>Columbia River – WRIA 25:</u> Outfall 001/002 Latitude: 46.130833 Longitude: -122.990556 001/002 Ditch (Outfall 006) Latitude: 46.130833 Longitude: -122.990556 Adjacent to Export Dock (Outfall 007) Latitude: 46.111667 Longitude: -122.961111 Cargo Dock (Outfall 008) Latitude: 46.13 Longitude: -122.9775 Export Dock (Outfall 009) Latitude: 46.102778 Longitude: -122.961111 Raw Water Ditch (Outfall 010) Latitude: 46.128056 Longitude: -122.984722 <u>Consolidated Diking Improvement District Ditch #3 – WRIA 25:</u> Outfall 003 Latitude: 46.1175 Longitude: -122.954167 Outfall 004 Latitude: 46.123611 Longitude: -122.963889 RW Office (Outfall 011) Latitude: 46.143333 Longitude: -122.980556

Permit Status	
Renewal Date of Previous Permit	May 11, 2004
Application for Permit Renewal Submittal Date	December 8, 2008 with revisions received December 1, 2009
Date of Ecology Acceptance of Application	January 26, 2009

Inspection Status	
Date of Last Sampling Inspection	June 12, 2014
Date of Last Non-sampling Inspection Date	May 21, 2013

Figure 1 Facility Location Map

06996

A. Facility Description

History

The approximately 700-acre, Weyerhaeuser Longview facility is located in Longview, Washington along the shores of the Columbia River, northwest of the Lewis and Clark Bridge. The site consists of multiple sources of water pollution which discharge to the wastewater treatment facilities. In two separate systems, Weyerhaeuser Longview treats industrial wastewater/stormwater and sanitary wastewater.

On site, Weyerhaeuser NR Company (Weyerhaeuser) owns and operates a:

- Kraft Pulp Mill
- Liquid Packaging Paper Machine
- Extruder Operations
- Saw Mill
- Planer Mill
- Lumber Drying Kiln
- Log Yard and Log Export Operations
- Solid Waste Material Recovery and Transfer Facility
- Log Truck Shop

A thermo-mechanical/de-ink/newsprint mill (NORPAC) operates on-site as a 50/50 joint venture between Weyerhaeuser and Nippon Paper. NORPAC consists of 9 refiner lines and 3 paper machines, located at NORPAC I, II, and III.

Weyerhaeuser accepts additional wastewater for treatment from:

- Columbia and Cowlitz Railway Locomotive Maintenance Shop
- Headquarters Road and Mt. Solo Landfills
- Hasa (sodium hypochlorite repackaging)
- Mint Farm Generation (natural gas fired power generation)
- Eagle US 2 facility, owned and operated by Axiall LLC(chloro-alkali manufacturing)
- Solvay (hydrogen peroxide manufacturing)
- Specialty Minerals Longview (calcium carbonate manufacturing)

Ecology has issued state waste discharge permits to these industrial facilities discharging waste into the Weyerhaeuser Longview wastewater treatment plant. Ecology's authority to issue state permits to these facilities is found in RCW 90.48.160, which state in relevant part:

"Any person who conducts a commercial or industrial operation of any type which results in the disposal of solid or liquid waste material into the waters of the state, including commercial or industrial operators discharging solid or liquid waste material into sewerage systems operated by municipalities or public entities which discharge into public waters of

the state, shall procure a permit from [] the department . . . before disposing of such waste material…"

(*see also* WAC 173-216-040(1)). The statute's broad application is to "any person" and "any type" of industrial facility that ultimately discharges to waters of the state. State discharge permits are appropriate in this case.

Ecology exercised its regulatory discretion to permit the non-Weyerhaeuser facilities individually under state permits, rather than consider them all co-permittees with Weyerhaeuser on Weyerhaeuser's NPDES permit. Ecology considered how administration and enforcement could best be managed in this instance, given the size and nature of the non-Weyerhaeuser facilities. The permitting decision reflects Ecology's determination that each non-Weyerhaeuser facility could be most effectively regulated through individual permits. Ecology has determined that the EPA's Effluent Guideline Limitations (ELGs) meet the requirements of all known, available, and reasonable methods of prevention, control, and treatment (AKART), as required by Ecology.

It should also be noted that 40 CFR 122.3(g), specifically excludes dischargers to privately owned treatment plants from the NPDES permitting process.

Industrial Processes

Bleached Paper Grade Kraft Mill

Weyerhaeuser constructed the kraft mill in 1948. Weyerhaeuser completed mill expansion in 1958 which was followed by optimization projects through 1992. The kraft mill and paperboard machine are referred to as Weyerhaeuser Liquid Packaging. The kraft mill produces approximately 830 off-machine tons (OMT) of bleached paperboard and 365 air-dried tons (ADT) of wet lap each day. Weyerhaeuser Longview generates approximately 25.2 million gallons per day (MGD) of wastewater from the processes that produce these products.

The process begins when pre-steamed wood chips and white liquor (a solution of Na_2S and NaOH), are fed to an impregnation vessel and then a Kamyr continuous digester, where delignification occurs at high temperature and pressure. The first stage of pulp washing is conducted a high pressure in the pressure diffusion washer before being discharged into two atmospheric blow tanks. The unbleached pulp, also known as brown stock, is screened for knots, is washed, and has the black liquor (spent white liquor, lignin, and other organics) removed for the chemical recovery of Na_2S and NaOH.

The brown stock goes through an additional step of delignification in the oxygen delignification systems. The pulp is then bleached at the bleach plant and sent to the paper machines on site or the wetlap pulp machine.

North Pacific Paper Corporation (NORPAC)

NORPAC is a 50/50 joint venture between Weyerhaeuser and Nippon Paper Corporation, producing deink pulp, TMP pulp, and newsprint. NORPAC generates approximately 16 MGD of wastewater for treatment. Approximately one third of the wastewater volume and two thirds of the biochemical oxygen demand (BOD) loading to the industrial wastewater treatment facility originate from NORPAC.

NORPAC I, consisting of Paper Machine 1, TMP Mill 1, and the first four TMP refiner lines, produces thermo-mechanical paper.

NORPAC II, consisting of Paper Machine 2, TMP Mill 2, and four additional TMP refiner lines, produces thermo-mechanical paper. Subsequent to the NORPAC II Project, a ninth refiner line was added in 1982.

NORPAC III, consisting of Paper Machine 3 and the deinking facility, produces thermo-mechanical paper and newsprint de-ink.

Saw Mill

Weyerhaeuser constructed the saw mill in 2008 with a projected production rate of 450 million board feet (MMbf) per year. The maximum production capacity is an estimated 500 MMbf per year. At the saw mill, logs are received then cut. Production at the saw mill is sent to the lumber drying kilns and planer mill for dimensioning and finishing.

Planer Mill and Lumber Drying Kilns

The lumber from the saw mill is either sent to the lumber drying kiln to be dried before being sent to the planer mill or is sent directly to the planer mill to be planed and shipped green.

Extruder

The extruder operation, formerly owned and operated by Pacific Lamination, applies a polymeric coating to paper for use in liquid packaging (milk cartons and drink boxes). Pellets of the polymeric materials (primarily low-density polyethylene) used for coating are shipped to the facility by rail. They are unloaded pneumatically and stored in storage silos.

Paperboard stock, for polymeric coating, arrives in 10-foot diameter rolls and is fed through one of two extrusion lines (Line 6 or Line 7). Each extrusion line consists of a pre-treatment burner, two extruders, and a corona discharge unit. The pre-treatment burners are used to prepare the paper for application of the polymeric coating, ensuring proper temperature, moisture content, and cleanliness. The two extruders in each line apply the polymeric coating to each side of the paper and the corona discharge unit treats the coated paperboard, preparing it for printing.

Material Recovery Facility (MRF)

The Weyerhaeuser Longview facility disposes of solid waste material generated in accordance with Federal, State, and local requirements. Waste is disposed of in a manner which prevents their entry into surface and groundwater. Solid waste materials include: primary treatment sludge, secondary treatment sludge, slaker grits, boiler ash, paper waste, and other miscellaneous waste. Weyerhaeuser handles solid waste at the Material Recovery Facility (MRF) for shipment by truck to the Headquarters Road Landfill. Leachate and stormwater generated is treated through the industrial wastewater treatment plant.

Wastewater Treatment Processes

Industrial Wastewater Treatment

The industrial wastewater treatment system consists of a primary clarifier, three deep aeration tanks, four secondary clarifiers, and an auxiliary retention pond. Total retention time through the system is approximately 24 hours. System components and basic configuration can be seen in Figures 2 and 3.

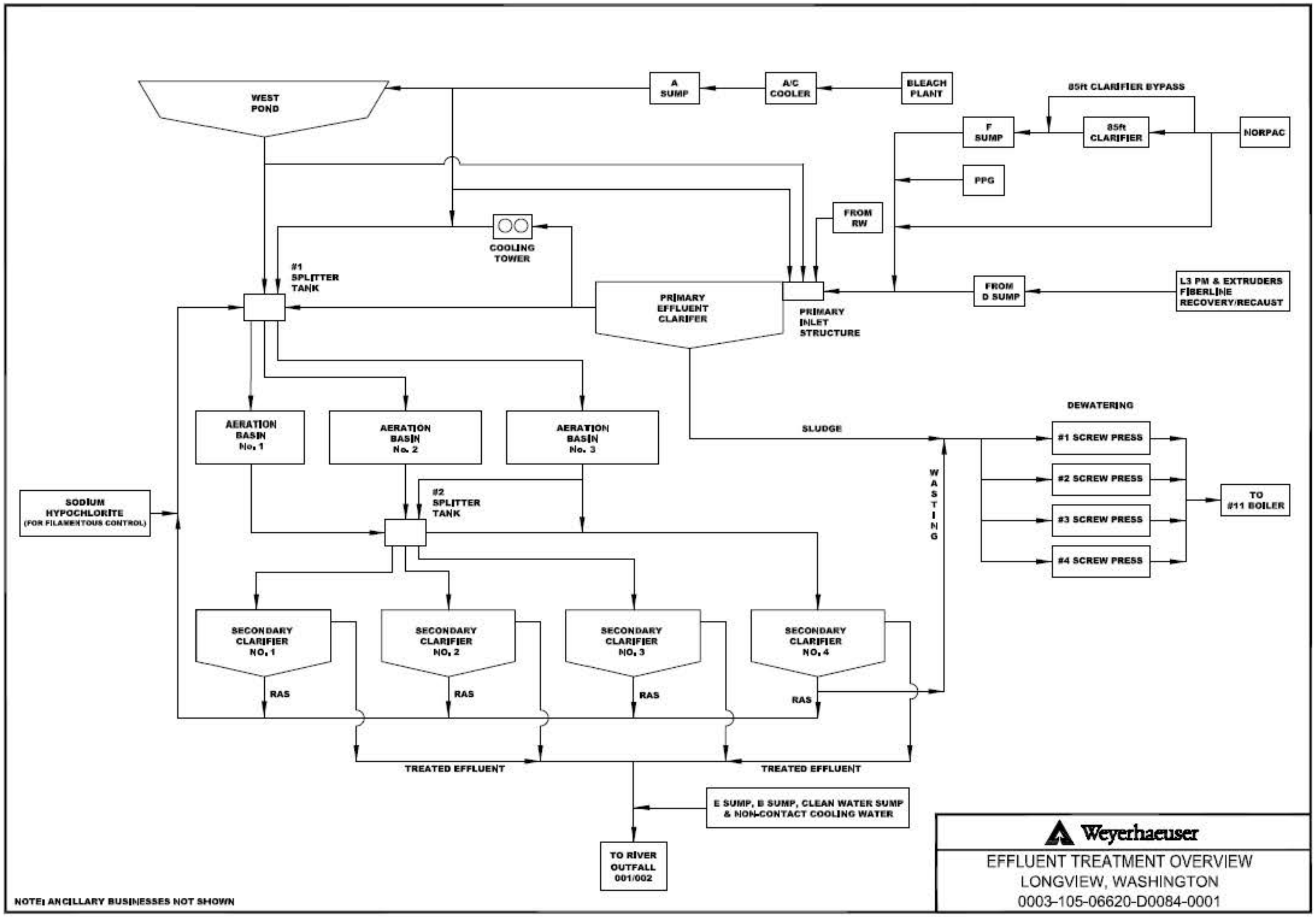
The Weyerhaeuser Longview facility sends wastewater containing high solids-loading to the primary clarifier. The primary clarifier is 295 feet in diameter with a capacity of 7.2 million gallons, producing approximately a 25 percent BOD_5 reduction and an 85 to 98 percent TSS reduction. From the primary clarifier, Weyerhaeuser sends wastewater to either a cooling tower if it is above 97° F and then to the No. 1 splitter, or directly to the No. 1 splitter.

From the No. 1 splitter, the wastewater goes to two or all three deep tanks for aeration. The two original aeration tanks are 5.1 and 7.2 million gallons in size. Weyerhaeuser installed an additional 7.2 million gallon aeration tank for added capacity.

The aerated wastewater is then divided among the four secondary clarifiers, each 210 feet in diameter and having a capacity of 3.9 million gallons. A BOD_5 removal efficiency of 85 to 99 percent is achieved through secondary treatment. Treated water from the secondary clarifiers flows by gravity through a series of above ground pipes to the outfall 001/002 junction box before being discharged through Outfalls 001 and 002. Total effluent discharge from Outfalls 001 and 002 averages 50 MGD.

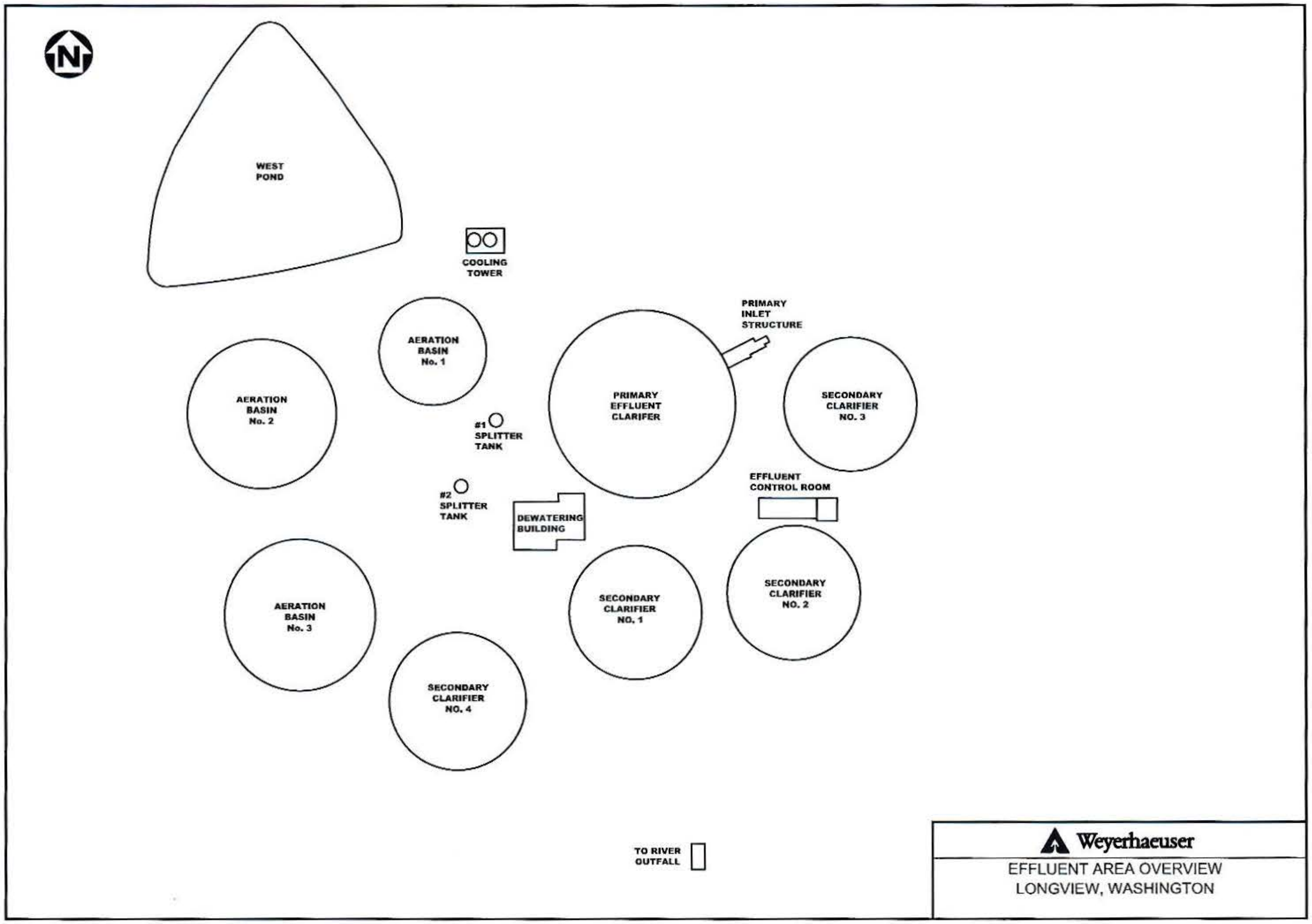
The west pond, located on the northwestern most portion of the site, has a capacity of approximately 11 million gallons. It is used as a clarifier during primary clarifier maintenance and as wastewater storage during upset or potentially hazardous wastewater flow conditions.

Figure 2 Effluent Treatment Overview



07001

Figure 3 Effluent Area Overview



Sanitary Wastewater Treatment

The sanitary wastewater treatment system begins with primary treatment in an Imhoff tank. Solids collected are anaerobically digested in the tank and then disposed of as agricultural boisolids. Overflow from the tank is treated in a 1.6 million gallon aeration lagoon with a 3 week retention time. Overflow from the lagoon goes through a chlorine contact chamber prior to being discharged at Outfall 005. Effluent discharged from Outfall 005 averages 0.06 MGD.

Stormwater Treatment

The Weyerhaeuser Longview facility sends stormwater from process areas to the industrial wastewater treatment system. Non-process stormwater and process water from some truck/equipment washes, dust control, and area wash-up go to Outfalls 003 or 004 for discharge to Consolidated Diking Improvement District Ditch #3 (CDID Ditch #3). Water conveyed to Outfall 003 collects in a detention pond (East pond) for sedimentation before discharge by a v-notch weir structure to CDID Ditch #3. Sodium carbonate is added to the East pond as a pH control measure.

Discharge Outfalls

The Weyerhaeuser Longview facility discharges water through five primary outfalls: 001, 002, 003, 004 and 005. The Bleach Plant Discharge is an internal monitoring point. Information regarding the latitude and longitude of each outfall can be found in Table 1.

Outfalls 001 and 002 are located on the western portion of the Weyerhaeuser Longview site. They are parallel, pile-supported, wooden stave pipes which extend into the Columbia River at an approximate angle of 35 degrees relative to the shoreline. Outfall 001 is 840 feet in length, 54 inches in diameter, and ends with a 320-foot, submerged diffuser section. Outfall 002 is 1,490 feet in length, 48 inches in diameter, and ends with a 300-foot, submerged diffuser section. The outfalls discharge non-contact cooling water, filter bed backwash, and industrial and sanitary wastewater treatment facility effluent. The non-contact cooling water, filter bed backwash, and industrial wastewater streams combine at the Outfall 001/002 junction box prior to discharge through Outfalls 001 and 002. The sanitary wastewater stream combines with the Outfall 001 effluent after the junction box.

Outfall 003 is located on the southeastern-most portion of the site along Industrial Way. Stormwater from the southeastern portion of the site, truck/equipment wash water, dust control water, and area wash-up water collect in a detention pond (East Pond) prior to discharge, by a v-notch weir, into CDID Ditch #3.

Outfall 004 is located along Industrial Way, northwest of Outfall 003. Stormwater from the central portion of the site, car/truck wash water, dust control water, area wash-up water, process cooling/HVAC water, and equipment wash water discharge by a v-notch weir prior to conveyance to CDID Ditch #3.

Outfall 005 is an internal outfall that is located at the sanitary wastewater treatment facility, west of the kraft mill and south of the industrial wastewater treatment facility, along the shores of the Columbia River. Outfall 005 is piped into the wood stave pipe of Outfall 001 and discharges into the Columbia River through the 001 diffuser.

Minor stormwater outfalls receive no treatment prior to discharge. These outfalls include:

- 001/002 Ditch (Outfall 006) which discharges into the Columbia River.
- Adjacent to Export Dock (Outfall 007) which discharges into the Columbia River.
- Cargo Dock (Outfall 008) which discharges into the Columbia River.
- Export Dock (Outfall 009) which discharges into the Columbia River.
- Raw Water Ditch (Outfall 010) which discharges into the Columbia River.
- RW Office (Outfall 011) which discharges into CDID Ditch #3.

Raw Water Treatment Processes

Water Supply Plant

The water supply intake is located on the shore of the Columbia River southeast of the sanitary wastewater treatment plant. Raw water from the Columbia River travels through bar screens and a travelling screen. The wire cloth openings on the travelling screen are 1/8th inch. The design face velocity for the traveling screens is 1.47 feet per second.

After the travelling screens, the water is pumped to four separate water treatment plants. The water is pretreated by the addition of sodium hypochlorite (disinfection), alum (flocculent), and sodium silicate (coagulant). The water is treated in sedimentation basins, followed by filtration through sand filters. The sand filters are backwashed on a 24 to 27 hour frequency; backwash is discharged through the 001/002 outfalls. The sedimentation basins are washed out annually; washout is discharged through the 001/002 outfalls.

Weyerhaeuser uses the finished water to satisfy its manufacturing water demand. In 2012, average daily water intake rate was 57.8 million gallons per day (MGD). The maximum daily water intake rate in 2012 was 77 MGD. In 2012, Weyerhaeuser discharged approximately 4.6 MGD of cooling water from Outfalls 001 and 002.

The sediment loading to Weyerhaeuser Longview's water supply plant are unique due to conditions resulting from the eruption of Mt. St. Helens. Based on this unique sediment loading, the Pollution Control Hearing Board determined that Weyerhaeuser Longview should be permitted to discharge filter backwash and basin washout into the Columbia River (Decision No. 85-220). In the late 1980's, a sediment retention structure (SRS) was put in place on the Toutle River to trap sediment from the Mt. St. Helens eruption. The SRS has since filled and sediment loading to the Toutle, Cowlitz, and Columbia River has increased and continue to put additional demands on Weyerhaeuser Longview's water supply plant.

B. Description of the Receiving Waters

The Weyerhaeuser Longview facility discharges to the Columbia River near river mile 63.5 and CDID Ditch #3. Other nearby point source outfalls include those belonging to Longview Fibre, the Three Rivers Regional Wastewater plant, and the City of Rainier wastewater treatment plant. The discharges for Longview Fibre and Three Rivers Regional Wastewater plant are located approximately 4 miles upstream from Weyerhaeuser Longview. The discharge for the City of Rainier wastewater treatment plant is approximately 3 miles upstream and across river from Weyerhaeuser Longview.

Significant nearby non-point sources of pollutants include livestock and silviculture runoff into the Cowlitz River which discharges into the Columbia River upstream of Weyerhaeuser Longview.

The drinking water intake for the City of Rainier, Oregon is located on the Columbia River, approximately ¼ mile upstream from the City of Rainier wastewater treatment plant. The City of Longview does not have an active drinking water intake on the Columbia and will be switching to groundwater sources in the Mint Farm area in the near future.

Designated uses of this section of the Columbia River include: fish spawning, rearing, and harvesting; primary contact recreation; water supply (domestic, industrial, agricultural); stock water; wildlife habitat; commerce and navigation; and boating and aesthetic enjoyment (WAC 173-201A-602). These uses will be discussed in detail later in the fact sheet.

The ambient background data used for this permit includes the following from the *Outfall Dilution and Temperature Study* dated January 20, 2004 prepared by CH2M Hill, the *Receiving Water Study* dated October 30, 2008 prepared by Integral Consulting, the *Fact Sheet for NPDES Permit WA0037788, Three Rivers Regional Wastewater Authority* dated 2007 prepared by Ecology, and USGS's *Water-Data Reports* dated 2007, 2010, and 2011.

This permit does not require Weyerhaeuser Longview to conduct an additional receiving water study. The United States Geological Survey (USGS) collects ambient water data from the Beaver Army Terminal station. This data is sufficient to characterize the ambient water quality and provides conservative values for calculating water quality based effluent limits. In the event that data collection at the Beaver Army Terminal station is terminated and Ecology deems the data will no longer be representative at the time of permit expiration, Ecology may require a receiving water study be conducted by Weyerhaeuser Longview, if practicable.

CDID Ditch #3 is part of a 35 mile system of sloughs, ditches, and drains for the purpose of stormwater collection and routing. Seven pump stations located along the ditches discharge the water to the Columbia River. Flow direction in the ditch system is variable and dependent on pumping station activity. CDID Ditch #3 has been placed on the 303(d) list for impaired waters for low dissolved oxygen concentrations. The ditch has also been listed as a water of concern for fecal coliform and turbidity.

Table 2 Ambient Background Data

Parameter	# of Samples	Value Used
Temperature (90th percentile annual 1-DADMax) [a]	--	20.96 ° C
pH (Maximum / Minimum) [b]	--	8.3 / 7.32 standard units
Dissolved Oxygen [c]	347	7.9 mg/L

Table 2 Ambient Background Data

Parameter	# of Samples	Value Used
Phosphorus, unfiltered [f]	24	0.05 mg/L as P
Sulfate, filtered [f]	24	9.21 mg/L
Fecal Coliform [e]	--	52.2/100 mL dry weather
Turbidity [f]	24	9.9 NTU (geometric mean)
Hardness [f]	24	40.5 mg/L as CaCO3 (10^{th} percentile)
Alkalinity, filtered [f]	24	49.5 mg/L as CaCO3
Ammonia [f]	23	20 µg/L
Aluminum, filtered [g]	7	7.82 µg/L (90^{th} percentile)
Antimony [g]	7	0.09 µg/L (geometric mean)
Arsenic, filtered [f]	24	0.99 µg/L (90^{th} percentile) 0.8 µg/L (geometric mean)
Boron, filtered [f]	24	9.9 µg/L (geometric mean)
Cadmium, filtered [g]	7	0.04 µg/L (90^{th} percentile)
Chromium [f]	24	0.19 µg/L (90^{th} percentile)
Copper, Total [f]	24	1.22 µg/L (90^{th} percentile) 0.97 µg/L (geometric mean)
Iron, filtered [f]	24	66.4 µg/L (90^{th} percentile)
Lead, Total [f]	24	0.7 µg/L (90^{th} percentile) 0.3 µg/L (geometric mean)
Magnesium, filtered [f]	24	5000 µg/L (90^{th} percentile)
Mercury [h]	6	0.005 µg/L (90^{th} percentile) 0.0027 µg/L (geometric mean)
Nickel, filtered [f]	24	0.64 µg/L (90^{th} percentile)

Table 2 Ambient Background Data

Parameter	# of Samples	Value Used
		0.39 µg/L (geometric mean)
Selenium, filtered [f]	24	0.16 µg/L (90th percentile)
Zinc, Total [f]	24	4.36 µg/L (90th percentile)

[a] Ambient temperatures taken from Appendix A of CH2M Hill's *Outfall Dilution and Temperature Study, Longview Mill Outfalls 001 And 002, Weyerhaeuser Company, Longview, Washington, 2004.* The Upstream River Temperature Site (Station UP-1) located at RM 64.

[b] Maximum pH value taken from Integral Consulting's *Receiving Water Study, Weyerhaeuser Longview Mill, Longview, Washington, 2008.* Minimum pH value and Hardness taken from Appendix D, Table D-1 of CH2M Hill's *Outfall Dilution and Temperature Study, Longview Mill Outfalls 001 And 002, Weyerhaeuser Company, Longview, Washington, 2004.*

[c] Ambient dissolved oxygen value calculated from arithmetic mean of measurements recorded in Appendix B, Table B-8 and B-9 of CH2M Hill's *Outfall Dilution and Temperature Study, Longview Mill Outfalls 001 And 002, Weyerhaeuser Company, Longview, Washington, 2004.*

[d] Ambient values taken from Integral Consulting's *Receiving Water Study, Weyerhaeuser Longview Mill, Longview, Washington, 2008.*

[e] Ambient value taken from Ecology's *Fact Sheet for NPDES Permit WA0037788, Three Rivers Regional Wastewater Authority, 2007.*

[f] Percentile and geometric mean values calculated from USGS's *Water-Data Reports, 14246900 Columbia River at Beaver Army Terminal, Near Quincy, OR, 2010 and 2011.*

[g] Percentile value calculated from USGS's *Water-Data Reports, 14246900 Columbia River at Beaver Army Terminal, Near Quincy, OR, 2007.*

[h] Percentile and geometric mean value calculated from Washington State Department of Ecology's *Water Quality Monitoring, 28A100 Columbia River at Vancouver, WA 2007.*

C. Wastewater Characterization

Weyerhaeuser Longview reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. Discharge monitoring report data from November 2010 to October 2012 were used to best represent the quality of the wastewater effluent at the time of permit renewal when applicable.

When concentrations of pollutants in the discharge were not reported in the discharge monitoring reports, data from Weyerhaeuser NR Company's NPDES application Form 2C, Ecology's *June 21, 2010 Class II Inspection* report, and Priority Pollutant Scan results for 2007, 2008, 2009, 2010, 2011, and 2012 were used. Priority pollutants **not** observed in any priority pollutant scans were not included in the table.

The wastewater effluent is characterized as follows:

Table 3 Effluent Characterization for Outfall 001

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5) [a]	mg/L	5.1	38.6
Total Suspended Solids (TSS) [a]	mg/L	11.1	56.6
Turbidity [b]	NTU	20.0	20.0
AOX [a]	lb/day	647	2,034
Chemical Oxygen Demand (COD) [a]	mg/L	338	852
Temperature [a]	°C	N/A	46.6

Parameter	Units	# of Samples	Average Value	Maximum Value
Total Organic Carbon (TOC) [c]	mg/L	1	48	48
Ammonia (as N) [c]	mg/L	1	0.19	0.19
Bromide [c]	mg/L	1	0.66	0.66
Chlorine, Total Residual (dry season) [d]	µg /L	1095	256	320
Chlorine, Total Residual (wet season) [d]	µg /L	1095	110	93
Color [c]	Color	1	350	350
Fecal Coliform [c]	#/100mL	2	3	3
Fluoride [c]	mg/L	1	0.18	0.18
Nitrate-Nitrite (as N) [c]	mg/L	1	0.05	0.05
Nitrogen, Total Organic (as N) [c]	mg/L	1	2.8	2.8
Phosphorus, Total (as P) [c]	mg/L	1	0.63	0.63

Parameter	Units	# of Samples	Average Value	Maximum Value
Sulfate (as SO_4) [c]	mg/L	1	130	130
Phenol [e]	µg/L	12	25	90
Aluminum, Total [c]	µg/L	1	700	700
Barium, Total [c]	µg/L	1	57.7	57.7
Boron, Total [c]	µg/L	1	43	43
Iron, Total [c]	µg/L	1	110	110
Magnesium, Total [c]	µg/L	1	25,200	25,200
Molybdenum, Total [c]	µg/L	1	2.3	2.3
Manganese, Total [c]	µg/L	1	424	424
Arsenic, Total [e]	µg/L	6	1.7	3.4
Cadmium, Total [e]	µg/L	6	2.0	8.0
Chromium, Total [e]	µg/L	6	4.5	8.0
Copper, Total [e]	µg/L	6	6.1	9.1
Mercury, Total [e]	ng/L	6	5.9	13.9
Nickel, Total [e]	µg/L	6	2.4	3.8
Antimony, Total [e]	µg/L	6	0.4	0.7
Zinc, Total [e]	µg/L	6	37.7	54
Chloroform, Total [e]	µg/L	24	13	83
Bromodichloromethane [e]	µg/L	24	0.5	6
Dichloro-difluoromethane [c]	µg/L	1	2	2
2,4,6-Trichlorophenol [e]	µg/L	6	0.85	6
Pentachlorophenol [e]	µg/L	6	0.80	4

Parameter	Units	# of Samples	Average Value	Maximum Value
Benzoic Acid [e]	µg/L	6	0.67	3

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH[a]	standard units	Cont.	5.4	7.8

[a] Values from November 2010 through October 2011 discharge monitoring reports.
[b] Values from Ecology's *June 21, 2010 Class II Inspection* report.
[c] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.
[d] Total residual chlorine values are seasonally dependent. Seasonal data was obtained from the CH2M Hill *Outfall Dilution & Temperature Study*.
[e] Values from Priority Pollutant Scan 2007, 2008, 2009, 2010, 2011, and 2012.

Table 4 Effluent Characterization for Outfall 002

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)[a]	mg/L	5.1	38.6
Total Suspended Solids (TSS) [a]	mg/L	20.0	20.0
Turbidity [b]	NTU	15.2	19
Adsorbable organic halides (AOX) [a]	lb/day	647	2,034
Chemical Oxygen Demand (COD) [a]	mg/L	338	852
Temperature [a]	°C	N/A	43.4

Parameter	Units	# of Samples	Average Value	Maximum Value
Total Organic Carbon (TOC)[c]	mg/L	1	52	52

Parameter	Units	# of Samples	Average Value	Maximum Value
Ammonia (as N) [c]	mg/L	1	0.20	0.20
Bromide [c]	mg/L	1	0.66	0.66
Chlorine, Total Residual (dry season) [d]	µg /L	1095	256	320
Chlorine, Total Residual (wet season) [d]	µg /L	1095	110	93
Color [c]	Color	1	350	350
Fecal Coliform [c]	#/100mL	2	<3	<3
Fluoride [c]	mg/L	1	0.16	0.16
Nitrate-Nitrite (as N) [c]	mg/L	1	0.05	0.05
Nitrogen, Total Organic (as N) [c]	mg/L	1	2.7	2.7
Phosphorus, Total (as P) [c]	mg/L	1	0.56	0.56
Sulfate (as SO_4) [c]	mg/L	1	135	135
Phenol [e]	µg/L	12	20	70
Aluminum, Total [c]	µg/L	1	760	760
Barium, Total [c]	µg/L	1	59.0	59.0
Boron, Total [c]	µg/L	1	44	44
Iron, Total [c]	µg/L	1	130	130
Magnesium, Total [c]	µg/L	1	26,300	26,300
Molybdenum, Total [c]	µg/L	1	2.2	2.2
Manganese, Total [c]	µg/L	1	429	429
Arsenic, Total [e]	µg/L	6	1.5	2.6

Parameter	Units	# of Samples	Average Value	Maximum Value
Cadmium, Total [e]	µg/L	6	0.89	1.9
Chromium, Total [e]	µg/L	6	4.5	7.9
Copper, Total [e]	µg/L	6	6.25	8.6
Mercury, Total [e]	ng/L	6	7.3	13.5
Nickel, Total [e]	µg/L	6	1.96	3.9
Antimony, Total [e]	µg/L	6	0.44	0.7
Zinc, Total [e]	µg/L	6	37.8	48
Chloroform, Total [e]	µg/L	24	13	85
Bromodichloromethane [e]	µg/L	24	0.5	6
2,4,6-Trichlorophenol [e]	µg/L	6	0.87	7
Benzoic Acid [e]	µg/L	6	0.5	3
Endrin Aldehyde [e]	µg/L	6	0.06	0.12

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH [a]	standard units	Cont.	4.7	7.8

[a] Values from November 2010 through October 2011 discharge monitoring reports.
[b] Values from Ecology's *June 21, 2010 Class II Inspection* report.
[c] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.
[d] Total residual chlorine values are seasonally dependent. Seasonal data was obtained from the CH2M Hill *Outfall Dilution & Temperature Study*.
[e] Values from Priority Pollutant Scan 2007, 2008, 2009, 2010, 2011, and 2012.

Table 5 Effluent Characterization for Outfall 003

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)[a]	mg/L	50.1	158.4
Total Suspended Solids (TSS) [a]	mg/L	56.2	112.4
Dissolved Oxygen [a]	mg/L	4.6	N/A
Oil and Grease [a]	mg/L	2.6	10.0
Fecal Coliform [a]	#/100mL	346	160,000

Parameter	Units	# of Samples	Measured Value
Total Organic Carbon (TOC)[b]	mg/L	1	9
Chlorine, Total Residual [b]	mg/L	1	0.01
Color [b]	Color	1	60
Fluoride [b]	mg/L	1	0.16
Nitrogen, Total Organic (as N) [b]	mg/L	1	0.34
Phosphorus, Total (as P) [b]	mg/L	1	0.10
Sulfate (as SO_4) [b]	mg/L	1	13
Sulfite (as SO_3) [b]	mg/L	1	0.10
Aluminum, Total [b]	µg/L	1	210
Barium, Total [b]	µg/L	1	21.7
Boron, Total [b]	µg/L	1	15
Iron, Total [b]	µg/L	1	710
Magnesium, Total [b]	µg/L	1	3,620
Molybdenum, Total [b]	µg/L	1	0.6
Manganese, Total [b]	µg/L	1	57

Parameter	Units	# of Samples	Measured Value
Copper, Total [b]	µg/L	1	1.0
Mercury, Total [b]	ng/L	1	3.1
Nickel, Total [b]	µg/L	1	0.5
Zinc, Total [b]	µg/L	1	11
Chloroform, Total [b]	µg/L	1	10
Dichloro-difluoromethane [b]	µg/L	1	2

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH [a]	standard units	104	5.8	7.8

[a] Values from November 2010 through October 2011 discharge monitoring reports.
[b] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.

Table 6 Effluent Characterization for Outfall 004

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)[a]	mg/L	2.1	6.2
Total Suspended Solids (TSS) [a]	mg/L	14.3	55.5
Dissolved Oxygen [a]	mg/L	4.7	N/A
Oil and Grease [a]	mg/L	2.0	2.0
Fecal Coliform [a]	#/100mL	182	3,000

Parameter	Units	# of Samples	Measured Value
Total Organic Carbon (TOC) [b]	mg/L	1	9
Ammonia (as N) [b]	mg/L	1	0.03

Parameter	Units	# of Samples	Measured Value
Chlorine, Total Residual [b]	mg/L	1	0.05
Color [b]	Color	1	60
Fluoride [b]	mg/L	1	0.54
Nitrate-Nitrite (as N) [b]	mg/L	1	0.11
Nitrogen, Total Organic (as N) [b]	mg/L	1	0.58
Phosphorus, Total (as P) [b]	mg/L	1	0.14
Sulfate (as SO_4) [b]	mg/L	1	8.4
Aluminum, Total [b]	µg/L	1	48
Barium, Total [b]	µg/L	1	15.6
Boron, Total [b]	µg/L	1	25
Iron, Total [b]	µg/L	1	2,400
Magnesium, Total [b]	µg/L	1	3,050
Molybdenum, Total [b]	µg/L	1	0.6
Manganese, Total [b]	µg/L	1	290
Arsenic, Total [b]	µg/L	1	1.6
Chromium, Total [b]	µg/L	1	0.5
Copper, Total [b]	µg/L	1	1.3
Mercury, Total [b]	ng/L	1	3.9
Nickel, Total [b]	µg/L	1	1.0
Zinc, Total [b]	µg/L	1	11
Di-N-butyl-Phthalate [b]	µg/L	1	5

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH [a]	standard units	104	6.3	7.6

[a] Values from November 2010 through October 2011 discharge monitoring reports.
[b] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.

Table 7 Effluent Characterization for Outfall 005

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)[a]	mg/L	1.6	6.5
Total Suspended Solids (TSS) [a]	mg/L	2.1	4.4
Fecal Coliform [a]	#/100mL	<2	<2
Chlorine, Total Residual [a]	mg/L	2.9	5.8

Parameter	Units	# of Samples	Measured Value
Total Organic Carbon (TOC) [b]	mg/L	1	7
Ammonia (as N) [b]	mg/L	1	21
Bromide [b]	mg/L	1	0.23
Color [b]	Color	1	70
Fluoride [b]	mg/L	1	0.54
Nitrate-Nitrite (as N) [b]	mg/L	1	1.5
Nitrogen, Total Organic (as N) [b]	mg/L	1	2
Phosphorus, Total (as P) [b]	mg/L	1	3.5
Sulfate (as SO_4) [b]	mg/L	1	11
Surfactants [b]	mg/L	1	0.08
Aluminum, Total [b]	µg/L	1	16

Parameter	Units	# of Samples	Measured Value
Barium, Total [b]	µg/L	1	8.9
Boron, Total [b]	µg/L	1	89
Iron, Total [b]	µg/L	1	450
Magnesium, Total [b]	µg/L	1	3,050
Molybdenum, Total [b]	µg/L	1	1.3
Manganese, Total [b]	µg/L	1	125
Arsenic, Total [b]	µg/L	1	1.1
Copper, Total [b]	µg/L	1	1.6
Mercury, Total [b]	ng/L	1	9.4
Nickel, Total [b]	µg/L	1	2.3
Zinc, Total [b]	µg/L	1	11
Phenols [b]	mg/L	1	0.01
Chloroform [b]	µg/L	1	4
Dichloro-bromomethane [b]	µg/L	1	1

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH [a]	standard units	520	6.7	7.7

[a] Values from November 2010 through October 2011 discharge monitoring reports.
[b] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.

Table 8 Effluent Characterization for Stormwater 001/002 Ditch

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)[a]	mg/L	2.5	3.2
Zinc [a]	µg/L	143	230

Parameter	Units	Minimum Value	Maximum Value
pH [a]	standard units	7.3	7.3

[a] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.

Table 9 Effluent Characterization for Stormwater Adjacent to Export Dock

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)[a]	mg/L	287	690
Zinc [a]	µg/L	110	170

Parameter	Units	Minimum Value	Maximum Value
pH [a]	standard units	5.0	6.8

[a] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.

Table 10 Effluent Characterization for Stormwater Cargo Dock

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5) [a]	mg/L	9.3	20
Zinc [a]	µg/L	225	570

Parameter	Units	Minimum Value	Maximum Value
pH [a]	standard units	5.4	7.0

[a] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.

Table 11 Effluent Characterization for Stormwater RW Office

Parameter	Units	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5) [a]	mg/L	8.9	10
Zinc [a]	µg/L	<10	10

Parameter	Units	Minimum Value	Maximum Value
pH [a]	standard units	7.0	7.1

[a] Values from NPDES renewal application Form 2C submitted by Weyerhaeuser NR Company in 2008.

D. Summary of Compliance with Previous Permit Issued

The previous permit placed effluent limits on Outfalls 001, 002, 003, 004, and 005, and the bleach plant discharge.

Outfalls 001/002 have effluent limits on:

- TSS
- BOD5
- pH
- AOX
- 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)

Outfall 003 and 004 have effluent limits on:

- pH
- Settleable Solids
- Oil and Grease

Outfall 005 has effluent limits on:

- BOD5
- TSS
- Fecal Coliform
- Chlorine Residual
- pH

Bleach Plant Discharge has effluent limits on:

- 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
- 2,3,7,8-tetrachlorodibenzofuran (TCDF)

- Chloroform
- Trichlorosyringol
- 3,4,5-trichlorocatechol
- 3,4,6-trichlorocatechol
- 3,4,5-trichloroguaiacol
- 3,4,6-trichloroguaiacol
- 4,5,6-trichloroguaiacol
- 2,4,5-trichlorophenol
- 2,4,6-trichlorophenol
- Tetrachlorocatechol
- Tetrachloroguaiacol
- 2,3,4,6-tetrachlorophenol
- Pentachlorophenol

Weyerhaeuser Longview has generally complied with the effluent limits and permit conditions of the permit issued on May 11, 2004. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections.

The following table summarizes the violations that occurred during the permit term.

Table 12 Violations

Begin Date	Monitoring Point	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
07/01/13	001/002	BOD5	Daily Maximum	Lbs per day	52100	49660	Numeric Effluent Violation
02/01/13	003	pH (Daily Min)	Minimum	Standard Units	5.9	6	Numeric Effluent Violation
05/01/11	003	pH (Daily Min)	Minimum	Standard Units	5.8	6	Numeric Effluent Violation
05/01/10	004	pH (Daily Min)	Minimum	Standard Units	4.5	6	Numeric Effluent Violation

Begin Date	Monitoring Point	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
05/01/10	004	Settleable Solids	Maximum	mL per Liter	2	0.1	Numeric Effluent Violation
06/01/09	001/002	BOD5	Daily Maximum	Lbs per day	69100	49660	Numeric Effluent Violation
11/01/05	003	pH (Daily Min)	Minimum	Standard Units	5.7	6	Numeric Effluent Violation

The following table summarizes compliance with report submittal requirements over the permit term.

Table 13 Submittals

Submittal Type	Submittal Name	Permit Section	Due Date	Submittal Status	Received Date
Receiving Water Study	Receiving Water Study Plan	S10	12/01/12	Received	11/29/07
Spill Prevention Plan	Spill Prevention Plan	S8	02/29/12	Received	02/22/12
Priority Pollutant Scan	Priority Pollutant Scan	S18	02/15/12	Received	02/16/12
Priority Pollutant Scan	Priority Pollutant Scan	S18	02/09/11	Received	02/11/11
Spill Prevention Plan	Spill Prevention Plan	S8	07/30/10	Received	07/20/10
Priority Pollutant Scan	Priority Pollutant Scan	S18	02/25/10	Received	02/25/10
Toxicity - Acute Testing	Final/Secondary Acute Summary Report	S11.E	12/08/08	Received	12/08/08
Toxicity – Chronic Testing	Final/Secondary Chronic Summary Report	S12.E	12/08/08	Received	12/08/08
Outfall Evaluation	Outfall Evaluation	S13	12/01/08	Received	10/24/08
Application for Permit Renewal	Application for Permit Renewal	G7	12/01/08	Received	12/08/08

Submittal Type	Submittal Name	Permit Section	Due Date	Submittal Status	Received Date
Priority Pollutant Scan	Priority Pollutant Scan	S18	01/02/09	Received	12/01/08
Priority Pollutant Scan	Priority Pollutant Scan	S18	02/27/08	Received	01/25/08
Mixing Study	Dilution Ratio Study	S1.B	06/01/07	Received	04/30/07
Other	Total Chlorine Free Study	S16	05/11/07	Received	05/15/07
Priority Pollutant Scan	Priority Pollutant Scan	S18	03/06/06	Received	03/27/06
Spill Prevention Plan	Spill Prevention Plan	S8	10/31/05	Received	10/25/05
Priority Pollutant Scan	Priority Pollutant Scan	S18	02/30/05	Received	02/18/05
Spill Prevention Plan	Spill Prevention Plan	S8	12/21/04	Received	12/06/04
Other	Treatment System Operation Plan	S4.A	12/31/04	Received	12/02/04
Solid Waste Control Plan	Solid Waste Control Plan	S5.C	12/31/04	Received	12/02/04
Toxicity – Acute Testing	Acute Toxicity Characterization	S11.A	12/10/04	Received	06/20/05
Toxicity – Chronic Testing	Chronic Toxicity Characterization	S12.A	12/10/04	Received	06/20/05
Toxicity – Acute Testing	Acute Toxicity Characterization	S11.A	12/10/04	Received	04/19/05
Toxicity – Chronic Testing	Chronic Toxicity Characterization	S12.A	12/10/04	Received	04/19/04
Toxicity – Acute Testing	Acute Toxicity Characterization	S11.A	12/10/04	Received	01/01/05
Toxicity – Chronic Testing	Chronic Toxicity Characterization	S12.A	12/10/04	Received	01/01/05
Toxicity – Acute Testing	Acute Toxicity Characterization	S11.A	12/10/04	Received	12/10/04
Toxicity – Chronic	Chronic Toxicity	S12.A	12/10/04	Received	12/10/04

Submittal Type	Submittal Name	Permit Section	Due Date	Submittal Status	Received Date
Testing	Characterization				
Receiving Water Study of Temperature	Temperature Study	S1.C	12/02/04	Received	12/02/04
Other	Best Management Practices Plan Certification	S9	10/01/04	Received	07/14/05

E. State Environmental Policy Act (SEPA) Compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges. The proposed permit conditions are no less stringent than the federal and state rules and regulations; therefore, the proposed permit issuance is exempt from the SEPA process.

III. Proposed Permit Limits

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility’s effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify

Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

A. Technology-Based Effluent Limits

Ecology must ensure that facilities provide all known, available, and reasonable methods of prevention, control, and treatment (AKART) when it issues a permit.

EPA has developed effluent guidelines for the pulp and paper industry based on the pollution control practices and technologies available at the time the guidelines were established. The development of these technology-based effluent guidelines for the industry evaluated both manufacturing and waste treatment variability. The test procedures for BOD_5 and TSS also have a great deal of variability in their results when comparing different laboratories or different technicians performing the tests. To account for this variability, a statistical assessment of the performance variability for adequately designed and well operated treatment systems was utilized to yield the daily maximum allowance and the 30-day average allowance for BOD_5 and TSS for the relevant subcategories.

Technology-based limits for the wastewater treatment plant (Table 14) have been established using production data provided by Weyerhaeuser Longview and federal effluent guidelines. The applicable regulation for the imposition of technology-based limits at Weyerhaeuser Longview can be found in 40 CFR 430, Subpart B (bleached kraft), Subpart G (mechanical pulp), and Subpart I (secondary fiber deink). Each subpart category establishes effluent guidelines in terms of pounds pollutant per 1000 pounds of product produced. The technology-based limits are calculated by multiplying the effluent guidelines by the reported daily production of each subpart category. Additional information regarding production values and regulatory basis can be found in Appendix D.

Table 14 Technology-Based Limits Outfalls 001/002

Parameter	Average Monthly Limit	Maximum Daily Limit
Biochemical Oxygen Demand (5-day)	26,921 lbs/day	50,249 lbs/day
Total Suspended Solids (TSS)	43,599 lbs/day	83,103 lbs/day
Adsorbable Organic Halides (AOX)	1,562 lbs/day	2,385 lbs/day
Chloroform[a]	10.4 lbs/day	17.4 lbs/day

Parameter	Daily Minimum	Daily Maximum
pH	6.0 standard units	9.0 standard units

[a] Compliance with chloroform limits is determined at the bleach plant effluent discharge.

Technology-based limits for the sanitary treatment plant (Table 15) have been established using the guidance provided in WAC 173-221-040 and -050. The sanitary treatment plant qualifies for the alternative limits in WAC 173-221-050. The limits prescribed are maximum limits, Ecology has determined that the treatment plant is capable of meeting the concentration limits in WAC 173-221-040 and has established those in the permit.

Mass-based limits were calculated using Ecology's Permit Writer's Manual which calls for the use of the sanitary treatment plant's design flow (expressed in million gallons per day for the maximum flow month in the design year). Ecology used the value 0.25 MGD in this calculation which was the average annual flow limit in the 1991 version of this permit. The average annual flow limit is considered more conservative than a maximum flow month and was determined to be appropriate in the absence of the additional design information. The calculated mass-based limits were higher than the previous permit's mass-based limits because the sanitary treatment plant is undersized for the current number of employees on-site, therefore the previous mass-based limits were carried forward on a best-professional judgment basis.

The 65% removal efficiency requirement has been included in the permit in accordance with WAC 173-221-050. Following this permit term, Ecology may reevaluate the percent removal requirement based on the treatment plant performance and in accordance with Ecology's Permit Writer's Manual.

The weekly limit for fecal coliform at Outfall 005 was replaced with a daily limit in the previous permit; the daily limit has been carried forward. The daily limit is more restrictive and consistent with the monitoring frequencies. Ecology has approved grab sampling and not 24-hour composite sampling for Outfall 005. The sanitary treatment system includes an aeration lagoon with a 3 week detention time. High sample variability is not expected over the course of any 24-hour period. Additional information regarding the calculation of the technology-based limits and the regulatory basis for each can be found in Appendix D.

Table 15 Technology-based Limits Outfall 005

Parameter	Average Monthly Limit	Maximum Daily Limit
Biochemical Oxygen Demand (5-day)	30 mg/L	45 mg/L
Total Suspended Solids (TSS)	30 mg/L	45 mg/L

Parameter	Monthly Geometric Mean	Daily Maximum
Fecal Coliform	200#/100mL	400#/100mL

Parameter	Monthly Average
Removal Rate BOD$_5$	>65%

Parameter	Daily Minimum	Daily Maximum
pH	6.0 standard units	9.0 standard units

Since the promulgation of the EPA's effluent guidelines, additional environmental regulations have been established to further the environmental protection at pulp and paper mills. For example, in 1998 the cluster rule for the pulp and paper industry was promulgated. The rule required that mills like Weyerhaeuser Longview switch from elemental chlorine to chlorine dioxide (elemental chlorine free) in their bleaching processes. This required change reduced the discharge of chlorinated organics. The EPA predicted that chloroform discharges would be reduced by 99% from proposal levels; dioxin and furan discharges would be reduced by 96% from proposal levels; and dioxin and furan loading to sludges would be reduced by 96% (EPA-821-F-97-010). Oxygen delignification is also employed at the mill to reduce the use of bleaching chemicals and reduce the formation of chlorinated organics.

A *Total Chlorine Free Study* was performed by the Weyerhaeuser Longview mill and submitted to Ecology as a requirement of Special Condition S16 of the expiring permit. Ecology received the study on May 15, 2007. The purpose of the study was to determine the feasibility of switching to a total chlorine-free bleaching process from the current elemental chlorine free process. It was determined that such a change did not make environmental and economic sense due to the limited environmental benefit of switching from elemental chlorine free (ECF) to total chlorine free (TCF) technology given the large reductions already realized from the switch to ECF technologies.

The EPA is required by Section 304(m) of the 1987 Water Quality Act to publish a biennial plan for developing new effluent guidelines and a schedule for the annual review and revision of existing guidelines. With regards to the pulp, paper, and paperboard category, EPA stated, in its most recent *2011 Annual Effluent Guidelines Review Report*, that it "prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE [Toxic-Weighted Pound Equivalents]. Based on the above conclusions, EPA is assigning this category [pulp, paper, and paperboard] with a lower priority for revision."

In consideration of the above facts, Ecology has concluded that the use of chlorine dioxide instead of elemental chlorine in the bleaching process and the proper operation and maintenance of the primary and secondary treatment design at Weyerhaeuser Longview is equivalent to all known, available, and reasonable methods of control, prevention, and treatment (AKART). Table 16 contains additional information regarding the pulp and paper mills in Washington State and the known, available, and reasonable technologies these facilities employ to protect the health of the communities and the environment.

Table 16 Pulp and Paper Treatment Technologies

Facility	Location	Pulping Process	Bleaching Process	Wastewater Treatment Technology
Boise White Paper	Wallula, WA	Bleached Kraft	Oxygen/ClO_2/Hydrogen Peroxide	Biological Treatment via Aerated Stabilization Basin
Cosmo Specialty Fibers	Cosmopolis, WA	Sulfite	Oxygen /ClO_2/Hydrogen Peroxide/Sodium Hydroxide	Biological Treatment via Aerated Stabilization Basin
Georgia Pacific Camas	Camas, WA	Bleached Kraft	Oxygen/ClO_2/Hydrogen Peroxide/Sodium Hydroxide	Biological Treatment via Aerated Stabilization Basin
Longview Fibre (Kapstone)	Longview, WA	Unbleached Kraft	N/A	Biological Treatment via UNOX and Secondary Clarification
Nippon Paper	Port Angeles, WA	TMP/Deink	Hydrogen Peroxide	Biological Treatment via Aerated Stabilization Basin
Port Townsend Paper	Port Townsend, WA	Unbleached Kraft	N/A	Biological Treatment via Aerated Stabilization Basin
Simpson Tacoma Kraft	Tacoma, WA	Bleached Kraft	Oxygen/ClO_2/Hydrogen Peroxide/Sodium Hydroxide	Biological Treatment via UNOX and Secondary Clarification
Weyerhaeuser Longview	Longview, WA	Bleached Kraft/TMP/Deink	Oxygen/ClO2/Hydrogen Peroxide/Sodium Hydroxide	Biological Treatment via Aeration and Secondary Clarification

Bleach Plant Effluent Limits

Bleach plant effluent at the mill is combined with other mill effluent prior to treatment. To ensure accurate measurement of pollutant concentrations, the point of compliance for pollutants that are primarily generated during the bleaching process is at the bleach plant discharge. In accordance with 40 CFR 430, the Permittee must demonstrate compliance with the bleach plant effluent limits for TCDD, TCDF, 12 chlorinated phenolic pollutants, and chloroform. Effluent limits have been incorporated into the permit. The Permittee was granted *certification in lieu of monitoring for chloroform* by letter on May 2, 2006. Chloroform monitoring has been removed and parameters have been established to ensure compliance.

Interim Performance-Based Limits

Outfalls 003 and 004 discharge to Consolidated Diking Improvement District Ditch #3 which is impaired for fecal coliform and dissolved oxygen. In accordance with Ecology's Permit Writers' Manual, to prevent further degradation of the water quality, interim performance-based limits were calculated. For BOD_5, dissolved oxygen, and fecal coliform, average monthly limits and maximum daily limits were established using 95 and 99 percentile data values respectively (Appendix D). These interim limits will prevent further degradation while appropriate treatment technologies are established through the *003 and 004 AKART Study and Compliance Schedule*. Final effluent limits will be established through administrative order or permit modification.

Monitoring frequencies for these interim performance-based limits were based on the existing minimum monitoring frequencies in the expiring permit. The monitoring frequency for BOD_5 at Outfall 003 was reduced from 5/week to weekly based on a review of the LTA-AML ratio. Ecology determined that weekly BOD_5 monitoring at Outfall 003 is a sufficient interval to yield data which reasonably characterizes the nature of the discharge.

Discharge Benchmarks

Ecology's 2012 Industrial Stormwater General Permit establishes stormwater benchmarks for all facilities requiring coverage and specifies specific benchmarks for the timber product and paper and allied product industries. These stormwater benchmarks were updated and incorporated into the renewed permit for Outfalls 001/002 Ditch, Adjacent to Export Dock, Cargo Dock, Export Dock, Raw Water Ditch, and RW Office. Using the Ecology's Industrial Stormwater General Permit as guidance, benchmarks were added and removed to best reflect the nature of the stormwater being discharged from the facility. Stormwater benchmarks are not numeric effluent limitations; they are indicator values. Although exceedance of a benchmark value is not a violation, failure to comply with prescribed actions following the exceedance of a benchmark values is a violation.

B. Surface Water Quality-Based Effluent Limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA, 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1), 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210, 2006) in the state of Washington.

Antidegradation

Description--The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330, 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).

- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Weyerhaeuser Longview is not a new facility but has the potential for expanded actions that would trigger a Tier II analysis. Ecology has defined expanded action as an increase (either monthly average or annual average) to an existing permitted concentration or permitted effluent mass limit (loading) to a water body greater than 10%. The 10% increase is relative to established baselines which were in place when the Tier II guidance came into effect in 2003. Based on this guidance, Weyerhaeuser Longview has not met the requirements for a Tier II analysis since it has not experienced the above mentioned 10% increase.

Facility Specific Requirements--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.
- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in chapter 173-201A WAC.

Ecology’s analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn’t interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)].

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 20 means the effluent is 5% and the receiving water is 95% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life *acute* criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life *chronic* criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water.
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. Ecology must specify both the allowed size and location in a permit.

The proposed permit specifies the size and location of the allowed mixing zone (as specified below).

2. The facility must fully apply "all known, available, and reasonable methods of prevention, control and treatment" (AKART) to its discharge.

Ecology has determined that the treatment provided at Weyerhaeuser Longview meets the requirements of AKART (see "Technology-based Limits").

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at: https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html.

In Weyerhaeuser Longview's *Outfall Dilution and Temperature Study* dated January 20, 2004, the dilution and mixing zone analysis was performed on a variety of discharge and environmental conditions. The modeling conditions that produced the lowest predicted dilutions were identified as the site-specific critical conditions (Table 20).

4. Supporting information must clearly indicate the mixing zone would not:

- Have a reasonable potential to cause the loss of sensitive or important habitat.
- Substantially interfere with the existing or characteristic uses.
- Result in damage to the ecosystem.
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis; using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute mixing zone.

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

Ecology determined the acute criteria will be met at 10% of the distance of the chronic mixing zone at the ten year low flow.

- **The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- **Comply with size restrictions.**

The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

9. Overlap of mixing zones.

Although outfalls 001 and 002 run parallel to each other as they extend into the Columbia River, the end of east diffuser section and the beginning of the west diffuser section are separated by 300 feet. The modeling results show that the neither the plumes emanating from each diffuser (001 and 002) nor the adjacent plumes from outfall 001 and 002 merge within the extent of the mixing zone sizes for each outfall. This indicates that within the overlapping mixing zones the concentrations at the edge of the mixing zone are unaffected and remain the same as for plumes outside the overlapping mixing zones.

C. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). The table included below summarizes the criteria applicable to this facility's discharge.

- Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The Aquatic Life Uses for this receiving water are identified below.

Table 17 Freshwater Aquatic Life Uses and Associated Criteria

Salmonid Spawning, Rearing, and Migration	
Temperature Criteria – Highest 1-DAD MAX	• 1-day maximum (1-DMax) of 20.0 °C • When natural conditions exceed 1-DMax, no temperature increase will raise the receiving water temperature by greater than 0.3 °C
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	To exceed 90 percent saturation
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH Criteria	The pH must measure within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

- The *recreational uses* for this receiving water are identified below.

Table 18 Recreational Uses and Associated Criteria

Recreational Use	**Criteria**
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL.

- The *water supply uses* are domestic, agricultural, industrial, and stock watering.
- The *miscellaneous freshwater uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

D. Water Quality Impairments

Total maximum daily loads (TMDLs) have been established for the Columbia River for dioxins and total dissolved gas (TDG).

On February 25, 1991, the Environment Protection Agency (EPA) established a TMDL to limit discharges of dioxins to the Columbia River Basin (*TMDL Document for Columbia River – Dioxin* dated February 25, 1991). The pollutant 2,3,7,8-TCDD is the most toxic of all the dioxins and therefore the TMDL was based on data describing concentration of 2,3,7,8-TCDD. To meet the water quality standard, EPA allocated Weyerhaeuser Longview a waste load allocation (WLA) of 0.26 mg of 2,3,7,8-TCDD per day. Using the guidance provided by EPA's *Technical Support Document for Water Quality-based Toxics Control* (EPA 505/2-90-001), Ecology established the maximum daily limit (MDL) for 2,3,7,8-TCDD by setting the average monthly limit (AML) equal to the WLA. The MDL was then calculated using a factor from Table 5-3 of the above referenced EPA document. The calculated MDL was not consistent with the 2,3,7,8-TCDD limit in the previous permit; the limit has been updated. An average annual limit, equal to the WLA has been added to the permit. Compliance with the previous limit for 2,3,7,8-TCDD was determined by no detection above 10 parts per quadrillion (ppq). This was not a part of the TMDL but was determined based on the analytical limitations at the time of the issuance of the TMDL. Analytical methods have improved and compliance with the 2,3,7,8-TCDD limit will now be determined by no detection above 5 ppq. Technical calculations can be found in Appendix D.

On November 18, 2002, the EPA established a TMDL to limit discharges of TDG (*TMDL Document for Columbia River - Total Dissolved Gas* dated September 2002). Elevated TDG levels are caused by four hydroelectric dams along the lower Columbia River. Water spilling from the dams entrains air causing the supersaturation of water with dissolved gases. Weyerhaeuser Longview is not a source of TDG therefore Ecology did not propose a limit for TDG in this permit.

Ecology has documented temperature impairment in the receiving water in the vicinity of the outfall. Ecology considers the entire Columbia River impaired for temperature. EPA has prepared a draft TMDL for temperature however has delayed issuance pending discussion and information exchanges.

The Consolidated Diking Improvement District Ditch #3(CDID Ditch #3), which Weyerhaeuser Longview discharges to through Outfalls 003, 004, and RW Office, is listed on the current 303(d) and is impaired for dissolved oxygen. Performance based limits have been established to prevent further degradation of the surface water. Discussion of stormwater limits is included in Section I.

E. Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

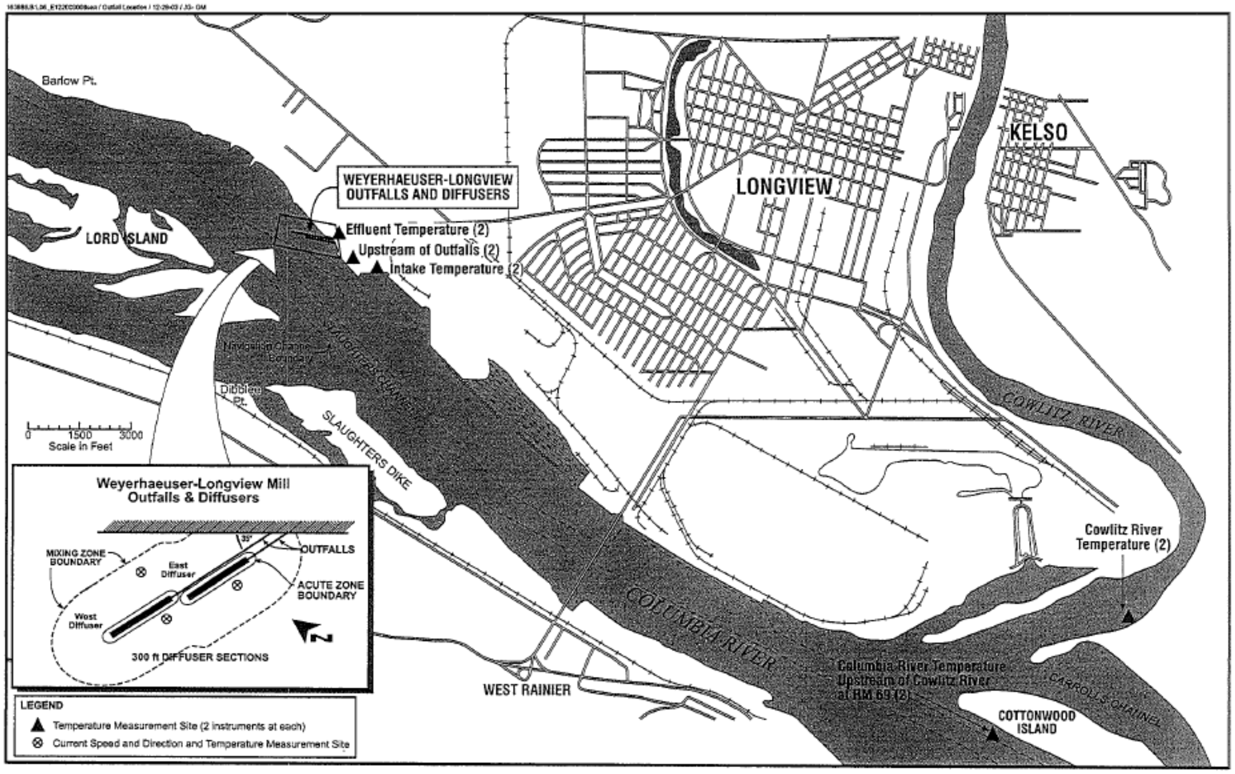
With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

The diffuser at Outfall 001 is 320 feet long with a diameter of 54 inches. The diffuser has a total of 12 14-inch diameter ports. The first two ports are spaced 27 feet apart. Ports two through ten are spaced 32 feet apart. Ports eleven and twelve are spaced 17.5 feet apart. The average depth of discharge from the diffuser ports ranges from 28 feet below Columbia River Datum (CRD) at low river flow and ebb tide to 43 feet CRD at high river flow and flood tide.

The diffuser at Outfall 002 is 300 feet long with a diameter of 48 inches. The diffuser has a total of 36 8-inch diameter ports. The ports are spaced 8-foot 4-inch on center. The average depth of discharge from the diffuser ports ranges from 21 feet below CRD at low river flow and ebb tide to 36 feet CRD at high river flow and flood tide.

Ecology obtained this information from CH2M Hill's *Outfall Dilution and Temperature Study* submitted on January 20, 2004.

Figure 4 Outfalls 001/002 Diagram and Map



Chronic Mixing Zone--WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the discharge ports and may not occupy more than 25% of the width of the water body as measured during MLLW.

Outfall 001 (east diffuser): The horizontal distance of the chronic mixing zone is 228 feet. The mixing zone extends from the top of the discharge ports to the water surface.

Outfall 002 (west diffuser): The horizontal distance of the chronic mixing zone is 221 feet. The mixing zone extends from the top of the discharge ports to the water surface.

Acute Mixing Zone--WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone.

Outfall 001 (east diffuser): The acute mixing zone for Outfall 001 extends 22.8 feet in any direction from any discharge port.

Outfall 002 (west diffuser): The acute mixing zone for Outfall 002 extends 22.1 feet in any direction from any discharge port.

Ecology determined the dilution factors that occur within these zones at the critical condition using CH2M Hill's *Outfall Dilution and Temperature Study* dated January 20, 2004. UDKHDEN, a three-dimensional hydrodynamic model, was selected to characterize near-field dilution in the study. Far-field dilution was modeled using the Brooks' method. Forty-eight combinations of parameters such as effluent flow rates and temperatures, receiving water temperatures, current speeds, discharge depth, and tidal effects were evaluated to determine dilution under critical (worst-case) conditions. Ecology requested an additional analysis to account for the effects of tidal reflux on the dilution factors. Weyerhaeuser Longview provided Ecology with a technical memorandum titled "*Addendum to Weyerhaeuser Longview Outfalls 001 & 002*" on May 27, 2014. Ecology reviewed the revised dilution factors provided in the technical memorandum and has incorporated them into the permit. The revised worst-case dilution factors are listed below.

Table 19 Dilution Factors (DF) Outfall 001 – East Diffuser

Criteria	Acute	Chronic
Aquatic Life	16.0	104.5
Human Health, Carcinogen		104.5
Human Health, Non-carcinogen		104.5

Table 20 Dilution Factors (DF) Outfall 002 – West Diffuser

Criteria	Acute	Chronic
Aquatic Life	27.8	97.5
Human Health, Carcinogen		97.5
Human Health, Non-carcinogen		97.5

Ecology determined the impacts of dissolved oxygen deficiency, pH, fecal coliform, turbidity, chlorine, ammonia, metals, other toxics, and temperature as described below, by using the dilution factors in the above. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

BOD5--With technology-based limits, this discharge from Outfalls 001, 002, and 005 result in a small amount of BOD_5 loading relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.

pH--Ecology modeled the impact of the effluent pH on the receiving water using the calculations from EPA, 1988, and the chronic dilution factor tabulated above.

Ecology predicts no violation of the pH criteria under critical conditions. Therefore, the proposed permit includes technology-based effluent limits for pH.

Fecal Coliform--Weyerhaeuser Longview has demonstrated it can reliably meet the water quality standard for fecal coliforms for primary contact recreation in the discharge of Outfall 005. Measured effluent concentrations from Outfall 005 are consistently below the reporting level of 2 organisms per 100 ml. At these concentrations, there is no reasonable potential to cause, or contribute to an excursion above any state water quality standard. The levels of fecal coliform discharged from outfalls 001 and 002 are significantly below the water quality standard and there is no reasonable potential to cause, or contribute to any excursion above the standard.

Turbidity--Ecology evaluated the impact of turbidity based on the turbidity data from Outfall 001, Outfall 002, and the receiving water. The impacts of filter plant backwash and/or filter plant sedimentation basin wash outs on turbidity will be assessed with the *Water Supply Plant Discharge AKART Study.* Best management practices are in place to minimize the impacts of turbidity.

No violations of the turbidity criteria are expected from Outfall 005 based on low effluent volume and total suspended solid (TSS) loading.

The proposed permit includes the technology-based limits for TSS at Outfalls 001, 002, and 005.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants were detected in the discharge:

- Ammonia
- Chlorine
- Phenol
- Arsenic
- Cadmium
- Chromium
- Copper
- Lead

- Mercury
- Nickel
- Zinc
- Chloroform
- Pentachlorophenol
- Dichlorobromomethane
- 2,4,6-Trichlorophenol
- Endrin Aldehyde

Ecology reviewed CH2M Hill's *Outfall Dilution and Temperature Study* dated January 20, 2004 which contains a reasonable potential analysis for ammonia (un-ionized NH3), total residual chlorine, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc. Ecology performed an additional updated reasonable potential analysis on the parameters reported present in the effluent for which surface water quality standards exist (Appendix D).

Valid ambient background data were available for ammonia, chlorine, aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, and zinc.

Ecology determined that ammonia, chlorine, aluminum, phenol, arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, chloroform, pentachlorophenol, dichlorobromomethane, (2,4,6) trichlorphenol, and endrin aldehyde; pose no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991.

Temperature--The state temperature standards (WAC 173-201A-200-210 and 600-612) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology or EPA has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Protections for temperature acute effects

Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.

General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Reasonable Potential Analysis

As part of its temperature analysis, Ecology reviewed the Weyerhaeuser Longview reasonable potential analysis in CH2M Hill's *Outfall Dilution and Temperature Study* dated January 20, 2004.

"Using the model-predicted average dilutions that UDKHDEN provides, the model results can be used to determine the effects that effluent temperature has on ambient temperature. UDKHDEN does a good job of predicting effluent cooling behavior in receiving water bodies when compared to data from both field and laboratory studies, since UDKHDEN was originally designed to model the behavior of thermal discharges (L. Davis, personal communication)."

Ecology performed additional temperature analyses using the updated data provided by Weyerhaeuser Longview.

Annual Summer Maximum and Incremental Warming Criteria: Ecology reviewed the reasonable potential analysis performed by CH2M Hill for the discharge to exceed the annual summer maximum, and the incremental warming criteria. Ecology performed an additional reasonable potential analysis using the updated data provided by Weyerhaeuser Longview. These analyses show no reasonable potential for an exceedance of the water quality criteria for temperature (see tables below).

The discharge is only allowed to warm the water by a defined increment when the background (ambient) temperature is cooler or warmer than the assigned threshold criterion. Ecology allows warming increments only when they do not cause temperatures to exceed either the annual maximum or supplemental spawning criteria. The incremental increase for this discharge was within the allowable amount.

Table 21 Temperature RPA – Outfall 001

	Core Summer Critera	Supplemental Criteria
INPUT	**July 1-Sept 14**	**Sept 15-July 1**
1. Chronic Dilution Factor at Mixing Zone Boundary	104.9	N/A
2. 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile)	21.0 °C	N/A
3. 7DADMax Effluent Temperature (95th percentile)	46.6 °C	N/A
4. Aquatic Life Temperature WQ Criterion in Fresh Water	17.5 °C	N/A
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	21.2 °C	N/A
6. Incremental Temperature Increase or decrease:	0.2 °C	N/A
7. Maximum Allowable Incremental Temperature Increase:	0.3 °C	N/A
8. Maximum Allowable Temperature at Mixing Zone Boundary:	21.3 °C	N/A
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	YES	N/A
10. Temperature Limit if Required:	NO LIMIT	N/A
B. If ambient temp is cooler than WQ criterion but within 28/(T_{amb}+7) and within 0.3 °C of the criterion		
11. Does temp fall within this incremental temp. range?	---	N/A
12. Temp increase allowed at mixing zone boundary, if required:	---	N/A
C. If ambient temp is cooler than (WQ criterion-0.3) but within 28/(T_{amb}+7) of the criterion		
13. Does temp fall within this Incremental temp. range?	---	N/A
14. Temp increase allowed at mixing zone boundary, if required:	---	N/A
D. If ambient temp is cooler than (WQ criterion - 28/(T_{amb}+7))		
15. Does temp fall within this Incremental temp. range?	---	N/A
16. Temp increase allowed at mixing zone boundary, if required:	---	N/A
RESULTS		
17. Do any of the above cells show a temp increase?	**NO**	**NO**
18. Temperature Limit if Required?	**NO LIMIT**	**NO LIMIT**

Table 22 Temperature RPA – Outfall 002

	Core Summer Critera	Supplemental Criteria
INPUT	**July 1-Sept 14**	**Sept 15-July 1**
1. Chronic Dilution Factor at Mixing Zone Boundary	97.5	N/A
2. 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile)	21.0 °C	N/A
3. 7DADMax Effluent Temperature (95th percentile)	43.4 °C	N/A
4. Aquatic Life Temperature WQ Criterion in Fresh Water	17.5 °C	N/A
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	21.2 °C	N/A
6. Incremental Temperature Increase or decrease:	0.2 °C	N/A
7. Maximum Allowable Incremental Temperature Increase:	0.3 °C	N/A
8. Maximum Allowable Temperature at Mixing Zone Boundary:	21.3 °C	N/A
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	YES	N/A
10. Temperature Limit if Required:	NO LIMIT	N/A
B. If ambient temp is cooler than WQ criterion but within 28/(T_{amb}+7) and within 0.3 °C of the criterion		
11. Does temp fall within this incremental temp. range?	---	N/A
12. Temp increase allowed at mixing zone boundary, if required:	---	N/A
C. If ambient temp is cooler than (WQ criterion-0.3) but within 28/(T_{amb}+7) of the criterion		
13. Does temp fall within this Incremental temp. range?	---	N/A
14. Temp increase allowed at mixing zone boundary, if required:	---	N/A
D. If ambient temp is cooler than (WQ criterion - 28/(T_{amb}+7))		
15. Does temp fall within this Incremental temp. range?	---	N/A
16. Temp increase allowed at mixing zone boundary, if required:	---	N/A
RESULTS		
17. Do any of the above cells show a temp increase?	**NO**	**NO**
18. Temperature Limit if Required?	**NO LIMIT**	**NO LIMIT**

Instantaneous Lethality to Passing Fish: The near-field dilution analysis performed by CH2M Hill demonstrates that the plume temperature is less than 33°C two seconds after discharge. CH2M Hill modeled the plume temperature two seconds after discharge (Table 21). Ecology performed an additional updated analysis using the following equation:

$T_{2sec} = T_{ambient90} + (T_{effluent99} - T_{ambient90})/(DF_{2seconds})$

Where:

T_{2sec} *= plume temperature 2-seconds after discharge.*

$T_{ambient90}$ *= 90th percentile of annual maximum 1DMax background temperatures.*

$T_{effluent99}$ *= 99th percentile of maximum 1DMax effluent temperatures. Ecology used the more conservative "1DMax temperature" instead of the "99th percentile 1DMax" in the analysis.*

$DF_{2seconds}$ *= centerline dilution factor at 2 seconds plume travel during a 7Q10 period.*

$DF_{2seconds}$ was calculated from CH2M Hill's *Outfall Dilution and Temperature Study*. The most conservative dilution factors were from case No. 19 for outfall 001 and case No. 43 for outfall 002. The study provided dilution factors for each outfall on a time basis. $DF_{2Seconds}$ values were calculated by interpolating between the data values to determine the mean dilutions at 2 second, then dividing by a peak-to-mean ratio of 1.94 (for unmerged, round plumes) to find conservative worst case dilution scenarios. The analysis demonstrates that the plume temperature is less than 33 °C two seconds after discharge. The results of the analysis can be found below.

Table 23 Instantaneous Temperature Lethality Analysis

OUTFALL	$T_{ambient\ 90}$ [°C]	$T_{effluent99}$ [°C]	DF_{2sec}	T_{2sec} [°C]
001	20.96	46.6	2.2	32.6
002	20.96	43.4	3.5	27.3

F. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria. Ecology determined the effluent may contain chemicals of concern for human health, based data or information indicating the discharge contains regulated chemicals.

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed (Appendix D).

Arsenic - In 1992 the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The freshwater criterion is 0.018 µg/L, and is based on exposure from fish and shellfish tissue and water ingestion. The criteria has caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 10 µg/L, which is not risk-based, and because the human health criteria is sometimes exceeded by natural background concentrations of arsenic in surface water and groundwater.

In Washington, when a natural background concentration exceeds the criterion, the natural background concentration becomes the criterion, and no dilution is allowed. This could result in a situation where natural groundwater or surface water used as a municipal or industrial source-water would need additional treatment to meet numeric effluent limits even though no arsenic was added as waste. Although this is not the case for all discharges, we do not have data at this time to quantify the extent of the problem.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

1. Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria. The revision of the drinking water MCL for arsenic offered a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers, however Ecology was unsuccessful in focusing the discussion on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources. The current arsenic MCL of 10 µg/L could also result in municipal treatment plants being unable to meet criteria-based effluent limits. Ecology will continue to pursue this issue as opportunities arise.

2. Additional and more focused data collection. The Water Quality Program will in some cases require additional and more focused arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well as some additional ambient monitoring data. At this time, Washington NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.

3. Data sharing. Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy to regulate arsenic.

Oregon Water Quality Analysis

Additionally, to ensure compliance with the applicable water quality requirements of all affected States [40 CFR 122.4(d)], Ecology has performed a simple mixing analysis using Oregon’s water quality standards for the protection of human health (Table 25 and 26). Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the full mixing volume. The approach assumes no decay or generation of the pollutant of concern within the mixing volume. The analysis was performed using the following equation:

PC = [(EC X EV) + (AC X AV)] / (EV + AV)

Where:

PC = Pollutant concentration affecting Oregon WQ

EC = Effluent pollutant concentration from Weyerhaeuser Longview discharge (50th percentile value). If less than 10 data points are available then a multiplier is used to calculate the 50th percentile value from the maximum value.

EV = Effluent discharge volume from Weyerhaeuser Longview. Highest monthly average flow from the previous 3 years (65.1 MGD, October 2013). Equal discharge volume through each outfall was assumed. The value was converted from MGD to cfs.

AC = Ambient pollutant concentration of Columbia River (geometric mean)

AV = Ambient volume (half of the 7Q10 low river flow was used to model the dilution from the Washington portion of the Columbia River)

Table 24 Oregon WQ Assessment – Outfall 001

OBSERVED POLLUTANT	Carcinogen?	OR WQS HH [µg/L]	No. of Effluent samples	Effluent Conc. [µg/L]	Effluent Volume [cfs]	Ambient Conc. [µg/L]	Ambient Volume [cfs]	Pollutant Conc. [µg/L]	OR WQ Impact?
Copper	NO	**1300**	6	8.2	50	0.97	43791	**0.98**	NO
Nickel	NO	**140**	6	3.4	50	0.39	43791	**0.39**	NO
Antimony	NO	**5.1**	6	0.63	50	0.09	43791	**0.09**	NO
Barium	NO	**1000**	1	144	50	0	43791	**0.17**	NO
Phenol	NO	**9400**	12	25	50	0	43791	**0.03**	NO
Arsenic	YES	**2.1**	6	3.1	50	0.8	43791	**0.80**	NO
Chloroform	YES	**260**	24	13	50	0	43791	**0.01**	NO
Pentachlorophenol	YES	**0.15**	6	3.6	50	0	43791	**0.00**	NO
Dichlorobromomethane	YES	**0.42**	24	0.5	50	0	43791	**0.00**	NO
Trichlorphenol (2,4,6)	YES	**0.23**	6	5.4	50	0	43791	**0.01**	NO

Table 25 Oregon WQ Assessment – Outfall 002

OBSERVED POLLUTANT	Carcinogen?	OR WQS HH [µg/L]	No. of Effluent samples	Effluent Conc. [µg/L]	Effluent Volume [cfs]	Ambient Conc. [µg/L]	Ambient Volume [cfs]	Pollutant Conc. [µg/L]	OR WQ Impact?
Copper	NO	**1300**	6	7.7	50	0.97	43791	**0.98**	NO
Nickel	NO	**140**	6	3.5	50	0.39	43791	**0.39**	NO
Antimony	NO	**5.1**	6	0.63	50	0.09	43791	**0.09**	NO
Barium	NO	**1000**	1	148	50	0	43791	**0.17**	NO
Phenol	NO	**9400**	12	20	50	0	43791	**0.02**	NO
Endrin Aldehyde	YES	**0.03**	6	0.11	50	0	43791	**0.00**	NO
Arsenic	YES	**2.1**	6	2.3	50	0.8	43791	**0.80**	NO
Chloroform	YES	**260**	24	13	50	0	43791	**0.01**	NO
Dichlorobromomethane	YES	**0.42**	24	0.5	50	0	43791	**0.00**	NO
Trichlorphenol (2,4,6)	YES	**0.23**	6	6.3	50	0	43791	**0.01**	NO

G. Sediment Quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website. http://www.ecy.wa.gov/programs/tcp/smu/sediment.html

Weyerhaeuser Longview submitted a sediment study was submitted on January 30, 1992. The proposed permit requires the Permittee to conduct a study to re-characterize sediment during this permit cycle (Special Condition S14).

H. Groundwater Quality Limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

Weyerhaeuser Longview does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

I. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

- *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.
- *Chronic toxicity tests measure various sublethal toxic responses*, such as reduced growth or reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Laboratories accredited by Ecology for WET testing know how to use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate a No Observed Effect Concentration (NOEC), Lethal Concentration, 50% (LC50), Effective Concentration, 50% (EC50), Inhibition Concentration, 25% (IC25), etc. Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (https://fortress.wa.gov/ecy/publications/SummaryPages/9580.html), which is referenced in the permit. Ecology recommends that Weyerhaeuser Longview send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

In accordance with regulations for acute toxicity testing, if the median survival of the test organisms is less than eighty percent, or any individual test result shows less than a sixty-five percent survival in one hundred percent effluent, then acute WET limits are required. For chronic toxicity testing, if any test demonstrates a statistically significant difference in response between the acute critical effluent concentration (ACEC) and the control, then chronic WET limits are required.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water acute or chronic toxicity. The most recent WET test results from September 2008 have been included in the tables below. The proposed permit will not include an acute WET limit. Weyerhaeuser Longview must retest the effluent before submitting an application for permit renewal.

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization. Weyerhaeuser Longview may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing and/or chemical analyses after the process or material changes have been made. Ecology recommends that the Permittee check with it first to make sure that Ecology will consider the demonstration adequate to support a decision to not require an additional effluent characterization.
- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased.

Table 26 Acute Toxicity Test Result in 100% Effluent

Species	Percent Survival	NOEC[a]	LC50[b]
Daphnia magna	100	100	>100
Fathead minnows	100	100	>100

[a] No observed effect concentration (NOEC) is the highest concentration of effluent in a toxicity test shown to have no statistically significant adverse effect when compared to an appropriate control.

[b] Lethal concentration, 50% (LC50) is the effluent concentration estimated to cause death in fifty percent of the test organisms in a toxicity test.

Table 27 Chronic Toxicity Test Results

Species	End Point	NOEC[a]	LOEC[b]
Ceriodaphina	Survival	100	>100
	Reproduction	100	>100
Fathead minnows	Survival	100	>100
	Growth	10	>100

[a] No observed effect concentration (NOEC) is the highest concentration of effluent in a toxicity test shown to have no statistically significant adverse effect when compared to an appropriate control.

[b] Lowest observed effect concentration (LOEC) is the lowest concentration of effluent in a toxicity test shown to an observed adverse effect.

J. Comparison of Effluent Limits with the Previous Permit Amended on February 21, 2007

Table 28 Comparison of Previous and Proposed Effluent Limits

Parameter	Basis of Limit	PREVIOUS EFFLUENT LIMITS: OUTFALL # 001/002		PROPOSED EFFLUENT LIMITS: OUTFALL # 001/002	
		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Biochemical Oxygen Demand (5-day)	Technology	26,570 lbs/day	49,660 lbs/day	26,921 lbs/day	50,249 lbs/day
Total Suspended Solids	Technology	45,144 lbs/day	85,768 lbs/day	43,599 lbs/day	83,103 lbs/day
AOX	Technology	1,657 lbs/day	2,530 lbs/day	1,562 lbs/day	2,385 lbs/day
Chloroform[a]	Technology	11.01 lbs/day	18.4 lbs/day	10.4 lbs/day	17.4 lbs/day
2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)	TMDL	N/A	0.56 mg/day	0.26 mg/day	0.38 mg/day
		Limit		Limit	
pH	Technology	5.0 – 9.0		5.0 – 9.0	

[a] Compliance with chloroform limit is determined at the bleach plant discharge.

Parameter	Basis of Limit	PREVIOUS EFFLUENT LIMTS: OUTFALL # 005		PROPOSED EFFLUENT LIMITS: OUTFALL # 005	
		Average Monthly	Average Weekly	Average Monthly	Average Weekly
Biochemical Oxygen Demand (5-day)	Technology	35 mg/L 40 lbs/day	53 mg/L 60 lbs/day	30 mg/L 40 lbs/day	45 mg/L 60 lbs/day
Total Suspended Solids	Technology	45 mg/L 61 lbs/day	65 mg/L 92 lbs/day	30 mg/L 61 lbs/day	45 mg/L 92 lbs/day

Parameter	Basis of Limit	PREVIOUS EFFLUENT LIMTS: OUTFALL # 005		PROPOSED EFFLUENT LIMITS: OUTFALL # 005	
		Monthly Geometric Mean Limit	**Daily Maximum Limit**	**Monthly Geometric Mean Limit**	**Daily Maximum Limit**
Fecal Coliform	Technology	200 #/100mL	400 #/100mL	200#/100mL	400 #/100mL
		Monthly Average		**Monthly Average**	
Removal of BOD_5	Technology	N/A		65%	
		Limit		**Limit**	
pH	Technology	6.0 – 8.5 at all times		6.0 – 8.5 at all times	
		Minimum	**Maximum**	**Minimum**	**Maximum**
Total Residual Chlorine, following chlorination	Best Professional Judgment	0.3 mg/L	N/A	0.3 mg/L	5.0 mg/L

Parameter	Basis of Limit	PREVIOUS EFFLUENT LIMTS: OUTFALL # 003		PROPOSED EFFLUENT LIMITS: OUTFALL # 003	
		Average Monthly	**Daily Maximum**	**Average Monthly**	**Maximum Daily**
Oil and Grease	Best Professional Judgment	10 mg/L	15 mg/L No Visible Sheen	10 mg/L	15 mg/L
Settleable Solids	Best Professional Judgment	N/A	0.1 mL/L	N/A	0.1 mL/L
Biochemical Oxygen Demand (5-day)	Performance	N/A	N/A	196 mg/L	476 mg/L
Fecal Coliform	Performance	N/A	N/A	22,085 #/100mL	89,809 #/100mL
		Average Monthly Minimum	**Minimum Daily**	**Average Monthly Minimum**	**Minimum Daily**
Dissolved Oxygen	Performance	N/A	N/A	2.33 mg/L	1.34 mg/L
		Limit		**Limit**	

Parameter	Basis of Limit	PREVIOUS EFFLUENT LIMTS: OUTFALL # 003		PROPOSED EFFLUENT LIMITS: OUTFALL # 003	
		Average Monthly	**Daily Maximum**	**Average Monthly**	**Maximum Daily**
pH	Best Professional Judgment	6.0 – 9.0 at all times		6.0 – 9.0 at all times	

Parameter	Basis of Limit	PREVIOUS EFFLUENT LIMTS: OUTFALL # 004		PROPOSED EFFLUENT LIMITS: OUTFALL # 004	
		Average Monthly	**Daily Maximum**	**Average Monthly**	**Maximum Daily**
Oil and Grease	Best Professional Judgment	10 mg/L	15 mg/L No Visible Sheen	10 mg/L	15 mg/L
Settleable Solids	Best Professional Judgment	N/A	0.1 mL/L	N/A	0.1 mL/L
Biochemical Oxygen Demand (5-day)	Performance	N/A	N/A	6.1 mg/L	15.7 mg/L
Fecal Coliform	Performance	N/A	N/A	389 #/100mL	1,384 #/100mL
		Average Monthly Minimum	**Minimum Daily**	**Average Monthly Minimum**	**Minimum Daily**
Dissolved Oxygen	Performance	N/A	N/A	1.31 mg/L	N/A
		Limit		**Limit**	
pH	Best Professional Judgment	6.0 – 9.0 at all times		6.0 – 9.0 at all times	

IV. Monitoring Requirements

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

A. Wastewater Monitoring

Weyerhaeuser Longview monitors for the pollutants listed under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

Ecology's Water Quality Program provides guidance for reducing monitoring frequencies in its Permit Writers' Manual. Permittees that satisfy a ratio of long term average (LTA) effluent concentration to the average monthly limit (AML) may be eligible for reductions. To remain eligible for these reductions the Permittee may NOT fail to submit any DMRs, violate the effluent limit of the pollutant with a reduced monitoring frequency, or be subject to a new formal enforcement action. Ecology may increase monitoring frequency for any of the above reasons through permit modification or Administrative Order.

Outfall 001/002

Weyerhaeuser Longview previously requested and received monitoring frequency reductions for BOD5, TSS, and AOX from Outfall 001/002. The existing permit requires monitoring frequencies of 1/week, 3/week, and 1/month for BOD_5, TSS, and AOX respectively.

On June 1, 2009, Weyerhaeuser Longview exceeded the daily maximum effluent limit of 49,660 lbs/day of BOD_5 triggering a permit violation of a pollutant with a reduced monitoring frequency. Ecology did not increase monitoring frequency following the violation.

On July 1, 2013, Weyerhaeuser Longview exceeded the daily maximum effluent limit of 49,660 lbs/day of BOD_5 due to a mill-wide power outage. An Ecology review of DMRs for BOD_5 effluent concentrations during the most recent two years shows a LTA-AML ratio less than 0.25. This ratio suggests the reduced monitoring frequency in the existing permit is acceptable and will be carried into the renewed permit. There have been no violations of TSS or AOX effluent limits.

In addition to monitoring frequency reductions, Weyerhaeuser Longview previously qualified and received a chloroform monitoring exemption per 40 CFR 430.02. Based on a minimum of 104 measurements taken over a period of no less than two years, Weyerhaeuser Longview demonstrated compliance with the limits for chloroform. Based on this demonstration, Ecology allowed Weyerhaeuser Longview certification in lieu of monitoring for chloroform and the established limits in the expiring permit which will be carried forward.

*Outfall 00*5

Weyerhaeuser Longview previously requested and received monitoring frequency reductions for BOD_5, TSS, and fecal coliform from Outfall 005. Based on "exemplary compliance" the mill was granted monitoring frequencies of 2/month, 1/month, and 1/month for BOD_5, TSS, and Fecal Coliform. The LTA-AML ratios for BOD_5, TSS, and fecal coliform are approximately 0.1, 0.01, and 0.005; these ratios suggest the reduced monitoring frequencies are acceptable and will be carried forward.

B. Lab Accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for:

Table 29 Accredited Parameters

General Chemistry				
Parameter Name	**Analyte Code**	**Method Description**	**NELAC Code**	**Matrix**
Turbidity	2055	EPA 180.1	10011402	W
Solids, Total Suspended	1960	SM 2540 D	20004802	W
Chlorine (Residual), Total	1940	SM4500-Cl G	20020604	W
pH	1900	SM 4500-H	20022406	W
Dissolved Oxygen	1880	SM 4500-O G	20025405	W
Biochemical Oxygen Demand (BOD)	1530	SM 5210 B	20027401	W
Chemical Oxygen Demand (COD)	1565	SM 5220 D	20136203	W

Microbiology				
Parameter Name	**Analyte Code**	**Method Description**	**NELAC Code**	**Matrix**
Fecal Coliform	2530	SM 9221 B (LTB) + E1 (EC) + C MPN	20188607	W

V. Other Permit Conditions

A. Reporting and Record Keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Operation and Maintenance Manual

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations [40 CFR 122.41(e) and WAC 173-220-150 (1)(g)]. The facility has prepared and submitted an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Ecology determined that the implementation of the Treatment System Operating Plan (TSOP) is a reasonable measure to ensure compliance with the terms of this permit. The Permittee is required to update the TSOP annually in accordance with Special Condition S4.A of the permit.

C. Non Routine Discharges

Occasionally, this facility may generate wastewater which was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These wastes typically consist of waters used to pressure-test storage tanks or fire water systems or of leaks from drinking water systems.

Special Condition S6 of the permit authorizes non-routine and unanticipated discharges under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- Authorize the facility to discharge the wastewater.
- Require the facility to treat the wastewater.
- Require the facility to reuse the wastewater.

D. Spill Control Plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

Weyerhaeuser Longview developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. Special Condition S7 of the proposed permit requires the facility to update this plan and submit it to Ecology.

E. Stormwater Pollution Prevention Plan (SWPPP)

In accordance with 40 CFR 122.44(k) and 40 CFR 122.44 (s), Special Condition S8 of the proposed permit includes requirements for the development and implementation of a SWPPP along with BMPs to minimize or prevent the discharge of pollutants to waters of the state. BMPs constitute Best Conventional Pollutant Control Technology (BCT) and Best Available Technology Economically Achievable (BAT) for stormwater discharges. A SWPPP requires a facility to implement actions necessary to manage stormwater to comply with the state's requirement under chapter 90.48 RCW to protect the beneficial uses of waters of the state.

The SWPPP must identify potential sources of stormwater contamination from industrial activities and identify how it plans to mange those sources of contamination to prevent or minimize contamination of stormwater. The Permittee must continuously review and revise the SWPPP as necessary to assure that stormwater discharges do not degrade water quality. It must retain the SWPPP on-site or within reasonable access to the site and available for review by Ecology.

Best Management Practices (BMPs)

BMPs are the actions identified in the SWPPP to manage, prevent contamination of, and treat stormwater. BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment systems, operating procedures, and practices used to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage. The Permittee must ensure that its SWPPP includes the operational and structural source control BMPs listed as "applicable" in Ecology's stormwater management manuals. Many of these "applicable" BMPs are sector-specific or activity-specific, and are not required at facilities engaged in other industrial sectors or activities.

Ecology-Approved Stormwater Management Manuals

Consistent with RCW 90.48.555 (5) and (6), the proposed permit requires the facility to implement BMPs contained in the Stormwater Management Manual for Western Washington (*2012* edition), or any revisions thereof, or practices that are demonstrably equivalent to practices contained in stormwater technical manuals approved by Ecology. This should ensure that BMPs will prevent violations of state water quality standards, and satisfy the state AKART requirements and the federal technology-based treatment requirements under 40 CFR part 125.3. The SWPPP must document that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable Stormwater Management Manuals, including: The technical basis for the selection for all stormwater BMPs (scientific, technical studies, and/or modeling) which support the performance claims for the BMPs selected.

An assessment of how the BMPs will satisfy AKART requirements and the applicable technology-based treatment requirements under 40 CFR part 125.3.

Operational Source Control BMPs

Operational source control BMPs include a schedule of activities, prohibition of practices, maintenance procedures, employee training, good housekeeping, and other managerial practices to prevent or reduce the pollution of waters of the state. These activities do not require construction of pollution control devices but are very important components of a successful SWPPP. Employee training, for instance, is critical to achieving timely and consistent spill response. Pollution prevention is likely to fail if the employees do not understand the importance and objectives of BMPs. Prohibitions might include eliminating outdoor repair work on equipment and certainly would include the elimination of intentional draining of crankcase oil on the ground. Good housekeeping and maintenance schedules help prevent incidents that could result in the release of pollutants. Operational BMPs represent a cost-effective way to control pollutants and protect the environment. The SWPPP must identify all the operational BMPs and how and where they are implemented. For example, the SWPPP must identify what training will consist of, when training will take place, and who is responsible to assure that employee training happens.

Structural Source Control BMPs

Structural source control BMPs include physical, structural, or mechanical devices or facilities intended to prevent pollutants from entering stormwater. Examples of source control BMPs include erosion control practices, maintenance of stormwater facilities (e.g., cleaning out sediment traps), construction of roofs over storage and working areas, and direction of equipment wash water and similar discharges to the sanitary sewer or a dead end sump. Structural source control BMPs likely include a capital investment but are cost effective compared to cleaning up pollutants after they have entered stormwater.

Treatment BMPs

Operational and structural source control BMPs are designed to prevent pollutants from entering stormwater. However, even with an aggressive and successful program, stormwater may still require treatment to achieve compliance with water quality standards. Treatment BMPs remove pollutants from stormwater. Examples of treatment BMPs are detention ponds, oil/water separators, biofiltration, and constructed wetlands.

Volume/Flow Control BMPs

Ecology recognizes the need to include specific BMP requirements for stormwater runoff quantity control to protect beneficial water uses, including fish habitat. New facilities and existing facilities undergoing redevelopment must implement the requirements for peak runoff rate and volume control identified by volume 1 of the *Western Washington SWMM* and chapter 2 in the *Eastern Washington SWMM* as applicable to their development. Chapter 3 of volume 3 *Western Washington SWMM* and chapter 6 in the *Eastern Washington SWMM* lists BMPs to accomplish rate and volume control. Existing facilities in western Washington should also review the requirements of volumes 1 (Minimum Technical Requirements) and chapter 3 of volume 3 in the *Western Washington SWMM*. Chapter 2 (Core Elements for New Development and Redevelopment) in the *Eastern Washington SWMM* contains the minimum technical requirements for facilities east of the Cascades. Although not required to implement these BMPs, controlling rate and volume of stormwater discharge maintains the health of the watershed. Existing facilities should identify control measures that they can implement over time to reduce the impact of uncontrolled release of stormwater.

F. Best Management Practices Plan

Special Condition S9 of the proposed permit requires the Permittee to implement a Best Management Practices (BMP) plan to prevent spills and leaks of spent pulping, liquor, soap, and turpentine. The BMPs for spill and leak prevention are defined in 40 CFR 430.03.

The Permittee must submit an annual written BMP report in accordance with 40 CFR 430.03(i)(4).

G. Solid Waste Control Plan

The Permittee could cause pollution of the waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste.

Special Condition S10 of the proposed permit requires this facility to update the approved solid waste control plan designed to prevent solid waste from causing pollution of waters of the state. The facility must submit the updated plan to Ecology for approval (RCW 90.48.080). You can obtain an Ecology guidance document, which describes how to develop a Solid Waste Control Plan, at: http://www.ecy.wa.gov/pubs/0710024.pdf

H. Wastewater Treatment System Efficiency Study

The proposed permit requires the Permittee to conduct and submit a treatment system efficiency study to Ecology (Special Condition S11). The purpose of the study is to ensure that the wastewater treatment system is operating efficiently and meets Ecology's standard for AKART.

I. Water Supply Plant Discharge AKART Analysis

The Permittee was previously authorized to discharge filter plant backwash and sediments from the raw water treatment system to the Columbia River. The basis for this determination was the unique suspended solids loading in the intake water caused by the eruption of Mt. St. Helens, as determined by the Pollution Control Hearings Board in PCHB No. 85-220.

Since it has been almost 30 years since the PCHB decision, Ecology is requiring that the Permittee conduct and submit an All Known, Available, and Reasonable methods of prevention, control, and Treatment (AKART) analysis for the discharge. The analysis will also analyze the effect the discharge has on the receiving water quality. Requirements of the study are included in Special Condition S12.

J. Cooling Water Intake Structure

Section 316(b) of the Clean Water Act requires that the location, design, construction, and capacity of cooling water intake structures (CWIS) reflect the best technology available (BTA) for minimizing adverse environmental impact. Section 316(b) is implemented through National Pollutant Discharge Elimination System (NPDES) permits. On May 19, 2014, EPA issued final regulations for the design and operation of cooling water intake structures. EPA has finalized standards that apply to existing manufacturing and industrial facilities that have a CWIS with a design intake flow greater than 2 million gallons per day (mgd) and use at least twenty five percent of the water withdrawn for cooling purposes.

Facilities requiring an NPDES permit with design intake flows of 2 mgd or less and less than twenty five percent used exclusively for cooling are required to implement Section 316(b) on a case-by case basis. 40 CFR 125.90(b) requires Ecology to use best professional judgment (BPJ) for determining BTA. Weyerhaeuser Longview at current operation does not meet the 25% criteria. As mentioned above, 40 CFR 125.90(b) will require a BPJ analysis not specifically addressed in Part 125. This BTA will minimize impingement and entrainment of all life stages of fish and shellfish. Impingement occurs when fish or shellfish become entrapped on the outer part of intake screens and entrainment occurs when fish or shellfish pass through the screens and into the cooling water system.

For facilities that are subject to 40 CFR 125 Subpart J and its conditions, the rule prescribes several alternatives to reduce impingement. This facility may choose to propose a separate site-specific alternative that complies with the BPJ in determining BTA pursuant to Section 316(b), which will be subject to Ecology's approval. The facility may propose one or more of the designated technologies (alternatives) prescribed in 40 CFR 125.94(c) to meet the impingement mortality requirements. Entrainment standards may be either site-specific or a reduction of intake flow to a level commensurate with a closed-cycle recirculating system. In this permit, the facility is required to conduct an entrainment performance study and submit to Ecology for review and approval. As for consideration of the endangered species, nothing in this permit allows take for the purpose of compliance with the Act.

Ecology must ensure that the location, design, construction, and capacity of the facility's cooling water intake structure reflect BPJ on case-by-case basis for minimizing adverse environmental impact. The proposed permit requires the mill to properly operate and maintain any existing technologies used to minimize impingement and entrainment and report any significant impingement or entrainment observed. In addition, the proposed permit requires the mill to submit an information and compliance report consistent with NPDES permit application requirements for cooling water intake structures in 40 CFR 122.21(r)(2) – (8). Ecology is requiring this submittal of the information and compliance report in accordance with 40 CFR 122.21(r) on a best professional judgment basis. Ecology will use this information to assess the potential for impingement and entrainment at the CWIS, evaluate the appropriateness of any proposed technologies or mitigation measures, and determine any additional requirements to place on the facility's CWIS in the next permit cycle.

Ecology may require the submittal of the information and compliance report in accordance with 40 CFR 122.21(r) on a best professional judgment basis in the event that the CWIS rule, finalized on May 19, 2014, is remanded or otherwise not in effect.

The report is further detailed in Special Condition S13 of the permit.

Special condition S12 requires the Permittee to perform a "Water supply plant discharge AKART analysis." This analysis may evaluate alternatives which include modifications to the intake structure. Within this analysis, the Permittee may include a best technology available analysis of the existing or alternative intake structure. In the event that the Permittee provides sufficient information for Ecology to make a BPJ, best technology available determination regarding the cooling water intake and section 316(b) of the Clean Water Act, the submittal of an information and compliance report per Special Condition S13will not be required.

K. Outfall 003 and 004 AKART Study and Compliance Schedule

Previous stormwater management proposals, such as Weyerhaeuser Longview's *Storm and Process Water Management Proposal* (February 1995), were submitted to Ecology and implemented. Weyerhaeuser Longview has been operating using the technologies identified in this stormwater AKART proposal. The permit renewal requires the Permittee to conduct and submit an Outfall 003 and 004 AKART study to Ecology. The purpose of the study is to ensure that the stormwater and process water management practices meet AKART standards. The study must analyze source control and treatment Best Management Practices (BMPs) utilized by the Permittee and the feasibility of alternative BMPs and technologies. Following Ecology review and AKART determination, Ecology will establish a compliance schedule for implementation of the reasonable stormwater and process water management improvements identified in the study. Required effluent limits will be established through permit modification or administrative order. BMPs identified must be incorporated into the SWPPP. Detailed requirements of this study are included in Special Condition S14.

L. Outfall Evaluation

The proposed permit requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S16). The inspection must evaluate the physical condition of the discharge pipe and diffusers, and evaluate the extent of sediment accumulations in the vicinity of the outfall.

M. Priority Pollutant Scan

The Permittee must sample the final effluent and analyze for priority pollutants on an annual basis. The priority pollutants are listed in Special Condition S2.A of the permit. Required detection limits and laboratory methods are listed in Appendix A of the permit.

N. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

VI. Permit Issuance Procedures

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.

1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology (Ecology).

December 2011. *Permit Writer's Manual*. Publication Number 92-109 (https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html)

Laws and Regulations (http://www.ecy.wa.gov/laws-rules/index.html)

Marc, Crooks E. Letter to: Frank Busch (Weyerhaeuser Company). 2 May 2006.

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/permits/guidance.html)

February 2007. *Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees*, Publication Number 07-10-024. http://www.ecy.wa.gov/pubs/0710024.pdf

Wright, R.M., and A.J. McDonnell.

1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

Appendix A--Public Involvement Information

Ecology proposes to reissue a permit to Weyerhaeuser Longview. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on October 11, 2013 in The Daily News, Longview to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period.
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting* which is available on our website at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html.

You may obtain further information from Ecology by telephone, (360) 407-6916 or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Industrial Section
PO Box 47600
Olympia, WA 98504-7600

The primary author of this permit and fact sheet is Shingo Yamazaki.

Appendix B--Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Appendix C--Glossary

1-DMax or 1-Day Maximum Temperature -- The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-Day Average of the Daily Maximum Temperatures -- The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute Toxicity -- The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART -- The acronym for “all known, available, and reasonable methods of prevention, control and treatment.” AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate Point of Compliance -- An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An “early warning value” must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient Water Quality -- The existing environmental condition of the water in a receiving water body.

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual Average Design Flow (AADF) -- Average of the daily flow volumes anticipated to occur over a calendar year.

Average Monthly (Intermittent) Discharge Limit -- The average of the measured values obtained over a calendar months time taking into account zero discharge days.

Average Monthly Discharge Limit -- The average of the measured values obtained over a calendar month's time.

Background Water Quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best Management Practices (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Categorical Pretreatment Standards -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA) -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection-Without Sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection-With Sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite Sample -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring -- Uninterrupted, unless otherwise noted in the permit.

Critical Condition -- The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of Receipt -- This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection Limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution Factor (DF) -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution Uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early Warning Value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement Limit -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering Report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial User -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local Limits -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major Facility -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum Day Design Flow (MDDF) -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum Month Design Flow (MMDF) -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum Week Design Flow (MWDF) -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method Detection Level (MDL) -- See Method Detection Level.

Minor Facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES) -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-Through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak Hour Design Flow (PHDF) -- The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak Instantaneous Design Flow (PIDF) -- The maximum anticipated instantaneous flow.

Point of Compliance -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential Significant Industrial User (PSIU) --A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).
Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL) -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the

result to the number nearest to (1,2,or 5) x 10^n, where n is an integer. (64 FR 30417).
ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable Potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible Corporate Officer -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Significant Industrial User (SIU) --

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug Discharge -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil Scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid Waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State Waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater -- That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-Based Effluent Limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total Coliform Bacteria -- A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total Dissolved Solids--That portion of total solids in water or wastewater that passes through a specific filter.

Total Maximum Daily Load (TMDL) -- A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total Suspended Solids (TSS) -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-Based Effluent Limit -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D--Technical Calculations

Technology-Based Limits:

Effluent limits for Outfall 001/002 were calculated using production data from the year 2012 and federal effluent guidelines. Bleached Paperboard, Wet Lap, and Bleached Kraft Pulp (sent to NORPAC) values were provided by Weyerhaeuser NR Company to Ecology by email correspondence. The remaining production values were obtained from 2012 discharge monitoring reports.

In the regulations, the EPA effluent limit guidelines are expressed in units of “lbs/1000 lbs of production,” because production is reported by the facility in units of “tons” the effluent limit guidelines were converted to units of “lbs/ton” in Table 31. This was accomplished by multiplying the effluent limit guidelines by a factor of 2.

The initial 565 average daily tons of thermo-mechanical pulp at NORPAC II falls under BPT guidelines, the remainder falls under NSPS in accordance with a historical Ecology-Weyerhaeuser agreement.

Table 30 Outfall 001/002 Limits

Operation	Production	Production Units	40 CFR…	Limit (BCT, BAT, BPT, NSPS)	BOD5				TSS			
					Daily Max		Monthly Avg.		Daily Max		Monthly Avg.	
					lb/ton	lb/day	lb/ton	lb/day	lb/ton	lb/day	lb/ton	lb/day
KRAFT MILL		--	--	--	--	--	--	--	--	--	--	--
Bleached Paperboard	830	MDT	430 Subpart B	NSPS	17	**14110**	9.2	**7636**	29.2	**24236**	15.2	**12616**
Wet Lap Pulp	365	ADT	430 Subpart B	NSPS	20.6	**7519**	11	**4015**	36.4	**13286**	19	**6935**
NORPAC	--	--	--		--	--	--	--	--	--	--	--
Bleached Kraft Pulp	61	ADT	430 Subpart B	NSPS	20.6	**1257**	11	**671**	36.4	**2220**	19	**1159**
Deink Newsprint Pulp	277	ADT	430 Subpart I	NSPS	12	**3324**	6.4	**1773**	24	**6648**	12.6	**3490**
TMP Pulp	1311	ADT	430 Subpart G	NSPS	9.2	**12061**	5	**6555**	14.6	**19141**	7.6	**9964**
TMP Pulp	565	ADT	430 Subpart G	BPT	21.2	**11978**	11.1	**6272**	31.1	**17572**	16.7	**9436**
TOTAL	**3,409**					**50,249**		**26,921**		**83,103**		**43,599**

Table 31 AOX and Chloroform Limits

Operation	Production	Production Units	40 CFR…	Limit (BCT, BAT, BPT, NSPS)	AOX				CHLOROFORM			
					Daily Max		Monthly Avg.		Daily Max		Monthly Avg.	
					lb/ton	lb/day	lb/ton	lb/day	lb/ton	lb/day	lb/ton	lb/day
Unbleached Pulp (Kraft)	1254	ADT	430 Subpart B	BAT	1.902	**2385**	1.246	**1562**	0.01384	**17.4**	0.00828	**10.4**

Effluent limits for Outfall 005 (Table 33) were calculated using the effluent guidelines in WAC 173-221-040 and -050. Ecology is required to apply the technology-based limits no less stringent than those prescribed in WAC 173-221-050; because the Permittee is capable of achieving the technology-based concentration limits for BOD5 and TSS in WAC 173-221-040, Ecology has included those limits in the permit.

Mass-based limits were calculated using Ecology's Permit Writer's Manual which calls for the use of the sanitary treatment plant's design flow (expressed in million gallons per day for the maximum flow month in the design year). Ecology used the value 0.25 MGD in this calculation which was the average annual flow limit in the 1991 version of this permit. The average annual flow limit is considered more conservative than a maximum flow month and was determined to be appropriate in the absence of the additional design information. The calculated mass-based limits were higher than the previous permit's mass-based limits because the sanitary treatment plant is undersized for the current number of employees on-site, therefore the previous mass-based limits were carried forward on a best-professional judgment basis.

Table 32 Outfall 005 Limits

Parameter	Monthly	Weekly
BOD5	30 mg/L 40 lbs/day	45 mg/L 60 lbs/day
TSS	30 mg/L 61 lbs/day	45 mg/L 92 lbs/day
Fecal (#/100mL)	200	400
pH	6.0-9.0	
Removal Rate BOD	>65%	--

TOTAL MAXIMUM DAILY LOAD LIMITS:

EPA Region X, established a Total Maximum Daily Load (TMDL) to limit discharges of dioxin to the Columbia River basin. The TMDL established loading limits for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Ecology used EPA's *Technical Support Document for Water Quality-based Toxics Control* (EPA 505/2-90-001) as guidance for calculating the maximum daily limit for the protection of human health. The full table of multipliers is provided in Table 5-3 of the above mentioned document. The conversion of the Weyerhaeuser Longview waste load allocation (WLA) to a Maximum Daily Limit (MDL) is shown below.

Table 33 TCDD Limit

WLA Dioxin (TCDD) mg/day	CV	Number of Sample per Month (n)	Multiplier	Maximum Daily Limit (MDL) mg/day
0.26	0.6	1	1.46	**0.38**

Reasonable Potential Analysis:

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found in the PermitCalc Workbook on Ecology's webpage at: http://www.ecy.wa.gov/programs/wq/permits/guidance.html.

The spreadsheets Input 2 – Reasonable Potential and LimitCalc in Ecology's PermitCalc Workbook determine reasonable potential (to violate the aquatic life and human health water quality standards) and calculate effluent limits. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

Table 34 Reasonable Potential Analysis Outfall 001 – Part 1 of 2

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	CHLORINE (Total Residual) 7782505 – DRY SEASON	CHLORINE (Total Residual) 7782505 – WET SEASON	CADMIUM - 7440439 4M Hardness dependent	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	ANTIMONY (INORGANIC) 7440360 1M	ZINC- 7440666 13M hardness dependent	CHLOROFORM 67663 11V
Effluent Data	# of Samples (n)		1	1095	1095	6	6	6	6	6	7	6	24
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		190	320	110	8	8	9.1	0.0139	3.8	0.7	54	
	Calculated 50th percentile Effluent Conc. (when n>10)												13
Receiving Water Data	90th Percentile Conc., ug/L		20	0	0	0.04	0.19	1.22	0.005	0.64		4.36	
	Geo Mean, ug/L							0.97	0.0027	0.39	0.09		0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	3,149	19	19	1.3892	15	7.2612	2.1	658.85	-	53.211	-
		Chronic	415	11	11	0.5281	10	5.2432	0.012	73.171	-	48.59	-
	WQ Criteria for Protection of Human Health, ug/L		-	-	-	-	-	1300	0.14	610	14	-	5.7
	Metal Criteria Translator, decimal	Acute	-	-	-	0.943	0.982	0.996	0.85	0.998	-	0.996	-
		Chronic	-	-	-	0.943	0.962	0.996	-	0.997	-	0.996	-
	Carcinogen?		N	N	N	N	N	N	N	N	N	N	Y

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.050	0.997	0.997	0.607	0.607	0.607	0.607	0.607	0.652	0.607	0.883
Multiplier			6.20	1.00	1.00	2.14	2.14	2.14	2.14	2.14	2.01	2.14	1.00
Max concentration (ug/L) at edge of…		Acute	93	16.736	6.890	1.049	1.232	2.358	0.006	1.109	0.084	11.302	0.000
		Chronic	31	3.050	1.048	0.194	0.345	1.393	0.005	0.771	0.013	5.416	0.000

Reasonable Potential? Limit Required?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**NO**	**n/a**

Human Health Reasonable Potential (continued from previous page)

s	$s^2=\ln(CV^2+1)$	0.555	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545
Pn	Pn=(1-confidence level)1/n	0.050	0.997	0.997	0.607	0.607	0.607	0.607	0.607	0.652	0.607	0.883
Multiplier		2.490	0.2143	0.2143	0.8603	0.8603	0.8603	0.8603	0.8603	0.8054	0.8603	0.5174
Dilution Factor		110.8	110.8	110.8	110.8	110.8	104.93	104.93	104.93	104.93	110.8	104.93
Max Conc. at edge of Chronic Zone, ug/L		4.269	0.6188	0.2127	0.0621	0.0621	1.0E+00	2.8E-03	0.4174	0.0945	0.4193	0.1239
Reasonable Potential? Limit Required?		**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**NO**	**NO**	**NO**	**NO**	**n/a**	**NO**

Table 35 Reasonable Potential Analysis Outfall 001 – Part 2 of 2

Pollutant, CAS No. & NPDES Application Ref. No.			PENTACHLOROPHENOL 87865 9A (pH dependent in freshwater)	LEAD - 7439921 7M Dependent on hardness	DICHLOROBROMOMETHANE 75274 12V	TRICHLOROPHENOL 2,4,6 88062 11A	PHENOL 108952 10A	ARSENIC (dissolved) 7440382 2M
Effluent Data	# of Samples (n)		5	24	24	6	12	6
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		2	1.3		6		3.4
	Calculated 50th percentile Effluent Conc. (when n>10)				0.5		25	
Receiving Water Data	90th Percentile Conc., ug/L		0	0.7				0.99
	Geo Mean, ug/L		0		0	0	0	
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	33.498	23.839	-	-		360
		Chronic	21.147	0.929	-	-		190
	WQ Criteria for Protection of Human Health, ug/L		0.28	-	0.27	2.1	21000	-
	Metal Criteria Translator, decimal	Acute	-	0.466	-	-	-	1
		Chronic	-	0.466	-	-	-	1
	Carcinogen?		Y	N	Y	Y	N	Y

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950	0.950		0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555	0.555		0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.549	0.883	0.883	0.607		0.607
Multiplier			2.32	1.00	1.00	2.14		2.14
Max concentration (ug/L) at edge of…		Acute	0.291	0.694	0.000	0.769		1.384
		Chronic	0.044	0.699	0.000	0.116		1.050
Reasonable Potential? Limit Required?			**NO**	**NO**	**n/a**	**n/a**		**NO**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545
Pn	Pn=(1-confidence level)1/n	0.549	0.883	0.883	0.607	0.779	0.607
Multiplier		0.9336	0.5174	0.5174	0.8603	0.6528	0.8603
Dilution Factor		104.93	110.8	104.93	104.93	104.93	110.8
Max Conc. at edge of Chronic Zone, ug/L		0.0178	0.0061	0.0048	0.0492	0.24	0.0264
Reasonable Potential? Limit Required?		**NO**	**n/a**	**NO**	**NO**	**NO**	**n/a**

Table 36 Reasonable Potential Analysis Outfall 002 – Part 1 of 2

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	CHLORINE (Total Residual) 7782505 – WET SEASON	CHLORINE (Total Residual) 7782505 – DRY SEASON	CADMIUM - 7440439 4M Hardness dependent	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	ANTIMONY (INORGANIC) 7440360 1M	ZINC- 7440666 13M hardness dependent	CHLOROFORM 67663 11V
Effluent Data	# of Samples (n)		1	1095	1095	6	6	6	6	6	7	6	24
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		200	320	110	1.9	7.9	8.6	0.0135	3.9	0.7	48	
	Calculated 50th percentile Effluent Conc. (when n>10)												13
Receiving Water Data	90th Percentile Conc., ug/L		20	0	0	0.04	0.19	1.22	0.005	0.64		4.36	
	Geo Mean, ug/L							0.97	0.0027	0.39	0.09		0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	3,149	19	19	1.3892	15	7.2612	2.1	658.85	-	53.211	-
		Chronic	415	11	11	0.5281	10	5.2432	0.012	73.171	-	48.59	-
	WQ Criteria for Protection of Human Health, ug/L		-	-	-	-	-	1300	0.14	610	14	-	5.7
	Metal Criteria Translator, decimal	Acute	-	-	-	0.943	0.982	0.996	0.85	0.998	-	0.996	-
		Chronic	-	-	-	0.943	0.962	0.996	-	0.997	-	0.996	-
	Carcinogen?		N	N	N	N	N	N	N	N	N	N	Y

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.050	0.997	0.997	0.607	0.607	0.607	0.607	0.607	0.652	0.607	0.883
Multiplier		6.20	1.00	1.00	2.14	2.14	2.14	2.14	2.14	2.01	2.14	1.00
Max concentration (ug/L) at edge of…	Acute	64	11.503	3.954	0.176	0.780	1.836	0.006	0.917	0.048	7.884	0.000
	Chronic	33	3.281	1.128	0.079	0.355	1.396	0.005	0.719	0.014	5.3652	0.000
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**NO**	**n/a**

Human Health Reasonable Potential (Continued from previous page)

s	s^2=ln(CV^2+1)	0.555	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545
Pn	Pn=(1-confidence level)1/n	0.050	0.997	0.997	0.607	0.607	0.607	0.607	0.607	0.652	0.607	0.883
Multiplier		2.490	0.2143	0.2143	0.8603	0.8603	0.8603	0.8603	0.8603	0.8054	0.8603	0.5174
Dilution Factor		103	103	103	103	103	97.5	97.5	97.5	97.5	103	97.5
Max Conc. at edge of Chronic Zone, ug/L		4.834	0.6656	0.2288	0.0159	0.066	1.0E+00	2.8E-03	0.4204	0.0949	0.4009	0.1333
Reasonable Potential? Limit Required?		**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**NO**	**NO**	**NO**	**NO**	**n/a**	**NO**

Table 37 Reasonable Potential Analysis Outfall 002 – Part 2 of 2

Pollutant, CAS No. & NPDES Application Ref. No.			**LEAD - 7439921 7M Dependent on hardness**	**DICHLOROBROMOMETHANE 75274 12V**	**ENDRIN ALDEHYDE 7421934 15P**	**TRICHLOROPHENOL 2,4,6 88062 11A**	**PHENOL 108952 10A**	**ARSENIC (dissolved) 7440382 2M**
Effluent Data	# of Samples (n)		24	24	6	6	12	6
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		1		0.12	7		2.6
	Calculated 50th percentile Effluent Conc. (when n>10)			0.5			20	
Receiving Water Data	90th Percentile Conc., ug/L		0.7					0.99
	Geo Mean, ug/L			0	0	0	0	
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	23.839	-	-	-		360
		Chronic	0.929	-	-	-		190
	WQ Criteria for Protection of Human Health, ug/L		-	0.27	0.76	2.1	21000	-
	Metal Criteria Translator, decimal	Acute	0.466	-	-	-	-	1
		Chronic	0.466	-	-	-	-	1
	Carcinogen?		N	Y	N	Y	N	Y

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555	0.555		0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.883	0.883	0.607	0.607		0.607
Multiplier			1.00	1.00	2.14	2.14	2.14	2.14
Max concentration (ug/L) at edge of…		Acute	0.692	0.000	0.009	0.515		1.155
		Chronic	0.698	0.000	0.002	0.146		1.037
Reasonable Potential? Limit Required?			**NO**	**n/a**	**n/a**	**n/a**	**n/a**	**NO**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545
Pn	Pn=(1-confidence level)1/n	0.883	0.883	0.607	0.607	0.779	0.607
Multiplier		0.5174	0.5174	0.8603	0.8603	0.6528	0.8603
Dilution Factor		103	103	103	103	103	103
Max Conc. at edge of Chronic Zone, ug/L		0.005	0.0051	0.0011	0.0617	0.21	0.0217
Reasonable Potential? Limit Required?		**n/a**	**NO**	**NO**	**NO**	**NO**	**n/a**

Outfall 003 and 004, Interim Performance-Based Limits:

Limits were established using sample data from discharge monitoring reports for the years 2010, 2011, and 2012. All percentile calculations used year 2012 data values. Calculations for dissolved oxygen for Outfall 003 and all parameters for Outfall 004 used additional data values from the years 2010 and 2011. The number of years of data used was based on the size of the data set required to ensure a representative characterization of the discharge.

Data collected for BOD_5 and fecal coliform were non-normally distributed. BOD_5 and fecal coliform data values were natural-log transformed; means, standard deviations, and percentiles calculated; and then calculated percentiles transformed back to numerical limits. Dissolved oxygen data was normally distributed and required no transformation.

Monthly and daily limits were based on 95 and 99-percentile values. The 99-percentile value for dissolved oxygen at Outfall 004 is below zero. Therefore no minimum for daily minimum for dissolved oxygen at Outfall 004 is proposed.

Table 38 Stormwater Performance-Based Limits

	003			**004**		
	BOD_5 lbs/day	**Dissolved Oxygen** mg/L	**Fecal Coliform** #/100mL	**BOD_5** lbs/day	**Dissolved Oxygen** mg/L	**Fecal Coliform** #/100mL
Mean	N/A	4.74	N/A	N/A	4.84	N/A
Standard Deviation	N/A	1.46	N/A	N/A	2.15	N/A
Mean[ln()]	4.35	N/A	6.08	0.72	N/A	2.82
Standard Deviation[ln()]	0.61	N/A	5.23	0.76	N/A	3.60
95%	**196**	**2.33**	**22085**	**6.1**	**1.31**	**389**
99%	**476**	**1.34**	**89809**	**15.7**	**-0.16**	**1384**

Appendix E--Response to Comments

Ecology has separated comments into six sections: United States Environmental Protection Agency Comments on Permit; United States Environmental Protection Agency Comments on Fact Sheet; National Marine Fisheries Service, Yakama Nation, Cowlitz Indian Tribe, and Columbia River Keeper Comments; City of Longview Comments; Weyerhaeuser Longview Comments; and Citizen Comments.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON PERMIT

1) Oregon Water Quality Standards:

The permittee discharges to the Columbia River where both the State of Washington's and the

State of Oregon's water quality standards apply. Federal NDPES regulations, 40 CFR 122.4(d), prohibit issuance of a NPDES permit"[w]hen the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected States." Ecology must consider Oregon's WQS' in the analysis of this permit.

Response to Comment*: To ensure compliance with the applicable water quality requirements of Oregon, Ecology has performed an analysis of the impact of Weyerhaeuser Longview's discharge on the Oregon's water quality. This analysis has been included in the Section III.F of the fact sheet.*

2) Cover Page:

The permit identifies only Weyerhaeuser NR Company as the Permittee. However, the Fact Sheet (Page 18) states that NORPAC, among other companies, discharge wastewater to Weyerhaeuser's industrial WWTP under this permit, other NPDES permits, and SWD permits. Ecology should name all dischargers on the permit as co-Permittees to ensure enforceability of permit limits and conditions.

Response to Comment: *Ecology has issued state waste discharge permits (under RCW 90.48.160) to the facilities which discharge wastewater to Weyerhaeuser Longview's wastewater treatment plant. These state waste discharge permits have enforceable AKART-based limits to ensure the protection of the environment and Weyerhaeuser Longview's wastewater treatment plant. Ecology believes that co-permitting the facilities which discharge to Weyerhaeuser Longview's wastewater treatment plant would cause an entanglement of liabilities for environmental non-compliance. Further detail is provided in Section A of the fact sheet.*

3) Page 2:

Under facility location, the facility's physical address should be provided. The address is provided in the fact sheet, but it would be helpful to provide the physical address in the permit as well.

Response to Comment: *Facility physical address has been added to the permit.*

4) Page 8:

The permit authorized non-stormwater discharges to surface waters without treatment. Only the combined process and stormwater discharge is monitored for select pollutants.

Additionally, the following non-stormwater discharges are authorized to the

Consolidated Diking Improvement District Ditch #3: vehicle wash water, dust control water, area wash-up water, equipment wash water, non-contact cooling water overflow, emergency .fire control water, and any other non-stormwater discharges identified in a permit application approved by Ecology. These non-stormwater- discharges are addressed by Special Condition S14.

The EPA urges Ecology to take more immediate action to mitigate non-stormwater discharges that are likely to contain pollutants, such as, requiring containment and pumping to appropriate treatment systems, refer to Comment No. 19 regarding Section S14 of the permit (Outfalls 003 and 004 AKART Study).

Response to Comment: *Ecology has updated the non-stormwater discharge authorizations. The discharge of vehicle wash water is prohibited after six months from the effective date. "Dust control water" and "area wash-up water" have been replaced with "pavement wash waters" which is consistent with EPA's Multi-Sector general Permit (MSGP). Best management practices will be put in place through the Stormwater Pollution Prevention plan. Additionally, the required Outfall 003/004 AKART study will look to analyze treatment options that are practicable.*

5) Page 8, Effluent Limits Outfall 001/002:

The effluent limit for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is based on the *EPA's Total Maximum Daily Load (TMDL) to Limit Discharges of 2, 3, 7, 8-tetrachlorodibenzo p-dioxin (TCDD) to the Columbia River*. The TMDL expresses the wasteload allocation (WLA) as a long-term average of 0.26 milligrams/day (mg/day) TCDD. The permit applies the WLA as a maximum daily limit (MDL) of 0.38 mg/day TCDD requiring semi-annual monitoring. The EPA's *Technical Support Document for Water Quality-based Toxic Control* recommends that the WLA be applied as an average monthly limit (AML) to ensure that the TMDL will be met over the long term. Furthermore, NPDES regulations [40 CFR 122.45 (d)] require an AML, unless impracticable. The EPA recognizes that applying the WLA as an AML with semi-annual monitoring may be problematic and does take into adequate account sample variability.

Alternately, it is reasonable to apply an average annual limit or longer-term limit of 0.26 mg/day TCDD, in addition to the MDL, to ensure the long term WLA is not exceeded. Applying only a MDL of 0.38 mg/day TCDD is not sufficient to ensure compliance with the long-term average WLA.

Response to Comment: *A maximum daily limit (MDL) of 0.26 mg/day has been included in the permit. The corresponding concentration remains above the required detection level in Appendix A of the permit, but below the quantitiation level in Appendix A. Compliance with the annual average and maximum daily limit will be determined by no detection above the quantitation limit of 5 ppq.*

6) Page 11, Effluent Limits Outfall 005 (discharges through Outfall 001):

The treated sanitary wastewater (Outfall 005) discharge comingles with the flow discharging through Outfall 001 after the final sample point for Outfall 001 as described in the fact sheet (Page 15). The discharge from the sanitary WWTP must meet all required technology-based effluent limits (TBELs) before combined with flows from Outfall 001. The permit correctly incorporates TBELs to comply with secondary treatment standards for biochemical oxygen demand 5-day (BOD5 or BOD), total suspended solids (TSS), pH, and a minimum of 85% removal of BOD and TSS. However, federal regulations also require mass-based effluent limits for BOD and TSS [40 CFR 122.45(f)]. The EPA notes that the current permit contains mass-based effluent limits for TSS and BOD; removal of these limits constitutes backsliding [40 CFR122.44(1)]. Additionally, Ecology must apply their TBELs for total residual chlorine of AML 0.5 mg/L and MDL 0.75 mg/L or WQBELs, whichever is more stringent. The proposed chlorine limit of greater than 0.3 mg/L imposes no upper limit on the concentration of chlorine allowable in the discharge.

Response to Comment: *Mass-based limits were calculated using Ecology's Permit Writer's Manual which calls for the use of the sanitary treatment plant's design flow (expressed in million gallons per day for the maximum flow month in the design year). Ecology used the value 0.25 MGD in this calculation which was the average annual flow limit in the 1991 version of this permit. The average annual flow limit is considered more conservative than a maximum flow month and was determined to be appropriate in the absence of the additional design information. The calculated mass-based limits were higher than the previous permit's mass-based limits because the sanitary treatment plant is undersized for the current number of employees on-site, therefore the previous mass-based limits were carried forward on a best-professional judgment basis.*

Regarding residual chlorine, the sanitary wastewater treatment plant discharge is mixed with the discharge of Outfall 001 prior to discharge into the Columbia River. Accounting for less that 0.1% of the total flow, there is adequate mixing within the pipe to ensure that the discharge from Outfall 005 is not detrimental to the environment or human health. A maximum upper limit of 5.0 mg/L has been established on a best-professional-judgement basis; similar limits have been established at other mills.

7) Page 12-13, Effluent Limits, Outfalls 003 and 004:

Outfall 003 has performance-based limits based on the "average monthly maximum" while Outfall 004 has limits based on the "average monthly" values for settleable solids, oil, grease, and BOD5. Minimum sample frequency is monthly or weekly for these parameters. Please clarify and correct the required statistical basis for reporting for each limit.

Outfalls 003 and 004 discharge stormwater, car/truck wash water, dust control water, and other sources of contaminated water to CDID 43. The permit does not authorize a mixing zone for either outfall; however, the fecal coliform effluent limits for both outfalls exceed the water quality standards. The fecal coliform effluent limits for Outfalls 003 and 004 are 24,300 and 380 colonies/100 mL, respectively, whereas, the water quality standard is 100 colonies/100 mL based on a monthly geometric mean. The permit cannot authorize discharges of process wastewater that cause or contribute to excursions above the water quality standards [40 CFR 122.44(d)(1)(i)] except on an interim basis under a compliance schedule.

Response to Comment*: The word "maximum" has been removed from "average monthly maximum" in the outfall 003 limits.*

*Ecology has clarified in the permit and fact sheet that the Outfall 003/004 limits for BOD5, fecal coliform, and dissolved oxygen are **interim** performance-based limits and part of a larger compliance schedule which will be established upon completion of the AKART study. These limits are put in place to prevent further degradation of the water body while the AKART study is performed to determine appropriate controls and limits. Final effluent limits will be established based on the technology that is determined to meet AKART requirements for these outfalls.*

8) Page 14, Discharge Benchmarks for 001/002 Ditch and other discharges:

The permit incorporates some new and changed benchmarks for this discharge by including new benchmarks for copper (14 ig/L), TSS (100 mg/L), and COD (120 mg/L), removing the benchmark for BOD (30 mg/L) and narrowing the allowable pH range (6 to 9 SU). The fact sheet must explain the rationale for these changes.

Response to Comment: *Ecology has added language justifying the change. The stormwater benchmarks were revised to better reflect the nature of the pollutants being discharged.*

9) Page 15, Mixing Zone Authorization:

Refer to Comment No. 25 for comments and concerns about the mixing zone authorizations for Outfalls 001 and 002.

Response to Comment: *Comment noted.*

10) Pages 16-18, Authorization for other discharges:

Sections S I .D through S1. L authorize the discharge of other wastewater streams either to the industrial WWTP or directly to Outfalls 001/002. For several of these dischargers, Ecology has issued permits under their SWD Permit Program (WAC 173-216) as indicated by facilities with permit numbers in the table below. Federal Effluent Guidelines Limitations (ELGs) apply to several of the authorized discharges as indicated in the table. Implementation of effluent guidelines occurs under two EPA programs, depending on the way a facility discharges its wastewater: the NPDES program for direct dischargers and the pretreatment program for indirect dischargers.

The application of pretreatment type permits for discharges to an industrial is inconsistent with Federal pretreatment regulations. Additionally, the EPA questions Ecology's regulatory authority to issue SWD permits for industrial discharges to other than a public owned treatment works (POTW). Based on WAC 173-216-010(1),

The purpose of this chapter is to implement a state permit program, applicable to the discharge of waste materials from industrial, commercial, and municipal operations into ground and surface waters of the state and into municipal sewerage systems.

Where WAC 193-216(10) defines

"Municipal sewerage system" or "publicly owned treatment works (POTW) " means a publicly owned domestic wastewater facility or a privately owned domestic wastewater facility that is under contract to a municipality.

Please provide additional information about Ecology's authority in this regard.

The EPA briefly reviewed the permitted facilities authorized to discharge to Weyerhaeuser's industrial WWTP and outfalls; refer to the notes provided in Table 1. We have concerns and questions about the lack of clarity regarding the applicable ELGs and derivation of effluent limits for discharges occurring outside the proposed permit. Again, the complexity of this permit necessitates a detailed discussion that clearly identifies all the discharges, volume of discharges, and pollutants of concern so that interested parties can understand the contribution of each authorized discharge to the total volume and pollutant load discharging from the facility. Please provide a clear and concise summary and evaluation of all of the wastewater streams discharging from the facility (refer to Comment No. 24).

Response to Comment: *The facilities discharging to Weyerhaeuser Longview's wastewater treatment facility are issued state waste discharge permits under RCW 90.48.160. Their permits are not issued under the federal pretreatment program because the facilities do not discharge to a POTW. The effluent limits in these state waste discharge permits are determined on a best-professional-judgment basis to meet the state AKART requirements. Often the pretreatment standards are used as a reference in determining state AKART limits.*

Ecology has included additional language in Section A (Facility Description) of the fact sheet describing this authority.

11) Page 18 S1.L. Discharges from other Weyerhaeuser Facilities:

The permit authorizes discharges of waste streams of comparable characteristics from other facilities to the industrial WWTP. Accepting various waste streams from other facilities puts the Permittee at higher risk of possible process upset or pass-through of pollutants due to unknown characteristics of or pollutants in hauled waste streams. At a minimum, the permit should require a record of receipt for off-site materials discharged to the industrial WWTP and other relevant information including date, time, total volume, type of discharge, pollutants, and pollutant concentrations, etc. The permit should include a statement that the Permittee is not authorized to accept waste streams that contain pollutants not disclose in their NPDES permit application.

Response to Comment: *The facilities discharging to Weyerhaeuser are regulated under the state waste discharge permitting program. These facilities are required to submit state waste discharge permit applications which include the volume and nature of their discharge to the Weyerhaeuser Longview wastewater treatment plant. Each of the facilities is required to meet specific effluent limits to protect the environment and the Weyerhaeuser Longview wastewater treatment plant. Additionally, the facilities are required to submit spill plans, slug discharge control plans, and other reports/documents to further ensure the protection of the environment and the Weyerhaeuser Longview wastewater treatment plant. Regulatory protections are in place (through the state waste discharge permitting process); after consultation with the*

Attorney General's Office, Ecology does not believe that requiring additional regulation through the NPDES permitting process is required.

12) Page 18, Temperature, Sample Type:

The temperature reporting requirement vaguely states "maximum," leaving in question whether only the monthly maximum need be reported. The permit should clarify the maximum daily temperature must be reported. Daily maximum data is needed to evaluate compliance with the 7-day average of the maximum daily temperatures (7-DADmax) temperature standard.

Response to Comment: *"Report Maximum" has been changed to "Report Daily Maximum."*

13) Page 18, Secondary Treatment Wastewater Effluent:

Footnote C appears to be incorrect. Please clarify whether this monitoring location is upstream of the addition of non-contact cooling water. If so, the permit must require flow monitoring at this point in order to calculate the mass loading of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) as required by the permit.

Response to Comment: *The footnote in reference is not a "c" but an "e." Footnote "e" explains the monitoring location in detail, no change has been made. Because of laboratory limitations, compliance with the TCDD limit is determined by no detections above the quantitation limit of 5 ppq, as explained in Special Condition S1.A, Effluent Limits: Outfall #001/002, footnote d.*

14) Page 18, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) Monitoring Frequency

The fact sheet should provide data to support the rationale for semi-annual monitoring of TCDD.

This highly toxic pollutant warrants additional scrutiny when determining an appropriate monitoring frequency. Since the Permittee monitored for this pollutant under the current permit,

Ecology should consider the variability and magnitude of the previously reported sample results to determine if more frequent monitoring is warranted to demonstrate compliance with the water quality-based effluent limits.

Response to Comment: *Weyerhaeuser Longview is required to monitor for TCDD semi-annually in the secondary treatment wastewater effluent* ***and*** *quarterly in the bleach plant effluent. Despite requiring monitoring at multiple monitoring points, TCDD has not been observed in the effluent at Weyerhaeuser Longview. The bleaching system at Weyerhaeuser Longview has undergone many changes that have greatly reduced the generation of chlorinated organic compounds. Ecology will continue to assess the need for further monitoring if the conditions necessitate the change. The fact sheet has been updated to include a detailed description of the upgrades in bleaching technology at the mill which have reduced the discharge of TCDD and other chlorinated organics (III.A.Technology-Based Effluent Limits, beginning after Table 15).*

15) Page 19, Sanitary Wastewater Influent/Effluent Monitoring

The permit lacks influent monitoring of the sanitary wastewater stream. Monitoring influent concentrations of TSS and BOD is required to calculate the percent removal as mandated under federal secondary treatment standards. Ecology's Permit Writer's Manual 1 prescribes 24-hr composite samples, not grab samples, for BOD and TSS. The permit should require this level of monitoring or the fact sheet should explain the rationale for an alternative sample type.

Response to Comment: *Ecology has included a minimum sampling frequency requirement for the sanitary wastewater treatment system influent.*

The sanitary wastewater treatment system has a 3-week detention time through an aeration lagoon. There is no reason to assume variable effluent quality over a 24-hour period. Ecology has updated the fact sheet with its justification for grab sampling.

16) Page 20, Monitoring Tables Outfall 003 and 004

Outfalls 003 and 004 discharge stormwater, car/truck wash water, dust control water, and other sources of contaminated water to the CDID #3. DMR data from Ecology's PARIS database shows the average monthly flow rate from Outfall 003 and 004 was 0.41 and 0.24 mgd, respectively, for the 12-month period ending Nov. 30, 2013. The required minimum sample frequencies for pollutants from these outfalls are not the same, with only monthly monitoring required for BOD, fecal coliform and pH for Outfall 004. Based on past discharge data, the flow from these outfalls appears significant. Additionally, based on the description of discharges to each outfall, the character of the discharge could be highly variable. The EPA recommends more frequency sampling for settable solids, oil, grease, BOD, fecal coliform, and pH at these discharge locations, especially in light the of required AKART study requirements.

The current permit includes monthly TSS and turbidity monitoring (at base flows) for both Outfalls 003 and 004. This permit removes these monitoring requirements. DMR data from PARIS shows the average turbidity discharged from Outfalls 003 and 004 were 165 and 32 NTU, respectively, for the 12-month period ending Nov. 30, 2013. The EPA recommends turbidity (and/or TSS as a surrogate) monitoring be retained in the permit to evaluate the discharges potential to cause or contribute to excursions above the WQS for turbidity.

Response to Comment: *Ecology has added turbidity as a required monitored parameter.*

The parameter limits and monitoring frequencies for Outfall 003 and 004 are all subject to change following the outcome of the Outfall 003/ 004 AKART Study and Compliance Schedule. Ecology believes that the monitoring frequencies in the permit and the historical monitoring data are sufficient to accurately characterize the discharge and ensure compliance pending the outcome of the AKART study.

17) Page 21, Effluent Characterization - Final Wastewater Effluent - Priority Pollutant Scan:

The Permittee is required to perform annual priority pollutant testing on the final effluent after mixing with clean water sumps and non-contact cooling water. The clean water streams may dilute the process water to the degree that toxic pollutants are no longer detectable. In addition to monitoring the final effluent, the EPA recommends requiring priority pollutant monitoring on the process wastewater stream before dilution with clean water streams to better assess the overall pollutant load to the river (e.g., monitor secondary treatment wastewater effluent). This additional monitoring should be done in addition to testing the final effluent.

Response to Comment: *When Ecology performs its reasonable potential analysis for water quality impact, the final effluent is used. For the year 2013, the average discharged volume from Outfalls 001/002 was 53.2 MGD. The average discharge of cooling water was 3.9 MGD. Comprising of only 7% of the discharged water, Ecology believes the dilution is not significant enough to justify the inclusion of additional monitoring.*

18) Page 36, S11. Wastewater Treatment Efficiency Study:

Based on the large discharge volume and the potential to discharge a variety of toxic pollutants, the EPA strongly agrees with the requirement to evaluate the overall effectiveness of the industrial WWTP with the expectation that it be operated at peak efficiency. The EPA further recommends that the Permittee be required to evaluate new technologies and treatment options that maybe used to remove higher levels of pollutants, particularly PBT chemicals known to be present in the wastewater. This is consistent with the state regulatory requirement for "all known, available and reasonable methods of treatment" (AKART). To ensure that this analysis is thorough, comprehensive, and meets Ecology's expectations, we recommend that Ecology work with the facility to refine and agree upon the scope prior to commencing with the study. The

EPA recommends the permit require Ecology's review and approval of the study plan prior to implementation.

Response to Comment: *Ecology looks to multiple sources for information to evaluate whether AKART must be re-evaluated for an existing facility. These include EPA's priorities for updating effluent guidelines for the industry, the treatment technologies employed at other mills in the state, and the availability of new technologies in use elsewhere for this industry.*

EPA has recently reviewed its effluent guidelines and concluded that an update to the guidelines for the pulp and paper industry is not necessary at this time. The treatment technology employed at this mill is consistent with other mills in the state. The treatment efficiency study required by the permit will help Ecology better understand the system's performance, how it compares to results achieved at similar facilities and whether a more detailed evaluation of the system is needed in future permit cycles.

Ecology has already included detailed requirements for the study within the permit. Ecology does not believe that requiring Weyerhaeuser Longview to request approval to implement a plan that has already been defined in the permit is necessary.

19) Page 37, S13 Cooling Water Intake Report:

With an average daily cooling water intake of approximately 58 mgd, the facility falls within the threshold for compliance with 316(b) of the Clean Water Act 1 t, which is 2 mgd. The permit states that impingement and entrainment studies must be included in the report, "if applicable."

The EPA urges Ecology and/or the Permittee to coordinate with National Marine Fisheries

Service (NMFS) to ensure that the resulting study report will address their concerns regarding impingement and entrainment. The study should include a determination regarding the potential for impingement and entrainment of aquatic species to demonstrate compliance with 316(b).

Response to Comment: *EPA's recent rule, Subpart J-<u>Requirements Applicable to Cooling Water Intake Structures for Existing Facilities Under Section 316(b) of the Clean Water Act</u>, for the first time defines specific requirements and compliance pathways for existing facilities with cooling water intake and usage meeting certain thresholds. Based on the applicability requirements identified in the rule, the detailed requirements of the rule do not appear to apply directly for this facility. Per subsection 125.90 (b), requirements for the intake must be set on a Best Professional Judgment (BPJ) basis.*

In order to establish BPJ requirements for use of the intake, the Permittee will gather the necessary information in the Cooling Water Intake Report and provide it to Ecology. Components of the new rule have been added to the requirements for this report. Ecology may look to these rule elements as appropriate in making a BPJ decision for this facility.

As a delegated state implementing the NPDES permitting program, Ecology must follow Federal rules. As the Federal agency establishing the rules, it is EPA's obligation to follow the appropriate consultation process with Federal to ensure the rules are protective of aquatic life from impingement and entrainment at the intake.

20) Page 37, S14. Outfalls 003 and 004 AKART Study:

These outfalls discharge comingled stormwater and process water. The comingling of process water and stormwater should be avoided. The report should include a plan to, where possible, segregate process waters to receive appropriate treatment prior to discharge.

The permit expresses Ecology's intentions to issue a compliance schedule through an administrative order to address necessary changes recommended by the study. The EPA recommends that the permit contain a reopener clause and that additional requirements be incorporated into the permit through a major permit modification to ensure requirements for public notification are met.

Response to Comment: *Special Condition S14 of the permit includes the requirement for examining separation of process water from stormwater. Ecology has also prohibited the discharge of untreated vehicle wash water after 6 month from the effective date of this permit.*

In addition to the existing General Condition G3 which gives Ecology to ability to modify the permit, Ecology has added permit language specifying the use of permit modification as a mechanism for changing the permit as a result of the AKART study.

<u>UNITED STATES ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON NPDES FACT SHEET</u>

1) Page 17,1st paragraph:

Remove the sentence, "During the winter, raw sewage overflows due to storm events greater in size than a one-in-five-year event are permitted from the City of Rainier wastewater treatment plant." The permit no longer authorizes raw sewage discharges as of Oregon's issuance in June 2012.

Response to Comment: *Ecology has removed the sentence from the fact sheet.*

2) Page 17, Table 2. Ambient Background Data:

The table does not provided the statistical basis for the values used for each parameter (e.g., maximum, average, 95" percentile, etc.). This information is needed to understanding the data set and the level of conservatism used for the reasonable potential analysis (RPA).

Response to Comment: *Ecology has updated the table.*

3) Page 19, Wastewater Characterization:

The current permit requires annual priority pollutant testing of the final effluent (current permit,S18, Page 39) yet Tables 3 and 4 (Fact Sheet, Pages 19-23) do not include all 126 priority pollutants and for many parameters only a single sample result is presented. The waste characterization upon which pollutants of concern (POC) are identified and reasonable potential is determined, must be inclusive of all the data required by the permit and submitted in the application for permit renewal. Ecology must complete a comprehensive evaluation of and clearly identify POC in the fact sheet (refer to Comment No. 26).

Response to Comment: *Ecology has reviewed the wastewater characterization data. Data from the permit application, water inspections, and priority pollutant scans were gathered. Priority pollutants which were not observed in the effluent (non-detections) were not included in the table. Language has been added to the fact sheet to clarify this point. The pollutants with only a single sample result were taken from the permit application.*

4) Page *32-34*, Table 13. Submittals:

The current permit required annual priority pollutant scans (S16.) and a Total Chlorine Free (TCF) Study (S18.), which do not appear in this table. Of particular interest, the fact sheet should include a discussion about the findings and conclusions of the TCF study, which was to be a comprehensive analysis of the conversion to a totally bleach free bleaching process.

Response to Comment: *The priority pollutant scans have been added to the table of submittals. The TCF study is already included in the table. A discussion regarding the results of the study has been included in the Technology-Based Effluent Limits section on page 40.*

5) Page 35, Technology-based Effluent Limits:

As already mentioned, this is a complex industrial permit authorizing the collection and treatment of process wastewater from a variety of industries located both on- and off-site. National regulations establish technology-based numerical effluent limits for specific pollutants at several control levels: BAT, BPT, BCT, NSPS, PSNS, or PSES. The EPA has promulgated

ELGs for many of the industries authorized to discharge under the draft permit. To the layperson, the unfamiliar terminology and complex application of ELGs is not easily understood. Ecology has neglected to identify clearly the ELGs that apply to each of the discharges. In the spirit of transparency, Ecology should provide the specific regulatory citation, applicable level of control, and numeric limits as cited in the ELG that apply to each authorized discharges. As it is, the factsheet does not present the ELGs and associated limits that apply to each discharge in a clear and comprehensive manner.

Response to Comment: *The requested transparency already exists in Appendix D, Table 31and 32. Production basis, regulatory citations, and effluent guidelines are all presented in a concise manner. Ecology believes this is an appropriately clear and concise presentation of the basis for the technology-based limits. The table is referenced in the fact sheet to help readers navigate efficiently.*

6) Page 39-43, Mixing Zone:

The draft permit authorizes the size of mixing zones for Outfalls 001 and 002 based on Ecology's regulatory provision for mixing zones in estuaries (i.e., radius of 200 feet plus the depth of the diffuser) rather than using the provision for rivers. In contradiction, the permit does not cite the regulatory basis for the mixing zone size and the fact sheet cites only the provision applicable to river discharges (Fact Sheet, Page 39). Ecology must explain the basis for applying the estuary provision [WAC 173-201A-400(7)(b)] instead of the river provision [WAC 173-201A-400(7)(a)].

The dilution factors used in evaluating the need for water quality-based effluent limits come from the *Outfall Dilution and Temperature Study* by CH2M Hill in 2004. The fact sheet should present key data and assumptions used in the model of dilution achieved under worst-case conditions. The fact should state whether the outfall dilution report was reviewed by Ecology's mixing zone modeling expert and approved by an authorized staff person.

Regardless of the provisions used to establish the size of the mixing zone, estuarine or river, the issue of the overlapping mixing zones must be address when evaluating reasonable potential.

The fact sheet includes the following figure depicting the mixing zones for Outfalls 001 and 002 (Page 46). The EPA has overlaid the hash-marked circle to identify overlapping area of the mixing zones. The EPA believes that independent analysis of the reasonable potential to cause or contribute to excursions above the chronic criteria would result in pollutant concentrations **at** twice the criteria at the outer edge of the overlapping zones. Furthermore, the following statement in the fact sheet regarding Ecology's assessment of overlapping mixing zones is confusing, *"[d]ue to the authorized dilution ratio of the east and west diffusers, Ecology has determined the combined effect of the diffusers will not cause an exceedance of the water quality standards."* (Page 43) The EPA suggests that Ecology consider the implications of overlapping mixing zones when re-evaluating reasonable potential (refer to Comment No. 26).

Ecology's assessment that the mixing zone is "effectively minimized" (Page 42) by the use of conservative assumptions in the dilution model is flawed. The mixing zone regulatory provision [WAC 173-201A(6)] calls for minimizing the size of the mixing zone. The permit authorizes the maximum size based on the estuarine provision.

Response to Comments: *Based on the comment, the mixing zone analysis was reviewed by Ecology's mixing zone modeling expert (Dr. Anise Ahmed, P.E.).*

Ecology found that, regarding the basis for the mixing zone size: The proposed mixing zone size is based on an assumption that the discharge is to an estuary. This does not fall within the defined demarcation for estuaries in WAC 173-201A-400 (7)(b). The measured salinity near the outfall is very low (0.08 ppt) and freshwater criteria have been applied to the discharge. However, the discharge is to a tidally influenced portion of Columbia River. For freshwaters the maximum downstream distance allowed for mixing zone is 300 feet plus the depth of the diffuser. For estuary this is 200 feet plus the depth of outfall. Although the freshwater criteria applies to the discharge, hydrodynamically the ambient waters "act" more like an estuary and assuming a smaller downstream distance (200 feet instead of 300 feet) for mixing zone is conservative.

Regarding overlapping mixing zones: The modeling results show that the neither the plumes emanating from each diffuser (001 and 002) nor the adjacent plumes from outfall 001 and 002 merge within the extent of the mixing zone sizes for each outfall. This indicates that within the overlapping mixing zones the concentrations at the edge of the mixing zone are unaffected and remain the same as for plumes outside the overlapping mixing zones.

Regarding Ecology's effective minimization of the mixing zone: Ecology believes that by assuming that an estuarine mixing zone is valid for the outfall, the downstream size is essentially reduced from 300 feet to 200 feet. This would fall under the definition of minimizing the mixing zone size.

Ecology also noted that the mixing zone study lacked an analysis of the effect of tidally influenced reflux. Ambient current data shows that the flow of the river reverses at certain times, possibly bringing the discharge back across the diffuser. Ecology requested, received, and reviewed a mixing zone study addendum which included a reflux estimate. The dilution factors were reduced accordingly and the reasonable potential analyses were updated.

7) Pages 47-52, Evaluating Water Quality-based Effluent limits:

The fact sheet states, "[t]urbidity may, be exceeded during filter plant backwash and/or filter plant sedimentation basin wash outs. As stated in the in Fact Sheet, Section the permit seeks to address the reasonable potential by requiring a *Water Supply Plant Discharge AKART study.* (Fact Sheet Page 48). The permit cannot authorize discharges that have a reasonable potential of causing or contributing to excursions above the WQS except on an interim basis and under a compliance schedule. Interim limits must be imposed if practicable and a compliance schedule must meet the requirement of *40 CFR* 122.47.

The list of toxic pollutants present in the discharge appears to be incomplete (Page 48). There are more than 13 toxic pollutants in the discharge. Furthermore, Ecology simply refers to the reasonable potential analysis (RPA) done in the 2004 *Outfall Dilution and Temperature Study* to conclude that there is not reasonable potential for all, but one pollutant on the list, aluminum.

The Fact Sheet presents RPA calculations for only aluminum out of the 13 pollutants in the list of toxic pollutants. Ecology must use available data submitted during the permit term and with the application for permit renewal to evaluate reasonable potential for all pollutants of concern (refer to Comment No. 22).

Response to Comment: *There are two main issues for the filter plant discharges – defining AKART and ensuring that water quality standards are met. As a result of a permit appeal by the Permittee, the Pollution Control Hearings Board (PCHB) decision No. 85-220 established that the current practices at the filter plant constituted AKART at that time.*

The current practices include using best management practices to minimize water quality impacts (eg. Basin washouts are conducted during high flow periods).

However, after almost three decades, Ecology believes it is appropriate to revisit the AKART analysis, taking into account current technology and conditions. This analysis must also include an assessment of whether current practices are violation water quality standards. If the analysis concludes that water quality impacts are expected, Ecology will address the situation using the proper regulatory mechanisms (ie. permit modification, regulatory order).

Ecology has updated the RPA table.

8) Page 49. Table 20 Toxic Pollutant Reasonable Potential Analysis:

Although this data table appears to have intended to provide a summary of the RPA, it does not include the sample number (n) or coefficient of variation (CV) used in the analyses. The EPA urges Ecology to rework the RPA using all available effluent data and Ecology's new RPA workbook (PermitCalc Workbook at: http://wwvv.ecy.wa.gov/programs/wqlpennits/guidance.html, from Ecology's Permit Writer's SharePoint site). Use of the most recent permit writers' tools ensures consistency in the RPA methodology and presentation.

Response to Comment: *Ecology has updated the RPA calculations and worksheet.*

9) Page 52, Table 21, RPA for Temperature:

The data table indicates maximum effluent temperature of 38.8°C and a maximum ambient river temperature of 20.96°C for the various model runs (2004 *Outfall Dilution and Temperature Study).* However, Table 3 (Fact Sheet, Page 19) indicates a maximum effluent temperature of 46.6 °C (115 °F) and Table 2 (Fact Sheet, Page 17) indicates a maximum receiving water temperature of 22°C. Ecology must re-evaluate temperature RPA based on all available data.

Response to Comment: *Ecology has included a reassessment of the effects of effluent temperature on the receiving water.*

10) Page 53, Human Health Criteria:

It is unclear if Ecology evaluated RPA for all POC for which there are human health criteria. The fact sheet shows RPA for only chloroform.

Response to Comment: *Ecology has updated the RPA calculations worksheet.*

11) Page 56-59, Table 24:

Double check table headings, six headings appear to be mislabeled.

Response to Comment: Ecology has updated the table.

12) Page 78, Appendix D, TBELs:

Due to the complexity of this permit, the EPA suggests this section provide some background and more detail about the application of ELGs in this permit. Providing information about historic production and effluent trends would provide context in relation to the calculated effluent limits.

Response to Comment: *Ecology believes the appropriate level of detail has been provided. Changes have been made throughout the fact sheet to provide additional clarity. Additional information regarding the application of ELGs has not been included.*

13) Page 79, RPA Worksheets:

The fact sheet must include RPA for all pollutants of concern the fact sheet only includes RPA for aluminum and chloroform.

Response to Comment: *Ecology has updated the RPA calculations worksheet.*

NATIONAL MARINE FISHERIES SERVICE, YAKAMA NATION, COWLITZ INDIAN TRIBE, AND COLUMBIA RIVERKEEPER COMMENTS

1) Persistent Bioaccumulative Toxics (PBTs):

National Marine Fisheries Service:

Many of the most dubious compounds that would be discharged from this plant under this permit are persistent bioaccumulative toxicants (PBTs) with significant toxicity to aquatic life, including salmonid species listed as threatened or endangered in the Columbia River system. In particular, this permit would authorize the discharge of 2,3,7,8 tetrachlorodi benzodioxin (TCDD), dibenzofurans (TCDF), and pentachlorophenol. While this letter will not review all that is known about these compounds, the authorization of their release as PBTs is troubling, and counter to both national level efforts to eliminate the release of PBTs known to have implications to adverse health effects in animals and humans, and to NMFS' and Washington State's recovery efforts for ESA-listed salmonid stocks. Indeed, 2,3,7,8 TCDD is perhaps the most toxic agent ever tested on fish, with mortality primarily occurring during hatching or shortly thereafter, associated with severe subcutaneous edema, craniofacial malformations, and disturbances in the cardiovascular system (Walker et al. 1991; Spitsbergen et al. 1991; Fisher et al. 1996; Elonen et al. 1998; Cooper and Chen 1998). Subacute lethality was documented in 45 percent of rainbow trout exposed to 0.038 ng/L over 28 days (Tillett et al. 1998). Salmonids may be the most sensitive of fish species to exposure as well. Walker et al. (1991) and Spitsbergen et al. (1991) established tissue-residues in lake trout embryos of 40 and 400 ng/kg (parts per trillion) following 48 hour exposure; all of the embryos at the high dose died and 22.5 percent died at the lower dose—all with pathognomonic clinical signs consistent with dioxin exposure.

Yakama Nation:

The effluent limit being proposed for 2,3,7,8-TCDD is derived from a 1991 Total Maximum Daily Load analysis conducted by EPA. This document is now out of date due to improvements in science and the fact that it predates the ESA listing of several species in the Columbia River that will be affected by the terms of the NPDES permit.

Response to Comments: *Under the Clean Water Act, a Total Maximum Daily Load (TMDL) is the regulatory tool used to address pollutant loading to impaired waters. The Columbia River is an interstate water and therefore the TMDL for 2,3,7,8-TCDD was issued by the EPA to address sources of this pollutant across state lines. Where TMDLs have been developed and Waste Load Allocations (WLA) assigned, Ecology is obligated by law to include those requirements in the permit. The requirements of a TMDL may not be changed through a permit issuance and any update to the 2,3,7,8-TCDD TMDL would need to be issued by the EPA. The TMDL for 2,3,7,8-TCDD was challenged and upheld in appeals which reached the United States Court of Appeals, Ninth Circuit (Dioxin/Organochlorine Center v. Clarke, 57F.3d 1517 (1995)).*

The EPA's existing TMDL for TCDD recognized the scientific limitations and made conservative bioaccumulation assumptions using the knowledge at the time of issuance. Of the total allowable TCDD loading to the Columbia, 60% went unallocated and 35% was allocated to US pulp mills. Since then some of the pulp mills identified in the development of the TMDL have been closed down, reducing the TCDD load to the Columbia River. In addition, changes in federal rules for the pulp and paper sector drove major technology changes to reduce chlorinated at pulp and paper mills across the United States. Significant among these was the switch from elemental chlorine to chlorine dioxide in the bleaching process and oxygen delignification. These improvements in technology are discussed further in the fact sheet (III.A.Technology-Based Effluent Limits, beginning after Table 15).

The laboratory detection level for 2,3,7,8-TCDD is in the single-digit ***part per quadrillion (pg/L)*** *range. Weyerhaeuser Longview is required to sample for 2,3,7,8-TCDD at the bleach plant and the secondary treatment wastewater effluent; there have not been detectable levels of 2,3,7,8-TCDD in Weyerhaeuser Longview's effluent in the previous permit term. The National Marine Fisheries Service cites studies conducted where aquatic species show harmful effects when exposed to significantly higher (in some cases many orders of magnitude higher) than the non-detect levels in Weyerhaeuser Longview's effluent. Weyerhaeuser Longview has shown* ***non-detection*** *of 2,3,7,8-TCDD down to 2 pg/L (0.002 ng/L) which compares favorably to the National Marine Fisheries Service cited 38 pg/L effects level. The* ***highest*** *non-detection levels at the bleach plant effluent, when converted to units of mg/day, are in the range of <0.15 mg/day (8 MGD was used in the calculation as the bleach plant effluent volume, as provided by the permit renewal application). This is below the TMDL WLA of 0.26 mg/day.*

The effective effluent limit for TCDD in the draft permit was <10 pg/L; this was based on the laboratory limitations at the time of the TMDL issuance. The effluent limit for TCDD in the final permit will reflect updated laboratory techniques and change the limit to <5 pg/L, which is the current Quantitation Limit (QL) established by Ecology. Because of laboratory limitations in detecting these low level toxic pollutants, the QL (5 pg/L) would be the effluent limit regardless of whether a TMDL or a reasonable potential analysis (RPA) were used to determine effluent limitations for TCDD. Ecology has no way of measuring compliance with limits that are below quantifiable levels.

Ecology has additionally established an average annual limit of 0.26 mg/day for TCDD which is discussed in Ecology's response to the EPA comments.

Only laboratory methods that are approved by EPA and Ecology may be used when analyzing for pollutants. The approved laboratory methods and detection limits are included in Appendix A of the NPDES permit.

Ecology appreciates the comments concerning the potential for toxicity in the discharge. In issuing NPDES permits Ecology establishes water quality based effluent limitations for pollutants with the potential to exceed standards. Under state and federal law, these effluent limitations may either be based on the state's EPA-approved water quality standards or waste load allocations established in an approved TMDL. Ecology does not have the legal authority to propose new criteria or amend the state's Water Quality Standards ad hoc based on comments received through an individual permit issuance process. Where enough scientific information and data exists to indicate the presence of pollutants that require environmentally protective criteria, Ecology's Water Quality Standards Group will work to develop those criteria. Comments provided will be forwarded to this group for review and consideration.

Based on the agency's ***Water Quality Standards Five-Year Work Plan FY 2012 – FY 2016,*** *Ecology will soon be beginning work to update the state's water quality criteria for the protection of aquatic life. During this upcoming rulemaking Ecology will solicit comments and input in updating the state's criteria to ensure that the best available science is used in adopting new criteria to protect aquatic life, including ESA listed species.*

2) AWQS/Oregon WQS:

Yakama Nation:

Ecology is not considering the National Ambient Water Quality Standards (AWQS), Oregon Human Health Criteria, or Aquatic Life Criteria that have been approved by the Environmental Protection Agency. It is our conclusion that, even though these levels are not protective of all Yakama People, they are the most protective EPA-approved standards for the Columbia River. Ecology cannot ignore standards of a downstream state in a shared water body like the Columbia River.

Response to Comment: *Oregon recently updated their water quality criteria for the protection of human health. Ecology is currently in the rulemaking process to update Washington's human health criteria. Ecology has assessed the impact of Weyerhaeuser Longview's effluent on the receiving water using both Washington and Oregon's water quality standards and updated the fact sheet accordingly. A simple mixing calculation was performed to demonstrate that Weyerhaeuser Longview's effluent meets the protective requirements of Oregon.*

It should be noted that even without performing this simple mixing analysis, the concentrations of the pollutants of concern are below Oregon's human health criteria at the edge of the mixing zone as can be seen in the Reasonable Potential Analysis.

3) Bioaccumulation/Additive Toxicity:

National Marine Fisheries Service:

NMFS recognizes that adverse effects from chemical exposure typically require exposure concentrations and durations above established biological effects thresholds. However, evaluating the risk of the discharge of chemicals based solely on anticipated water concentrations is fraught with error when such chemicals are bioaccumulative and reach steady state in exposed animals through multiple exposure pathways. Dioxins and dibenzofurans, for example, bioconcentrate only moderately from water exposure, and significant exposure occurs from dietary bioaccumulation and biomagnification.

National Marine Fisheries Service:

The permit would authorize maximum daily discharges of 10 pg/L of 2,3,7,8 TCDD and 39 pg/L of 2,3,7,8 TCDF. As the mechanism of action of the toxicants is the same—initiated with the initial binding of the chemical to the aryl hydrocarbon receptor in the exposed animals—the exposure of fish to multiple congeners represents additive toxicity risk. Yet, from our limited review, the permit does not capture an analysis of this toxicological additivity, or reflect on the use of toxic equivalency factors to better refine the discharge limits for constituents whose toxicity is asserted through the same mechanism of action. Further, the permit only provides limits for the 2,3,7,8 chlorine-substituted TCDD and TCDF congeners. Yet, significant work over the years with bleached Kraft mill effluents has identified numerous other congeners from among the roughly 215 isomers in these classes of compounds that could be released and accumulate in biota tissues and sediments. These additional congeners also represent additive risk to exposed animals, for which permit conditions should be recognized. Notably, the high limits allowed are precariously close to concentrations referenced in the first bullet of this comment letter (e.g., subacute lethality from 28 day exposure to 38 pg/L 2,3,7,8 TCDD).

National Marine Fisheries Service:

A large variety of chlorophenols are found in the bleach plant discharge effluent. Chlorophenols are known to cause a variety of lethal and sublethal effects on aquatic organisms at small concentrations. Further, individual chemicals in discharge form complex mixtures that can have additive effects that may differ from effects from individual compounds.

Cowlitz Indian Tribe:

We are also concerned that the proposed chemical discharges could interact to form new or other modified complex compounds or develop into a “toxic soup” that have potential to impact important resources and habitats to our Tribe. We are concerned that the draft permit and associated fact sheet neither adequately describe nor consider potential risks that proposed discharges would have to the aquatic environment.

Columbia Riverkeeper:

The discharges from Weyerhaeuser’s pulp mill and associated facility contain toxic substances such as dioxins, furans, phenols, chloroform, cyanide, PCBs, and toxic metals. While Ecology proposes technology- and TMDL-based effluent limits for some of these pollutants, the Draft Permit and Fact Sheet do not adequately analyze factors like biomagnification, additive toxicity, and multiple exposure pathways that impact how toxic pollutants actually affect aquatic organisms. Accordingly, the levels and types of toxic pollution authorized by the Draft Permit may harm the Columbia River’s Endangered Species Act-listed salmon and steelhead, and people who eat locally-caught fish.

Ecology should revise the permit and Fact Sheet to explain and ensure that toxic pollution from Weyerhaeuser's facility will not violate Washington's narrative water quality standards, which protect beneficial uses of the Columbia River like salmon and steelhead survival and human fish consumption. WAC 173-201A-510(1); WAC 173-201A-240. If a discharge may have the reasonable potential to violate a narrative water quality standard, Ecology must set a corresponding water quality-based effluent limit to ensure that such a violation does not occur. 40 C.F.R. 122.44(d)(1)(i); WAC 173-201A-510(1). Washington's narrative water quality standard for toxic pollution requires that toxic substances in a discharge not have the potential, either singularly *or cumulatively*, to harm sensitive aquatic life like salmon and steelhead, or adversely impact characteristic water uses like fish consumption, or otherwise adversely affect public health. Ecology, *Water Quality Program Permit Writer's Manual* (2011) at VI-4 (citing WAC 173-201A-240). Accordingly, the limits on toxic pollution in the permit must be at least sufficient to protect salmon and steelhead, and people who eat them. It is not clear that Ecology has fully considered the impacts of toxic pollution from Weyerhaeuser's discharge or set effluent limits that will protect salmon and steelhead or fish eaters. Accordingly, the effluent limits in the Draft Permit may authorize toxic discharges that violate the narrative water quality standards, in violation of 40 C.F.R. 122.44(d)(1)(i) and WAC 173-201A-510(1).

Ecology fails to account for important information about how toxic pollutants in Weyerhaeuser's discharges actually reach and affect salmon, steelhead, and other aquatic life. The water concentration of a toxic pollutant at the edge of a mixing zone is only one aspect of how that pollutant will impact aquatic life. The Fact Sheet should explain how bioaccumulation and biomagnification of extremely toxic pollutants such as dioxins, furans, phenols, and PCBs in Weyerhaeuser's discharges will impact aquatic organisms. The Fact Sheet should also account for the additive toxic effects of 2,3,7,8 tetrachlorodibenzodioxin and tetrachlorodibenzofuran and their multiple toxic congeners. Because these toxic substances all impact aquatic organisms through the same molecular mechanism, Ecology must consider the impacts of these pollutants cumulatively when deciding whether the proposed effluent limits will actually protect aquatic life. Ecology's final public Fact Sheet should, at a minimum, explain how Ecology has addressed these issues.

Response to Comments: *As discussed previously, Ecology sets water quality based effluent limitations based on either the state's current water quality criteria, or a waste load allocation in an EPA-approved TMDL. Narrative criteria can be pursued when there is an indication of the presence of a pollutant and there is enough scientific data to support the development of the criteria. In this case, although some information has been submitted, it is unclear that the data support the finding that narrative criteria are needed. Beyond that, it is unclear whether enough data is available to determine a numeric based on the narrative provision. Ecology plans to begin rulemaking to update the state's criteria for protection of aquatic life within the next few years, and will solicit comments from all interested parties to ensure that the best available science is used to establish those criteria at that time. Ecology has forwarded your comments to the Water Quality Standards Group for additional consideration.*

Where water quality standards have been established for pollutants and the pollutants have been observed in the effluent, Ecology has performed a reasonable potential analysis to determine the potential for a water quality exceedance, and if a reasonable potential exists, effluent limits and monitoring requirements have been developed.

In addition, Whole Effluent Toxicity (WET) testing requirements are a part of the past and new permit. WET testing is a regulatory tool under the Clean Water Act to capture the effects of additive toxicity and other possible toxicity interaction that are specific to a given effluent. WET testing involves exposing living organisms (plants, vertebrates, invertebrates) to set concentrations of the Permitttee's effluent over a period of time and recording the results. WET testing is performed to determine both the acute (short term) and the chronic (longer term) effects of the effluent on sensitive species. The Permittee must meet specific WET performance standards. For acute toxicity, a median of at least 80% survival in 100% effluent with no single test showing less than 65% survival in 100% effluent must be observed. For chronic toxicity, no toxicity in a concentration of effluent representing the edge of the acute mixing zone may be observed. More information regarding WET testing can be found at Ecology's WET testing website (http://www.ecy.wa.gov/programs/wq/wet/index.html). Weyerhaeuser Longview passed all WET tests with 100% survival of all species in 100% effluent concentration during the previous permit term. The WET testing frequency in the permit reflects Weyerhaeuser Longview's past WET performance and is consistent with the application of the WET requirements.

As stated previously, Ecology is using the regulatory tools at our disposal to protect the health of the communities and the environment. Ecology encourages the participation of stakeholders in current and future updates to the state's standards and criteria.

4) Copper/Zinc Discharges:

National Marine Fisheries Service:

Dissolved copper is present in relatively high levels in the effluent from outfalls #1 and #2. The ambient background level of dissolved copper in the Lower Columbia River is approximately 1.0 µ/L. Maximum values of measured concentrations of total copper released from outfalls #1 and #2 were 9.1µg/L and 8.6 µg/L respectively. These values equate to dissolved copper concentrations of 7.8 µg/L and 7.4 µg/L. Currently, NMFS refers to effects levels established by Baldwin *et al.*, (2003) and Sandahl *et al.*, (2007), which documented significant olfactory sensory responsiveness effects within ten minutes at 2.0 µg/L above ambient background dissolved copper levels of 3.0µg/L or less. Therefore, effluent discharged from these outfalls contains dissolved copper at concentrations above those known to cause harm to ESA-listed fish.

National Marine Fisheries Service:

Dissolved zinc is present in relatively high levels in the discharge. Similar to copper, dissolved zinc is known to be toxic in fish, and NMFS thresholds for dissolved zinc are concentrations of 5.6µg/l over background levels between 3.0µg/L and 13µg/L. According to ambient background data for the Lower Columbia River, total zinc is at 4µg/L. Maximum values for zinc concentrations discharged from outfalls #1 and #2 are 54µg/L and 48µg/L, respectively. Converting this number to dissolved zinc yields concentrations of 52µg/L and 47µg/L, well above thresholds for harm recognized by NMFS.

Columbia Riverkeeper:

Data in the Fact Sheet indicate that Weyerhaeuser discharges levels of dissolved copper and zinc that are toxic to salmon and steelhead, but the Draft Permit does not include any effluent limits for these pollutants. Copper and zinc can severely damage the olfactory capabilities of salmon and steelhead, even at relatively low concentrations, and be fatal at higher concentrations. The Fact Sheet, at pages 17 to 30, indicates that effluent from Weyerhaeuser's outfalls 001, 002, export dock, cargo dock, and stormwater ditch 001/002 all occasionally (and possibly even on average) contain zinc and or copper concentrations above the levels known to cause harm to threatened and endangered salmon and steelhead.

Ecology's Fact Sheet does not address these issues. Ecology cannot authorize discharges that would violate the applicable water quality standards—including narrative water quality standards—that protect beneficial uses like aquatic life and fish consumption. 40 C.F.R. § 122.44(d)(1)(i); WAC 173-201A-510(1); WAC 173-201A-240. Based on the discussion above, it is not clear that the proposed effluent limits that will protect salmon and steelhead or comply with federal and state requirements.

Ecology has an additional, independent legal obligation under the federal Endangered Species Act (ESA) to ensure that activities authorized by NPDES permits to not "take" ESA-listed species. 16 U.S.C. § 1538(a)(1)(B); 50 C.F.R. § 222.102; *see also Loggerhead Turtle v. County Council of Volusia County, Fla.*, 148 F.3d 1231, 1247–55 (11th Cir. 1998); *see also Strahan v. Coxe*, 127 F.3d 155, 158, 163 (1st Cir. 1997).

National Marine Fisheries Service:

Effluent from the export dock, the cargo dock, and the stormwater ditch 001/002 contains extremely elevated levels of total zinc. These maximum values recorded are 170 μg/L, 570 μg/L, 230μg/L, which convert to dissolved zinc concentrations of 163μg/L, 547μg/L, and 220μg/L, well above thresholds recognized by NMFS to cause harm to ESA-listed fish.

Response to Comments: *Ecology has authorized mixing zones for Outfalls 001 and 002. Ecology did not find a reasonable potential for a violation of copper or zinc water quality standards at the mixing zone boundaries.*

The other stormwater discharges from the facility (001/002 Ditch, RW Office, Raw Water Ditch, Adjacent to Export Dock, Export Dock, and Cargo Dock) will be managed under an adaptive management system modeled on the requirements of Washington's current Industrial Stormwater General Permit. Benchmark values have been established to be protective of the environment over a wide range of environmental conditions. These benchmarks are triggers which will ensure that the facility is actively pursuing effective pollution control practices. Ecology is also requiring that the facility prepare a Stormwater Pollution Prevention Plan. This plan will put in place Best Management Practices (BMPs) and other requirements to best manage the occurrence and treatment of stormwater at the facility.

5) Bleached Pulp Effluent Stress:

National Marine Fisheries Service:

Stress associated with living in water contaminated with bleached pulp discharges is known to increase the degree of parasitism and bacterial infections in fish living in these waters and suggests possible effects on their immune systems.

Response to Comment: *Ecology has performed a reasonable potential analysis on the effects of the effluent on aquatic life. The analysis showed no reasonable potential for an exceedance of the water quality criteria of the protection of aquatic life.*

6) Cooling Water Intake:

Cowlitz Indian Tribe:

We are also concerned as to the mechanism of surface water intake associated with this draft permit. Specifically, we are concerned that the intakes may entrain larval ESA-listed eulachon (Thaleichthys pacificus).

Response to Comment: *Ecology shares the concerns of the Cowlitz Indian Tribe. The cooling water intake requirements in this permit are meant to determine the best path forward to minimizing the intake structure's impact on species of concern. The cooling water intake rule for existing facilities was finalized after the public comment period; Ecology reviewed the rule and made adjustments to the cooling water intake report requirements.*

7) Public Review:

Cowlitz Indian Tribe:

We also echo their concern that Weyerhaeuser's stormwater pollution prevention plan and BMP plan for spent pulping liquor, soap, and turpentine will not receive adequate scrutiny without public review and comment periods.

Columbia Riverkeeper:

Riverkeeper supports Ecology's determination that Weyerhaeuser is subject to the EPA's narrative effluent guidelines for the management, spill prevention, and control of spent pulping liquor, soap, and turpentine at bleached kraft pulp mills as described at 40 C.F.R. § 430.03. *See Draft Permit* at S9. However, Riverkeeper and the public should have the opportunity to review and comment on a draft of the Best Management Practices (BMP) plan. 40 C.F.R. § 430.03(d); *Waterkeeper Alliance, Inc. v. United States EPA*, 2005 U.S. App. LEXIS 6533, *38–*43 (2d Cir. Feb. 28, 2005). Moreover, because the terms of the BMP plan constitute non-numeric or narrative effluent limits, the terms of the BMP plans should be included in the permit. *See Waterkeeper Alliance, Inc. v. United States EPA*, 2005 U.S. App. LEXIS 6533, *36–*38 (2d Cir. Feb. 28, 2005).

Public comment would strengthen the BMP plan and enhance public understanding of the pollution control requirements in place at the Weyerhaeuser mill. The BMP plan will contain a detailed engineering review of the facility, specify the procedures and practices by which Weyerhaeuser will meet various BMP standards, and explain the required monitoring program. 40 C.F.R. § 430.03(d)(1). This plan has a direct effect on the pollutants in the mill's discharges because the "materials controlled by these practices, if spilled or otherwise lost, can interfere with wastewater treatment operations and lead to increased discharges of toxic, nonconventional, and conventional pollutants." 63 Fed. Reg. 18504, 18561. The BMP plan will contain new and important information, and create substantive requirements for Weyerhaeuser's operations.

Riverkeeper and the public should be allowed to review and comment on a draft BMP plan; please re-open the public comment period and allow the public to review the draft BMP plan.

Finally, as this is evidently the first iteration of the WA0000124 NPDES permit where Weyerhaeuser has been required to implement 40 C.F.R. § 430.03, and because the applicable implementation deadlines have passed, the permit should clarify that, upon issuance of the permit, Weyerhaeuser must *immediately* comply with all BMP requirements. *See* 40 C.F.R. § 430.03(j)(1).

Response to Comments: *Wording in Special Condition S9 of the permit has changed to add clarity. The BMP Plan for spent pulping, liquor, soap, and turpentine was already a requirement of the expired permit and is already being implemented by Weyerhaeuser Longview. The facility is required to implement the plan, as it has already been developed. A review of the plan is required by the permit renewal.*

In accordance with 40 CFR 430.03(g), Ecology has included language requiring that the Permittee maintain a copy of the BMP Plan on site and available for Ecology review. It is Ecology's role to ensure that the BMP plan is being implemented at the facility. Ecology will perform this duty through inspections of the facility. Ecology inspection reports (like all public records) are available for review upon request.

The SWPPP will be available to the public upon request made to Ecology (Public Records Act, Chapter 44-14 WAC). Public access to these documents will allow for public review and scrutiny.

8) Anti-Backsliding:

Cowlitz Indian Tribe:

Riverkeeper also asserts that the draft permit may be in violation of the Clean Water Act's anti-backsliding rule. We share Riverkeeper's concern on this point, but argue that the maintenance of the status quo with respect to toxic effluent is an unacceptable practice in an industry that is constantly innovating. If Ecology's intent is to do no worse than the past concerning persistent bioaccumalative toxins, it has abrogated its responsibility to assure our "… fundamental and inalienable right to a healthful environment…" [RCW 43.21C.020(3)]

Columbia Riverkeeper:

Generally, effluent limits in a new version of a NPDES permit must be at least as stringent as those in the previous version of that permit. *See* 40 C.F.R. § 122.44(l)(1). This requirement is commonly referred to as the Clean Water Act's "anti-backsliding" rule. *See* Ecology, *Water Quality Program Permit Writer's Manual* (2011) at II-23. Some of the effluent limits in the Draft Permit appear less stringent than the limits in the previous version of the WA0000124 permit, but the Fact Sheet does not explain why these less-stringent limits fall under any of the exceptions to anti-backsliding.

First, Table 24 of the Fact Sheet states that the previous version of the permit allowed a monthly average of 26,570 lbs of BOD per day, and a daily maximum of 49,666 lbs of BOD per day, from Outfalls 001 and 002. The new effluent limits proposed in the Draft Permit would increase the BOD limits to a monthly average of 26,921 lbs of BOD per day, and a daily maximum of

50,249 lbs of BOD per day. *See Draft Permit* at 8. At face value, this increases the monthly average and daily maximum BOD effluent limits.8

Second, Table 24 of the Fact Sheet indicates that the previous version of the permit contained mass-based total daily limits for BOD and TSS discharges from the sanitary wastewater treatment plant, in addition to concentration-based limits. The Draft Permit eliminates these mass-based limits entirely. *See Draft Permit* at 11. If relaxing an effluent limit is not permitted, then completely eliminating an effluent limit is surely also illegal, and constitutes impermissible backsliding. Also, Ecology should explain its reasons for eliminating the mass-based (or total) BOD and TSS effluent limits on discharges from the sanitary waste-water treatment plant.

The Fact Sheet does not appear to address how the proposed effluent limits discussed above satisfy the anti-backsliding rule. Ecology's final permit and Fact Sheet should set these effluent limits at levels consistent with the effluent limits in the previous version of the permit, or explain why the proposed limits comply with the anti-backsliding rule, or explain which of the anti-backsliding exemptions, 40 C.F.R. § 122.44(l)(2)(i), Ecology believes applies.

Response to Comments: *The effluent limits in the permit are based on EPA's effluent guidelines which have remained unchanged. The EPA's effluent guidelines for this industry are based on production. The change in permit effluent limits in this permit renewal is based on natural variations in production at the facility. These effluent limit changes are not prohibited by the anti-backsliding regulations in 40 CFR 122.44.*

9) SEPA:

Cowlitz Indian Tribe:

The Tribe is concerned that proposed discharges in the draft permit will impact ESA listed species and our first foods. Since the last permit issuance, eulachon have been ESA listed as threatened. We urge Ecology to follow the approach and processes set forth by the State Environmental Policy Act (SEPA) in light of the new listing. A SEPA process would also provide a process for adequate mitigation measures to be developed on a broader spectrum of potential impacts that the issuance of this permit may present. As proposed, the draft permit does not mitigate for damage to ESA-listed species.

Response to Comment: *The renewal of waste discharge permits for existing discharges falls outside of the actions which trigger a review under SEPA (RCW 43.21C.0383).*

10) AKART:

Columbia Riverkeeper:

Every NPDES permit issued by Ecology must require, at least, the Permittee to apply "[a]ll known, available, and reasonable methods of prevention, control, and treatment" to decrease pollution discharges. WAC 173-216-110(1)(a); WAC 173-216-020(1). This standard, commonly called "AKART," is the underlying legal standard for technology-based effluent limits in NPDES permits issued by Ecology. Accordingly, unless water quality concerns dictate stricter effluent limits, each effluent limit in Weyerhaeuser's Draft Permit must comply with the AKART standard. Ecology did not analyze whether many of Weyerhaeuser's proposed technology-based effluent limits constitute AKART, or Ecology did not describe those analyses in the Fact Sheet. These omissions deprive Riverkeeper and the public of the opportunity to comment on whether the Draft Permit's terms satisfy the applicable state and federal legal requirements.

Compliance with permit limits derived from federal effluent guidelines does not ensure compliance with Washington's AKART requirement, even though parts of the AKART analysis mirror parts of the Environmental Protection Agency's (EPA) methodology for setting effluent guidelines. *See* Ecology, *Water Quality Program Permit Writer's Manual* (2011) at IV-26 ("AKART may be equivalent to the federal effluent guidelines or may be more stringent."). Even after applying effluent guidelines when writing the permit, "there is another decision to be made..." Ecology, *Water Quality Program Permit Writer's Manual* (2011) at IV-6. "The decision is whether the effluent guidelines also constitute all known, available and reasonable methods of treatment (AKART)." *Id*. "If the effluent guidelines are over 10 years old, the permit writer should, at the minimum, conduct an analysis of unit processes design and efficiencies at the facility to determine if the effluent guidelines constitute AKART." *Id*. If the technological and economic bases for the effluent guidelines applicable to Weyerhaeuser's facility in 40 C.F.R. § 430 are outdated, Ecology must reassess whether the proposed technology-based effluent limits derived from EPA's effluent guidelines constitute AKART.

The federal effluent guidelines that Ecology relied on when proposing technology-based effluent limits in the Draft Permit appear to be several decades old. The new source performance standards (NSPS) that Ecology used to propose effluent limits for BOD and TSS from bleached paperboard and wet lap pulp production at the kraft mill, and bleached kraft pulp at NORPAC, appear to have been promulgated by EPA in 1977 or 1982. *See* 40 C.F.R. § 430.25(a); *see also* 63 Fed. Reg. 18504, 18568 (April 15, 1998). The NSPS standards for BOD and TSS from de-ink newsprint pulp production, and the best practicable control technology (BPT) and NSPS standards for BOD and TSS from thermo-mechanical pulp production at NORPAC, which Ecology used to propose permit limits were apparently promulgated in 1982. 40 C.F.R. §§ 430.72, 430.74, and 430.95; 47 Fed. Reg. 52006 (November 18, 1982); *see also* 63 Fed. Reg. 18504. The best available technology (BAT) standards that Ecology used to propose limits for AOX, Chloroform, and TCDF from unbleached kraft pulp production appear to have been set in 1998. 63 Fed. Reg. at 18512. None of these technology-based effluent guidelines were developed in the last fifteen years.

The Draft Permit and Fact Sheet do not mention, let alone demonstrate, whether EPA's effluent guidelines for AOX, Chloroform, and TCDF are equivalent to AKART. As discussed above, EPA's technology-based effluent guidelines for these pollutants are roughly 15 years old. Ecology's guidance instructs Ecology to re-assess whether new pollution reduction technologies have become "known," "available," and "reasonable" in the last 15 years. Ecology, *Water Quality Program Permit Writer's Manual* (2011) at IV-6. Because AKART is Washington's standard for technology-based permit limits, Ecology is legally required to consider whether the 1998 effluent guidelines for AOX, Chloroform, and TCDF actually constitute AKART. *See* RCW 34.05.570(3)(c), (f).

Ecology should also revise the Fact Sheet's AKART analysis for BOD and TSS discharges from Outfalls 001 and 002. Ecology's AKART discussion, on page 35 of the Fact Sheet, does not explain why pollution limits based on 40-year-old technology and economic considerations provide the same level of pollution reduction as would all currently 'known, available, and reasonable methods of pollution prevention, control, and treatment.' While Ecology mentions the AKART standard in relation to BOD and TSS discharges from Outfalls 001 and 002, it appears that Ecology summarily concluded that EPA's effluent guidelines constituted AKART. 3 This is not the process for determining AKART, and certainly does not follow Ecology's guidance, which instructs that "the permit writer should, at the minimum, conduct an analysis of unit processes design and efficiencies at the facility to determine if the effluent guidelines constitute AKART." Ecology, *Water Quality Program Permit Writer's Manual* (2001) at IV-6. The effluent guidelines are the beginning of the AKART analysis, not the end. Ecology must determine whether the 1982 effluent guidelines for BOD and TSS actually satisfy AKART. *See* RCW 34.05.570(3)(c) & (f).

Ecology should conduct an AKART analysis for dioxin and explain the results of that analysis in the Fact Sheet. If an applicable technology-based limit—like an AKART-based limit—would be more restrictive than a water quality-based limit, the permit must impose the technology-based limit. "This is the basic philosophical approach found in the Clean Water Act." Ecology, *Water Quality Program Permit Writer's Manual* (2011) at IV-28. The proposed effluent limit for dioxins appears to be a water quality-based effluent limit derived from Weyerhaeuser's maximum daily load allocation in the Columbia River dioxin TMDL. *Fact Sheet* at Table 28. If an AKART-based dioxin limit would be more stringent that the TMDL-based limit, the AKART-based limit must apply. At a minimum, Ecology's revised Fact Sheet should explain why an AKART-based effluent limit for dioxin would be less restrictive than the TMDL-derived, water quality-based limit.

Finally, the application of AKART to a discharge is a pre-requisite for authorizing a mixing zone. WAC 173-201A-400(2) ("A discharger shall be required to fully apply AKART prior to being authorized a mixing zone."). Because the Weyerhaeuser mill relies on mixing zones to meet water quality standards, Ecology's AKART determinations have significant implications for both the water quality- and technology-based effluent limits applicable to the facility.

Cowlitz Indian Tribe:

We have reviewed comments submitted by Columbia Riverkeeper (Riverkeeper) regarding the draft permit. We are particularly concerned with Riverkeeper's comments regarding the apparent inadequacy of AKART analysis used in determining maximum discharge amounts. We concur with Riverkeeper that Ecology has failed to meet its responsibility to ensure that Weyerhaeuser will use all known and reasonable technology to minimize toxic pollution of the Columbia River.

Response to Comments: *The fact sheet has been updated to include additional language relating to the AKART determination (III.A.Technology-Based Effluent Limits, beginning after Table 15).*

In the previous permit, Ecology required the submission of an O&M manual and a Treatment System Operation Plan (TSOP). In the permit renewal, Ecology is requiring a Wastewater Treatment Efficiency Study in addition to the previous submittals.

As noted previously in these responses, Ecology looks to multiple sources for information to evaluate whether AKART must be re-evaluated for an existing facility. These include EPA's priorities for updating effluent guidelines for the industry, the treatment technologies employed *at other mills in the state, and the availability of new technologies in use elsewhere for this industry.*

EPA has reviewed its effluent guidelines and concluded that an update to the guidelines for the pulp and paper industry is not needed at this time. The treatment technology employed at this mill is consistent with other mills in the state. The treatment efficiency study required by the permit will help Ecology better understand the system's performance, how it compares to results achieved at similar facilities and whether a more detailed evaluation of the system is needed in future permit cycles.

In the cases of the outfall 003/004 area and discharges associated with the filter plant, Ecology has concluded that a re-evaluation of AKART is necessary and included these requirements in the permit renewal.

11) Filter Plant Discharge:

Columbia Riverkeeper:

Riverkeeper supports Ecology's consideration of effluent limits for sediment discharges from Weyerhaeuser's raw water treatment system. Riverkeeper has several comments on the development and application of such limits.

First, the Draft Permit and Fact Sheet point to elevated sediment load in the mill's intake water resulting from the St. Helens eruption to justify the lack of AKART-based effluent limits for TSS discharges from the raw water treatment system. The Fact Sheet should compare the suspended sediment load in the intake water before and directly after the St. Helens eruption with the current suspended sediment load.

Second, the permit should contain effluent limitations sufficient to prevent sediment discharges from the raw water filtration system from degrading existing beneficial uses and violating numeric and narrative water quality standards. Page 48 of the Fact Sheet explains that the water quality standards for turbidity "may be exceeded during filter plant backwash and/or filter plant sedimentation basin wash outs." That statement appears to contradict the statement on page 42 that asserts: "Ecology conducted a reasonable potential analysis for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met." If Ecology conducted a Reasonable Potential Analysis (RPA)5 on the impacts of discharges from the raw water treatment plant that shows a potential to violate water quality standards, Ecology should clearly explain that RPA and its results in the Fact Sheet. If Ecology did not conduct an RPA accounting for these sediment discharges, Ecology should conduct this analysis because TSS is obviously a pollutant of concern at the facility. Regardless of Ecology's intent to study and potentially implement AKART, Ecology must set water-quality based effluent limits to ensure that sediment discharges from the water filtration system meet the applicable water quality standards. WAC 173-201A-510(1) ("Waste discharge permits must be conditioned so the discharges authorized will meet the water quality standards."); *see also* 40 C.F.R. § 122.44(d)(1)(i).

Third, Weyerhaeuser's decades-old practice of concentrating, amassing, and discharging trapped sediments (and added pollutants like alum) does not constitute AKART. Ecology's guidance and past practice dictate that "[t]he discharge of pollutants already captured does not meet the intent of AKART." Ecology, *Water Quality Program Permit Writer's Manual* (2011) at IV-26, IV-34, *citing Ecology's arguments in* Pollution Control Hearings Board, Case No. 85-218. Under Ecology's own reasoning, the practice of discharging trapped sediment and other incorporated pollutants from the intake water treatment plant does not constitute AKART, and the proposed extensive study period is thus unnecessary.

Fourth, Riverkeeper protests both the schedule and procedure for the AKART study proposed at section S12 of the Draft Permit. The proposed process for studying, determining, and implementing AKART limits public review and participation. If Ecology proposed AKART-based limits for sediment discharges from the filtration system in this Draft Permit, the public would be able to review and comment on the AKART determinations and resulting effluent limits. By merely proposing an AKART study, Ecology once again delays setting actual effluent limits on these discharges, and deprives the public of a chance to comment on this important analysis in the context of permit renewal. Public scrutiny and comment is especially important if Ecology intends to delegate the AKART study and analysis to Weyerhaeuser, the Permittee.

Finally, Ecology should explain its legal authority for not proposing and setting AKART-based effluent limits for sediment discharges from the raw water treatment system in this Draft Permit and Fact Sheet. Ecology's rules require that "[a]ny permit issued by the department shall appl [a]ll known, available, and reasonable methods of treatment" WAC 173-220-130(1)(a). Allowing discharges to continue while Weyerhaeuser merely studies AKART for several years does not appear to meet this standard. Additionally, if Weyerhaeuser is not currently applying AKART, Ecology may not authorize mixing zones for these discharges. WAC 173-201A-400(2).

Response to Comment: *As stated in the Fact Sheet, the Pollution Control Hearings Board (PCHB) decision No. 85-220 established that the current practices at the filter plant were the only reasonable technologies due to the eruption of Mt. St. Helens. This determination is nearly 30 years old and Ecology believes it is appropriate to re-evaluate AKART for this discharge given changing technologies and conditions to ensure that AKART is applied. Ecology has extended the study to include an assessment of water quality impacts.*

An AKART study must be conducted before Ecology can make a determination and include requirement in the permit.

The AKART study is performed by Weyerhaeuser Longview but it is Ecology that will make the determination of AKART for the discharge. If Ecology determines that the study does not sufficiently address the available technologies then Ecology may request additional information. If Ecology makes an AKART determination that requires changes to the current system, then an implementation schedule will be established through administrative order or permit modification; effluent limits would be incorporated through a modification to the permit.

12) Outfall 003/004 Stormwater:

Columbia Riverkeeper:

Outfalls 003 and 004 discharge to the Consolidated Diking Improvement District (CDID) Ditch #3. These outfalls drain a significant portion of Weyerhaeuser's facility and discharge a mixture of stormwater, equipment and facility wash water, dust control water, and cooling water. Weyerhaeuser has discharged to CDID Ditch #3 with essentially no effluent limits for the past several decades. As a result of similar industrial discharges, the CDID Ditch #3 is water-quality limited for dissolved oxygen, and a ‘water of concern’ for turbidity and bacteria pollution, according to Ecology’s 2012 303(d) list.

Riverkeeper supports Ecology’s recognition that AKART pollution-control measures should apply to discharges from Outfalls 003 and 004. However, Riverkeeper disagrees with Ecology’s proposed approach for setting and implementing AKART-based effluent limits for these outfalls. The proposed permit at Section S14 gives Weyerhaeuser has 1.5 years from the effective date of the permit to complete an AKART study for Outfalls 003 and 004, after which time Ecology will set AKART-based effluent limits and a compliance schedule (of unknown duration) for meeting those limits.

Ecology should set AKART-based effluent limits for Outfalls 003 and 004 in this proposed permit. The proposed process for setting AKART-based effluent limits appears to shield the decision and process from public review. Riverkeeper appreciates that preparing these documents and studies is resource- and time-intensive. But those plans and studies should have been prepared—by Ecology or Weyerhaeuser—sometime in the five years since 2009, when the previous version of the WA0000124 permit expired. The process for deciding on AKART and setting permit limits is at the very heart of the permit-writing process and deserves the highest level of public involvement and scrutiny. Piecemealing these studies out over the years will discourage, and perhaps entirely prevent, public review and input. Public scrutiny and input is especially important if Ecology intends to delegate the AKART study and analysis to Weyerhaeuser. At the very least, the permit should expressly guarantee an opportunity for public comment when Ecology proposes the new AKART-based effluent limits.

Additionally, Ecology should explain its legal authority for not proposing and setting AKART-based effluent limits for discharges to CDID Ditch #3 in this Draft Permit. Ecology’s rules require that “[a]ny permit issued by the department *shall apply* [a]ll known, available, and reasonable methods of treatment” WAC 173-220-130(1)(a) (emphasis added). Allowing Weyerhaeuser to discharge for several years without actually applying AKART does not appear to meet this standard.

However Ecology decides to apply AKART-based limits, Ecology must also ensure that discharges from Outfalls 003 and 004 meet the applicable water quality standards and, if necessary, set water quality-based effluent limits. WAC 173-201A-510(1) (“Waste discharge permits must be conditioned so the discharges authorized will meet the water quality standards.”). Ecology should begin by analyzing whether discharges from Outfalls 003 and 004 will meet water quality standards by conducting a RPA, *see* Ecology, *Water Quality Program Permit Writer’s Manual* (2011) at VI-30, or other appropriate calculation. WAC 173-220-130(2). Ecology should conduct this investigation for each pollutant that is anticipated to occur in the discharge from Outfalls 003 and 004, but with particular attention to BOD, turbidity, dissolved oxygen, and nutrient loading, because those pollutants appear to be contributing to water-quality impairments in CDID Ditch #3. If any pollutant contained in the discharges has a reasonable potential to violate a numeric or narrative water quality standard, Ecology must set a corresponding water quality-based effluent limit.6 40 C.F.R. 122.44(d)(1)(i).

Riverkeeper requests that Ecology re-issue the Fact Sheet and Draft Permit for public comment after calculating and implementing AKART-based effluent limits and any necessary water quality-based effluent limits based on the RPA for Outfalls 003 and 004.

Response to Comment: *Ecology shares the Riverkeeper's concerns regarding the 303(d) listed Longview ditch system. Weyerhaeuser Longview's outfalls 003 and 004 have been operating under past AKART determinations; the proposed AKART study will update the implementation of pollution management with current regulations and policy. As stated by the Columbia Riverkeepers, ideally the AKART study would have already been completed and implemented. Unfortunately that is not the current reality that the facility or Ecology faced; Ecology is therefore committed to the efforts that have been placed in this permit.*

In order for AKART-based limit to be established, Ecology must ***first*** *establish what technologies meet the intent of AKART at the site. For this to happen, Weyerhaeuser Longview must submit an AKART study for Ecology review. Once the AKART study is reviewed by Ecology and an AKART determination is made, AKART-based limits will be established. This is the reason that AKART-based limits have not already been established in this permit. It is not Ecology's intent to avoid transparency or to piece meal the process. Ecology is approaching this issue in the necessary step-wise fashion.*

The following changes have been made to the permit:

- *Ecology has added turbidity monitoring to both outfalls 003 and 004.*
- *The due date for the submittal of the AKART study was missing and has been added to the permit language.*
- *The AKART study due date has been accelerated to be 1 year from effective date.*
- *Ecology has included permit language requiring that stormwater Best Management Practices (BMPs) identified as meeting AKART be incorporated into the SWPPP.*

13) Industrial Stormwater:

Columbia Riverkeeper:

As a large industrial facility with associated lumber processing, log barking, and log decking, the Weyerhaeuser mill has the potential to discharge significant quantities of contaminated stormwater. "Stormwater runoff from the built environment remains one of the great challenges of water pollution control, as this source of contamination is a principal contributor to water quality impairment of waterbodies nationwide." Accordingly, Riverkeeper invests significant organizational resources in reducing stormwater pollution to the Columbia River and its tributaries. Generally, Riverkeeper supports Ecology's proposed permit conditions that more closely align stormwater management at the Weyerhaeuser Longview mill with the requirements of Washington's 2012 Industrial Stormwater General Permit (ISGP).

The core requirements of the ISGP are (1) tiered corrective actions in response to benchmark exceedences and (2) the creation and implementation of an industry- and facility-specific Storm Water Pollution Prevention Plan (SWPPP). While the proposed permit requires corrective actions and a SWPPP, a few revisions would provide clearer and more enforceable stormwater controls.

First, Weyerhaeuser's permit should fully incorporate by reference Sections S8 and S9 of the ISGP. Without fully incorporating the documentation and reporting requirements of theses sections of the ISGP, enforcing the corrective action requirements of Weyerhaeuser's permit will be difficult for Ecology, and nearly impossible for citizens. Section S1.B. of the Draft Permit does require Weyerhaeuser to "take" the tiered corrective actions required by ISGP Section S8, but it is unclear whether the Draft Permit requires Weyerhaeuser to document the corrective actions it takes, as would be required of an ISGP Permittee. *See, e.g.*, 2012 ISGP at S8.B.2 (requiring Permittees to "Summarize the Level 1 Corrective Actions in the Annual Report (Condition S9.B)."). Additionally, the Draft Permit creates no requirement for Weyerhaeuser to submit documentation similar to the "Annual Reports" required by ISGP Section S9.B., which detail a Permittee's corrective actions over the previous monitoring year. Unless the permit explicitly requires Weyerhaeuser to document and report each corrective action responding to a stormwater benchmark exceedence, Ecology and citizens will not know whether Weyerhaeuser is taking corrective actions—the key requirement for stormwater pollution reduction in the permit.

Second, the public should have the opportunity to review and comment on a draft SWPPP. A SWPPP is a comprehensive document that controls how stormwater pollution will be managed, reduced, and monitored at a facility. Weyerhaeuser operates a large and complex facility, and this will be the first SWPPP prepared for the site; the SWPPP would almost certainly benefit from public review, insight, and comments. Also, because Weyerhaeuser will be required to "implement" its SWPPPs (*Draft Permit* at Section S8), the language of the SWPPP will create enforceable requirements for how Weyerhaeuser manages stormwater. The public should have the same opportunity to comment on these important requirements as any other requirements in the Draft Permit, such as technology-based effluent limits. Accordingly, Riverkeeper requests that Ecology ask Weyerhaeuser to prepare a draft SWPPP and that Ecology re-open the public comment period to allow comment on the draft SWPPP.

Response to Comment: *Ecology has added language (Special Condition S19) to ensure that the annual reporting requirements of Special Condition S9.B of Ecology's ISGP (2012) are met by Weyerhaeuser Longview.*

Public involvement has been addressed previously in Ecology's response to the "National Marine Fisheries Service, Yakama Nation, Cowlitz Indian Tribe, and Columbia Riverkeeper"comment No. 7.

14) ESA-Listed Species:

Yakama Nation:

The affected area of the Columbia River is very important to the Yakama Nation and the Columbia River ecosystem. Every anadromous fish that is produced or harvested by the Yakama Nation passes through or near the outfall of the Weyerhaeuser, Longview plant. Many of the fish in this area are Endangered Species Act (ESA) listed species and the habitat is ESA-listed as critical.

Response to Comment: *Comment noted. Ecology shares the Yakama Nation's interest in protecting aquatic life including ESA-listed species.*

15) Mixing Zone:

Yakama Nation:

The Yakama nation believes Ecology has not met the requirements described in the fact sheet for this permit to authorize a mixing zone under WAC 173-201A-400. On page 41 *Fact Sheet for NPDES Permit WA-0000124 Weyerhaeuser, Longview*, Ecology states:

Supporting information must clearly indicate the mixing zone would not"

- *Have a reasonable potential to cause the loss of sensitive or important habitat.*
- *Substantially interfere with the existing or characteristic uses.*
- *Result in a damage to the ecosystem.*
- *Adversely affect public health.*

The proposed mixing zone is in the middle of ESA critical habitat, with discharged effluent containing chemicals at levels that have been determined to likely cause a take of ESA-listed species, in a water body where those species are important to the designated used of fishing. Setting effluent limits at levels less protective than those that have been deemed protective of public health and aquatic life in the Columbia River by EPA and the State of Oregon does not appear to meet the above requirements.

Response to Comment: *See Ecology's previous response to the "National Marine Fisheries Service, Yakama Nation, Cowlitz Indian Tribe, and Columbia Riverkeeper"comment No. 1. The state's Water Quality Standards authorizes the used of mixing zones. Ecology has followed the agency's policy in applying Chapter 173-201A WAC and authorizing the mixing zone for this discharge.*

16) Receiving Water:

ECOLOGY NOTE: Ecology has responded to the Yakama Nation's general comments. Where the general comments do not cover the topics and concerns discussed in the more detailed and technical portion of the Yakama Nation's comments, Ecology has provided an additional response, as seen below.

Yakama Nation:

It is not clear that the description of the receiving waters is based on adequate and complete information. For example, Table 2 of the Fact Sheet does not include data for AOX, any other chlorinated hydrocarbon, or mercury in the receiving waters. Mercury is a problem contaminent in the Columbia River.

The permit assumes that data from distant locations, e.g., Beaver Island Terminal, are representative of conditions at the site. Water quality a Beaver Island is not monitored for all substances found in the effluent being discharged from the facility. The facility does not discharge into waters represented by the reference area data selected for use in the permit.

In addition, review of aerial photos shows that the flow adjacent to the site is laminar (parallel to the shore), at least for portions of the year. This area also receives other waste discharges from other point and non-point sources. As a result, aquatic resources are potentially exposed to the combined effluents, relatively undiluted, for some distance downstream in the nearshore zone which provides critical habitat for several species. An additional receiving water body study is warranted for this permit.

Response to Comment: *The sampling station at the Beaver Army Terminal provides a very complete set of sampling events. The sampling at Beaver Army Terminal provides near monthly sampling for each and every year of the permit term. Weyerhaeuser Longview's ability to produce data as complete, inclusive, and thorough as that provided by the USGS is doubtful. The Beaver Army Terminal data is publically available and searchable using the USGS Site Number 14246900 at: http://wdr.water.usgs.gov/wy2013/search.jsp . The downstream site not only includes upstream pollutant sources, but also conservatively includes the Weyerhaeuser Longview effluent and other downstream dischargers between the Weyerhaeuser Longview outfalls and the sampling station. Ecology has also included language in the permit which would require that Weyerhaeuser Longview perform a receiving water study, should the sampling station at Beaver Army Terminal stop sampling.*

17) ESA Take:

Yakama Nation:

Ecology has not requested ESA consultation despite the likelihood that the permitted discharge will cause adverse effects on listed species. A December 20, 2013 letter to Ecology from the National Marine Fisheries Service concludes that the, "Constituents discharged from this plant will have likely adverse outcomes to fish species under NMFS authorities under the ESA and Magnusson-Stevens Acts" taken together with this statement, the available body of scientific literature and the environmental circumstances surrounding the proposed permit indicate that the preponderance of evidence weighs heavily towards a conclusion that the discharge would create a "taking" of ESA-listed species for which Ecology has no coverage. Yakama Nation asserts that the burden of proof falls upon Ecology to produce a credible showing that this NPDES permit will not result in a chronic, unpermitted "take" of ESA-listed species or the adverse modification of critical habitat. In the alternative, Ecology should request consultation with NMFS to assess the potential for take and the appropriate conservation action, if indicated.

Response to Comment: *The Endangered Species Act of 1973 (ESA) mandates all Federal departments and agencies to conserve listed species and to utilize their authorities in furtherance of the purposes of the ESA. The ESA directs all Federal agencies to insure that any action they authorize, fund, or carry-out does not jeopardize the continued existence of an endangered or threatened species. The ESA's implementing regulations specify how Federal agencies are to fulfill their "section 7" consultation requirements under the act. Under these regulations this consultation must occur at the Federal agency level. In this case, where Ecology is proposing a wastewater discharge permit renewal as a delegated state, the ESA consultation would need to be requested by EPA in accordance with the appropriate procedures. While EPA provided comments to Ecology on the permit, they did not request a section 7 consultation regarding this permit renewal.*

Ecology has acted according to its authority and applied the state's current Water Quality Standards in the renewed permit. As discussed previously, Ecology does not have the legal authority to modify the state's standards ad hoc through an individual permit reissuance as a result of comments received.

Ecology will soon begin working on updating the criteria for protection of aquatic life in the state's Water Quality Standards. That process is the right time to ensure that the updated *criteria are based on the best available science for protection of all aquatic life, including ESA listed species. Any changes to the criteria will require EPA approval before they become effective. EPA will review any updates to the standards and may request ESA consultation as part of their approval process.*

CITY OF LONGVIEW STORMWATER COMMENTS

1) City of Longview Comment:

Neither the proposed permit nor its fact sheet reflect the degree to which Ditch #3 is vulnerable to large wastewater discharges or how potentially deleterious such discharges from Outfall 003 can be.

a) Data tabulated below from both City of Longview (City) and Weyco LV help capture Outfall 003's poor quality and its impact on Ditch #3:

DITCH #3 & WEYCO OUTFALL 003 EFFLUENT DATA

Source of Data	**Longview**[a] 2009 - Present	**WeycoLV**[b] 2004 - Present	**WA Surface WQ Standard**
Dissolved Oxygen (mg/L)		4.8	6.5 (warm species)
BOD_5 (Lbs/Day)		436	NA
Fecal Coliform (colonies/100mL)		815 (geomean)	100 <10% @ >200
Turbidity (NTU)			
• Weyco LV Outfall 003	203[c]	105[c]	10% over background
• Ditch #3 Background (Estimate[d])	~35 +/- 15		
• Ditch #3 180' East of Outfall 003	85		
• Ditch #3 430' East of Outfall 003	43		
• Ditch #3 100' West of Outfall 003	168		
• Ditch #3 250' West of Outfall 003	107		
• Ditch #3 350' West of Outfall 003	99		
Mean & Max Daily Flow (CFS)		1.0 & 3.4	

[a] See Attachment #1 for a summary of this data.

[b] See Attachment #2 for a summary of this data.

[c] The reason for the difference is not clear. Weyco's data is more extensive, but it also seems low. The City's Hach 2100P Turbidimeter is calibrated regularly, and has always closely matched replicate samples taken periodically and analyzed by the ALS - Columbia laboratory in Kelso, WA.

[d] This is a conservative City estimate based on years of WQ & IDDE investigations and Ecology's 1993 Cusimano study. Cusimano's NTU average was 50 NTU; however, PacFibre's Log Pond was still connected to Ditch #3 at that time.

b) The permit's fact sheet does not describe Ditch #3. For the Columbia River however, it includes an extensive narrative and ambient data characterization.

c) The permit's fact sheet neither acknowledges that Ditch #3 has been placed on Ecology's 303(d) list as a "water of concern" because of suspected turbidity impairments, nor does it include turbidity in its Effluent Characterization for Outfalls 003 and 004. However, turbidity is included in its characterization of Outfalls 001 and 002 to the Columbia River. Lastly, the proposed permit discontinues the turbidity monitoring requirement for Outfalls 003 and 004.

d) Woodyard leachate contains high levels of organics (tannins, lignins, phenolics, and resin acids). These organics can remain suspended in water for months and exhibit toxicity to aquatic life, especially as organisms use oxygen to degrade them.

e) Outfall 003 is large relative to its receiving water body. In fact, under certain circumstances, it can exceed Ditch #3's flow rate,[1] and the discharge has been observed on several occasions to affect the ditch from bank-to-bank, particularly when CDID #1's Oregon Way pump station is off and the ditch flow is to the west.

f) Compared to Weyco LV's Columbia River Outfalls 001 and 002, Outfalls 003 and 004 discharge to a far smaller water body with more impairments; yet, the effluent contains bacteria concentrations over 100x higher, BOD_5 at least 10x higher, and TSS levels that are 5 to 25x higher than those major Columbia River discharges*!* See the table below:

EFFLUENT CHARACTERIZATIONS

(from Ecology's Fact Sheet)

Parameter / Water Body / Process	**001**	**002**	**003**	**004**	**005**
Receiving Water Body	Columbia	Columbia	Ditch #3	Ditch #3	Columbia
Process Type Served	Pulp & Paper	Pulp & Paper	Ancillary	Ancillary	Sanitary
DO			4.6	4.7	
BOD_5 (mg/L)	5.1	5.1	50.1	2.1	1.6
Fecal Coliform (colonies/100mL)	3	<3	346	182	<2
TSS (mg/L)	11.1	20.0	56.2	14.3	2.1

Parameter / Water Body / Process	001	002	003	004	005
Turbidity (NTU)	20	15.2			

[1] CDID #1's Oregon Way Pump Station (about 600' upstream of 003) is rated at 156 CFS – but its operation is largely limited to before and after rain events and typically runs at full capacity only during large storms. Alternatively, Ecology's 1993 Longview Ditches WQ study by Bob Cusimano measured September and November flows in that stretch of Ditch #3 to be just over 2.4 and 2.0 CFS, respectively. According to Weyco LV's DMR data, average and maximum daily flows for Outfall 003 from 2004 through 2013 were 1.0 and 3.4 CFS, respectively.

Response to Comments: *Ecology has updated the Fact Sheet to contain more narrative describing the Ditch #3. Additionally, monitoring requirements for turbidity have been added to Outfalls 003 and 004. Ecology has structured this permit to address the discharge of pollutants from Outfalls 003 and 004. A more detailed explanation is included in later responses by Ecology.*

2) City of Longview Comment

Although Weyerhaeuser has had an NPDES permit for decades – perhaps longer than any industrial facility in the area, Ecology apparently has not yet complied with its own Permit Writer's Manual and numerous state laws to "review the applicant's operations and incorporate permit conditions which require all known, available, and reasonable methods to control toxicants in the applicant's wastewater." (RCW 90.48.520)

a) Ecology fails to cite BMPS for the 003 and 004 drainage areas, a significant portion of the facility.[1] However, doing so (i.e. identifying best conventional control technology (BCT) from guidelines and/or the best professional judgment) appears to be integral to Ecology's permit writing process. Ecology's request that Weyco LV provide both a SWPPP and an AKART study, further suggests that existing sources have not already been evaluated and/or lack appropriate controls.

b) Past performance with this facility suggests that if Ecology does not set implementation schedules for the SWPPP and the AKART study in the permit (as required by the Permit Writers Manual), Ditch #3 will continue to receive fouled stormwater for another five to ten years. Note the passage below from the 2004 fact sheet for Weyco LV's Wastewater NPDES permit:

> "*After Weyerhaeuser has collected data for BOD_5 and fecal coliform for two years, Ecology may recalculate performance based limits at outfall 003 for these two pollutants provided that the segment of the Consolidated Diking Improvement District Ditch #3 affected by discharges [from] outfall 003 remains listed as impaired for dissolved oxygen and fecal Coliform bacteria on Ecology's Clean Water Act Sec. 303(d) list of impaired waters.*"

[1] For treatment, the fact sheet cites pH control using sodium carbonate and an unspecified degree of "sedimentation" in the East Pond. Neither method, as described, is approved for stormwater. Additionally, the "detention" referenced is not treatment.

Response to Comments: *The requirement in this permit for an AKART analysis does not imply that an AKART analysis was not performed previously; AKART must periodically be reassessed* *to ensure that the technologies that are employed still meet the current requirements. Weyerhaeuser Longview has submitted previous reports, such as the "Storm and Process Water Management Proposal" (February 1995), which demonstrated AKART. Additionally, Weyerhaeuser Longview has historically had a SWPPP, but one was not required during the previous permit iteration. With this permit renewal, Ecology is updating the SWPPP requirements and AKART analysis at the facility to ensure that it is meeting the regulatory requirements and it is being protective of the environment and human health.*

3) City of Longview Comment:

With regard to Outfall 003, Weyco LV's NPDES permit fails to "maintain the highest possible standards to insure the purity of all waters of the state" and to "extinguish the sources of water quality degradation" in keeping with RCW 90.48.010, and various WACs (see Attachment 3 for more information).

a) With its large, black discharge contrasting sharply with receiving waters, Weyco LV's Outfall 003 has been the most conspicuous source of pollution into CDID #1's ditch system for at least a decade (i.e. since PacFibre permanently isolated their Log Pond from CDID #1's system). To illustrate via anecdote, when the Port of Longview complained that CDID #1's Oregon Way pump station discharge was discoloring the Columbia River, Weyco LV's Outfall 003 was found to be the source. See Attachment #4 for a selection of photographs taken by the City.

b) Ecology's proposed permit exacerbates this situation by removing monitoring requirements and authorizing orders of magnitude more concentrated pollution into Ditch #3, relative to its size, than it does the Columbia River.

i) For example, flows in Ditch #3 are roughly five orders of magnitude lower than that of the Columbia River;[1] yet, Ecology is allowing the company to send up to a third as many pounds per day of BOD_5 loading to the ditch as it does to the Columbia. The proposed BOD_5 limit is equivalent to dumping up to two vactor truckloads of pollution per day directly into this 25-foot wide, two foot deep, usually stagnant ditch.

ii) 003's average fecal coliform count is 8x higher than the surface water quality standard; yet, the proposed permit has neither a benchmark nor a meaningful effluent limit. (See tables below)

iii) Moreover, instead of requiring BMPs that would help mitigate the problem, Ecology offers the company a daily effluent limit of 136,000 colonies of fecal coliform bacteria per 100 mL*!* At this level, they are essentially permitting raw sewage to be dumped into Ditch #3.[2] For more perspective, Ecology is allowing 340X more fecal coliform bacteria, by concentration, to be released to Ditch #3 than from Weyco LV's sanitary sewer treatment plant and almost three orders of magnitude more, by concentration, than from the Three Rivers Regional Wastewater Treatment Plant – both to the Columbia River, a massive, fecal-unimpaired waterway.

Note #1: Although it's associated with wood products instead of warm-blooded animal wastes, klebsiella is still a type of fecal coliform bacteria; and as such, it is a frequent human pathogen that causes a wide range of diseases, notably pneumonia, urinary tract infections, septicemia, and soft tissue infections. If Ecology is unconcerned with this type of threat to human health, then they should require Weyco LV to demonstrate attainment with e.coli bacteria as a surrogate for the broader fecal coliform category. (Also, see Note #4 below.)

Note #2: Aside from the fact that Outfalls 003 and 004 are comprised almost exclusively of stormwater (as well as exempt and conditionally exempt non-stormwater discharges) and are therefore incompatible with wastewater and associated effluent limits, there are at least four possible flaws with how Ecology derived the fecal coliform interim limits for Outfalls 003 and 004 with the 95th & 99th percentile interim limit methodology. First, the data set is relatively small, given the amount of data available to Ecology, and the set is spectacularly foul (i.e. it averages 66X the water quality standard). Second, the data includes at least one giant outlier (i.e. a sample result that is 1360X higher than the surface water quality standard). Thirdly, the approach uses the straight mean of transformed data, when in fact, the limit is given as geometric mean (geometric means typically yield much lower results with highly variable data versus a straight average). Finally, and most importantly, a daily maximum limit is a poor fit for fecal coliform because of the highly variable nature of the organism and the analytical methodology used to quantify it. The surface water quality standard overcomes this by allowing up to 10% of samples to exceed twice the desired geomean.

Note #3: The City did not have time to ascertain why the BOD_5 limits are so much higher than all previous results reported via the company's DMRs.

Note #4: By properly regulating Outfalls 003 and 004 as stormwater, Ecology offers the company one major consolation: BOD_5 and fecal coliform limits can simply go away.

c) In addition to establishing interim limits, Section 3.3.11 of the Ecology's Permit Writer's Manual requires that for discharges to waterbodies with a 303(d) listing but no TMDL, "A final limit based on the water quality criteria is calculated and placed in the permit (with a compliance schedule) if compliance is expected in the term of the permit.[3] The compliance schedule must be as short as practicable and must include specified required actions that demonstrate reasonable progress toward attainment of the final limit or water quality criteria." Ecology has completely failed to do this.

d) The tables below compare the proposed Outfall 003 and 004 limits with those for Weyco LV's other outfalls, water quality standards, and a decade of past performance. (Note that in every manner of comparison, Ecology's proposed limits for Outfall 003 are the anomaly).

COMPARISON OF SOME PROPOSED EFFLUENT LIMITS

(from Ecology's Fact Sheet)

Parameter	**001 / 002**	**003**	**004**	**005**	**Stormwater Outfalls**
Type of average	Daily	Daily	Daily	Daily / *Wkly*	Benchmark
DO		≥1.34 mg/L			

Parameter	**001 / 002**	**003**	**004**	**005**	**Stormwater Outfalls**
Type of average	Daily	Daily	Daily	Daily / *Wkly*	Benchmark
BOD_5	50,249 #/day	17,500 #/day	33.9 #/day	*45 mg/L*	
Fecal Coliform (colonies / 100 mL)		136,000[a]	1,390	400	
TSS (mg/L)	83,103 #/day			*45*	100
COD (mg/L)					120
Turbidity (NTU)					25
Copper (µg/L)					14
Zinc (µg/L)					117

COMPARISON OF PROPOSED EFFLUENT LIMITS WITH PAST PERFORMANCE & WQ STANDARDS

(from 10-years of Weyco LV's DMR data)

	BOD_5 (Lbs / Day) Avg/Monthly	BOD_5 (Lbs / Day) Max/Daily	DO - Max (mg / L)	TURBIDITY-Max (NTU)	FECAL COLIFORM (Colonies / 100 mL) Geomean/Monthly	FECAL COLIFORM (Colonies / 100 mL) Max/Daily
10-YR Min	14	27	0.5	4	2	30
10-YR Mean	436	2,195	5	103	815	16,022
10-YR Max	2,032	9,986	11	430	14,097	160,000
Proposed Limit	3,600	17,500	1.34	None	24,300	136,000
Limit / 10-YR Mean	8.25	7.97		N/A	30	8.49
Limit / 10-YR Max	1.77	1.75		N/A	1.72	0.85
WQ Standard *or Benchmark*			6.5	*25*	100	200
10-YR Mean / WQ				4.14	8.15	80
10-YR Max / WQ				17.2	141	800

[1] The Columbia River is the continent's fourth largest river, with an average flow at its mouth about 265,000 CFS. As established herein by a previous footnote, flow in Ditch #3 ranges from ~2 CFS normally to over 200 CFS in major storms.

[2] The proposed discharge limit is significantly above water quality and public health standards for fecal coliform bacteria. For example, Ecology's "Illicit Discharge Indicator Thresholds Memorandum," dated July 28, 2013, identifies fecal coliform bacteria levels of >500 and >5,000 CFU/100 mL for dry and wet weather, respectively, as indicator thresholds of bacteria pollution. King County closes its beaches if the geometric mean of fecal coliform

bacteria sampling results exceeds the "Ten State Standard:" 200 colonies / 100 mL, with not more than 10% of samples exceeding 1,000 colonies / 100 mL. Fecal coliform bacteria occur at very high counts (several thousand colony forming units per 100 mL) when sewage is present in the water. Fecal coliform bacteria adhere to / harbor within and grow upon sediments.

[3] There was no evidence provided or any apparent reason to suggest that Weyco LV is uniquely unable to comply with commonplace stormwater requirements, unlike the other 135 wood products industrial permittees in the state.

Response to Comments: *The City of Longview has incorrectly cited Ecology's Permit Writer's Manual. The language cited by the City of Longview, "A final limit based on the water quality criteria is calculated and placed in the permit" is under the section for existing discharges with "No TMDL and* ***No 303(d) Listing****." In developing interim limits and requiring a study, Ecology is following the appropriate guidance provided in Chapter VI, Section 3.3.11, "No TMDL –* ***303(d) Listed*** *– Existing Discharge."*

The guidance calls for a two-pronged approach to addressing pollutant of concern. The first is to implement ***interim*** *limits based on past performance. These limits are intended to ensure that the body of water receiving the discharge does not become further impaired. These interim limits are meant to "hold the line" while the second prong, the engineering study is performed. Upon completion of the study and selection of AKART by Ecology the facility will be required to implement the alternative that Ecology has selected. Ecology believes this approach does not "exacerbate" the impairment of the Longview Ditch system but rather sets out a stepwise path to define and implement an alternative to ensure that AKART is being provided for discharges to the ditch. The interim nature of the performance-based limits was not made clear in the draft permit, the permit has been updated to add this clarity.*

At the City of Longview's request, Ecology has reviewed the calculations of the interim limits. The limits have been recalculated. Ecology noticed two particular errors, the first being that "non-detect" values were assigned a value of "zero" instead of "half the detection limit." This increased the standard deviation in the data set and lead to high fecal coliform limits at outfall 003 in the draft permit. Ecology has replaced the "non-detect" values with "half the detection limit" and recalculated interim fecal coliform limits.

Ecology also used the mass-based values for BOD_5 in its limit calculations. Many of the mass-based values are very low (i.e. 1 lb/day), when these values are log transformed they create a large standard deviation in the data set. This in turn, created a high BOD_5 limit in the draft permit. The mass-based values have been replaced with the corresponding concentration-based values for the calculation of the BOD_5 limits. The updated BOD_5 limits have been placed in the permit. Ecology believes that these concentration-based limits are more appropriate given the variable flow at these outfalls.

Additionally, turbidity monitoring for Outfalls 003 and 004 have been placed in the permit.

4) City of Longview Comment

At a minimum, Ecology's ongoing permissiveness regarding this outfall represents a gross double standard compared to what is required of the Longview area's 27 Industrial Stormwater General NPDES Permit (ISGP) Permittees and its four other Individual Industrial Wastewater NPDES Permittees.

a) The ISGP prohibits violations of surface water quality standards and requires both a SWPPP and AKART as pre-conditions of compliance. Weyco LV's permit apparently does not.

b) Outfall 003's average turbidity over the last decade is 4X higher than the ISGP's benchmark.

c) Weyco's 003 and 004 Outfalls are not subject to the COD and TSS stormwater monitoring requirements like other outfalls in their permit and like other wood-products facilities. Also, all ISGP permittees must also monitor and control for zinc and copper – somehow, for Outfalls 003 and 004, Weyco LV does not.

d) Despite the fact that Outfalls 003 and 004 are all but exclusively stormwater (plus exempt and conditionally exempt non-stormwater), they are not subject to benchmarks as are the facility's other stormwater outfalls and all ISGP discharges. Given this ambiguity, it is unlikely that the company will include those drainage basins in their forthcoming SWPPP.

e) The ISGP delineates corrective actions to be taken when benchmarks are exceeded. The proposed permit, however, alludes to but does not identify or require any corrective actions – the Section containing them, Section S1.B.1, is missing.

f) When BMPs are found to be inadequate (i.e. a benchmark is exceeded), the ISGP requires an engineering analysis and rapid implementation of its recommendations (including structural). The proposed permit gives Weyco LV 18 months to complete just the engineering analysis (AKART study), and it does not require implementation any of its recommendations. By comparison, the over 1000 ISGP permittees are given as little as 4½-months to study the problem and just another 4½-months to fix it. Why has Weyco LV been held to such a lower standard? Compared to most other industrial permittees, they have been contending with stormwater issues for longer and have greater resources. For example, Weyco LV has local and regional engineers and/or are more accustomed to contracting for engineering services. These engineers have the benefit of bountiful precedent – including from wood products industries in town and other regulated Weyerhaeuser facilities in the region. Also, to facilitate stormwater improvements, Ecology has provided clear, detailed guidance to all industrial NPDES permittees, such as: the "Industrial Stormwater General Permit Implementation Manual for Log Yards," Publication #04-10-031 (a new draft was issued April 2013), the "Vehicle and Equipment Washwater Discharges BMPs Manual," WQ-95-056 (it was updated in 2012), and the 2012 Stormwater Management Manual for Western Washington (SWMMWW).

Response to Comments: *As stated earlier, Weyerhaeuser Longview has been operating under past AKART determinations regarding the generation/management of stormwater and the discharges from outfalls 003 and 004. Ecology is requiring an AKART study to reassess what currently constitutes all known, available, and reasonable methods of treatment at the facility. Weyerhaeuser Longview has had a SWPPP in the past, but it was not a requirement in the last iteration of the NPDES permit. Ecology is requiring a SWPPP in this permit renewal.*

Regulatory language has been added to the permit that requires stormwater BMPs identified by the "003 and 004 Outfall AKART Study and Compliance Schedule" to be included in the SWPPP.

The corrective action requirements for exceedances of stormwater benchmark values have been clarified in the permit.

Outfalls 003 and 004 both had requirements for zinc and copper monitoring in the draft permit and so no change has been made with regard to this.

Ecology has accelerated the due date for the "003 and 004 Outfall AKART Study and Compliance Schedule" to one year from the NPDES permit effective date. Providing enough time to allow for the completion of a quality study is essential to the success of the AKART study.

The ISGP establishes benchmarks for pollutants from stormwater discharges. These benchmarks are not permit limits but act as triggers for corrective action. Each time a benchmark is triggered, the Permittee must comply with the prescribed corrective action in the ISGP. After triggering benchmarks three times, the facility must complete an engineering study to establish a path forward to eliminating the discharge of pollutants above stormwater benchmark values. Given past sampling data, Ecology is not waiting for benchmarks to be triggered multiple times, over many quarters, before requiring an engineering study (003 and 004 Outfall AKART Study and Compliance Schedule); instead Ecology is requiring the study as a submittal in this permit. It is Ecology's opinion that this approach to addressing concerns regarding Outfalls 003 and 004 is justified based on the current data and will result in more expedient improvements in the discharge. The study will look at the entire 003/004 drainage basin and establish a more comprehensive approach to managing the stormwater generated at the site.

WEYERHAEUSER LONGVIEW COMMENTS

1) Page 6; Summary of Report Submittals:

The "First Submittal Date" entry related to S15.B appears to be missing the word, "Date" in the phrase, "4 years after effective *date*."

Correct the apparent omission.

Response to Comment: *Correction has been made.*

2) Page 7; Summary of Report Submittals:

The "First Submittal Date" entry related to S16 appears to include a typographical error in the phrase, "Within 90 days of *conducting* the outfall evaluation."

Correct the apparent omission.

Response to Comment: *Correction has been made.*

3) Page 8; Special Condition S1:

This condition authorizes non-stormwater discharges to the CDID Ditch which have been identified, "in a permit application approved by Ecology." We note that as far as we know, Ecology does not formally 'approve' Form 2C NPDES Permit renewal applications. Therefore this phrase may be misleading and may not allow those discharges intended to be authorized since the permit application has not been "approved."

Replace the phrase, “and any other non-stormwater discharges identified in a permit application approved by Ecology” with, “and any other non-stormwater discharges identified in the source’s permit application.”

Response to Comment: *The wording has been changed; “approved by Ecology” has been replaced with “accepted as complete by Ecology”*

4) Page 11; Effluent Limits: Outfall # 005:

This draft permit returns an 85% removal efficiency requirement for both BOD5 and TSS. A similar requirement for BOD5 was removed during the last NPDES permit renewal in 2004. Reinstatement of the requirement would serve no environmental protection purpose, overlooks a reasonable regulatory solution specifically designed for the Outfall #005 performance scenario, and will almost certainly result in some occasions of non-compliance and with it a threat of enforcement action.

Environmental Protection – The Fact Sheet (Table 7, page 27) summarizes the BOD/TSS performance over the current permit term, indicating discharge averages of 1.6 mg/l and 2.1 mg/l, respectively. These concentration values translate to 2-8 pounds/day of pollutant discharge, respectively. Imposing additional regulatory demands on a treatment process with such a de minimus pollutant load simply has no merit. Adding in the reality that 005 wastewater discharges internally to the 001 and 002 pulping/papermaking process outfalls further makes the point. The mass discharge of BOD/TSS from 001/002 averages about 8,000 and 15,000 pounds/day, respectively. The steady BOD/TSS loading from the sanitary sewer is an imperceptible addition to the mill contribution of those pollutants to the Columbia River and does not warrant additional regulatory control.

Regulatory Solution – The permit Fact Sheet cites WAC 173-221-040 as the basis for regulation of outfall 005 (page 35 of Fact Sheet). We suggest WAC 173-221-050 offers more relevant regulatory direction. Subparagraphs (2) or (4) describe options to appropriately regulate small facilities and/or those which receive less concentrated influent. Just as Ecology did in 2004, either of these subsections could be relied on to impose reasonable alternative effluent limits. Subsection (2)(c) could be the basis for imposition of the 30 mg/l (average monthly) and 45 mg/l (average daily) effluent limits, BOD and TSS, proposed in this permit. (Note that these concentration-based effluent limits are more stringent than the limits in the current permit.) Alternatively, subsection (4)(a)(ii) could be relied on to compute mass discharge limits based on the 30 mg/l and 45 mg/l allowed concentrations.

Non-Compliance and Enforcement Liability - The sanitary treatment system runs very efficiently but is oversized for the number of employees currently working on the site. Some infiltration/inflow undoubtedly serves to dilute the influent to the system. Treatment system performance prior to 2004 infrequently yielded a <85% removal rate. Consistent with the regulatory policy intent embodied in WAC 173-221-050 and in recognition of the truly de minimus discharge from the sanitary treatment system, Ecology eliminated the percent removal requirement in 2004. To reimpose the 85% removal requirement along with an obligation for influent testing, recreates the opportunity for sporadic non-compliance. However insignificant the actual pollutant discharge, reported non-compliance will then create vulnerability to government and citizen enforcement. This is not an acceptable outcome for Weyerhaeuser.

Suggested improvement – Eliminate the imposition of the >85% BOD and TSS removal requirement in S1. Eliminate footnote "d" in the "Effluent Limits: Outfall #005" Table. Eliminate the "Removal Efficiency (BOD and TSS)" line in proposed S2. Sanitary Wastewater Effluent – Outfall 005 Monitoring.

Response to Comment: *Ecology recognizes that the sanitary wastewater treatment plant at Weyerhaeuser Longview meets the definition of a "waste stabilization pond." A 65% removal rate for BOD has been included in the permit based on WAC 173-221-050(2). BOD and TSS limits of 30 and 45 mg/L remain in place on a best-professional judgment basis and to prevent backsliding.*

5) Page 14; S1.B. Discharge Benchmarks:

This condition discusses benchmarks in general and refers to, "the specific corrective action requirements in Special Condition S1.B.1." We note that Special Condition S1. B.1. is not found in this document. We further note that the corrective action requirements may be found in the second paragraph of this condition which refers to Special Condition S8 of the ISGP.

Strike the phrase which begins with, "however, if the Permittee fails." The reference to the requirements of the Industrial Stormwater General Permit should suffice.

Response to Comment: *Comment noted. "in Special Condition S1.B.1" has been struck.*

6) Page 15, Mixing Zone Authorization:

The Columbia River at river mile 65 is categorized as freshwater (see WAC 173-201A-602, Table 602). This fact is recognized elsewhere in the permit and Fact Sheet (for example, note Tables 16 and 20 which make references to the applicability of fresh water numeric criteria). Yet Ecology's draft permit proposes a mixing zone dimension established for an "estuarine" receiving water (subsection -400(7)(b)). Ecology should re-draft proposed S1.C.1. to incorporate the mixing zone dimensions specified for "freshwaters" and "rivers and streams" (See subsection -400(7)(a)). The Acute and Chronic critical effluent concentrations presented in S18 Chronic Toxicity should also be adjusted.

Three basic reasons support this request. First, the draft Fact Sheet presents an analysis demonstrating that conditional requirements for authorization of a mixing zone are, in fact, achieved (reference is to WAC 173-201A-400(1) through (5), and Fact Sheet discussion on pages 39-42). That the January 2004 "Outfall Dilution and Temperature Study," CH2M-Hill, evaluated water quality criteria compliance for an estuarine receiving water is not consequential to this current request. Regulatory and physical conditions demonstrated for a smaller mixing zone (note that the mixing zone dimensions set by regulation for estuarine receiving waters are smaller than the dimensions for a freshwater/stream receiving water) will intuitively also be achieved for a larger mixing zone. Second, subsection -400(7) reads as a mandatory requirement; i.e., "the maximum size of the mixing zone shall comply with the following (dimensions)". The Columbia River is a freshwater stream and subsection -400(7)(a) defines the applicable mixing zone dimension. Third, by all accounts the Dept of Ecology will be adopting more stringent toxic pollutant water quality criteria by the end of 2014. Options presented by Ecology's Water Quality Program in November 2013 indicated toxic pollutant water quality criteria are likely to be 2-34 times more stringent than current WAC 173-201A criteria. The Longview mill may need the extra dilution afforded by the "freshwater" mixing zone in order to demonstrate achievement of criteria in "reasonable potential" analyses.

The 001/002 mixing zones should be based on WAC 173-201A-400(7)(a).

Response to Comment: *Ecology understands the Weyerhaeuser Longview's concerns. Because the Columbia River is tidally influenced, an estuarine model was used in Weyerhaeuser Longview's 2004 "Outfall Dilution and Temperature Study". The study was used to determine dilution factors. These dilution factors are what Ecology uses when performing its reasonable potential analysis. Unless a new dilution study is performed using different mixing zone sizing criteria, no change to the dilution factors or mixing zone will be considered.*

Ecology will also clarify that the Columbia River is a fresh water body (not estuarine/marine) and subject to the freshwater water quality criteria.

7) Page 16; S1.D. Water Supply Plant Discharge:

It is not clear what "conditions" Ecology has in mind in its authorization of "discharge filter plant backwash and TSS from the existing raw water treatment system." We appreciate that the proposed Special Condition S12 requires an AKART analysis for these discharges, but that is a study requirement to be completed during the term of the permit and is separate from Clean Water Act authorization to discharge treatment plant solids.

Define what is meant by "conditionally." If the agency intends substantive conditional requirements, we request an opportunity to review and offer comments on those. Alternatively, strike the word "Conditionally" from this permit condition.

Response to Comment: *"Conditionally" has been struck.*

8) Page 23; S2.C.3 Flow Measurement, Field Measurement etc.:

This condition appears to require weekly calibration of continuous monitoring instruments. Flow meters at Secondary out, B-Sump, E-Sump, 003, 004 and 005 are all defined as continuous monitoring devices. The term, "Calibration" typically implies the comparison of a testing device to a known standard. We assert that it is practically impossible to pass a known volume of water through these flow meters to evaluate "accuracy" and create a possible ability to "calibrate" these flow measurement systems. Dye studies can approximate a calibration but are very expensive and prone to errors. We are therefore perplexed by the intent of this requirement and suggest it should be narrowed to focus on continuous meters other than flow monitors. We assert that S2.C.2 is sufficiently prescriptive to ensure reliable flow data is collected and presented to DOE. The agency should also be reminded of a correspondence exchange and meeting in July and August 2009 which fully described the technologies and capability of flow meters employed on-site, system calibration practices, and the reporting procedures the mill would follow. We believe this interaction with Ecology yielded a full understanding on the necessary practices to define compliance with S2.C. Flow Measurement.

Modify **S2.C.3** to read, "Calibrate continuous monitoring instruments **other than flow meters** weekly….."

Response to Comment: Suggested change has been made.

9) Page 23; S2.C.3.b. pH measurement:

S2.C.3.b. uses odd language to specify how continuous pH measuring instruments must be calibrated. Our standard practice is to use buffer solutions and calibrate in the field.

Modifying S2.C.3.b. to refer to standard industry practice or manufacturer's recommendation for calibrating such instruments. Consider striking language which unnecessarily prescribes specific locations and means of calibrating devices which may conflict with manufacturer's recommendations.

Response to Comment: *The permit specifies that manufacturer's recommend practices are acceptable. Ecology will change the wording to allow for "manufacturer accepted practices." If a calibration technique it not deemed as acceptable by the manufacturer then Ecology is wary about its use in the field.*

10) Page 23; S2.C.3.c. Chlorine measurement:

We use continuous chlorine monitors across the site for safety reasons. None are used to collect data for NPDES purposes. Therefore, this requirement would appear to add calibration requirements to instruments not regulated by DOE.

Strike S2.C.3. or add the phrase, "if continuous chlorine measurement instruments are used to demonstrate compliance with this permit they must be calibrated in a laboratory within 15 minutes of sample collection."

Response to Comment: *Ecology has narrowed the language of the section to only capture the chlorine monitors at the facility used to determine NPDES compliance.*

11) Page 25; S2.E.2.a.ii.3 Suspending sampling for consistent attainment:

This condition describes suspending sampling for consistent attainment achieved prior to July 1, 2012. For obvious reasons this condition is not pertinent or appropriate in a renewed permit.

Strike this paragraph.

Response to Comment: *This section was not included in err. Ecology now requires 8 consecutive quarters (previously 4 quarters) which demonstrate a reported value less than or equal to the benchmark value. This means sampling must resume for parameters which have previously achieved consistent attainment.*

12) Page 28; S3.E.2.a. Immediate Reporting for discharges to waterbodies used as a source of drinking water:

Neither the Columbia River downstream of the Longview site nor the CDID ditch are used as a source of drinking water. The Longview municipal system draws water from an aquifer geologically separated from the Longview site. Thus, we assert that notification requirements other than for failures of the sanitary system's disinfection system will never be triggered and should be removed.

Simplify this permit by removing the second and third bullets from this list. Consider also striking the first bullet since even if the disinfection system were to fail the discharge would not impact a water body of interest to the Department of Health's Drinking Water Program.

Response to Comment: *It is Ecology's understanding that the Columbia River is still used by the City of Longview as an emergency backup supply for drinking water. Since there exists a potential for drinking water use, the subsection will remain unchanged. It is Ecology's expectation that if/when the Columbia River is being used as a source of drinking water, this section would apply.*

13) Page 30; S4. Operation and Maintenance:

The second paragraph is replete with unrealistic expectations and ambiguous language. Consider these questions. Does this paragraph apply only to the mill process wastewater treatment system, or to other/all of the wastewater treatment and outfalls on the site? Does Ecology literally have interest in "any facility maintenance"? What is meant by "interruption of wastewater treatment" and the "degrade(ing) of effluent quality" (and are these intended to be considered separate performance conditions or are they linked)? What mechanism does Ecology imagine is needed to share maintenance plans and gain approval? (As one practical example, is Ecology really prepared to review and approve the repair of a line leak discovered on a weekend night?) What are the critical and non-critical water quality periods?

Strike this paragraph from this permit unless answers to the above questions can be provided. Any permit language must articulate precise and reasonable performance expectations.

Response to Comment: *Ecology believes that the language contained in Special Condition S4 is appropriate and not ambiguous. The language requires the proper operation and maintenance of the wastewater treatment facility. The language does not say "interruption of wastewater treatment* ***and/or*** *degrade effluent quality but rather "interruption of wastewater treatment* ***and*** *degrade effluent quality." Ecology has updated the language so as not to imply that maintenance requires Ecology approval prior to commencement.*

14) Page 33, S6 Non-Routine and Unanticipated Discharges:

This section appears to be Ecology boilerplate NPDES permit language. We simply note that for "unanticipated discharges" it may not be possible for the mill to contact Ecology "prior to any such discharge" and supply comprehensive information about what hadn't been anticipated. Further, the permit would be far less ambiguous if the intent of this condition were made clearer by adding the phrase, "without treatment." As written, the condition appears to prohibit the discharge of non-routine wastewaters to the wastewater treatment system.

Modify this sentence to read, "Beginning on the effective date of this permit, the Permittee is authorized to discharge <u>without treatment</u> non-routine wastewater on a case-by-case basis if approved by Ecology.

Response to Comment: *The title of Special Condition S6 has been changed. "Unanticipated" has been removed. The intent of the condition is fully captured by "non-routine" and the word "unanticipated" adds unnecessary confusion. Truly unanticipated discharges are potentially captured by General Condition G10. Ecology hopes this provides sufficient clarity.*

15) Page 34 S7.A.1 Spill Control Plan:

We note an apparent typographical error, the extra word, "by."

Modify this sentence to read, "Submit to Ecology an update to the existing Spill Control Plan within one year of the effective date of the permit."

Response to Comment: *Change has been made.*

16) Page 34 S7.B.1 Spill Control Plan Components:

Subparagraph (1) is too broad. This NPDES boilerplate language should be narrowed to those hazardous substances which if spilled or released to the environment could reach a wastewater conveyance system, treatment system, and possibly be discharged to waters of the state. Any spills/releases at locations that are isolated from the NPDES-regulated system should not be subject to this permit section. As one example, table salt will designate as a WT02 dangerous waste under WAC 173-303-070. Unless clarity is provided to the proposed permit language, there would be a literal need to tell Ecology about the location of salt containers in the lunch room, how spills will be addressed, etc.

Adjust the S7.B.1. section to read "…, or otherwise released into ~~the environment~~ <u>a wastewater conveyance or treatment system regulated by this permit</u>,".

Response to Comment: *Ecology disagrees with the proposed language change. The proposed language would exempt potentially harmful materials which are stored in areas that would potentially drain directly to surface water and bypass "a wastewater conveyance or treatment system regulated by this permit."*

The comment provided has informed Ecology that all spills of table salt are managed as dangerous waste at Weyerhaeuser Longview. A review of the annual dangerous waste reporting shows that no such spills of table salt have ever been reported.

Ecology believes that "released into the environment" appropriately narrows the scope. No changes have been made.

17) Page 35; S10.C Solid Waste Control Plan:

While this looks like boilerplate permit language, we are interested to understand what regulatory authority the agency relies on to require a Solid Waste Control Plan. Specifically, does Ecology really have authority (or interest) in "approving" the mill choices on recycling/reuse/disposal of solid waste? What are the decision-making criteria that will determine Ecology's approval or disapproval of the Plan? Isn't the first statement requiring the mill to "Handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water" sufficient?

To be frank, in 2013 this Solid Waste Plan amounts to a make-work effort with marginal value to both Ecology and Weyerhaeuser; i.e., it was much more relevant in 1980. The appropriate regulatory requirement for this permit is for Ecology to instruct Weyerhaeuser to keep solid waste and untreated leachate out of state waters.

Response to Comment: *A Solid Waste Control Plan has been submitted by Weyerhaeuser Longview during the last permit cycle. Ecology believes that the submittal of a Solid Waste Control Plan is an appropriate measure to prevent solid waste and solid waste leachate from entering ground and surface waters. Ecology is requiring that the plan be updated and does not see this as amounting to large effort or use of resources.*

18) Page 36, S11 Wastewater Treatment System Efficiency Study:

This is a new requirement with this permit renewal. Although the Fact Sheet is virtually silent on the reason for imposing this study, we believe its origin is based on internal Permit Writers Manual guidance (page IV-6, WDOE Publication 92-109, December 2011). That guidance indicates Ecology permit writers should "conduct an analysis of unit processes design and efficiencies at the facility to determine if the effluent guidelines constitute AKART," if the relevant federal effluent guideline is more than 10 years old.

While EPA effluent guidelines for the Pulp, Paper and Paperboard Point Source Category (40 CFR 430) are more than 10 years old (they were last updated in 1998), they are not obsolete. Be aware that EPA conducts an annual review of all industry effluent guidelines to assess the need for updates/revisions consistent with Clean Water Act demands. These are data-driven, technology-assessment reviews. The product from the effort is a prioritized plan which directs EPA Office of Water work. Relevant pages from the last EPA review of 40 CFR 430 effluent guidelines are enclosed as Attachment 1. EPA's conclusion for the Pulp, Paper and Paperboard category was: "EPA is assigning this category with a lower priority for revision in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs." This EPA determination must be taken as an affirmation that 40 CFR 430 guidelines achieve Best Practical, Best Conventional and Best Available Technology criteria as defined by the federal Clean Water Act. EPA's determination should give Ecology confidence that Washington's statutory requirement for AKART is also demonstrated.

If Ecology continues to insist the S11 study is necessary, please answer these questions in the Response to Comments on this draft permit:

1. What is the physical scope of the S11 requirement? Does it apply only to the pulp and paper process treatment system (Outfalls 001/002), or also to the sanitary sewer system (Outfall 005), and the stormwater discharges on site?
2. What is the specific regulatory authority (presumably from WAC 173-220, but maybe WAC 173-221) which supports Ecology's Special Condition request?
3. What are the objective measurement criteria Ecology would rely on to assess the "adequacy" of the treatment system performance? Why would it not be empirically obvious that over the term of the

current permit the treatment system performance has been "adequate" given:

a. evidence of an extraordinarily high compliance rate against effluent limitations. Table 12 of the Fact Sheet documents permit violations during the term of the current permit. The compliance rate with all permit requirements certainly exceeds 99%.

b. documentation of average conventional pollutant discharges at approximately 25% of effluent limit mass values (Tables 3 and 4 in the Fact Sheet),

c. demonstration of no "reasonable potential to exceed" for any toxic pollutant (Table 20 in the Fact Sheet),

d. a showing of "no toxicity" of acute/chronic bioassay standards (Tables 22 and 23 in the Fact Sheet).

4. What is Ecology's definition of "efficient operation" and does Ecology intend in subsequent regulatory actions to impose treatment efficiency performance demands in the permit?

5. What is the relevance of distinguishing treatment system performance for "dry weather" and "wet weather flows" through the mill process treatment system? In any given month hydraulic flow through the system might vary by 5-10 MGD, and more if there process slowdowns for any number of reasons. To make a point, consider a 2" per day rain event on the 100 acres of pulp and paper manufacturing area. Even assuming that all of this precipitation drains to the treatment system, the resulting 5 MGD is within the variability range of daily production–driven process flow. Dry weather vs. wet weather is not a meaningful distinction, and is not worthy of a study scenario.

Ecology's interest in gaining confidence in the "adequacy" of treatment system performance and demonstrating AKART does not require an extensive, expensive and ambiguously defined, study. Available information exists to support such a regulatory determination. This determination is backstopped by EPA's declaration on the adequacy of existing Pulp, Paper and Paperboard effluent guidelines.

Response to Comment: *Ecology looks to multiple sources for information to evaluate whether AKART must be re-evaluated for an existing facility. These include EPA's review of effluent guidelines for the industry, the treatment technologies employed at similar facilities in the state, and the availability of new technologies in use elsewhere for this industry. The treatment efficiency study required by the permit will help Ecology better understand the system's performance, how it compares to results achieved at similar facilities and whether a more detailed evaluation of the system is needed in future permit cycles.*

This efficiency study is intended to cover the industrial wastewater treatment system (outfalls 001/002). Although this study is new to Weyerhaeuser Longview's NPDES permit, it is found in other industrial section NPDES permits. The inclusion of this study is consistent with Ecology's application of AKART throughout the industry.

Ecology includes the dry weather/wet weather requirement to take in consideration for facilities impacted by wet weather flow. Weyerhaeuser Longview has made clear that there is little variation between dry weather and wet weather flow. Despite this, Ecology still requires four (4) sampling events. Ecology could alternatively propose quarterly sampling events but it does not sound as if the change would not have any meaningful impact on the results. No change has been made.

Ecology's has determined that proper/efficient operation and maintenance of secondary treatment wastewater treatment facilities meets the intent of AKART at pulp and paper mills. Ecology agrees with Weyerhaeuser Longview that they have shown exemplary compliance with effluent limits. This is, in part, due to the careful optimization of the WWTP by facility staff. Ecology understands that Weyerhaeuser Longview already collects much of the data requested in the efficiency study as part of their routine wastewater system optimization; the request for this information is not viewed as incurring a great cost to the facility as it is data that is already being routinely collected.

The fact sheet and permit have been updated to clarify the basis and expectations of the efficiency study.

19) Page 36; S12 Water Supply Plant Discharge AKART:

It is appropriate to note that nothing has fundamentally changed on this topic since the Pollution Control Hearings Board decision in Weyerhaeuser Company (Longview Plant) v. Washington Department of Ecology, PCHB No. 85-220; July 14, 1986. Eroded sediment from Mount St. Helens still affects the Toutle/Cowlitz/Columbia River systems, and fundamentally impacts Weyerhaeuser's raw water treatment processes. The level of treatment required and the associated cost that Weyerhaeuser would incur with any effluent limit on these discharges will be disproportional to costs endured by other sources within the same class of dischargers. This PCHB decision is included with this comment letter. Additionally, in light of the continuing Mt St Helens sediment load to the Columbia River, the Dept of Ecology must certainly have been influenced in NPDES permitting decisions since 1984 by the public policy concept evident in RCW 90.54.020(3)(b) and WAC 173-220-130(1)(a)(ii); i.e., to credit substances removed from plant intake water.

We look forward to productive discussions regarding this analysis with DOE.

Response to Comment: *It is Ecology's duty to ensure that AKART is being applied to authorized discharges. In the 30 years since the PCHB decision conditions and technologies may have changed. Therefore Ecology is requiring a reassessment of AKART for the water supply plant discharges. It is Ecology's expectation that the feasibility of technologies which were not assessed previously (sub-riverbed intakes, groundwater wells, ect…) be assessed. In addition to these technology-based requirements, Ecology is concerned about the water quality impacts of these discharges and has included a requirement for a water quality impact analysis.*

20) Page 37-38, S14, Outfalls 003 and 004 AKART Study:

We understand Ecology's intention to be that the Industrial Stormwater General NPDES Permit (2012) with its terms and conditions will be relied on for the regulation of stormwaters discharging from the Longview mill site. This draft mill NPDES permit is replete with references to and in some cases actual permit language from the ISWGP. We assume this same intention extends to the stormwater component of the 003/004 outfalls. But there are also process waters which discharge to (at least) the 003 outfall, and we assume this Special Condition S14 AKART study is focusing on those process waters.

Some clarity on this point would be appreciated.

Response to Comment: *Ecology is requiring that AKART be reassessed for the discharges to Outfalls 003/004. Given the available data for Outfalls 003/004, it is clear that applicable benchmarks from the ISGP will not be met for these discharges. Rather than waiting for several more quarters of discharges that would exceed benchmarks, Ecology is requiring the AKART study to assess the management of the 003/004 discharges in a comprehensive fashion.*

*Ecology would like to emphasize that **all discharges** must meet the requirements of AKART, thus the requirement for the study is not limited to process water sources but the cumulative discharge, this includes stormwater and process water sources. If Weyerhaeuser Longview believes that the stormwater component of the discharge meets AKART without engineered treatment, the burden will be upon the facility to justify that belief.*

Ecology has updated the language in the permit so that upon completion and approval of the AKART study, the stormwater BMPs identified must be incorporated into the SWPPP.

21) Page 46; G5 Plan Review Required:

This general condition appropriately references WAC 173-240; however, the 180 day prior-to-construction plan submittal requirement does not appear to be supported by the referenced code. Specifically, WAC 173-240-110 requires the submission of engineering reports and plans for industrial wastewater facilities thirty days before the time approval is desired. WAC 173-240-030 requires the submission of plans and specifications for domestic wastewater facilities consistent with a compliance schedule issued by the department or at least sixty days before the time approval is desired. Is the 180 day review period a de facto compliance schedule?

Align the plan review requirement with the review periods specified for domestic and industrial wastewater facilities in WAC 173-240.

Response to Comment: *General Condition G5 is derived from WAC173-240-110(1). The 180 day requirement was established by Ecology to provide the necessary time required to perform a review of an engineering report and detailed plans and specifications.*

CITIZEN COMMENTS

Note: Ecology received comments from Yolanda Vanveen regarding both the issuance of an air Notice of Construction Order and the draft NPDES permit. Ecology has responded to the comments regarding the draft NPDES permit.

1) Yolanda Vanveen Comment:

A NPDES permit is normally issued every five years. Why has it been nearly ten years since the last NPDES permit?

Response to Comment: *Due to staffing limitations there is a backlog of permits. Ecology is working towards reducing the backlog and having all permits current.*

2) Yolanda Vanveen Comment:

Sets limits on the kinds, amounts and concentrations of pollutants a facility may release. What are the current levels and limits?

Response to Comment: *Current limits can be found in the current NPDES permit which is located for the public to review at: https://fortress.wa.gov/ecy/industrial/Default.aspx .*

3) Yolanda Vanveen Comment:

The contamination in the Columbia River basin poses an "unacceptable risk" to people, fish and wildlife, the U.S. Environmental Protection Agency [7] said after issuing its first comprehensive report on toxic pollution in the massive Columbia system back in 2009. Why then has little been done to stop the continued pollution? There is increasing societal awareness and concern about toxics in our environment. The Environmental Protection Agency (EPA) estimates that there are between 80,000 and 100,000 chemicals in use in our personal lives, in business and in commerce. Many of these chemicals are making their way into the magnificent Columbia River Basin and affecting the ecosystem and the fish that tribal people have consumed for 10,000 years or more. [12]

Response to Comment: *Ecology has developed the pollutant limits in this permit based on technology-based and water-quality based standards/criteria. These standards have been developed to prevent the discharge of pollutant in quantities that would be harmful to aquatic life and human health. Ecology has performed a "reasonable potential analysis" which looks at the quantities of pollutants in the effluent and determines whether the environment or human health will be negatively impacted based on the water quality criteria. The analysis can be found in Appendix D of the fact sheet.*

Fact Sheet for NPDES Permit WA0000256

Georgia Pacific Consumer Products (Camas), LLC

March 10, 2015

Purpose of this Fact Sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Georgia Pacific Consumer Product (Camas), LLC (G-P).

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for G-P, NPDES permit WA0000256 are available for public review and comment from March 17, 2015 until April 20, 2015. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

G-P reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as **Appendix E - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Summary

G-P operates a pulp and paper mill in Camas, Washington. The mill uses the Kraft process to produce communication and tissue paper. G-P collects and treats its wastewater before discharge to the Columbia River.

The reissued permit contains effluent limits for the conventional pollutants Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), adsorbable organic halides, dioxins, and pH. Major changes from the previous permit include:

- Lower BOD_5 and TSS limits based on current pulp production.
- Collecting data on sediments near the outfall.
- Reporting requirements for the cooling water intake structure.

Table of Contents

I. Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the NPDES, administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 Revised Code of Washington (RCW).

The following regulations apply to industrial NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC)
- Water quality criteria for ground waters (chapter 173-200 WAC)
- Whole effluent toxicity testing and limits (chapter 173-205 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC)

These rules require any industrial facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A-Public Involvement Information** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in **Appendix E**.

II. Background Information

Table 1 General Facility Information

Facility Information	
Applicant:	Georgia Pacific Consumer Products (Camas), LLC
Facility Name and Address	401 NE Adams Street Camas, WA 98607
Contact at Facility	Gordon Liljenquist, Environmental Engineer (360) 834-8142
Responsible Official	Gary Kaiser, Vice President 401 NE Adams Street Camas, WA 98607 (360) 834-3021
Industry Type	Bleached Pulp and Paper
Categorical Industry	40 CFR Part 430
Type of Treatment	Primary and secondary treatment
SIC Codes	2611, 2621, 2679
NAIC Codes	322110, 322121, 322299
Facility Location (NAD83/WGS84 reference datum)	Latitude: 45.58484 Longitude: 122.40565
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Outfall 001 to Columbia River, River Mile 120 Latitude: 45.570833 Longitude: 122.4125 Outfall 002 to Camas Slough, Columbia River Latitude: 45.5833 Longitude: 122.40833

Permit Status	
Renewal Date Permit Issued on	January 15, 2009
Application for Permit Renewal Submittal Date	June 19, 2013
Date of Ecology Acceptance of Application	September 19, 2013

Inspection Status	
Date of Last Sampling Inspection	July 1, 2014
Date of Last Non-sampling Inspection Date	June 25, 2014

A. Facility Description

Location

The Camas mill is a 661-acre pulp and paper manufacturing complex established in 1883. It began as a pioneer newsprint mill and evolved into a 700 tons/day integrated communications paper and tissue paper mill. The manufacturing complex is bound on three sides by the City of Camas, Washington. Approximately 185 acres of the mill site is heavily developed and lies north of the Camas Slough (an arm of the Columbia River that connects to the Washougal River). The rest of the mill resides on Lady Island, which covers some 476 acres south of the Camas Slough and fronts the Columbia River. The island is only partially developed and hosts the wastewater treatment system and two landfills.

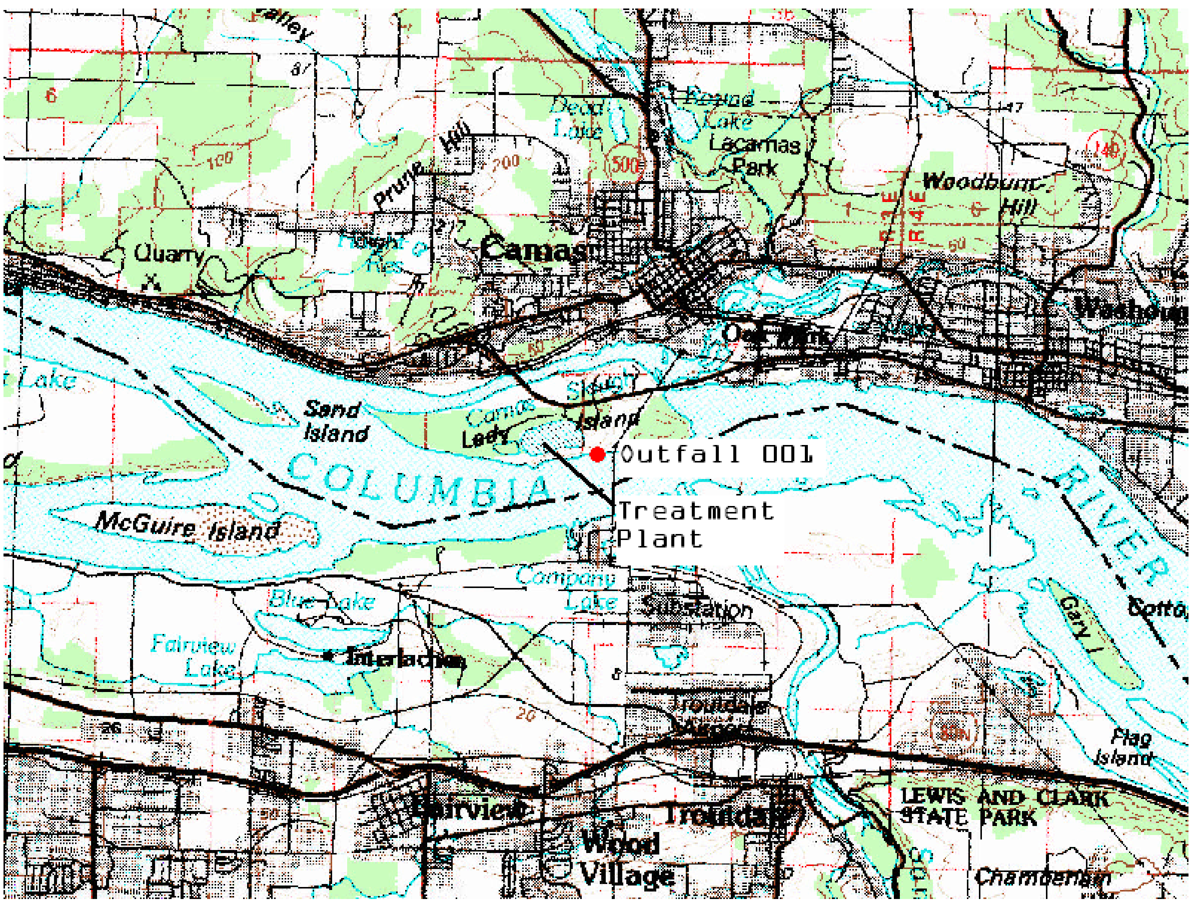


Figure 1. Facility Location Map

Industrial Process

The mill currently produces tissue, toweling, and communication papers. Raw materials in the form of wood chips, sawdust, waste paper, chemicals, and pulp arrive from all over the West by truck, barge and rail car. The Camas mill uses the Kraft process to convert wood chips and sawdust into pulp. The mill bleached brown pulp in one of two bleach plants. Most of the paper grades products contains a blend of these pulps and purchased pulp, and secondary fiber recycled from waste paper. After reviewing the production data over the previous five years, Ecology set the production base as follow:

Production Rate in Machine Air-dried Ton/Day

Bleached Kraft Paper and Market Pulp	798
Non-Integrated Tissue	11
Secondary Fiber Non-Deink	32
Total Production	841

Currently six machines produce paper; five of them towel and tissue grades, the other machine produces communication papers. The oldest paper machine dates from 1910 and the newest was built in 1984. Daily production ranges from 30 tons per day on the smallest paper machine to over 700 tons per day on the newest and largest. The mill sells its products directly to printers and converters or further processes them into finished goods. The mill also operates a pulp dryer to produce baled pulp for internal use or sale.

Wastewater receives primary and secondary treatment before discharge to the main channel of the Columbia River.

The Camas mill employs approximately 500 people. Most processes operate 24 hours each day, 7 days a week and 52 weeks a year. Production equipment can be shut down for cleaning, maintenance, or to control output. The entire facility is shut down periodically for maintenance and cleaning.

Wastewater Treatment Processes

The wastewater treatment system include of a traveling screens, 300-foot diameter primary clarifier, and secondary treatment system. The secondary treatment system consists of a 250 million gallon (66 acres), moderately mixed plug flow aerated stabilization basin followed by a 150 million gallon (42 acres) partially mixed aerated basin with a settling zone.

Solid Wastes

G-P processes sludge from the primary clarifier in a Komline-Sanderson spring coil vacuum filter and a Reitz V-Press. The final material, containing 35 to 45 percent solids, is either burned in the No. 3 Power Boiler or landfilled either on or offsite.

Outfall 001

Outfall 001 is the principal outfall. G-P treats mill wastewater and an intermittent discharge of groundwater from the sand traps on the mill well water system with primary treatment and secondary treatment system. The final effluent discharges outfall extending 384 feet into the Columbia at river mile 120.

The outfall consists of a 60-inch diameter concrete cylinder pipe with a single 60-inch diameter port at a 45º upward angle. Due to strong subsurface turbulence in this area of the river, the mill provided the outfall with a strategically positioned single port. This design provides better dilution than the diffuser approach previously employed. The minimum water depth over the outfall is 50 feet.

Outfall 002

Outfall 002 consists of non-point source stormwater from the City of Camas, Lacamas Lake water, well water overflow, and filter plant backwash from the Camas mill. It does not contain industrial stormwater run-off from the mill. Stormwater from the City of Camas is not covered under this NPDES permit; this stormwater flow is separately managed and discharged under the Western Washington Phase II Municipal Stormwater Permit. The discharge originates in Blue Creek and Whiskey Creek on the southeastern slope of Prune Hill. It travels under the Camas Mill in a concrete channel or pipe and discharges directly to the north shore of the Camas Slough.

In the mid 1980's, Ecology issued permits that required treatment of filter plant backwash to remove solids. Several companies appealed the condition. In 1986, the Pollution Control Hearing Board (PCHB) ruled against Ecology and the condition was taken out of the permits. It has been twenty years since the PCHB ruling, Ecology required the Permittee to perform an All, Known, Available, and Reasonable Treatment (AKART) analysis on the filter backwash. G-P submitted the AKART study in January 2013. The study selected the method of collecting the filter backwash for treatment and discharge via Outfall 001. The mill will submit a timeline for implementation and an engineering report.

The mill monitors this outfall continuously for the following parameters: flow and pH. The mill uses a Palmer-Bowlus flume to measure flow in an underground pipeline and is located west of the K5 Bleach Plant. The pH monitoring station is near the Will Sheet 1 Building.

Outfall 003 (Historical)

Outfall 003 was a sand trap purge from the well field located in the southeast corner of the mill. The outfall discharged directly to the north shore of the Washougal River. In December 2002, G-P notified Ecology of its intention to eliminate Outfall 003, which it accomplished by routing the flow to Outfall 001. The mill designed its wastewater treatment systems to treat up to 76 million gallons per day (MGD) of raw wastewater with its primary and secondary treatment system. The maximum flow from Outfall 003 was at 0.076 MGD and current Outfall 001 flow is 20 to 35 MGD. Therefore, the diversion of Outfall 003 to 001 did not present a significant burden on the wastewater treatment system. Ecology analyzed the reasonable potential of the combined discharge and determined that the combined Outfall 001 had no potential to exceed the water quality standards, WAC 173-201A.

Stormwater Outfall

The Permittee collects, treats, and discharges stormwater as part of the process discharge and has met all of required planning and monitoring requirements. Specialty Minerals collects stormwater on its property and discharges it to the mill treatment system. Stormwater discharge limitations are consistent with and incorporated in the process effluent discharge limitations.

B. Description of the Receiving Water

G-P Camas mill discharges to the Columbia River at Outfall 001 and to Blue Creek, which flows to Camas Slough at Outfall 002. Other nearby point source outfalls include the City of Camas Municipal Treatment Plant. Significant nearby non-point sources of pollutants include storm water from the cities of Camas and Washougal. A review of Ecology's Water Quality Atlas showed no nearby drinking water intake. Ecology considered ambient/background data from several sources, including ambient monitoring stations 28A100 and 28B070 and G-P's receiving water studies conducted in the vicinity of the discharge.

Data representing the receiving water conditions are tabulated below. For toxic pollutants, the geometric mean of background monitoring results were multiplied by a factor of 1.74 to estimate the 90th percentile value.

Table 2. Ambient Data

Parameter	Columbia R. @ Camas
Temperature, highest annual 1-DADMax, ºC	21.80
Temperature, highest annual 7-DADMax, ºC	21.50
pH minimum, standard unit	7.12
pH maximum, standard unit	7.99
Dissolved Oxygen, mg/L	11.2
Ammonia-N, mg/L	0.006
Fecal Coliform, colonies per 100mL	3.68
Turbidity, NTU	3.5
Hardness, mg $CaCO_3$/L	61.6
Arsenic, dissolved, µg/L	1.11
Cadmium, dissolved, µg/L	< 4.35
Chromium, dissolved, µg/L	0.20
Copper, dissolved, µg/L	1.27
Lead, dissolved, µg/L	0.020
Manganese, dissolved, µg/L	< 4.35
Mercury, µg/L	< 0.001
Nickel, dissolved, µg/L	< 17

Parameter	Columbia R. @ Camas
Zinc, dissolved, µg/L	0.88

C. Wastewater Characterization

G-P reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. Unless otherwise stated below, the tabulated data represents the quality of the wastewater effluent discharged within the period of January 2009 through May 2013.

The ammonia monitoring data are based on the July 2009 to July 2012 nutrients sampling study. G-P conducted this voluntary sampling to monitor the performance of the treatment system performance.

Metals and dioxin data for Outfall 001 includes the results from the 2013 chemical analysis of the effluent. Ecology includes pollutants that are at detectable concentrations and are assigned water quality standards under Chapter 173-201A-040 WAC.

Arsenic data is from a two-year study from January 2009 through February 2011.

Table 3. Outfall 001 Wastewater Characterization

Parameter	Units	# of Samples	Average	Maximum
Flow	MGD	1,598	22.99	33.6
BOD_5	mg/L	778	22	50
BOD_5	lb/day	778	4,006	11,250
TSS	mg/L	1,598	84	28
TSS	lb/day	1,598	5,263	14,922
Ammonia-N	mg/L	59	0.84	2.81
Aluminum	µg/L	1	417	417
Antimony	µg/L	2	0.07	0.14
Arsenic, total	µg/L	26	1.4	3.4
Barium, total	µg/L	1	88.4	88.4
Cadmium	µg/L	2	0.2	0.2
Chromium	µg/L	2	5.0	5.6
Copper, total	µg/L	2	4.5	5.3
Lead, total	µg/L	2	1.58	1.95
Manganese, total	µg/L	1	224	224
Mercury	µg/L	2	0.011	0.0215
Nickel	µg/L	2	3.1	3.4
Zinc, total	µg/L	2	52.4	89.3
2,3,7,8-TCDD	µg/L	2	< 0.00000483	< 0.00000485

Parameter	Units	# of Samples	Geometric Mean
Fecal Coliform	#/100mL	1	162

Parameter	Units	# of Samples	Minimum	Maximum
pH	S.U.	1598	6.7	8.3

Parameter	Units	# of Samples	Average	Maximum
Temperature, winter	ºC	800	13.6	23.6
Temperature, summer	ºC	779	22.8	31.2

Table 4. Outfall 002 Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum
Flow	MGD	1598	15.4	27.0
BOD_5	mg/L	1	0.57	0.57
BOD_5	lb/day	1	120	120
TSS	mg/L	1	2.1	2.1
TSS	lb/day	1	41	41
Nitrate-Nitrite	mg/L	1	0.61	0.61
Ammonia-N	mg/L	1	0.056	0.056
Aluminum	µg/L	1	137	137
Barium	µg/L	1	13.6	13.6
Chromium	µg/L	1	0.7	0.7
Copper	µg/L	1	1.7	1.7
Iron	µg/L	1	651	651
Lead	µg/L	1	0.28	0.28
Manganese	µg/L	1	32.7	32.7
Nickel	µg/L	1	1.3	1.3
Zinc	µg/L	1	2.0	2.0

Parameter	Units	# of Samples	Geometric Mean
Fecal Coliform	#/100mL	1	21

Parameter	Units	# of Samples	Minimum	Maximum
pH	S.U.	1598	6.6	8.6

D. Summary of Compliance with Previous Permit Issued

The previous permit placed effluent limits on BOD_5, TSS, pH, AOX, and 2,3,7,8-TCDD.

G-P Camas has complied with the effluent limits and permit conditions throughout the duration of the permit issued on December 31, 2008. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections.

The following table summarizes compliance with report submittal requirements over the permit term.

Table 5. Permit Submittals

Submittal	Due Date	Receipt Date
Outfall Evaluation	7/15/2013	6/24/2013
O&M Treatment System Operating Plan update	6/24/2013	6/24/2013
Chemical Analysis of Influent and Effluent	1/15/2014	6/25/2013
Solid Waste Control Plan	8/15/2009	3/1/2012
Solid Waste Control Plan	8/15/2009	1/28/2010
AKART analysis for backwash discharge	1/14/2013	1/14/2013
Treatment System Operating Plan	1/15/2012	12/29/2011
Treatment System Operating Plan	1/15/2014	6/24/2013
Application for Permit Renewal	7/15/2013	6/24/2013
O&M Manual update	1/15/2012	1/4/2012
O&M Manual update	1/15/2013	12/24/2012
O&M Manual update	1/15/2010	1/15/2010
Acute Toxicity Testing Results	3/18/2013	3/18/2013
Chronic Toxicity Testing Results	3/18/2013	3/18/2013
Chronic Toxicity Testing Results	10/18/2012	10/18/2012
Acute toxicity testing results	10/18/2012	10/18/2012
O&M Manual update	4/19/2011	4/19/2011
Solid Waste Control Plan	8/15/2009	2/25/2011
Chemical Analysis of Influent and Effluent	4/19/2011	4/19/2011
Treatment System Operating Plan	1/15/2010	9/15/2009
Treatment System Operating Plan	1/15/2010	7/21/2009
Chemical Analysis of Influent and Effluent	1/15/2010	3/6/2009
Treatment System Operating Plan	1/15/2010	5/16/2008

E. State Environmental Policy Act (SEPA) Compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

III. Proposed Permit Limits

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

A. Design Criteria

Under Chapter 173-220-150 (1)(g) WAC, flows and waste loadings must not exceed approved design criteria. The design criteria for the treatment facility are sufficient to provide secondary treatment to all wastewater.

The design criteria for this treatment facility are taken from the permit application. The design parameters are as follows:

Table 6. Design Standards for Peak Monthly Waste Load with Adequate Safety Factors

Parameter	Design Capability
Flow - Monthly Average (Maximum Month)	76.0 MGD
BOD_5 - Influent Loading	85,000 lbs/day
TSS - Influent Loading	143,000 lbs/day
Temperature	110ºF

The treatment system is designed for a hydraulic loading of 76 MGD. Following reductions in production, the mill discharges about 33 MGD maximum, which is more than 50 percent, decrease. The design daily average BOD loading is from 184,000 lbs/day to 85,000 lbs/day after the decreased aeration. Daily TSS influent loading has been in the range of about 10,000 to 15,000 lbs/day, which is well below the design standards.

Ecology decided not to establish design criteria for G-P Camas' wastewater treatment system through a formal engineering review process. The system has demonstrated the ability to comply with their limits, at full production, for many years. Because the system is currently at significantly less than half of its full treatment capability, we have not included a requirement for an engineering analysis in this permit. When the Permittee approaches full production in the future, Ecology will require G-P to prepare an engineering report evaluating the capacity of both the process wastewater facility in order to formally establish Ecology-approved design criteria.

B. Technology-Based Effluent Limits

Technology-based effluent limits are based on the technology available to treat pollutants at a reasonable cost. EPA periodically evaluates specific industries, including the pulp and paper industry, and publishes federal effluent guidelines which represent technology-based limits. Ecology sets technology-based limits by using the federal effluent guidelines or on a case-by-case basis.

On December 17, 1993, EPA proposed revised federal effluent guidelines for the pulp and paper industries known as the "Cluster Rule." Following extensive review and public comments, EPA adopted and published the Cluster Rule (40 CFR Part 430) on April 15, 1998. Under the Cluster Rule, G-P Camas is subject to Subpart B for production of bleached Kraft paper grade and market pulp, Subpart J for tissue produced from wastepaper, and Subpart L for non-integrated tissue production. The Cluster Rule establishes limits representing best practicable control technology (BPT) and best conventional pollutant control technology (BPT).

Washington state law RCW 90.48.520 requires dischargers to provide all known, available, and methods of prevention, control, and treatment (AKART). This requirement is functionally an overlay of the federal requirements. Generally, federal effluent guidelines that are 5 years old or newer are considered AKART. For older federally effluent guidelines, Ecology will review the treatability database and the treatment system design efficiency to determine if the federal effluent guidelines still constitute AKART. The guidelines for each production subcategory apply as follows:

Table 7. Applicable Federal Effluent Guidelines

Production Subcategory	Production, tons/day	Basis	Applicable Regulation
Bleached Kraft Pulp & Paper grade	798	BCT	40 CFR 430.23, Subpart B
Non-integrated Tissue	11	NSPS	40 CFR 430.125, Subpart L
Secondary Fiber, Non-deink	32	BCT	40 CFR 430.105 Subpart J

Because the federal effluent guidelines are over 10 years old, Ecology reviewed EPA's treatability database, the June 2003 technical review submitted by the Permittee, and the 2013 and treatment removal efficiency data specific to G-P Camas' wastewater treatment system. Based on the review, Ecology determined that the G-P's wastewater treatment system constitutes AKART.

G-P completed the Total Chlorine Free (TCF) Study following the permit issuance in 2003. The results showed that it is unfeasible to convert from elemental chlorine free (ECF) to TCF bleaching due to high costs and market outlook. This is evident as G-P's K3 bleach plant, which was converted to TCF in March 2000, was subsequently shut down in October 2001 because it had not been economically viable. Recent TCF studies by other Kraft mills are consistent with this analysis. Ecology determined that G-P's ECF process meets the bleach plant AKART.

Conventional Pollutants

Federal effluent guidelines for conventional pollutants are based on gross paper machine production at the off-the-machine reel. The paper machine production analysis takes into account processed recycled pulp, paper machine additives, pulp mill losses, bleach plant losses, and machine paper moisture. The guidelines cover paper machine production by subcategories. G-P's production are in the following subcategories:

- Paper grade and market pulp, produced by the Kraft process with chlorine dioxide bleaching
- Tissue produced from purchased pulp
- Tissue produced from waste paper without de-inking

Off-the-machine production rate (tons per day) is defined as the total production divided by the number of production days. G-P calculated the production rates on a monthly basis. **Table 7** contains the 12-month average rate based on production within the past five years. The rate is representative of expected production for the next permit cycle.

EPA set a monthly average and a daily maximum discharge allowance for each subcategory in 40 CFR 430. These allowances are set as mass of pollutant per mass of product. Ecology multiplied the allowance by a mass conversion factor and by the paper machine production rate (tons per day) to calculate the limits for each subcategory. Ecology summed the limits from all subcategories to obtain a technology-based limit for BOD and TSS. This approach is consistent with the EPA's recommended "building block" method.

Tables 20 and **21** in **Appendix D** contain the calculations of technology-based limits**.** Thefinal limits are summarized in the table below.

Table 8. Technology-based Limits for Conventional Pollutants

Parameter	Average Monthly Limit	Maximum Daily Limit
BOD_5	9,307 lbs/day	17,948 lbs/day
TSS	19,638 lbs/day	36,575 lbs/day

Parameter	Daily Minimum	Daily Maximum
pH	6.0 standard units	9.0 standard units

The federal effluent guideline limit for pH is 5.0 to 9.0. If a discharger monitors pH continuously, then the discharger may receive an exception from the limit for a duration of 1 hour per each excursion and a sum of 7 hour 26 minutes a month for all excursions. The regulation does not specify the magnitude of the excursion. For pulp mills, Ecology allows an excursion of 5.0 to 10.0 SU.

Non-Conventional Pollutants

EPA established effluent limits for non-conventional pollutants, effective after April 15, 2001, that represent the degree of effluent reduction attained by mills applying best available technology (BAT) economically achievable from Bleached Paper Grade Kraft and Soda, subcategory in 40 CFR 430.24. EPA set monthly average and maximum daily allowances based on the mass of adsorbable organic halides (AOX) or chloroform per mass of bleach plant production.

Bleach plant production rate is defined in EPA's 1993 Development Document for the pulp and paper industries (page 15-11). Production rate is the quantity of unbleached pulp entering the bleach plant, divided by the number of bleach plant operating days. G-P's average production rate is 684 tons per day. It must be noted that this production rate is different from the rate used to calculated technology-based limits for BOD and TSS.

Ecology multiplied the production rate by effluent guildelines limits and a conversion factor to calculate technology-based limits for AOX and chloroform. The are in **Table 22, Appendix D**. The final limits are shown in the table below. The facility monitors for AOX at Outfall 001 and chloroform at the bleach plant.

Table 9. Technology-based Limits for Non-Conventional Pollutants

Parameter	Average Monthly Limit	Maximum Daily Limit
AOX	852 lbs/day	1,301 lbs/day
Chloroform	5.66 lbs/day	9.47lbs/day

Bleach Plant Effluent Limits

Bleach plant effluent limits for the following chlorinated organic compounds are established by 40 CFR 430.24. The limits represent best available technology (BAT) economically achievable for the Bleached Paper Grade Kraft and Soda subcategory. The limits are at minimum levels below:

Table 10. Technology-based Limits for Non-Conventional Pollutants

Pollutant	Minimum Level
2,3,7,8-TCDD	10 pg/L[(1)]
2,3,7,8-TCDF	31.9 pg/L[(1)]

Pollutant	Minimum Level
Trichlorosyringol	2.5 µg/L(2)
3,4,5-Trichlorocatechol	5.0 µg/L(2)
3,4,6-Trichlorocatechol	5.0 µg/L(2)
3,4,5-Trichloroguaiacol	2.5 µg/L(2)
3,4,6-Trichloroguaiacol	2.5 µg/L(2)
4,5,6-Trichloroguaiacol	2.5 µg/L(2)
2,4,5-Trichlorophenol	2.5 µg/L(2)
2,4,6-Trichlorophenol	2.5 µg/L(2)
Tetrachlorocatechol	5.0 µg/L(2)
Tetrachloroguaiacol	5.0 µg/L(2)
2,3,4,6-Tetrachlorophenol	2.5 µg/L(2)
Pentachlorophenol	5.0 µg/L(2)

Notes: (1)Picograms per liter. (2)Micrograms per liter.

Minimum levels for the above compounds are in specified in 40 CFR 430.01(i). EPA defines minimum level as "the level at which the analytical system give recognizable signals and acceptable calibration points."

Best Management Practices

Federal regulations (40 CFR 430.28) require Best Management Practices (BMPs) to prevent leaks and spills of spent pulping liquors, soap, and turpentine. The BMPs objective is to focus on prevention measures as a first priority to insure to the extent possible that leaks or spills do not occur. In the event that a significant leak or spill does occur, the program will provide, where necessary, for containment and diversions of the regulated substance to protect the integrity of the wastewater treatment system. G-P developed BMPs and has implemented the program since January 9, 2006. The proposed permit will require the facility to maintain the BMPs plan onsite.

C. Surface Water Quality-Based Effluent Limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (chapter 173-201A-510 WAC). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA, 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., chapter 173-201A-240(1) WAC; 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (chapter 173-201A-200 WAC, 2006) and of all marine waters (chapter 173-201A-210 WAC, 2006) in the state of Washington.

Antidegradation

Description--The purpose of Washington's Antidegradation Policy (chapter 173-201A-300-330 WAC; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.

Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

There is no new or expanded action at the facility. The proposed permit does not require Tier II analysis.

Facility Specific Requirements--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.

Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)].

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent is 10% and the receiving water is 90% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life *acute* criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life *chronic* criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water.
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. **Ecology must specify both the allowed size and location in a permit.**

   The proposed permit specifies the size and location of the allowed mixing zone (as specified below).

2. **The facility must fully apply "all known, available, and reasonable methods of prevention, control and treatment" (AKART) to its discharge.**

   Ecology has determined that the treatment provided at G-P Camas meets the requirements of AKART (see "Technology-based Limits").

3. **Ecology must consider critical discharge conditions.**

   Surface water quality-based limits are derived for the water body's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated water body uses). The critical discharge condition is often pollutant-specific or water body-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at: https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html.

Table 11. Critical Conditions Used to Model the Discharge

Critical Condition	Value
Seven-day-average low river flow, a recurrence interval of ten years (7Q10)	90,000 cfs
River depth, at 7Q10	49.6 ft
Current velocity	1.05 ft/s
Receiving water temperature	
1-DADmax @ 90th percentile	21.8 ºC
7-DADMax at 90th percentile	21.5 ºC
Modeling input, field data with no depth variation	21.4 ºC
Outfall configuration	
Number of ports	1
Port diameter	60 in
Vertical discharge angle	45 degrees
Horizontal discharge angle	0 degrees
Port depth	54.4 ft
Port elevation	7.5 ft
Effluent Flow Rate	
Annual average flow	
Model input, acute effect	57.5 MGD

Critical Condition	**Value**
Model input, chronic and human health non-carcinogen effect	45.9 MGD
Effluent Temperature	
95th percentile (June 2002 to July 2006)	30.85 ºC
99th percentile, (June 2002 to July 2006)	30.97 ºC
Model input, acute effect	31.1 ºC
Model input, chronic/human health (non-carcinogenic) effect	30.4 ºC

Ecology obtained ambient data at critical conditions in the vicinity of the outfall from Parametrix Mixing Zone Temperature Evaluation and Dilution Ratio Study dated November 2004 and from other sources, including data monitoring report submitted by the Permittee. Parametrix conducted the study over the 2002-2004 period. Parametrix measured the current velocity over depths of 1 to 49 feet. Typical velocities ranged from 0.56 meters per second (1.3 feet per second) at the surface to 1.00 meters per second (3.28 feet per second) near the riverbed. The mean Columbia River flow (halfway between extremes) as measured from calendar year 1960 through year 2005, was 168,000 cubic feet per second (cfs). The average river flow during the field study (162,000 cfs) was significantly greater than the minimum dry season average daily discharge of 90,000 cfs release from the Bonneville Dam and is assumed to be 7Q10 flow rate. The 7Q10 is the lowest average flow measured over seven consecutive days that occurs on average once in ten years.

Pollutants in an effluent may affect the aquatic environment near the point of discharge (nearfield) or at a considerable distance from the point of discharge (farfield). Parametrix employed the EPA computer model 3PLUMES to evaluate the impacts of the diffuser at the mixing zone boundary. 3PLUMES is a numerical model to predict nearfield and farfield mixing regions. Mixing in the nearfield is vigorous as discharge momentum from the outfall/diffuser port dissipates quickly, which is characterized by physical property of the port, including size, shape, orientation. Other properties affect the nearfield mixing also include velocity of effluent and receiving water, buoyancy of the effluent in relation to the surrounding waters. Dispersion of the farfield is driven by turbulent transport in the receiving waters, current speed, river depth, bottom roughness, river bends, and eddies. Farfield mixing rates are typically less than nearfield mixing rates.

3PLUMES, based in part on the same theory as the UDKHDEN model, is an interface linking the nearfield module Update MERGE (UM) with a farfield module based on Brooks Equation (Fischer, H. B., et al. 1979). The model is ideally suited to buoyant discharges into deep receiving waters like G-P's discharge into the Columbia River. The port was simulated as single-port outfall to obtain a conservative evaluation of the downstream thermal impacts.

Ecology's *Water Quality Program Permit Writer's Manual* contains parameters for dilution ratio modeling. For effluent flow rate, the manual recommends using the maximum daily flow rate and maximum monthly average flow rate for acute and chronic effects, respectively. These high flow rates represent critical condition, the worst-case scenario with the least dilution. However, current effluent flow rate has decreased to about 60% of the critical condition flow rate. This decrease is due to the permanent shut down of several processes and reduction in mill production. As a result, the effects of the discharge will not reach the worst-case scenario predicted the dilution ratio study.

Ecology reviewed the information on a case-by-case basis to determine if the dilution ratio study requires updating. The Permittee previously submitted two approved dilution ratio studies in December 1991 and November 2004. Far-field mixing resulted in a chronic dilution ratio of 69 in the 1991 study and 70 in 1994 study. Considering the sensitivity of the modeling, these results indicate no changes in dilution over the thirteen years. Additionally, the outfall configuration is the same. Ecology determined that the 2004 dilution study and current data are sufficient demonstrate designated uses are protected at edge of the mixing zone. The study will be at least 15 years old at the end of the next permit cycle. Ecology will review information at the next permit renewal to determine the need to update mixing zone study.

4. Supporting information must clearly indicate the mixing zone would not:

- Have a reasonable potential to cause the loss of sensitive or important habitat.
- Substantially interfere with the existing or characteristic uses.
- Result in damage to the ecosystem.
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

5. **The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.**

   Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

6. **The size of the mixing zone and the concentrations of the pollutants must be minimized.**

   At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

   Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving water body. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

   Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. **Maximum size of mixing zone.**

   The authorized mixing zone does not exceed the maximum size restriction.

8. **Acute mixing zone.**

   - **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

     Ecology determined the acute criteria will be met at 10% of the distance (or volume fraction) of the chronic mixing zone at the ten year low flow.

- **The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

  As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- **Comply with size restrictions.**

  The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

D. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). The table included below summarizes the criteria applicable to this facility's discharge.

Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The Aquatic Life Uses for this receiving water are identified below.

Table 12. Freshwater Aquatic Life Uses and Associated Criteria

Salmonid Spawning, Rearing, and Migration	
Temperature Criteria – Highest 7-DAD MAX	17.5°C (63.5°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	8.0 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH Criteria	The pH must measure within the range of 6.5 to 8.5 with a human-caused

Salmonid Spawning, Rearing, and Migration	
	variation within the above range of less than 0.5 units.

- The *recreational uses* for this receiving water are identified below.

Table 13. Recreational Uses and Associated Criteria

Recreational Use	Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL.

- The *water supply uses* are domestic, agricultural, industrial, and stock watering.
- The *miscellaneous freshwater uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

E. Water Quality Impairments

The Clean Water Act Section 303(d) includes a process for assessing and cleaning up polluted waters. Ecology conducted water quality assessments and grouped the assessed waters into different categories. Waters in the polluted category are those with pollutants that do not meet water quality standards set in chapter 173-201A WAC. Ecology identified such waters as "impaired" and placed them on the 303(d) list for those pollutants.

Waters on the 303(d) list may have a Total Maximum Daily Load (TMDL) for the pollutants for which they are listed. A TMDL establishes an allowable pollutant loading to the water body and allocates the loading to various sources. It is effectively an implementation plan designed to reduce pollutants being discharged and clean up polluted waters. TMDLs are effective upon approval by the EPA.

The Columbia River segment the point of discharge is listed on the current 303(d) and is impaired for dioxin (2,3,7,8-TCDD). EPA Region 10 issued a public notice on June 15, 1990 proposing an establishment of a TMDL to limit discharges of dioxin into the Columbia. The TMDL addressed 2,3,7,8-TCDD in discharges from the Camas mill and other bleached pulp mills, along with other sources. EPA finalized the TMDL on February 25, 1991. EPA estimated that the TMDL would achieve an overall 95% reduction in dioxin discharges from the Columbia River basin bleached pulp mills. The TMDL assigned the Camas mill a waste load allocation of 0.42 mg/day, as a long-term average. Using the EPA-recommended method, the WLA resulted in an annual average limit of 0.42 mg/day and a maximum daily limit of 0.62 mg/day (see Appendix C for calculation). The point of compliance is at the secondary effluent (Outfall 001). Compliance sampling is required once per year, at a minimum. The permit required dioxin analyses to meet a minimum detection limit of 5 pg/L. To calculate the discharge mass loading, Ecology multiplied the detection limit (pg/L) by the Outfall 001 flow rate (MGD) and a conversion factor of 0.003785. The resulting discharge is as follow:

Annual Average: <5 pg/L × 22.99 MGD × 0.003785 = <0.44 mg/day of 2,3,7,8-TCDD.

Maximum Daily: <5 pg/L × 33.6 MGD × 0.003785 = <0.63 mg/day of 2,3,7,8-TCDD.

TCDD in the discharge is <0.44 mg/L average and <0.63 mg/L maximum. These are considered to be in compliance with the average limits of 0.42 mg/day and maximum limit of 0.62, for the following reasons:

- G-P converted to elemental chlorine free bleaching following the development of the TMDL. This conversion substantially reduced the dioxin concentration in the effluent.
- The dioxin concentration at Outfall 001 is likely to be significantly below 5 pg/L. This is due to mixing of the dioxin-bearing stream (bleach plant effluent at <5 pg/L detection limit) with non-dioxin bearing wastewater from other processes.

Therefore, achieving the minimum detection limit of 5 pg/L at the Outfall 001 assures compliance with the TMDL for dioxin.

Ecology and the Oregon Dept. of Environmental Quality jointly issued a TMDL addressed total dissolved gas (TDG) in September 2002. The source of TDG are hydroelectricity projects and dams along the Columbia River. The Camas mill effluent is not a source. The permit will not require monitoring or a limit for TDG.

Ecology has not documented temperature impairment in the receiving water in the vicinity of the outfall, however, Ecology considers the entire Columbia River impaired for temperature. EPA has prepared a draft TMDL for temperature however has delayed issuance pending discussion and information exchanges. Results from the receiving water and effluent temperature study showed that the Camas mill effluent does not cause violation of the temperature criteria. Therefore, the permit will not place a limit of the effluent temperature.

F. Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (nearfield) or at a considerable distance from the point of discharge (farfield). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

The diffuser at Outfall 001 is 384 feet long with a diameter of 60 inches. The diffuser has a one 60-inch diameter port. The minimum water depth over the diffuser is 46.9 feet. Ecology obtained this information from the Dilution Ratio Study Report submitted in November 2004.

Chronic Mixing Zone--Chapter 173-201A-400(7)(a) WAC specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream for a distance of over 100 feet, not utilize greater than 25% of the flow, and not occupy greater than 25% of the width of the water body.

The horizontal distance of the chronic mixing zone is 345 feet downstream from the discharge port. The mixing zone extends from the top of the discharge ports to the water surface.

Acute Mixing Zone--Chapter 173-201A-400(8)(a) WAC specifies that in rivers and streams a zone where acute toxics criteria may be exceeded must not extend beyond 10% of the distance towards the upstream and downstream boundaries of the chronic zone, not use greater than 2.5% of the flow and not occupy greater than 25% of the width of the water body.

The horizontal distance of the acute mixing zone is 35 feet. The mixing zone extends from the top of the discharge ports to the water surface. The dilution factor is based on this distance.

Ecology determined the dilution factors that occur within these zones at the critical condition using list models, dye studies used. The dilution factors are listed below.

Table 14. Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	8.7	70.2
Human Health, Carcinogen		70.2
Human Health, Non-carcinogen		70.2

Ecology determined the impacts of dissolved oxygen deficiency, nutrients, pH, fecal coliform, chlorine, ammonia, metals, other toxics, and temperature as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

Dissolved Oxygen--BOD_5 and Ammonia Effects--Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The 5-day Biochemical Oxygen Demand (BOD_5) of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand in the receiving water.

With technology-based limits, this discharge results in a small amount of BOD_5 loading relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.

pH--Ecology modeled the impact of the effluent pH on the receiving water using the calculations from EPA, 1988, and the chronic dilution factor tabulated above. **Appendix D** includes the model results in **Table 26**.

Ecology predicts no violation of the pH criteria under critical conditions. Therefore, the proposed permit includes technology-based effluent limits for pH.

Fecal Coliform--The source of the bacteria is wood chips and are not from the intestinal tract of warm-blooded animal. G-P was able to reduce the bacteria by using virgin wood chips and managing the chips on paved surfaces to minimize contact and contamination with the soil.

Historically, fecal coliform does not have a reasonable potential to impact receiving water. The receiving water is not listed as “water of concern” or “impaired” for bacteria. Ecology modeled fecal coliform count by simple mixing analysis using the water quality criteria and a chronic mixing zone dilution factor of 70.2. The model estimates that the effluent only raises bacteria concentration by 2 counts per 100 mL at the edge of the mixing zone.

The model predicts no violation of the water quality criterion for fecal coliform. No fecal coliform limits are required in the proposed permit.

Turbidity--Ecology evaluated the impact of turbidity based on the range of turbidity in the effluent and turbidity of the receiving water. Based on visual observation of the facility’s effluent, Ecology expects no violations of the turbidity criteria outside the designated mixing zone.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge: ammonia, arsenic, and heavy metals. Ecology conducted a reasonable potential analysis (See **Appendix D**) on these parameters to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity, Ecology used the available receiving water information from ambient station 28A100, the 2002-2006 temperature study, and Ecology spreadsheet tools.

Valid ambient background data were available for pollutants in **Table 2**. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Ecology determined that the pollutants in **Table 23** pose no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 (**Appendix D**) and as described above. Ecology’s determination assumes that this facility meets the other effluent limits of this permit.

Water quality criteria for most metals published in chapter 173-201A WAC are based on the dissolved fraction of the metal (see footnotes to table WAC 173-201A-240(3); 2006). G-P Camas may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Ecology may adjust a metal's translator on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Arsenic--The facility completed the arsenic monitoring study in the current permit cycle. The study measures total arsenic, which can be mathematically converted to dissolved arsenic data using a metal translation factor. The study spanned a two-year period from 2009 and 2011 and gathered sufficient data to address potential variability. For the study, the facility sends the discharge samples to an independent third-party laboratory for analysis. Ecology reviewed the data and used the highest concentration measured to run the statistical analysis using EPA-mandated procedures. Ecology will not set an arsenic limit because the data analysis supports the conclusion that arsenic concentration in the discharge has no reasonable potential to exceed the aquatic life criteria (see **Table 23**, **Appendix D**). These criteria are 390 μg/L for acute and 190 μg/L for chronic. The criteria are established to be protective of freshwater fish and other aquatic organisms. Arsenic criteria protective of human health is a different requirement to be considered separately, in the following paragraphs.

In 1992 the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The criterion for marine waters is 0.14 μg/L inorganic arsenic, and is based on exposure from fish and shellfish tissue ingestion. The freshwater criterion is 0.018 μg/L, and is based on exposure from fish and shellfish tissue and water ingestion. These criteria have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 50 μg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and ground water. Long-term arsenic monitoring by the facility from 2009 through 2011 showed a total arsenic concentration of 1.5 μg/L on average, without distinguishing the inorganic concentration that Ecology wanted. There is not a readily available procedure to separate the inorganic portion from the total portion. Evaluating arsenic analysis is complicated because it is the inorganic form only that is of concern.

In relation to this issue, evaluation of compliance with human health criteria will be an ongoing activity and Ecology's current position may change in the future depending on effluent characteristics.

In Washington, when a natural background concentration exceeds the criterion, the natural background concentration becomes the criterion, and no dilution zone is allowed. This could result in a situation where natural groundwater or surface water used as a municipal or industrial source-water would need additional treatment to meet numeric effluent limits even though no arsenic was added as waste. Although this is not the case for all dischargers, we do not have data at this time to quantify the extent of the problem.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

- Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria. The upcoming revision of the MCL for arsenic offers a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers. This discussion should focus on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources.
- Additional and more focused data collection. The Water Quality Program will in some cases require additional and more focused arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well as some additional ambient monitoring data. At this time, Washington NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.
- Data sharing. Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy to regulate arsenic.

Temperature--The state temperature standards (WAC 173-201A-200-210 and 600-612) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures. The threshold criterion for the Columbia at the point of discharge is 17.5ºC.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

Ecology listed the Columbia River at the point of discharge for temperature in the 2004 303(d) listing. There is no TMDL completed for temperature. Without a TMDL, Ecology's policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C.

The 2002-2004 field study by Parametrix measured the water temperature along vertical transects at distances between as close as 55 feet upstream to approximately 350 feet downstream from G-P's diffuser. The goal was to identify the incremental temperature increase, which represents the warming of the river temperature with respect to the river temperature upstream of the discharge. The results of these measurements indicated that the incremental temperature increased from approximately 0.23°C at a downstream distance of 35 feet to no measurable impact at around the points of 350 feet downstream of the diffuser.

In additional to the field study, Parametrix ran the 3PLUMES to model temperature for in-situ, acute, and chronic mixing. The incremental temperature increase applies at the chronic mixing zone. The results shown in the following table predict plume centerline temperature of 21.47ºC, 21.54ºC, and 21.57ºC, respectively at the chronic mixing zone boundary. These modeled temperatures at the chronic mixing zone boundary are all within 0.3ºC of the ambient temperatures enter into the model.

Table 15. 3PLUMES Model Plume Depth Temperature Values

Distance (ft)	Plume Depth (ft)			Plume Centerline Temperature (ºC)			Plume Centerline Temperature change (ºC)[(a)]		
	In-Situ	Chronic	Acute	In-Situ	Chronic	Acute	In-Situ	Chronic	Acute
0	54.5	54.5	54.5	26.40	30.40	31.10	5.00	9.00	9.70
35	44.0	33.4	31.2	21.89	22.35	22.52	0.49	0.95	1.12
50	41.7	28.2	25.0	21.77	22.03	22.14	0.37	0.63	0.74
100	36.2	14.6	9.5	21.61	21.73	21.81	0.21	0.33	0.41
200	27.8	(b)	(b)	21.51	21.58	21.64	0.11	0.18	0.24
350	17.7	Surface	Surface	21.47	21.54	21.57	0.07	0.14	0.17

(a)Above Ambient at 21.40ºC, field data measurement collected 35 ft upstream of the Outfall 001. (b) Plume reached surface

- Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

As required by the 2003 permit, G-P conducted a two-year monitoring study to determine if its discharge impacted the receiving water below the point of discharge. G-P monitored temperature of the receiving water upstream and downstream of the discharge near the surface, at mid depth, and near the bottom in the summer months between June and September of each of the two years of the study. G-P submitted the final report for the river study to Ecology on August 28, 2006. The following table gives the results of the study determined by subtracting the measured upstream value from the measured downstream value for each depth:

Table 16. Temperature Changes (ΔT) at Different Transect

Depth	**ΔT at Acute mixing zone**	**ΔT at Chronic mixing zone**
Upper DataSonde	+ 0.01 ºC	- 0.06 ºC
Middle DataSonde	+0.05 ºC	+ 0.02 ºC
Bottom DataSonde	+0.23 ºC	- 0.07 ºC

The river temperature change in the above table is well below 0.3ºC incremental warming criteria. Considering that the accuracy of the temperature recording devices may vary by up to ± 0.01°C, Ecology concluded that G-P's discharge resulted in a minimal measurable difference in temperature between the upstream and downstream temperatures.

In this permit renewal, Ecology reviewed recent monitoring data to determine whether the August 28, 2006 temperature study is up-to-date. The last two years of monitoring showed discharge temperature data is consistent with those of discharge temperature during the study. Therefore, the results in the 2006 study are representative of the current discharge conditions. The effluent has no potential to cause a measureable change in the river temperature that will exceed the 0.3ºC warming criteria.

- Protections for temperature acute effects

Instantaneous lethality to passing fish: The upper 99^{th} percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge. The maximum effluent temperature during the summer season is 31.2ºC. Therefore, there is no reasonable potential to entrain organisms in an area of near instantaneous lethality for passing fish.

General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C. The facility demonstrates the discharge meet this criteria in the 2006 temperature study report.

Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating. The facility demonstrates the discharge meet this criteria in the 2006 temperature study report.

G. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern for human health, based on data or information indicating the discharge contains regulated chemicals and the 303(d) listing (quality impairment) of the receiving water body for a regulated chemical that Ecology knows or expects is present in the discharge.

Ecology evaluated the discharge's potential to violate the human health-based criteria as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to make a reasonable potential determination. The evaluation in **Table 24** showed that the discharge has no reasonable potential to cause a violation of human health standards, and an effluent limit is not needed.

Oregon Department of Environmental Quality (DEQ) established human health criteria in OAR 340-041-0033, which EPA adopted in 2001. The DEQ's human health criteria are generally more stringent than Ecology's criteria. Ecology is in the process of updating Washington's human health criteria. For information purposes, Ecology evaluated the Permittee discharge using the DEQ criteria. Results in **Table 25** showed G-P's discharge has no potential to exceed Oregon's DEQ human health criteria at the edge of the Georgia Pacific's mixing zone.

H. Cooling Water Intake Structure

Section 316(b) of the Clean Water Act requires that the location, design, construction, and capacity of cooling water intake structures (CWIS) reflect the best technology available (BTA) for minimizing adverse environmental impact. Section 316(b) is implemented through National Pollutant Discharge Elimination System (NPDES) permits. On May 19, 2014, EPA issued final regulations for the design and operation of cooling water intake structures. EPA has finalized standards that apply to existing manufacturing and industrial facilities that have a CWIS with a design intake flow greater than 2 million gallons per day (MGD) and use at least twenty five percent of the water withdrawn for cooling purposes.

Facilities requiring an NPDES permit with design intake flows of 2 MGD or less and withdrawing less than twenty five percent of the actual intake flow that is used exclusively for cooling are required to implement Section 316(b) on a case-by case basis. 40 CFR

125.90(b) requires Ecology to use best professional judgment (BPJ) for determining BTA. G-P has submitted data showing its current operation withdraws less than 25% of its actual intake flow. As mentioned above, 40 CFR 125.90(b) will require a BPJ analysis not specifically addressed in Part 125. This BTA will minimize impingement and entrainment of all life stages of fish and shellfish. Impingement occurs when fish or shellfish become entrapped on the outer part of intake screens and entrainment occurs when fish or shellfish pass through the screens and into the cooling water system.

For facilities that are subject to 40 CFR 125 Subpart J and its conditions, the rule prescribes several alternatives to reduce impingement. This facility may choose to propose a separate site-specific alternative that complies with the BPJ in determining BTA pursuant to Section 316(b), which will be subject to Ecology's approval. The facility may propose one or more of the designated technologies (alternatives) prescribed in 40 CFR 125.94(c) to meet the impingement mortality requirements. Entrainment standards may be either site-specific or a reduction of intake flow to a level commensurate with a closed-cycle recirculating system. The proposed permit requires the facility to submit previously conducted entrainment studies or other relevant and representative studies for Ecology's review and approval. As for consideration of the endangered species, nothing in this permit allows take for the purpose of compliance with the Act.

The mill withdraws cooling water from groundwater wells, the Camas Slough and Lake Lacamas. This proposed permit will contain provisions to address G-P's surface water intake structures at the Camas Slough and Lake Lacamas. The intake structure at the Camas Slough is 9 feet by 3 feet traveling screen. The intake structure at Lake Lacamas is a 15.5-feet diameter rotary fish screen with 3 by 3 inches slot size and surface speed of 5 feet per minute. G-P has submitted preliminary information estimating a surface water withdrawal rate of about 3.11 MGD, totaled from both intake structures. Of this rate, the facility estimated about 0.30 MGD, or 10 percent, of the surface water withdrawn is used for cooling.

Further research is needed to verify the design intake flow rate (DIF) and the intake velocity at each CWIS. The DIF is the maximum flow rate the system is capable of withdrawing from the waterbody. It is unlikely that the facility will reach the DIF because water usage has decreased due to the permanent shut down of major process units as well as reduction in pulp production. This decrease of water usage is evident in a 30 percent drop in discharge rate over the last ten years. The facility's actual intake flow rate is more representative of the environmental impacts than the DIF.

Ecology must ensure that the location, design, construction, and capacity of the facility's cooling water intake structure reflect BPJ on case-by-case basis for minimizing adverse environmental impact. The proposed permit requires the mill to properly operate and maintain any existing technologies used to minimize impingement and entrainment and report any significant impingement or entrainment observed. In addition, the proposed permit requires the mill to submit an information and compliance report consistent with NPDES permit application requirements for cooling water intake structures in 40 CFR 122.21(r)(2)-(8). Ecology is requiring this submittal of the information and compliance report in accordance with 40 CFR 122.21(r) on a best professional judgment basis. Ecology will use this information to assess the potential for impingement and entrainment at the

CWIS, evaluate the appropriateness of any proposed technologies or mitigation measures, and determine any additional requirements to place on the facility's CWIS in the next permit cycle.

Ecology may require the submittal of the information and compliance report in accordance with 40 CFR 122.21(r) on a best professional judgment basis in the event that the CWIS rule, finalized on May 19, 2014, is remanded or otherwise not in effect.

I. Sediment Quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (chapter 173-204-400 WAC). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website. http://www.ecy.wa.gov/programs/tcp/smu/sediment.html.

The Department has promulgated Sediments Management Standards under chapter 173-204 WAC. The Sediment Management Standards contain numeric chemical and biological criteria that are protective of benthic organisms that live in the sediment. These standards state that Ecology may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards.

Past sediments monitoring does not indicate sediment toxicity or a violation of the Sediment Management Standards at this site. However, because of the large volume of discharge and some past instances of elevated detection limits or concentrations in the chemical analyses of sediments near the site, additional sediment monitoring is required periodically to ensure continued compliance.

Sediment sampling will be required for the top 10 cm depth near the two outfalls. Chemical analysis of all freshwater numeric criteria identified in the Sediment Management Standards (chapter 173-204-563 WAC) will be required, including site-specific chemicals of interest including dioxins, chemical indicative of wood waste, and conventional analytes.

The Permittee must develop a Sampling and Analysis Plan in accordance with the *Sediments Sampling and Analysis Plan Appendix (February 2008)*. The Sampling and Analysis Plan must be approved by Ecology before performing sediment sampling. After the sediment sampling is completed, the Permittee must submit a Data Report to Ecology for review and approval.

J. Groundwater Quality Limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (chapter 173-200-100 WAC).

G-P Camas does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

K. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Using the screening criteria in chapter 173-205-040 WAC, Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Within the next five years, the facility plans to reroute filter plant backwash to the wastewater treatment system for treatment. Ecology determine that the loading from the filter plant backwash is less than 1 percent of the total loading to the treatment plant and is unlikely to increase effluent toxicity. Furthermore, the treatment system achieves AKART for total suspended solids. No effluent recharacterization is necessary under chapter 173-205-060 WAC. The permit will require WET testing prior to the next permit renewal as a screening tool.

L. Comparison of Effluent Limits with the Previous Permit Issued on December 31, 2008

Table 17. Comparison of Previous and Proposed Effluent Limits

		Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter	**Basis of Limit**	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
BOD_5	Technology	11,085 lbs/day	22,770 lbs/day	9,307 lbs/day	17,948 lbs/day
TSS	Technology	24,895 lbs/day	46,338 lbs/day	19,638 lbs/day	36,575 lbs/day
AOX	Technology	1,141 lbs/day	1,742 lbs/day	852 lbs/day	1,301 lbs/day
2,3,7,8-TCDD	Technology	-	1.31 mg/day	-	1.31 mg/day
Chloroform	Technology	7.58 lbs/day	12.68 lbs/day	5.66 lbs/day	9.47 lbs/day

Parameter	Basis of Limit	Limit	Limit
pH	Technology	Daily minimum ≥ 6.0 and daily maximum ≤ 9.0. Excursions between 5.0 and 6.0 and between 9.0 and 10.0 are allowed provided no single excursion exceed 60 minutes in length and total excursions do not exceed 7 hours and 30 minutes per month.	

IV. Monitoring Requirements

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

A. Wastewater Monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The frequency of monitoring is subjectively determined in accordance with Ecology's Permit Writer's Manual Section XIII. The Manual offers Method 1 and Method 2 approach for developing monitoring frequency. Frequency may be reduced for good performance in accordance with the EPA's 1996 *Interim Guidance for Performance-Based Reductions of NPDES Permit Monitoring Frequency*. The Permit Writer's Manual Section XIII.1.3.3 adopts the EPA's guidance.

For the conventional pollutants BOD_5 and TSS, Ecology proposes to retain frequency of 3/week, which is consistent with Method 1 approach outlined in Section XIII 1.3.1. The most recent two years of the Permittee's performance indicates less frequent monitoring may be statistically justified. Monitoring frequency may be reduced further in subsequent permit cycles based on performance. The Permittee has the opportunity to request for reduced monitoring in condition S2.E of the permit. The request must include justification for reducing the monitoring frequency.

The federal effluent guidelines do not include COD effluent limitations or monitoring requirements. The Permittee conducted 5 years of monitoring from 2003 to 2008 to characterize COD in the discharge. Ecology discontinued monitoring for this parameter in 2009. For this permit term, Ecology determined that resuming monitoring is unnecessary as there are no modifications to the process or treatment that would likely to increase COD loading. An additional argument against COD monitoring is that the test results in the generation of a dangerous waste.

The federal effluent monitoring guidelines set forth monitoring frequency for chloroform and twelve chlorinated organics in 40 CFR Part 430.02. The 2003-2008 permit implemented the monitoring frequency stipulated by federal regulations. These same federal regulations allow adjustment in monitoring frequency after 5 years of monitoring has occurred. Monitoring results showed that the twelve chlorinated compounds were not detected in the bleach plant effluent. Also, chloroform has not been detected in the final effluent pollutant scan and has been below the bleach plant effluent limits for many years. Therefore, Ecology adjusted the monitoring frequency for chloroform and the chlorinated organics, as allowed by EPA's regulations and guidance.

This proposed permit has the same monitoring frequency as the previous permit. The table below contains the summary of the monitoring frequency:

Table 18. Proposed Monitoring Frequency

Parameter	Units	Point of Compliance [a]	Minimum Sampling Frequency	Sample Type
BOD_5	mg/L	Final Effluent	3/week	24-hour composite
TSS	mg/L	Final Effluent	3/week	24-hour composite
pH	Std	Final Effluent	Daily	Continuous

Parameter	Units	Point of Compliance [a]	Minimum Sampling Frequency	Sample Type
Temperature	ºF	Final Effluent	Daily	Continuous
AOX	μg/L	Final Effluent	Monthly	24-hour composite
2,3,7,8-TCDD	pg/L	Final Effluent	Annually	24-hour composite
2,3,7,8-TCDF	pg/L	Final Effluent	Annually	24-hour composite
2,3,7,8-TCDD	pg/L	Bleach Plant Effluent	Quarterly	24-hour composite
2,3,7,8-TCDF	pg/L	Bleach Plant Effluent	Quarterly	24-hour composite
Chloroform	μg/L	Bleach Plant Effluent	1/permit	24-hour composite
Chlorinated organics [a]	μg/L	Bleach Plant Effluent	1/permit	24-hour composite
[a] The sampling point is the point of compliance. [b] The list of chlorinated organics under 40 CFR 430.02 is in Table 10.				

B. Lab Accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for the parameters below:

Table 19. Permittee Laboratory Accreditation

Parameter	Analyte Code	Method Description	Matrix
BOD_5	1530	SM 5210	Water
COD	1565	SM 5220	Water
TSS	1960	SM 2540	Water
Dissolved oxygen	1880	SM 4500	Water
pH	1900	SM 4500	Water

The method detection level (MDL) also known as detection level (DL) is the minimum concentration of a pollutant that a laboratory can measure and report with a 99 percent confidence that its concentration is greater than zero (as determined by a specific laboratory method). The quantitation level (QL) is the level at which a laboratory can reliably report concentrations with a specified level of error. Estimated concentrations are the values between the DL and the QL. Ecology requires permitted facilities to report estimated concentrations. When reporting maximum daily effluent concentrations, Ecology requires the facility to report "less than X" where X is the required detection level if the measured effluent concentration falls below the detection level.

V. Other Permit Conditions

A. Reporting and Record Keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Operation and Maintenance Manual

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations [40 CFR 122.41(e) and chapter 173-220-150 (1)(g) WAC]. The facility has prepared and submitted an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (chapter 173-240-150 WAC). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

C. Non Routine and Unanticipated Discharges

Occasionally, this facility may generate wastewater which was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These wastes typically consist of waters used to pressure-test storage tanks or fire water systems or of leaks from drinking water systems.

The permit authorizes non-routine and unanticipated discharges under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- Authorize the facility to discharge the wastewater.
- Require the facility to treat the wastewater.
- Require the facility to reuse the wastewater.

D. Spill Plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

G-P Camas developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the facility to update this plan and submit it to Ecology.

E. Best Management Practices and Stormwater Runoff

Best management practices (BMPs) are the actions identified to manage, prevent contamination of, and treat stormwater. BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment systems, operating procedures, and practices used to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage.

The 2009 permit required the Permittee to address industrial area stormwater runoffs that were not treated in the wastewater treatment. The requirements include stormwater runoff monitoring, reporting, and identification of management options for pollutants reduction. The facility met the requirements and submitted the final report to Ecology on July 1, 2011. The report contained a plan to upgrade stormwater collection system to fully capture the industrial areas stormwater runoff and route it to the wastewater treatment system. The facility implemented the plan in phases; each phase addressed a designated stormwater drainage area. The first phase was completed in June 2012 and the final phase in December 2014. The plan implementation resulted in the capture and treatment of stormwater from approximately 10 acres [*sum of drainage area from north mill parking lot, PECO dock, dock warehouse, Will Sheeter II building, and unitizer building*].

The Permittee must notify Ecology upon discovering new stormwater runoffs from industrial activities that are not included in the previous monitoring study and implementation plan. To address such flows, the permit will require an update of the storm water monitoring plan and report. In the interim, the facility must maintain and implement an up-to-date spill plan. The existing spill plan contains materials loading procedures, routine inspections, and employee training. These measures provide a degree of source control and stormwater pollution prevention.

F. Outfall Evaluation

The proposed permit requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S13). The inspection must evaluate the physical condition of the discharge pipe and diffusers, and evaluate the extent of sediment accumulations in the vicinity of the outfall.

G. Filter Plant Backwash AKART Analysis

The Permittee submitted an AKART study in January 2013 for the treatment of the filter plant backwash. The study evaluates alternative treatment methods for the backwash. The method constituting AKART is the treatment of the backwash in the facility’s wastewater treatment system to remove solids. This method will address TSS and eliminate the backwash discharge to Blue Creek. The proposed permit will require the implementation of AKART under a schedule approved by Ecology (Special Condition S15).

H. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

VI. Permit Issuance Procedures

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwater, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.

1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology

December 2011. *Permit Writer's Manual*. Publication Number 92-109 (https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html)

Laws and Regulations (http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/permits/guidance.html)

February 2007. *Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees*, Publication Number 07-10-024. http://www.ecy.wa.gov/pubs/0710024.pdf

Wright, R.M., and A.J. McDonnell

1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

Appendix A--Public Involvement Information

Ecology proposes to reissue a permit to Georgia Pacific Consumer Products, (Camas), LLC. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on March 17, 2015 in the Camas-Washougal Post-Record to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the office issuing the permit, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology's document titled *Frequently Asked Questions about Effective Public Commenting* is available on our website at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html.

For more information, contact Ecology by telephone, (360) 407-7064, or by writing to:

Water Quality Permit Coordinator
Department of Ecology
Industrial Section
PO Box 47600
Olympia, WA 98504-7600

The primary author of this permit and fact sheet is Ha Tran.

Appendix B--Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. “Date of receipt” is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Appendix C--Glossary

1-DMax or 1-Day Maximum Temperature -- The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-Day Average of the Daily Maximum Temperatures -- The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute Toxicity -- The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART -- The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate Point of Compliance -- An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient Water Quality -- The existing environmental condition of the water in a receiving water body.

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual Average Design Flow (AADF) -- average of the daily flow volumes anticipated to occur over a calendar year.

Average Monthly (Intermittent) Discharge Limit -- The average of the measured values obtained over a calendar month's time taking into account zero discharge days.

Average Monthly Discharge Limit -- The average of the measured values obtained over a calendar month's time.

Background Water Quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best Management Practices (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Categorical Pretreatment Standards -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA) -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection-Without Sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection-With Sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite Sample -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring -- Uninterrupted, unless otherwise noted in the permit.

Critical Condition -- The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of Receipt -- This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection Limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution Factor (DF) -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution Uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early Warning Value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement Limit -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering Report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial User -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- Therefore, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local Limits -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major Facility -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum Day Design Flow (MDDF) -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum Month Design Flow (MMDF) -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum Week Design Flow (MWDF) -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method Detection Level (MDL) -- See Method Detection Level.

Minor Facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES) -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-Through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak Hour Design Flow (PHDF) -- The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak Instantaneous Design Flow (PIDF) -- The maximum anticipated instantaneous flow.

Point of Compliance -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential Significant Industrial User (PSIU) --A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).
Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL) -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and

cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1,2,or 5) x 10^n, where n is an integer. (64 FR 30417).
ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable Potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible Corporate Officer -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Significant Industrial User (SIU) --

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug Discharge -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil Scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting

Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid Waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State Waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater -- That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-Based Effluent Limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total Coliform Bacteria -- A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total Dissolved Solids -- That portion of total solids in water or wastewater that passes through a specific filter.

Total Maximum Daily Load (TMDL) -- A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total Suspended Solids (TSS) -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-Based Effluent Limit -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D--Technical Calculations

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

Simple Mixing:

Ecology uses simple mixing calculations to assess the impacts of certain conservative pollutants, such as the expected increase in fecal coliform bacteria at the edge of the chronic mixing zone boundary. Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the authorized mixing zone. The approach assumes no decay or generation of the pollutant of concern within the mixing zone. The predicted concentration at the edge of a mixing zone (MZ) is based on the following calculation:

MC = [EC + (AC X DF)]/(1 + DF)

where:

EC = Effluent Concentration

AC Ambient Concentration

DF Dilution Factor

Reasonable Potential Analysis:

The spreadsheets REASPOT.XLS, and LIMIT.XLS in Ecology's TSDCALC Workbook determine reasonable potential (to violate the aquatic life water quality standards) and calculate effluent limits. The spreadsheet HUMAN-H.XLS determines reasonable potential and calculates effluent limits for human health pollutants. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b). Results from the TSDCALC Workbook are in Tables 23-25.

Calculation of the pH mixing at the Acute and Chronic Mixing Zone:

Ecology used the model based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.) The modeling parameters and results are in **Table 26**.

Calculation of the TMDL Limits for Dioxin:

EPA's Technical Support Document for Water Quality-Based Toxic Control, Section 5.4.4, discusses special consideration for the derivation of Human Health-based limits as follows:

Annual Average Limit = WLA, 0.42 mg/day
Maximum Daily Limit = Average Monthly Limit × multiplier
where multiplier $= \exp[2.326\sigma - 0.5\sigma^2] \div \exp[1.645\sigma_n - 0.5\sigma_n^{\ 2}]$
$\sigma^2 = \ln(CV^2 + 1) = \ln(0.6^2+1) = 0.307$, with CV set 0.6

σ_n^2 = ln (CV^2÷n +1)= ln (0.6^2÷0.33+1) = 0.788, n is number of sample
multiplier = exp [2.326×0.554 – 0.5×0.307]÷ exp [1.645×0.859 – 0.5×0.738]
=3.11÷2.12 = 1.47
Maximum Daily Limit = 0.42 mg/day × 1.47 = 0.62 mg/day

Calculation of Water Quality-Based Effluent Limits:

Water quality-based effluent limits are calculated by the two-value wasteload allocation process as described on page 100 of the TSD (EPA, 1991) and shown below.

1. Calculate the acute wasteload allocation WLA_a by multiplying the acute criteria by the acute dilution factor and subtracting the background factor. Calculate the chronic wasteload allocation (WLA_c) by multiplying the chronic criteria by the chronic dilution factor and subtracting the background factor.

WLA_a = (acute criteria × DF_a) – [(background conc.x (DF_a - 1)]

WLA_c = (chronic criteria × DF_c) – [(background conc. x (DF_c -1)]

where: DF_a = Acute Dilution Factor

DF_c = Chronic Dilution Factor

2. Calculate the long term averages (LTA_a and LTA_c) which will comply with the wasteload allocations WLA_a and WLA_c.

$LTA_a = WLA_a \times e^{[0.5\sigma^2 - z\sigma]}$ where: $\sigma^2 = \ln[CV^2 + 1]$

$z = 2.326$

CV = coefficient of variation = std. dev./mean

$LTA_c = WLA_c \times e^{[0.5\sigma^2 - z\sigma]}$ where: $\sigma^2 = \ln[(CV^2 \times 4) + 1]$

$z = 2.326$

3. Use the smallest LTA of the LTA_a or LTA_c to calculate the maximum daily effluent limit and the monthly average effluent limit.

Maximum Daily Limit = MDL

$MDL = LTA x\, e^{(Z\sigma - 0.5\sigma^2)}$ where: $\sigma^2 = \ln[CV^2 + 1]$

z = 2.326 (99th percentile occurrence)

LTA = Limiting long term average

Average Monthly Limit = AML

$AML = LTAx\,e^{(Z\sigma_n - 0.5\sigma_n^2)}$ where:

$\sigma^2 = \ln[(CV^2 \times n) + 1]$

n = number of samples/month

z = 1.645 (95th % occurrence probability)

LTA = Limiting long term average

Table 20. Calculation of Technology-based BOD_5 Limits

	Applicable Regulation	Production (ton/day)	Monthly ave (lb/ton of product)	Max daily (lb/ton of product)	Monthly ave (lb/day)	Max daily (lb/day)
Bleached kraft pulp & paper	40 CFR 430.23	798	11.0	21.2	8,778	16,918
Non-integrated tissue	40 CFR 430.125	11	6.8	14.0	75	154
Secondary fiber, non-deink	40 CFR 430.105	32	14.2	27.4	4,54	876
Total					9,307	17,948

Table 21. Calculation of Technology-based TSS Limits

	Applicable Regulation	Production (ton/day)	Monthly ave (lb/ton of product)	Max daily (lb/ton of product)	Monthly ave (lb/day)	Max daily (lb/day)
Bleached kraft pulp & paper	40 CFR 430.23	798	23.8	44.3	18,992	35,352
Non-integrated tissue	40 CFR 430.125	11	5.2	12.0	57	132
Secondary fiber, non-deink	40 CFR 430.105	32	18.4	34.1	589	1,091
Total					19,638	36,575

Table 22. Calculation of Bleach Plant Discharge Limits

	Unbleached pulp (ton/day)	Monthly ave (lb/ton of unbleached pulp)	Max daily (lb/ton of unbleached pulp)	Monthly ave (lb/day)	Max daily (lb/day)
AOX	684	1.246	1.902	852	1,301
Chloroform	684	0.00828	0.01384	5.66	9.47

Table 23. Reasonable Potential Analysis, Aquatic Life Criteria

			Ammonia, as Total NH_3	Aluminum	Arsenic	Cadmium	Chromium(hex)	Chromium (tri)	Copper	Lead	Mercury	Nickel	Zinc
Effluent Data	# of Samples (n)		59	1	26	2	2	2	2	2	2	2	2
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, µg/L (Max. or 95th Percentile)		3	417	3.4	0.2	5.6	5.6	5.3	1.95	0.0215	3.4	89.3
	Calculated 50th percentile Effluent Conc. (when n>10)		0.74										
Receiving Water	90th Percentile Conc., µg/L		0.01	0	1.11	0	0.2	0.2	1.27	0.02	0.001	17	0.88
	Geo Mean, µg/L								0.73		0.001	9.77	
Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	5,722	750	360	2.19	15	369	10.8	37.96	2.1	939.4	75.9
		Chronic	820	-	190	0.721	10	119.7	7.503	1.479	0.012	104.3	69.32
	WQ Criteria for Protection of Human Health, µg/L		-	-	-	-	-	-	1300	-	0.14	610	-
	Metal Criteria Translator, decimal	Acute	-	-	1	0.943	0.982	0.316	0.996	0.466	0.85	0.998	0.996
		Chronic	-	-	1	0.943	0.962	0.86	0.996	0.466	-	0.997	0.996
	Carcinogen?		N	N	Y	N	N	N	N	N	N	N	N
Effluent percentile value			0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
s	s^2=ln(CV^2+1)		0.555	0.555	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.555
Pn	Pn=(1-confidence level)$^{1/n}$		0.95	0.05	0.89	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Multiplier			1.00	6.20	1.00	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79
Max concentration (µg/L) at edge of…		Acute	0.328	297	1.37	0.08	2.58	0.95	3.43	0.57	0.010	1.48	39.57
		Chronic	0.046	36.816	1.14	0.01	0.49	0.46	1.54	0.25	0.002	0.18	5.68
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Table 24. Reasonable Potential Analysis, Human Health Criteria

			Antimony	Copper	Manganese	Nickel	Mercury
Effluent Data	# of Samples (n)		2	2	1	2	2
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, µg/L (Max. or 95th Percentile)		0.14	5.3	224	3.4	0.0215
	Calculated 50th percentile Effluent Conc. (when n>10)						
Receiving Water Data	90th Percentile Conc., µg/L			1.27	0	0	0.001
	Geo Mean, µg/L		0	1.27	0	0	0.001
	WQ Criteria for Protection of Human Health, µg/L		14	1300	50	610	0.14
	Metal Criteria Translator, decimal	Acute	-	0.996	-	0.998	0.85
		Chronic	-	0.996	-	0.997	-
	Carcinogen?		N	N	N	N	N
s	$s^2=\ln(CV^2+1)$		0.5545	0.5545	0.5545	0.555	0.555
Pn	Pn=(1-confidence level)1/n		0.224	0.224	0.050	0.224	0.224
Multiplier			1.5242	1.5242	2.4895	1.5242	1.5242
Dilution Factor			70.2	70.2	70.2	70.2	70.2
Max Conc. at edge of Chronic Zone, µg/L			0.003	1.00	7.9438	0.738	0.0005
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**

Table 25. Washington and Oregon State Human Health Criteria

Parameter [(a)]	Washington human health criteria (µg/L)	Oregon human health criteria (µg/L)	Concentration at the edge of the chronic mixing zone (µg/L) [(b)]	Reasonable potential to exceed Washington and Oregon human health criteria?
Arsenic, inorganic	-	2.1	0.0244	NO
Antimony	14	5.1	0.003	NO
Barium	-	1,000	3.1	NO
Copper	1,300	1,300	1.0	NO
Nickel	610	140	0.0738	NO
Zinc	-	2,100	1.94	NO

(a) Pollutants detected in the discharge. (b) Analysis in Ecology's REASPOT worksheet using processes and formula in *Technical Support Document for Water Quality-based Toxics Control* (EPA 505/2-90-001).

Table 26. Analysis of pH at Mixing Zone Boundary, High pH condition

INPUT			
	@ Acute Boundary	@ Chronic Boundary	@ Whole River
1. Dilution Factor at Mixing Zone Boundary	8.7	70.2	70.2
2. Ambient/Upstream/Background Conditions			
Temperature (deg C):	21.80	21.80	21.80
pH:	7.99	7.99	7.99
Alkalinity (mg CaCO3/L):	10.50	10.50	10.50
3. Effluent Characteristics			
Temperature (deg C):	31.20	31.20	31.20
pH:	8.30	8.30	8.30
Alkalinity (mg CaCO3/L):	326.87	326.87	326.87
OUTPUT			
1. Ionization Constants			
Upstream/Background pKa:	6.37	6.37	6.37
Effluent pKa:	6.32	6.32	6.32
2. Ionization Fractions			
Upstream/Background Ionization Fraction:	0.98	0.98	0.98
Effluent Ionization Fraction:	0.99	0.99	0.99
3. Total Inorganic Carbon			
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	11	11	11
Effluent Total Inorganic Carbon (mg CaCO3/L):	330	330	330
4. Condtions at Mixing Zone Boundary			
Temperature (deg C):	22.88	21.93	21.93
Alkalinity (mg CaCO3/L):	46.86	15.01	15.01
Total Inorganic Carbon (mg CaCO3/L):	47.48	15.30	15.30
pKa:	6.36	6.37	6.37
RESULTS			
pH at Mixing Zone Boundary:	**8.24**	**8.07**	**8.07**

Table 27. Analysis of pH at Mixing Zone Boundary, Low pH condition

INPUT			
	@ Acute Boundary	@ Chronic Boundary	@ Whole River
1. Dilution Factor at Mixing Zone Boundary	8.7	70.2	70.2
2. Ambient/Upstream/Background Conditions			
Temperature (deg C):	21.80	21.80	21.80
pH:	7.12	7.12	7.12
Alkalinity (mg CaCO3/L):	10.50	10.50	10.50
3. Effluent Characteristics			
Temperature (deg C):	31.20	31.20	31.20
pH:	6.70	6.70	6.70
Alkalinity (mg CaCO3/L):	326.87	326.87	326.87
OUTPUT			
1. Ionization Constants			
Upstream/Background pKa:	6.37	6.37	6.37
Effluent pKa:	6.32	6.32	6.32
2. Ionization Fractions			
Upstream/Background Ionization Fraction:	0.85	0.85	0.85
Effluent Ionization Fraction:	0.71	0.71	0.71
3. Total Inorganic Carbon			
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	12	12	12
Effluent Total Inorganic Carbon (mg CaCO3/L):	463	463	463
4. Condtions at Mixing Zone Boundary			
Temperature (deg C):	22.88	21.93	21.93
Alkalinity (mg CaCO3/L):	46.86	15.01	15.01
Total Inorganic Carbon (mg CaCO3/L):	64.13	18.78	18.78
pKa:	6.36	6.37	6.37
RESULTS			
pH at Mixing Zone Boundary:	**6.80**	**6.97**	**6.97**

Appendix E--Response to Comments

Ecology received comments from Georgia-Pacific, EPA Region 10, Williams Research, and Columbia Riverkeeper. The comments received in writing or as oral testimony at the public hearing held on June 16, 2015, are separated by commenter and topic. Ecology's responses are shown in italics following each comment. Attachments submitted with the comments are not included but are available for review at Ecology's Headquarters at 300 Desmond Dr SE, Lacey WA 98503.

Georgia-Pacific Consumer Products (Camas), LLC (Comments 1-18)

1. Permit Condition S1 Footnote e, grammatical revision – this sentence should read: When pH is continuously monitored, excursions between 5.0 and 6.0, or 9.0 and 10.0 are not ~~be~~ considered violation if…

   Error noted and corrected.

2. Permit Condition S1.B Footnote b, GP requests that the second, third, and fourth sentences be removed as they are not applicable to the definition of "Maximum Daily."

   Permit Condition S1.B specifically applies to the Bleach Plant Effluent. Footnote b is to clarify the definition of Maximum Daily Limit with respect to the Bleach Plant Effluent. The footnote begins with "Maximum daily effluent limit is the highest allowable daily discharge." The following second, third, and fourth sentences of the footnote are as follow:

   - *Second sentence: "The daily discharge is the average discharge of a pollutant measured during a 24-hour period." This sentence helps clarify that a result of a 24-composite sample (not a grab sample) is used to determine compliance with the permit limits. Therefore, Ecology proposes to retain the second sentence.*
   - *Third sentence: "For pollutants with limits expressed in units of mass, calculate the daily discharge as the total mass of the pollutant discharged over the day." This sentence applies to the chloroform limit, which is expressed in units of mass per day. A flow rate must be multiplied by the concentration to calculate mass per day discharge. This sentence clarifies that a flow rate representative of the discharge over the day (not an instantaneous flow rate) is used to calculate the monitoring result. Therefore, Ecology proposes to retain the third sentence.*
   - *Fourth sentence: "This does not apply to pH or temperature." There is no pH or temperature monitoring of the Bleach Plant Effluent. Therefore, this clarification is unnecessary. Ecology will remove this sentence.*

   Ecology has revised Footnote b in accordance to the discussion in the bullets above.

3. According to Ecology's manual (Permit Manual VII-16), the frequency of the priority pollutant should be based on whether there is a reasonable potential for exceedance of the water quality criteria. If there is not a reasonable potential for exceedance, only year three (3) requires priority pollutant scan. Georgia-Pacific has a long history of acceptable results

for its scans which justifies a reduced frequency consistent with the Ecology permit manual. We request that a priority pollutant scan only be required in year three (3) of the permit cycle.

The most recent update of Ecology's Permit Writer's Manual was published in January 2015. Chapter VII contains guidelines on how to develop permit requirements. As noted by G-P, Chapter VII of the Manual recommends a priority pollutant scan in the third year if recent data shows no potential to exceed water quality standards. The Manual also states that "in addition, other information may be needed to more clearly make a reasonable potential determination at the next permit issuance." In certain cases, additional priority pollutant (PP) testing is recommended.

For the pulp and paper industry, Ecology's practice is to require priority pollutant scans a <u>minimum</u> of 3 times per permit cycle. Based on the complexity of the industry, Ecology finds that three PP scans as described in the proposed permit are generally sufficient to gather information need to make a "reasonable potential to exceed" determination at the next permit renewal. A single year PP scan may result in an ambiguous determination; that is, there may not be enough data for Ecology to evaluate the potential to exceed water quality standards. Ecology does not use data from historical PP scans to make the determination.

Ecology will retain the PP scans in the first, third, and fifth year of the permit cycle to ensure there is sufficient information for the next permit renewal.

4. Permit Condition S2.A Footnote e, reference to grab samples (the first and last sentence) should be deleted as continuous monitoring is required.

   The permit requires continuous monitoring. If the facility cannot monitor continuously for any reason (e.g. instrument malfunction, power loss), then a grab sample is necessary to collect data and determine the effect of the discharge temperature.

   Ecology proposes to retain the reference to grab samples for temperature. S2.A Footnote e will be revised to: "When the Permittee is unable to comply with the continuous monitoring requirement, the Permittee must conduct daily grab sampling when the effluent is at or near its daily maximum temperature, which usually occurs in the late afternoon."

5. Permit Condition S2.D, the following struck through sentence is requested to be removed: "Flow temperature settleable solids, conductivity, pH, and internal process control parameters are exempted from this requirement. ~~The Permittee must obtain accreditation for conductivity and pH if it must receive accreditation for registration for other parameter~~." The sentence proposed to be removed is contradictory to the preceding sentence.

   The language in S2.D is in accordance with WAC 173-220-210(4)(c). This regulation offers exemptions from accreditation for pH and conductivity analysis, except if "the laboratory must otherwise be registered and accredited." In other words, any requirements for lab accreditation would supersede the exemption provided in WAC 173-220-210(4)(c).

   This permit requires lab accreditation for pH in order to comply with pH limits and BOD_5 analysis. This requirement supersedes the exemption in WAC 173-220-210(4)(c). Ecology *will remove pH from the exemption list as follows: "Flow, temperature, settleable solids, conductivity, ~~pH,~~ and internal process control parameters are exempted from this requirement."*

This NPDES permit does not specify conductivity analysis. However, Ecology recognizes that conductivity analysis may be required under other provisions (e.g., acute and chronic toxicity tests). In these cases, striking out the sentence G-P proposed may contradict these provisions as well as the intent of WAC 173-220-210.

G-P has the option to send samples to an outside laboratory for conductivity analysis. For these sample analyses, G-P's in-house lab is not required to be accredited. If required, the outside lab performing the analysis must be accredited for conductivity. The current permit language in S2.D does not address the use of an outside lab. Therefore, Ecology made the following revision: "The Permittee must use a laboratory accredited for conductivity analysis if conductivity must otherwise be registered or accredited."

6. Permit Condition S3.A.5, proposed wording for clarification – this section should read: For values measured below the quantification limit, calculate average values (unless otherwise specified in the permit) using:

   Ecology reviewed the revised wording from G-P. The revision proposed is bolded below and would read as follows:

   2. ***For values measured below the quantification limit****, calculate average values (unless otherwise specified in the permit) using:*
      a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
      b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample for the reporting period.
      c. *Zero (for values reported below detection) if the lab did not detect the parameter in another sample for the reporting period.*

   Ecology refers G-P to the double-underline text in the permit language above. This text provides the clarification G-P is seeking; that is, how to treat values measured below detection limit or MDL. Ecology will retain the current permit language in S.3.A.5.

7. Permit Condition S3.F.a, the clarifying language is requested for the second bullet in this section, Plant Bypasses that aren't otherwise authorized under section S4.B.

   Permit condition S3.F.a is requirement to notify Department of Health (DOH) when plant bypasses discharge to a water body that is a source of drinking water. This is based on DOH's authority in relation to public health, in accordance with RCW 43.70.080(2), which a separate rule from the bypass requirements in 40 CFR 122.41 (permit condition S4). As these rules and regulations are not interrelated, each bypass must be evaluated case-by-case to meet all applicable requirements. As part of this process, notification to DOH is required. Ecology will retain the current permit language.

8. Permit Condition S3.F.b.5, proposed wording: This requirement does not include materials from industrial process overflows to impermeable surfaces which are collected and routed to the treatment system.

   Condition S3.F.b.5 requires 24-reporting for non-compliance. A wastewater overflow to an impermeable surface that is fully captured, treated, and discharged under this permit meets the intent of the NPDES permit. Such a wastewater overflow is not a non-compliance event. Ecology has incorporated this language into the permit.

9. Permit Condition S4.B, the clarifying language below is requested: Further, "Preventative Maintenance should likely be separated as shown below.
   "Except as other set forth below, this permit prohibits a bypass which is the intention diversion of waste streams from any portion of a treatment facility…

   2.b No feasible alternative to the bypass exist, such as
   The use of auxiliary treatment facilities.
   Retention of untreated wastes.
   Stopping production.
   Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
   Transport of untreated wastes to another treatment facility
   Preventative maintenance

   Permit Condition S4.B is revised based on Comment #24 from EPA regarding the bypass procedures. The revision is consistent with 40 CFR 122.4(m) and provides the clarification G-P seeks.

10. Permit Condition S12, the following clarification language is requested:
    The Permittee must follow the guidance provided in the Appendix of the Sediment Source Control Standards User Manual Appendix B: Sediment Sampling and Analysis Plan (Sediment Sampling and Analysis Plan Appendix, Ecology 2008) <u>except as otherwise approved by Ecology in the Permittee's site specific Sampling and Analysis Plan.</u>

    G-P proposed to add underlined text, as shown above, to incorporate site-specific considerations in the sediment Sampling Analysis Plan.

    The guidance in "Sediment Sampling and Analysis Plan Appendix" provides for site-specific considerations in the development and approval the Sampling Analysis Plan (SAP). The Introduction section of the guidance (page 8) states that "the design of the [sediment] monitoring program varies with both discharge- and site-specific characteristics." Ecology believes the clarification G-P proposes is already incorporated into the guidance. Ecology will retain the standard language for S12 in the permit.

11. Permit Condition S16, the following clarifying language of the second paragraph in S.16.B is requested:

The facility may propose a site-specific alternative for complying with the BTA requirement pursuant to Section 316 (b), propose an alternative that may be additional to EPA or Ecology guidance issued in the permit term defining BTA options for those facilities not required to meet the requirement of 125.94 through 125.99, or propose one of the designated technology prescribed in 40 CFR Section 125.94(c) to meet the impingement mortality requirement.

G-P proposed to add the underlined text "propose an alternative that may be additional to EPA or Ecology guidance issued in the permit term defining BTA options for those facilities not required to meet the requirement of 125.94 through 125.99."

As noted in the fact sheet, G-P is below one of the thresholds in 40 CFR 125.91(a), which is 25% of the actual intake flow used for cooling water. The proposed language is based on the expectation that guidance would be available to define BTA options for CWIS under either one or both of the thresholds established in 40 CFR 125.91(a).

Ecology will retain the current permit language without the suggested change. There is no plan for either EPA or Ecology to develop guidance for BTA options specifically for cooling water intake structures that does not exceed the 2 MGD cumulative design threshold or the 25% cooling water usage threshold. For these cooling water intake structures, the regulations in 40 CFR 125.90 specify that BTA is implemented on a case-by-case basis.

12. Fact Sheet page 7, the second sentence of the first paragraph should be accurately state: It began as a pioneer newsprint mill and evolved into an 800 tons/day integrated communication paper and tissue paper mill.

    Ecology noted the factual error and corrected the production to from 1000 tons/day to 700 tons/day in the Fact Sheet.

13. Fact Sheet, pages 34-35, the following clarifying language in the Fact Sheet is requested to provide flexibility with potential future compliance measures, and to more clearly define the applicability status of the facility.

    Facilities requiring an NPDES permit with design intake flows of 2 MGD or less and withdrawing less than twenty five percent of the actual intake flow that is used exclusively for cooling are required to implement Section 316(b) on a case-by case basis. 40 CFR 125.90(b) requires Ecology to use best professional judgment (BPJ) for determining BTA. G-P has submitted data showing ~~at~~ its current operation does not meet the 25% ~~criteria~~ of its actual intake flow.

    G-P proposed the underlined changes to the fact sheet language as above. Ecology reviewed the regulation in 40 CFR 125.91(a)(3). Part 125.92(3) has the following wording, with regards to one of the criterion for applicability of Part 125.94 et seq.:

    "Twenty-five percent or more of the water the facility withdraws on an actual intake flow basis is used exclusively for cooling purposes."

    The change G-P proposed above is consistent with the applicability definition in the regulation. Ecology revised the paragraph as suggested in the above comment.

14. Fact Sheet page 35, the following clarifying language in the Fact Sheet is requested to provide flexibility with potential future compliance measures, and to more clearly define the applicability status of the facility.

    <u>Facilities that are less than 2 MGF DIF and less than 25% are not subject to the requirements of 125.94 through 125.99 (125.90(b)).</u>

    G-P proposed the underlined text to replace the following language currently in the Fact Sheet.

    "As mentioned above, 40 CFR 125.90(b) will require a BPJ analysis not specifically addressed in Part 125. This BTA will minimize impingement and entrainment of all life stages of fish and shellfish. Impingement occurs when fish or shellfish become entrapped on the outer part of intake screens and entrainment occurs when fish or shellfish pass through the screens and into the cooling water system."

    Section 316(b) requires <u>all</u> cooling water intake structures (CWIS) to have the best technology available (BTA) to minimize impingement and entrainment. Section 316(b) is the "umbrella requirement" for CWIS; this umbrella requirement is reflected in 40 CFR 125.90(b). Ecology will retain the above paragraph in the Fact Sheet.

    G-P proposed that "facilities that are less than 2 MGD DIF and less than 25% are not subject to the requirements of 125.94 through 125.99 (125.90(b))." The 2MGD DIF and 25% are thresholds established in 40 CFR 125.91(a). The regulations state that the use of CWIS exceeding these thresholds must be subject to Parts 125.94 through 125.99; however, the regulation does not specifically bar CWIS below one or more of the thresholds from using Parts 125.94 through 125.99. Facilities below these thresholds may choose to follow Parts 125.94 through 125.99 to comply with 316(b). In other words, any facility with CWIS may use 125.94 through 125.99 to meet BTA rather than developing their own case-by-case, site-specific BTA. To reflect this option, Ecology will not incorporate the sentence in Comment #14.

15. Fact Sheet page 35, the following clarifying language in the Fact Sheet is requested to provide flexibility with potential future compliance measures, and to more clearly define the applicability status of the facility.

    This facility may choose to propose a separate site-specific alternative that complies with the BPJ in determining BTA pursuant to Section 316(b), which will be subject to Ecology's approval <u>or propose an alternative that may be in additional to EPA or Ecology guidance issued in the permit term defining BTA options for those facilities not required to meet the requirements of 125.94 through 125.99</u>. The facility may propose one or more of the designated technologies (alternatives) prescribed in 40 CFR 125.94(c) to meet the impingement mortality requirements. <u>Alternatives for </u>~~E~~entrainment standards may be ~~either~~ site-specific, <u>consistent with alternatives that may be in additional EPA or Ecology guidance issued in the permit term</u> or a reduction of intake flow to a level commensurate with a closed-cycle recirculating system.

G-P proposed the underlined changes to the fact sheet language as above. This revision is in conjunction with G-P's proposed change in Comment #11.

G-P proposed to add a BTA alternative, which is based on EPA or Ecology guidance that would be developed for facilities with CWIS below one or more of the thresholds. As noted in Response #11, there is no plan to develop guidance for BTA options specifically for cooling water intake structures that do not exceed the 2 MGD cumulative design threshold or the threshold for 25% of actual water intake used for cooling. Ecology will retain the Fact Sheet language without the suggested change.

16. Fact Sheet page 35, the following clarifying language in the Fact Sheet is requested to provide flexibility with potential future compliance measures, and to more clearly define the applicability status of the facility.
    The proposed permit requires the facility to submit previously conducted entrainment studies or other existing relevant and representative studies for Ecology's review and approval. As for consideration of the endangered species, nothing in this permit allows take for the purpose of compliance with the Act.

    G-P proposed the insertion of the underlined "existing," to clarify the submittal of the entrainment study.

    Ecology reviewed the regulations for the entrainment performance study in 40 CFR 122.21(r)(7). The regulations state that "the owner or operator of an existing facility must submit any previously conducted studies or studies obtained from other facilities addressing technology efficacy, through-facility entrainment survival, and other entrainment studies." In other words, entrainment studies are existing studies. The regulations did not specify that facilities must conduct new entrainment studies. However, facilities may choose to do the entrainment performance study to comply with 316(b).

    To reflect the regulations, Ecology will incorporate the change proposed by G-P into the fact sheet.

17. Fact Sheet page 35, the following clarifying language in the Fact Sheet is requested to provide flexibility with potential future compliance measures, and to more clearly define the applicability status of the facility.
    Should this facility remain below the 25% threshold for water used exclusively for cooling water use, then the provisions of 125.94 through 125.99 do not apply as described in 125.90(b).

    G-P proposed to add the underlined text above to the Fact Sheet. This addition parallels the suggested change in Comment #14.

    As noted in Ecology's Response #14, the 2MGD DIF and 25% of actual intake flow used for cooling are thresholds established in 40 CFR 125.91(a). The regulations state that the use of CWIS exceeding these thresholds is subject to Parts 125.94 through 125.99; however, the regulations do not specifically bar CWIS below one or more of the thresholds from using Parts 125.94 through 125.99.

In accordance with 125.90(b), facilities below the thresholds must meet BTA on a case-by-case basis. As part of the case-by-case analysis, facility may opt to apply BTA in parts 125.94 through 125.9, rather than developing their own site-specific BTA. To reflect this option, Ecology proposes not to include the language G-P suggested in the Fact Sheet.

18. Fact Sheet page 35, the following clarifying language in the Fact Sheet is requested to provide flexibility with potential future compliance measures, and to more clearly define the applicability status of the facility.
    In addition, the proposed permit requires the mill to submit an information and compliance report consistent with NPDES permit application requirements for cooling water intake structures in 40 CFR 122.21(r)(2) <u>and (3) and applicable provision of paragraphs (4), (5), (7), and (8)</u>.

    Ecology is requiring this submittal of the information and compliance report in accordance with the <u>applicable provision of</u> 40 CFR 122.21(r) on a best professional judgment basis. Ecology will use this information to assess the potential for impingement and entrainment at the CWIS, evaluate the appropriateness of any proposed technologies or mitigation measures, and determine any additional requirements to place on the facility's CWIS in the next permit cycle.

    Ecology may require the submittal of the information and compliance report in accordance with the <u>applicable provisions of</u> 40 CFR 122.21(r) on a best professional judgment basis in the event that the CWIS rule, finalized on May 19, 2014, is remanded or otherwise not in effect.

    G-P proposed to insert the underlined text above to the Fact Sheet. Some of the proposed text is verbatim from the regulations. The current Fact Sheet language is:

    In addition, the proposed permit requires the mill to submit an information and compliance report consistent with NPDES permit application requirements for cooling water intake structures in 40 CFR 122.21(r)(2)-(8).

    The current Fact Sheet language is written in "Plain Talk," which attempts to summarize the regulations for ease of reading. Summarizing the regulations is routinely done in Fact Sheets, as Fact Sheets are not legal documents. The purpose of the Fact Sheet is to explain Ecology's decisions in writing the permit. A facility's applicability status and compliance measures are based on the regulations rather than the Fact Sheet language.

    For the purpose of clarification, Ecology accepts and incorporates the change into the Fact Sheet.

<u>U.S. Environmental Protection Agency (EPA) Region 10 (Comments 19-32)</u>

19. Permit page 7, The effluent limit for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is based on the *EPA 's Total Maximum Daily Load (TMDL) to Limit Discharges of 2, 3, 8-tetrachlorodibenzo-p-dioxin (TCDD) to the Columbia River.* The TMDL expresses the wasteload allocation (WLA) as 0.42 milligrams/day (mg/day) TCDD. The permit applies only a maximum daily limit (MDL) of 1.31 mg/day TCDD requiring annual monitoring. The EPA's *Technical Support Document for Water Quality-based Toxic Control* recommends that

the WLA be applied as an average monthly limit (AML) to ensure that the TMDL will be met over the long term.

Using the TSD approach, the AML should be 0.42 mg/day and the MDL should be 0.61 mg/day (TSD, Table 5.3, CV=0.6, n=1 results in a MDL/AML multiplier of 1.46), not 1.31 mg/day. NPDES regulations [40 CFR 122.45 (d)] require an AML, unless impracticable. Applying only a MDL of 1.31 mg/day TCDD is not sufficient to ensure compliance with the long-term average WLA in the TMDL. Ecology applied the approach recommended in the TSD to develop TMDL-based limits in the Weyerhaeuser Longview permit, which is subject to the same TMDL, so for consistency the same approach should be applied in this permit.

The TMDL sets a long-term average wasteload allocation (WLA) of 0.42 mg/day for the G-P Camas mill. The WLA, which reflects the long term average, is used to calculate effluent limits. The current method used is:

- *Maximum Daily Limit* = *LTA × LTA multiplier = LTA × exp* $[2.326\sigma - 0.5\sigma^2]$
  where z = *2.326 for 99th percentile probability of occurrence*
  σ^2 = $\ln(CV^2 + 1) = \ln(0.6^2 + 1) = 0.307$, *with CV equal to 0.6*
  Maximum Daily Limit = *0.42 mg/day × exp* $(2.326 \times 0.554 - 0.5 \times 0.307) = 1.30$ *mg/day*

The method above has been used to calculate Water Quality-Based limits for protection of aquatic life.

Ecology noted an alternate method is used for calculating human health criteria. EPA's <u>*Technical Support Document for Water Quality-Based Toxic Control*</u>*, Section 5.4.4, discussed special consideration for the derivation of Human Health-based limits; the recommended method is as follow:*

- *Annual Average Limit* = *WLA, 0.42 mg/day*
- *Maximum Daily Limit* = *Average Monthly Limit × multiplier*
  where multiplier = $\exp[2.326\sigma - 0.5\sigma^2] \div \exp[1.645\sigma_n - 0.5\sigma_n^{\,2}]$
  σ^2 = $\ln(CV^2 + 1) = \ln(0.6^2 + 1) = 0.307$, *with CV set 0.6*
  σ_n^2 = $\ln(CV^2 \div n + 1) = \ln(0.6^2 \div 0.33 + 1) = 0.788$, *n is sample/month*
  multiplier = $\exp[2.326 \times 0.554 - 0.5 \times 0.307] \div \exp[1.645 \times 0.859 - 0.5 \times 0.738]$
  $= 3.11 \div 2.12 = 1.47$
  Maximum Daily Limit = *0.42 mg/day × 1.47 = 0.62 mg/day*

The TMDL for 2,3,7,8-TCDD is based on the human health criteria. Ecology will apply the annual average limit of 0.42 mg/day and the maximum daily limit of 0.62 mg/day as calculated above. These limits are consistent with EPA's comment and the Technical Support Document. Ecology incorporated the calculation into Appendix C of the Fact Sheet (page 56).

20. EPA notes that the fact sheet (p. 27) indicates the assigned TMDL WLA of 0.41 mg/day. Please clarify why the fact sheet is slightly lower than the WLA provided in the TMDL.

The 2,3,7,8-TCDD WLA of 0.41 mg/day listed in the Fact Sheet is an error. It is corrected to the 0.42 mg/day to be consistent with the TMDL.

21. Permit Page 10, the permit authorizes discharges of filter backwash water from outfall 002 with pH limits of 6.0 (minimum) and 9.5 (maximum). The permit does not authorize a mixing zone for outfall 002.

    Without a mixing zone, the permit cannot authorize discharges that would contribute to violations of applicable water quality criteria of 6.5 to 8.5 (fact sheet page 26). The fact sheet does not provide a reasonable potential analysis or the technical basis for the pH limits at outfall 002. Ecology must show through RPA that the proposed effluent limit do not cause or contribute to excursions about the WQS without allowance for mixing.

    G-P draws fresh water from the Columbia River and Lacamas Lake; G-P strains the water through the filter media before using it at the mill. The facility intermittently flushes (or backwashes) with filtered water to prevent the filter media from clogging. The backwash discharges to Blue Creek, which flows back into the Columbia (Outfall 002).

    This NPDES permit authorizes G-P to discharge the filter backwash to Outfall 002. The permit does not authorize G-P to discharge industrial stormwater or process wastewater to this outfall. Ecology considered the following facts:

    - *The source of G-P's discharge to Outfall 002 is water from the Columbia and Lacamas Lake.*
    - *The fresh water sources meet the water quality criteria for pH*
    - *G-P does not add chemicals to the filter plant for pH adjustment*

    Based on the above information, Ecology determine that G-P's discharge to Outfall 002 has no potential to exceed the water quality criteria for pH. However, Ecology retained the pH limits of 6.0 (minimum) and 9.5 (maximum) as a method to detect spills or releases to Blue Creek.

22. Also in relation to outfall 002, the fact sheet (page 9) states, *"Outfall 002 consists of non-point source stormwater from the City of Camas, Lacamas Lake water, and filter plant backwash from the Camas mill."*

    The permit (page 10) does not explicitly authorize stormwater discharges through outfall 002. The permit must explicitly authorize these discharges and consider appropriate permit requirements. The fact sheet should discuss permit status for these municipal stormwater discharges to outfall 002 to indicate whether authorization of these discharges are covered under any other NPDES permits.

    G-P's NPDES permit does not authorize the discharge of industrial stormwater through Outfall 002, either from the G-P mill or the City of Camas. This NPDES permit authorizes the discharge of the filter plant backwash and overflow to Outfall 002. The permit condition S1.C (page 10) of the permit accurately reflects this authorization.

The City of Camas stormwater discharge to Outfall 002 is authorized under the Western Washington Phase II Municipal Stormwater Permit. Per EPA's recommendation, page 9 of the Fact Sheet is revised to clarify the permit status of the municipal stormwater.

23. The Fact Sheet, also states, *"The mill monitors this outfall continuously for the following parameters: flow and pH"*, but the permit (page 11) requires only pH monitoring. Flow monitoring must be added to the monitoring table. The location of the monitoring point must ensure process discharges can be monitoring independent of stormwater discharges as the effluent limits for pH would only apply to the process wastewater discharge.

    The permit does not require G-P to report Outfall 002 flow for the following reasons:

    - *The Outfall 002 flow meter is a Palmer-Bowlus flume in the pipeline that measures total flow from G-P as well as other sources, including the City of Camas stormwater and groundwater seepage. This flow is not representative of G-P's discharge contribution.*
    - *G-P does not discharge process wastewater into Outfall 002 (per Ecology's Response #22).*
    - *G-P discharge is intermittent filter plant backwash. This flow is characterized in the filter plant backwash AKART study.*

    G-P withdraws fresh water from Lacamas Lake and groundwater wells. The freshwater from the lake is then filtered for use at the mill; a fraction of the filtered water is backwashed to unclog the filter media, then discharged through Blue Creek, which flows into to the Columbia (via the Camas Slough at Outfall 002).

    The backwash is done periodically, making this discharge intermittent. G-P submitted a formal AKART study documenting the backwash flow to be 1500 gpm on average at an average duration of 15 minutes. The mill also estimates backwashing 3 to 6 times a day. This amounts to 67,500 to 135,000 gallons per day to Outfall 002.

24. The bypass language is not consistent with federal regulations 40 CFR 122.41(m). Ecology may not "authorize" bypasses. Ecology may "allow" certain bypasses that do not cause effluent limits to be exceed consistent with 40 CFR 122.41(m)(2), which states *'it/he permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (m)(3) and (m)(4) of this section "*. Ecology may "approve" anticipated bypasses consistent with 40 CFR 122.41(m)(4)(ii) which states, *"the Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph (m)(4)(i) of this section "*. The EPA is aware that Ecology is revising the permit template's bypass language and Ecology must ensure the revisions are consistent with federal regulations.

    Ecology noted EPA's comment and has revised the bypass standard language in S4.B to be consistent with 40 CFR 122.4(m). The revised language is incorporated into the NPDES permit.

25. The permit requires whole effluent toxicity (WET) testing for outfall 001 only, but requires sediment monitoring (page 29) at both outfalls 001 and 002. The fact sheet (pages 36-37) explains that the filter backwash will be routed back to the wastewater treatment system in the next five years and is unlikely to increase toxicity at outfall 001. The EPA recommends the permit contain provisions for characterization of WET at outfall 002 until the process discharge to outfall 002 cease.

    As noted by EPA, sediment monitoring is required for both outfall 001 and 002 to gather information to comply with Chapter 173-204 WAC. Toxicity testing under Chapter 173-210 WAC is for another media under a separate provision. Toxicity is evaluated independently from the sediment characterization, using a case-by-case approach. Ecology considered the following information:

    - *G-P's discharge to Outfall 002 is water supplied by the Columbia River and Lacamas Lake. The water quality criteria for these sources are protected under the NPDES permitting program and State Waste Discharge Permitting Program.*
    - *G-P's discharge to Outfall 002 is filtered water from the above sources, backwashed to unclog the filter media.*
    - *The permit does not authorize a discharge of industrial stormwater or process wastewater to Outfall 002.*

    Based on information above, Ecology determined that G-P's discharge to Outfall 002 is unlikely be a source of toxicity. Ecology is not requiring toxicity characterization for this discharge in the permit.

26. The permit includes requirements for a stormwater monitoring plan update and report update. However, there is no evidence in the permit, fact sheet (page 61) or Ecology's permit database (i.e. PARIS) that the Permittee has coverage under the Industrial Stormwater General Permit (ISGP).

    Based on the requirements in this permit, the Permittee is not held to the same performance standards and BMPs required by the ISGP for discharges. Please explain how stormwater from the site is regulated beyond the monitoring and reporting requirements in the permit and ensure stormwater discharges from this facility is regulated consistent with similar large industrial stormwater discharges.

    G-P does not discharge under the Industrial Stormwater General Permit (ISGP). Stormwater from the facility is covered under this NPDES permit. The requirements of the NPDES permit are consistent with the ISGP as follow:

    - *Monitor pollutants consistent with similar industries, per condition S14.A. These pollutants are the same as those identified for industries with the same SIC in the ISGP.*
    - *Evaluate and implement management options based on the monitoring, per condition S14.B. These management options are similar to the operation source control and treatment BMPs identified in the ISGP.*
    - *Capture and treatment of stormwater, under S1.A. This is consistent with the highest level response (Level 3 treatment BMPs) identified in the ISGP.*
    - *Stormwater management plan, including BMPs.*

Permit conditions S1 and S14 incorporate the requirements from the ISGP. The monitoring plan and report update assures that the facility continues to comply with the requirements.

27. The permit requires the Permittee to implement the AKART (i.e. level of treatment) determination regarding the filter backwash in accordance the January 2013 AKART study. The EPA recommends Ecology impose an enforceable implementation date in the permit. Ecology's approval of a schedule may only be enforceable through the permit or a separate administrative order.

    The AKART treatment is to route the filter plant back to G-P's wastewater treatment system. The treatment system has the capability to treat this flow to meet water quality standards.

    G-P is currently reviewing its filter plant operations and conducting an engineering assessment to end the use of the filter plant, thereby eliminating this source of the discharge. If the filter plant is shut down permanently, AKART treatment on the filter backwash will no longer be a requirement. In consideration of this option, Ecology does not set an AKART implementation date.

28. Page 11. (Industrial process description) and Page 15 (Technology-based effluent limits) - The fact sheet does not adequately describe the industrial process to easily confirm the appropriate TBELs have been applied. The fact sheet does indicate type of bleach process and whether chlorine bleaching is employed or whether chlorophenolic-containing biocides are used. The EPA recommends Ecology more clearly explain the development of TBELs.

    Ecology added a narrative describing the production in each subcategory and the "building block" method used to derive TBELs. The narrative also described production subcategories and production rates used to calculate limits for conventional and non-convention pollutants. The revision is on pages 15-16 of the Fact Sheet.

29. Page 12. Table 4. The fact sheet presents wastewater characterization data for outfall 002, which shows discharge at an average flow rate of 15.4 mgd, and pollutant concentration data for ammonia and some metals. However, the fact sheet does not include reasonable potential analysis to determine if effluent limits are needed for the known pollutants of concern. Given the data presented in the fact sheet, Ecology must evaluate the discharge for reasonable potential and set limits if needed for all known pollutants of concern.

    Outfall 002 flow (15.4 mgd) includes stormwater from the City of Camas (along Blue Creek), freshwater overflow from Lacamas Lake and intermittent backwash from G-P's filter plant backwash. Because of this co-mingling, Outfall 002 is not representative of pollutants in G-P's discharge. Table 4 data for Outfall 002 cannot be used to conduct reasonable potential analysis on G-P's discharge. As G-P's discharge consists of lake water, there is no reasonable potential to exceed water quality criteria.

    To confirm, Ecology did a reasonable potential analysis on Outfall 002 for ammonia, nitrate/nitrite, lead, zinc, chromium, and nickel (see the following table). This analysis is an inaccurate, but conservative estimate of G-P's impact at Outfall 002. The analysis shows *that, with pollutant contributions from multiple sources, there is no potential to exceed water quality criteria for these pollutants at Outfall 002.*

Reasonable Potential Analysis of Outfall 002 Discharge

			Ammonia-NH_3	Pb	Zn	Cr-hex	Cr-Tri	Nitrate/Nitrite-N	Ni
Effluent Data	# of Samples (n)		1	1	1	1	1	1	1
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Conc., µg/L (max. or 95th perc.)		0.056	0.28	2	0.7	0.7	0.61	1.3
Receiving Water	90th Percentile Conc., µg/L		0.01	0.02	0.88	0.2	0.2	-	17
Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	5,722	37.96	75.913	369	369	-	939.43
		Chronic	930	1.48	69.32	119.7	119.7	-	104.33
	Protection of Human Health, µg/L		-	-	-	-	-	10E3	610
	Metal Criteria Translator, decimal	Acute	-	0.466	0.996	0.316	0.316	-	0.998
		Chronic	-	0.466	0.996	0.86	0.86	-	0.997
	Carcinogen?		N	N	N	N	N	N	N

Aquatic Life Criteria

Effluent percentile value			0.095	0.095	0.095	0.095	0.095	0.095	0.095
s	$s^2=\ln(CV^2+1)$		0.56	0.56	0.56	0.56	0.56	0.56	0.56
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.05	0.05	0.05	0.05	0.05	0.05	0.05
Multiplier			6.20	6.20	6.20	6.20	6.20	6.20	6.20
Max concentration (µg/L) at edge of…		Acute	0.347	0.809	12.346	1.371	1.371	3.781	8.041
		Chronic	0.347	0.809	12.346	3.731	3.731	3.781	8.033
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**NO**

Human Health Criteria

s	$s^2=\ln(CV^2+1)$	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Pn	Pn=(1-confidence level)1/n	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.49	2.49	2.49	2.49	2.49	2.49	2.49
Dilution Factor		1	1	1	1	1	1	1
Max Conc. at edge of Chronic Zone, µg/L		0.14	0.70	4.98	1.7	1.7	1.52	3.24
Reasonable Potential? Limit Required?		**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**NO**	**NO**

30. Page 12, Compliance with Permit Limits. The EPA recommends the fact sheet provide information regarding the facilities compliance with the TMDL WLA. The effluent concentration data shows the concentration of TCDD is below the detection level. It would be helpful to distill this information as it relates to the mass-based effluent limit for TCDD in the permit. In other words, based on the concentration of TCDD in the final or bleach plant effluent and discharge flow data, has the facility complied with the permit limit and TMDL WLA.

Per EPA's recommendation, Ecology included the analysis of how compliance with the TMDL WLA is demonstrated. This analysis is incorporated into the Water Quality Impairment discussion (page 28 of the Fact Sheet).

31. Page 60. The EPA recommends reasonable potential analysis (RPA) for pH be performed assuming worst-case conditions for both low and high pH at chronic conditions to demonstrate the discharges at the permitted pH limits will not contribute to water quality standards violations. The analysis should be done using the lowest ambient water pH value (or a low percentile value e.g. 5th percentile) paired with the low pH effluent limit to evaluate RP for low pH. Additionally, the analysis should be done using the highest ambient water pH value (or a high percentile value e.g. 95th percentile) paired with the high pH effluent limit to evaluate RP for high pH. A low percentile value of the data set for receiving water and effluent alkalinity should be used to better represent a worst-case scenario.

    Per EPA's recommendation, Ecology ran the pH modeling analysis with the following input:

    - *Maximum pH in the receiving water of 7.99, maximum effluent pH of 8.3 (Table 26)*
    - *Minimum pH in the receiving water of 7.12, minimum effluent pH of 6.7 (Table 27)*

    Conservative values for the receiving water alkalinity (the lowest available data based Washougal River contribution) and effluent alkalinity were included in the modeling input. These inputs considered the worst-case scenario. The resulting model showed worst case pH expected at the edge of the mixing zone are 6.8 and 8.24. The results meet the pH water quality criteria range of 6.5 to 8.5. The effluent has no reasonable potential to exceed water quality.

32. 1. Comments Addressing Applicant's Effluents Containing Poly-Chlorinated Dibenzo Dioxins (PCDD) and Poly- Chlorinated Dibenzo-Furans (PCDF)

    1.1 Final Issuance of the Department of Ecology's Draft Permit is Unlawful as Proposed; the Draft Permit's 2,3,7,8- Tatrachlorodibenzo-dioxin Allowed Daily Waste Load is Over Three Times Higher than the Allowed and Required Final EPA TMDL Wasteload Allocation.

    On February 25, 1991, the U.S. Environmental Protection Agency, Region 10, published a final "Total Maximum Daily Loading to Limit Discharges of 2, 3, 7, 8-TCDD to the Columbia River Basin."[1] No subsequent amendments or changes to the 1991 TMDL are shown at or published at EPA Region 10's TMDL website. As a result, Commentors assert that the February 25, 1991 EPA TMDL as published describes the of 2, 3, 7, 8-TCDD congener wasteload allocations for Applicant's PCDD/PCDF-containing discharges.

    This EPA TMDL specifically addresses both the Camas mill and the specific Columbia River stream segment adjacent to the Camas mill.

    Attachment #1 shows Table 3-2 ["Wasteload Allocation Options for Chlorine-Bleaching Pulp Mills"] and Table 4-1 shows the final "Wasteload Allocation Options for Chlorine-Bleaching Pulp Mills in Context of Watershed Targets."

Table 3-2 shows that the James River, Camas, WA mill TMDL recommendation was based on the facility's 1650 tons/day of production of bleached pulp at the time. The James River mill was subsequently acquired by the Applicant for the present permit renewal.

Table 4-1 shows that the Camas, WA mill was assigned a 2,3,7,8- TCDD waste load allocation of 0.42 mg/day. The EPA TMDL indicates that it:

"Established waste load allocation to individual pulp mills which use chlorine bleaching, at this time. Use equal mass discharge per unit production (Table 3-2, Option2) to allocate waste loads to individual pulp mills in that source category. NPDES permit limits for these pulp mills must be consistent with this TMDL."[2]

U.S. EPA 2,3,7,8-TCDD TMDL also cites 42 U.S.C §1314(1) as requiring an individual control strategy for individual mills, indicating:

> "An ICS [individual control strategy] may be a draft or a final National Pollutant Discharge Elimination System (NPDES) permit. The §304(1) lists developed from Washington, Oregon, and Idaho have identified dioxin levels in the Columbia, Snake, and Willamette Rivers as exceeding applicable water quality standards. Limits included in ICS's, developed under §304(1), must be consistent with waste load allocations (WLAs) where a TMDL has been established."

Department of Ecology rules on effluent limitations, water quality standards and other requirements for permits require:

> "Any permit issued by the department shall apply and insure compliance with all of the following, whenever applicable….Any more stringent limitation, including those necessary to:

(i) Meet water quality standards, treatment standards or schedules of compliance established pursuant to any state law or regulation under authority preserved to the state by section 510 of the FWPCA; or

(iii) **Implement any applicable water quality standards: such limitations to include any legally applicable requirements necessary to implement total maximum daily loads established pursuant to section 303(d)** and incorporated in the continuing planning process approved under section 303(e) of the FWPCA and any regulations and guidelines issued pursuant thereto:……"[3] [emphasis added]

The present final EPA 2,3,7,8-TCDD TMDL waste load allocation of 0.42 mg/day is required to be applied by these federal and state regulatory requirements for any 2.3.7.8-TCDD maximum daily loading limit in any permit issuance for Applicant's NPDES renewal. The failure of the Department of Ecology to make this change in the draft permit gives rise to a basis for appealing any issued permit in the present proceeding.

The 2,3,7,8-TCDD loading limitations contained in the present, previously issued permit from 2008 and the present proposed draft permit as published both contain maximum daily loading limits for 2,3,7,8-TCDD loading limits of 1.31 mg/day. This means that the currently-in-effect final permit and proposed draft permit are both elements of an erroneous and unlawful Department of Ecology present and past determinations that the1.31 mg/day loading limit was appropriate, acceptable, complied with the EPA TMDL and would result in compliance with water quality standard limitations for 2,3,7,8-TCDD.

Commentors assert that the 2008 permit maximum allowable 2,3,7,8-TCDD effluent limitation of 1.31 mg/day shown in Attachment #2 in the 2008 permit main effluent limitation table was a previous illegal and unlawful final decision, and product of DOE's erroneous determination on the proper and acceptable water quality based 2,3,7,8-TCDD waste load allocation and water quality based effluent limitation required of 0.42 mg/day as published in the EPS TMDL.

That Applicant's mill has modified it's bleaching processes since 1991 and lowered its total bleached pulp production from 1650 tons per day to less than 1000 tons per day presently is not justification or validation for the Department of Ecology to increase allowed 2,3,7,8-TCDD effluent loading to 1.31 mg/day as it did in the 2008 permit and the present draft permit.

The Federal Clean Water Act, EPA regulations on water quality-based effluent limitations and Department of Ecology rules for NPDES permit effluent limitations all require that the draft permit be amended to reduce allowable 2,3,7,8 TCDD loadings to no more than that allowable by the EPA TMDL waste allocation provided for this facility at 0.42 mg/day. In addition, Commentors petition the Department of Ecology to publicly explain how and why previous permits were issued to the Applicant containing 2,3,7,8- TCDD effluent loading limits that did not comply with the EPA TMDL requirements and set forth this explanation for public consumption in it's DOE response to comments.

[1]The Columbia River 2,3,7,8-TCDD TMDL is available at http://yosemite.epa.gov/R10/WATER.NSF/TMDLs/Approved+TMDLs
[2]Ibid, EPA TMDL, p. 4-1
[3]WAC 173-220-130(1)(b), in part

The comment is consistent with EPA's comment #19 and the Columbia Riverkeeper's comment #54. Ecology revised the 2,3,7,8-TCDD (dioxin) TMDL limit based on the comments received. The maximum daily limit is revised from 1.3 mg/day to 0.62 mg/day. Ecology also incorporates the WLA of 0.42 mg/day into an average limit. The derivation of these limits are based on EPA's Technical Support Document for Water Quality-based Toxic Control.

Ecology reviewed discharge data for compliance with the revised limits. The review is on page 28 of the Fact Sheet. The discharge is in compliance with the 0.62 mg/day maximum and 0.42 mg/day average limits because the analytical detection limit is low (5 pg/L or less). The permit will require G-P to achieve the analytical detection limit at 5 pg/L or lower to maintain compliance. Based on discharge data, the laboratory has been able to achieve detection limit lower than 5 pg/L. Permit condition S1.A footnote c requires additional reporting and re-sampling to demonstrate compliance.

Mr. John Williams Research at Williams Research (Comments 33-49)

33. 1.2 Comments Addressing Required EPA Method 1613B Analytical Determinations for Polychlorinated Dibenzodioxin/Furans

1.2.1 The Application Does Not Contain Information that Certifies, Demonstrates, Shows or Indicates Whether and How Applicant Has Complied with Final Effluent and Process

Wastewater Analytical Determination and Analytical Procedures under EPA Method 1613B for 2,3,7,8- TCDD/2,3,7,8- TCDF for the Past, Submitted Analytical Determinations.

Both the previously issued permit for Applicant in 2008 and the 2015 draft NPDES permit both have provisions requiring Applicant to use EPA Method 1613B[4] for wastewater analytical determinations.

Applicant has submitted some 2,3,7,8-TCDD and/or 2,3,7,8-TCDF data in Tables B-12, B-13, B-14, and B-15. However, the data in Tables B-13 to B-15 are not provided with any certification by the Applicant or by the Applicant or by Applicant's contract laboratories, or any supporting narrative that shows, certified or demonstrates that the 2,3,7,8-TCDD/2,3,7,8- TCDF were carried out in compliance with all elements of EPA's analytical methodology for EPA Method 1613B.

Applicant's submitted Form 2C, Section VIII indicates Applicant used Vista Analytical Laboratory of El Dorado Hills, CA for dioxin and furan pollutant analysis for Table B-13 to B-15. However, Applicant omitted **all** Vista Analytical Laboratory reports from supplementation provided, and no such documentation has been provided at all in the Applicant's submittal.

Applicant did include limited, very summary documentation for 2,3,7,8- TCDD/2,3,7,8 TCDF analytical determinations. However ALS documentation cannot be considered to be a certification or demonstration by the Applicant that all elements of EPA Method 1613B were carried out according to EPA's requirements and standards.

Commentor's assert Applicant's presently provided laboratory documentation for its submitted 2,3,7,8-TCDD/2,3,7,8-TCDF analytical determination is incomplete and, as a result, Applicant's submittal was improperly determined as technically complete during the Department of Ecology permit application process for Applicant failure to properly document submitted 2,3,7,8-TCDD/2,3,7,8-TCDF effluent and analytical information.

[4]EPA Method 1613B is available at this URL:
http://water.epa.gov/scitech/methods/cwa/organics/dioxins/index.cfm

Ecology accepts permit applications for completeness of information adequate to start the permit writing. Errors in a completed application may be found and corrected through the permitting process. This practice is a part of the permit renewal process.

The application Form 2C noted that Vista Analytical performed the analyses for dioxin (2,3,7,8-TCDD) and furan (2,3,7,8-TCDF). The lab currently conducting the analyses is ALS Environmental-Houston HRMS.

Ecology does not require the permit application to have labs provide a narrative of compliance with EPA-approved methods. To demonstrate compliance, labs must:

1) Be accredited per WAC 173-220-210(4). As part of the accreditation, labs must have QA/QC plans to show compliance with EPA-approved methods; and

2) Provide quality control reports. The report must describe deficiencies and flag results that did not meet QA/QC.

ALS Environmental-Houston provided analytical reports and QC reports, which G-P included as part of the application. The lab is also accredited for dioxin and furan analyses *(accreditation #C819-14). The accreditation information is available on Ecology's website Lab Search Database. Therefore, Ecology does not require additional information and considered the documentation to be complete.*

34. 1.2.2 The Fact Sheet Contains No Finding or Review by the Department of Ecology that Applicant's Submitted 2,3,7,8-TCDD/2,3,7,8-TCDF Analytical Determinations Were Properly Determined According to EPA Method 1613B

Commentor's can find no evidence, statements or claims in the Fact Sheet that the Department of Ecology has reviewed Applicant's submitted 2,3,7,8-TCDD/2,3,7,8-TCDF analytical determinations and supporting laboratory information to verify that Applicant's submitted laboratory results were produced in compliance with the method requirements of EPA 1613B.

EPA Region 10 has published data acceptance evaluation criteria for 2,3,7,8-TCDD/2,3,7,8-TCDF laboratory determinations and their acceptance for quality assurance/quality control acceptance criteria.[5] Commentors can see no evidence from the Fact Sheet that the Department of Ecology has evaluated Applicant's submitted 2,3,7,8-TCDD/2,3,7,8-TCDF analytical determinations and has analyze dthem according to the requirements of both EPA Method 1613B and EPA Region 10's recommended quality assurance review and data acceptability criteria.

More specifically, Commentors note that some of Applicant's submitted results from ALS Environmental for 2013 TCDD/TCDF analytical work and samples had spike recovery efficiencies below 60-70%.

[5]Available at the following URL:
http://www.epa.goc/region10/pdf/qa/final_PCDD_PCDF_validation_guidelined_EPA_910_R_14_003.pdf

Ecology's Fact Sheets do not contain a separate section to discuss laboratory review. Review of lab methods and performance is conducted under Ecology's laboratory accreditation program, and is outside of the scope of this permit. Ecology reviewed the lab for criteria as described in Response #33 above. Ecology also requires labs to flag data that are out of range for QC/QA (e.g. spike recoveries, contaminated blanks).

35. 1 Comments Pertinent to Required NPDES Application Element Deficiencies in Applicant's Submittals on Facility Physical Process and Water Balance Identification and Documentation, and Outfall and Process Wastewater Stream Identification and Sample Locations

Applicant failed to submit a facility process flow diagram with a water balance and descriptions of the individual site process units and cooling water circuit that generate or transfer process wastewater or cooling water. Such information is required under 40 C.F.R §122.21(e) & (g) in sufficient detail to allow the public to identify wastewater generating elements of the facility. Such information is also necessary to determine whether the facility's design elements are acceptable best management practice design and operational features as effluent limitation elements for the facility.

The permit application Appendix C contains schematics of wastewater flow. The schematics contain all treatment units, flow rates, and water balances as required by 40 CFR 122.21. G-P also included sources of its water and processes that generate wastewater. Ecology reviewed the information provided and determined that the schematics are sufficient for the purpose of permit drafting.

Ecology understands some people would like more detail on the wastewater system. This additional information is accessible at Ecology's headquarters office in Lacey. Requests for copies can be made via e-mail or by the phone number listed on the Fact Sheet.

36. Applicant did not identify, disclose or demonstrate all locations or physical sampling points where compliance with effluent limitations is measured for Outfall #001 and #002 and for the "Bleach Plant" internal waste stream. Applicant should have identified these physical sampling point locations or otherwise certify that the samples were collected at the physical outfall locations or internal sewer sampling points to be identified. Given the location of Outfall #001 such physical outfall opening near the bottom of the Columbia River is not the usual sampling point. The application should clearly delineate all specific sampling points in use or required under the permit.

    G-P included the latitude and longitude of each outfall in its NPDES permit application. The application form and 40 CFR 122.21 do not require G-P to specify physical sampling points.

    The permit requires a sampling point to be representative of the effluent, but does not specify an exact location. The permit takes into consideration unanticipated events or conditions that may leave the sampling point inaccessible or unsafe. In such cases, sampling may be moved to another representative location to comply with the permit.

37. More specifically the Bleach Plant sewer should at least be defined as an internal waste stream with a numeric outfall descriptor for physical sampling/monitoring point for all enforceability, accountability and monitoring reproducibility purposes.

    The bleach plant effluent is discharge to the sewer and another treatment unit. Because the effluent does not flow directly to a water body, Ecology did not identify it with an outfall number. However, the bleach plant effluent is an enforceable monitoring point and documented in Ecology's tracking systems. G-P includes the monitoring results in the facility's discharge monitoring report (DMR).

38. 2 Applicant Has Not Demonstrated Compliance with All Bleach Plant Internal Waste Stream Effluent Limitations and Monitoring Requirements of the 40 C.F.R. Part 430 Effluent Limitation Guidance and EPA Internal Waste Stream Monitoring Requirements as a Result of the Failure of the Department of Ecology to Establish Effluent Limitations and Monitoring Requirements for One of the Two Site Bleaching Process Lines and Associated Plant Sewers Attachment #5 shows Figure C-1 and C-2 of the Application (the submitted unacceptable line drawing and water balance as indicated by a criticism a prior portion of this comment) which nevertheless shows that bleaching process line effluents from the two bleach plants have two different sewering dispositions at the site.

Figure C-1 shows one bleach process line sewer with a flow of 5.6 MGD. This particular bleach plant appears to be designated as "K5" by other data shown in the particular bleaching line sewer is routed to the first aeration basin instead of to the primary clarifier.

Figure C-1 also shows a bleach plant line effluent of unknown volume which is part of a 13.2 MGD general process sewer "main tailrace." Applicant apparently does not monitor with an internal monitoring point the bleach plant effluent from the process bleaching line sewering to the "main tailrace" as no such data was submitted or identified. The Department of Ecology draft permit impermissibly does not identify any internal monitoring point as required for this specific process bleaching line.

EPA's Part 430 Effluent Limitation Guidance requirements binding on the Applicant and the permit issuance process conducted by the Department of Ecology requires the following:

> "(e) Pursuant to 40 CFR 122.44(i) and 122.45(h), a discharger must demonstrate compliance with the effluent limitations in paragraph (a)(l) or (b)(3) of this section, as applicable, by monitoring for all pollutants (except for AOX and COD) at the point where the wastewater containing those pollutants leaves the bleach plant. The permitting authority may impose effluent limitations and/or monitoring requirements on internal waste streams for any other pollutants covered in this section as appropriate under 40 CFR 122.44(i) and 122.45(h)"[1]

The Part 430 requirement define "Bleach plant" as:

> "All process equipment used for bleaching beginning with the first application of bleaching agents (e.g. chlorine, chlorine dioxide, ozone, sodium or calcium hypochlorite, or peroxide), each subsequent extraction stage, and each subsequent stage where bleaching agents are applied to the pulp. ……Process equipment used for oxygen delignification prior to the application of bleaching agents is not part of the bleach plant."[2]

Part 430 further defines "Bleach plant effluent" as:

> "The total discharge of process wastewaters from the bleach plant from each physical bleach line operated at the mill, comprising separate acid and alkaline filtrates or the combination thereof."[3]

The consequence of the specific definition of "bleach plant" and "bleach plant effluent" together with the requirements of 40 C.F.R. §430.24(e) is that EPA requires internal waste together with the requirements of 40 C.F.R §430.24(e) is that EPA requires internal waste stream monitoring and the resulting maintenance of compliance with such bleach plant effluent limitations on the totality of effluent flow from both bleach plant lines.

The draft permit and Applicant-submitted effluent characterization data only addresses the single K-5 bleach line and its effluents, and not the other bleaching line effluents that is presently discharged to the main tailrace. For the subject facility, "bleach plant effluent" clearly is the totality of flow from both plants, The Applicant and the Department of Ecology are impermissibly ignoring the bleaching line other than the K5 bleach plant in a manner that violates the permit issuance requirements pertinent to 40 C.F.R §430.24(e).

The draft permit should not issue without a specific amendment by Applicant to the permit application to include effluent characterization of the other bleach line sewer, and the

Department of Ecology must require an internal monitoring and sampling point to address sewered effluents from this unaddressed bleaching process at the facility.

[1]40 C.F.R §430.24(e), in part

[2]40 C.F.R §430.01(c), in part

[3]40 C.F.R §430.01(d)

The comment addressed two streams: K5 bleach line (K3 and K4 were shut down); and the bleach line to Main Tailrace. Each are discussed below:

- *The K5 bleach line: G-P identified this stream as bleach plant effluent. The facility monitors for chlorinated organic compounds as required in 40 CFR 430.24. As noted in the comment, this flow is to the Corrosive Sewer. This sewer is a separate line from the Main Tailrace and the Processing Sewer and does not flow to the primary clarifier.*
- *Flow to the Main Tailrace: Ecology and G-P visually inspected the source of this flow following the receipt of this comment. We found that the "bleach plant" flow is mislabeled. This stream is overflow from storage tanks containing feeds/pulp to the paper machine. As such, it does not meet the definition of bleach plant effluent as "process wastewater from the bleach from each physical bleach line operated at the mill." This stream is part of the paper machine process (identified as PM on the permit application). As this is not bleach plant effluent defined in 40 CFR Part 430.24, internal monitoring for chlorinated organics and limits do not apply.*

Based on Ecology's review, no additional monitoring is required for the above streams. To clearly identify the bleach plant effluent, Ecology requested G-P to re-label the flow to the tailrace in subsequent reports and applications.

39. 1 Miscellaneous Comments

1.1 Draft Permit Table on "Summary of Permit Report Submittals" is Ambiguous

The table in the proposed permit "labeled" "Summary of Permit Report Submittals" on page 5 of the Department of Ecology (DE) draft permit for "First Submittal Date" legends under S5 (permit renewal), S10A (acid toxicity test) and S.11A are ambiguous as published, showing "enter a specific date" rather than a deterministic date required by any permit condition of the permit.

The submittal dates are based on permit issuance and expiration dates. These are currently in the permit as described below.

- *Condition S5 - Page 24 states that renewal application is due 180 days prior to permit expiration*
- *Conditions S10.A and S11.A - Page 5 (under the "Frequency" column) notes that acute and chronic toxicity test reports are also due with the permit application.*

The permit issuance and expiration dates have not been confirmed as of the date of this writing. Ecology will fill in the specific dates with the issuance of the permit.

40. 2. Neither Applicant Nor the Department of Ecology Have Properly Addressed the Matter of Total Residue Chlorine in Applicant's Process Wastewater and Non-Contact Cooling Water Effluents With Implications for Narrative Water Quality Standard Compliance and Compliance for Technology-Based Effluent Limitation Requirements for Total Residual Chlorine

Applicant's submittal is incomplete and non-approvable as a result of Applicant's failure to provide proper process wastewater and cooling water effluent characterization on Total Residual Chlorine (TRC) sufficient to ensure discharges do not violate Narrative Water Quality Standards.

The facility's NPDES permit application contains an NPDES Form 2C-Section V effluent characterization with Applicant declaring Total Residual Chlorine (TRC) as "BELIEVED ABSENT" for both Outfall #001 and #002 (See Attachment #3).

At the end of each outfall Section V form was the following Applicant declaration:

> "Total Chlorine Residual and Sulfite (CAS# 14265-45-3) were not tested due to the limited hold times of each parameter and the inability to have them tested by out laboratory with a sufficient amount of time. However, testing results for those parameters were submitted with the last NPDES Permit Application for the Camas Mill. Since that time, no major changes to the process have occurred and results would be expected to be similar. There result for the Total Chlorine Residual was <0.1 mg/L and the result for Sulfite was <2 mg/L. Further, as per a conversation with the Mill's Pulp and Paper Unit Supervisor (March 29, 2013) marking the column "Believed Absent" would be acceptable.

Applicant's declaration is not a sufficient basis to require testing and monitoring of TRC effluents for both site Outfalls, or a sufficient, proper or acceptable basis for Applicant checking the "BELIEVED ABSENT" box on its application forms for the Outfall #001 and #002.

First, there is sufficient process-related basis to consider that a chlorine dioxide bleaching mill will likely have Total Residual Chlorine in process wastewater, and Applicant shows Sodium Hypochlorite mas an additive used at the mill [probably in a cooling water circuit].

Second, Applicant variously referred to TRC results of <0.1 mg/L or, 0.02 mg/L indicating Applicant is using a method with similar detection limits. However, these sample detection limitations are not sufficient to characterize lower aqueous concentrations of TRC with known negative consequences below such concentrations. EPA has published water quality criteria for Total Residual Chlorine which provide:

> "The procedure described in the "Guidelines for Deriving Numerical National Water Quality Criteria for the protection of Aquatic Organisms and Their Uses" indicate that, except possibly where a locally important species is very sensitive, freshwater aquatic organisms and their uses should not be affected unacceptably if the **four day average** concentration **does not exceed 11 ug/L more than once every three years on average** and if the **one-hour average concentration does not exceed 19 ug/L more than once every three years on average.**"

Finally, Applicant admitted measure at least two quantified concentrations of Total Residual

Chlorine beyond their method detection limit in the Outfall #001 final effluent as shown in the whole effluent toxicity reports as shown in Attachment #4 as part of the Application.

The Applicant is attempting to evade clear requirements to fully characterize their present TRC effluents from Outfall #001 and #002. The collateral and resulting consequences of this evasion is Applicant's failure to properly meet NPDES Application completeness standard requirements at 40 C.F.R. § 122.21 (e) for application information content required by 40 C.F.R. § 122.21 (f), including effluent characteristics required by 40 C.F.R. § 122.21 (g)(7)(i) and (vi)(A). Collateral to that failure is the resulting failure of the Department of Ecology to properly determine and regulate Applicant's facility with the required technology-based and water-quality based effluent limitation and TRC continuous monitoring requirements.

(no footnote in section, but footnote added at end of section) [1]EPA Ambient Water Quality Criteria for Chlorine- 1984; EPA 440/5-84-03D, pdf page 25-26, document available at: http://water.epa.gov/scitech/swguidance/standards/upload/2001_10_12_criteria_ambientwqc_chlorine1984.pdf

As noted in Response #33, G-P's application is complete and adequate for permit drafting. Applications with errors or incorrect inferences are not automatically considered incomplete. Ecology may address incorrect information as part of the permitting process (drafting, entity review, public review and comment, etc.) Ecology does not require G-P to resubmit the application.

In the permit application, G-P inferred Total Residual Chlorine (TRC) to be absent in the effluent. G-P based this conclusion on accredited TRC analyses, which showed non-detect. These analyses are more likely to be accurate than measurements taken during toxicity testing in Attachment #6 of the comment. This is because CH2M Hill lab in Corvallis has accreditation for toxicity testing, but <u>not</u> for TRC Method 4500. G-P's declaration is reasonable, as Ecology does not set limits for parameters that are unaccredited.

To further investigate the concerns raised in the comment, Ecology assumed TRC to be present in the effluent and used TRC data from the toxicity testing to evaluate "reasonable potential to exceed" the water quality criteria for TRC. The analysis used the EPA-approved statistical method in <u>Technical Support Document for Water Quality-based Toxics Control</u> (EPA/505/2-90-001, March 1991). The analysis applied the maximum effluent concentration and considered mixing zones dilution factors of 8.7 for acute and 70.2 for chronic. The input and results of the analysis are as follow:

- *Maximum effluent concentration = 50 µg/L TRS*
- *Coefficient of variation (CV) = 0.6*
- *Ln (CV^2 + 1) = 0.555*
- *Multiplier = 2.14*
- *Concentration at edge of acute mixing zone = 12.3 µg/L TRS*
- *Concentration at edge of chronic mixing zone = 1.5 µg/L TRS*

The results showed that TRS at the edge of the mixing zones are below water quality criteria of 19 µg/L for acute and 11 µg/L for chronic. TRS in the discharge has no reasonable potential to cause exceedance of water quality criteria and no additional monitoring is required.

41. At Attachment 6, we have included the National Marine Fisheries' letter regarding the Weyerhaeuser Mill's NPDES renewal. We believe the NMFS' comments apply to the G-P discharges also. The permitted levels of metals and chlorinated compounds will harm and stress the aquatic species in the Columbia River, even though the permitted levels of pollutants may at first blush comply with water quality standards. Specifically, the G-P NPDES Fact Sheet at Table 2 shows ambient River levels of Copper and Zinc at 1.27 and .88 ug/l, respectively. Table 3 shows the Mill will add wastewater containing copper as high as 5.3and zinc as high as 89.3 ug/l. (Converting those concentrations from total to dissolved apparently allows for a 20% reduction, according to the NMFS letter)

The NMFS letter at p.3 states that (dissolved) copper at concentrations over 2.0 ug/l and (dissolved) zinc at 5.6 ug/l will exceed the NMFS thresholds for harms to Endangered Species Act (ESA) –listed species. For these reasons, the G-P Mill's discharges of metals at the cited concentrations will cause and contribute to adverse impacts on ESA-listed species.

The Permit and Fact Sheet contain analyses of impacts of copper and zinc in the discharge. Ecology applied the EPA-approved statistical method in Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001, March 1991). This method determine "reasonable potential" to violate the water quality, by calculating the concentration zinc and copper at the edge of the mixing zones. Appendix C of the Fact Sheet (Table 23) showed the result of the analysis. The copper concentration at the edge of the chronic mixing zone is 1.54 µg/L, lower than NMFS criteria of 2.0 µg/L for protection of endangered species. The zinc concentration at the edge of the mixing zone 5.68 µg/L; this result appears consistent with NMFS criteria of 5.6 µg/L.

To confirm the effects of the effluent, Ecology also considered the results of whole effluent toxicity (WET) testing conducted in 2012 and 2013. Using EPA's protocols, the tests used fish and invertebrates and measured the effects on species mortality, growth, and reproduction. Tests results showed no toxicity.

42. We also adopt the NMFS discussion regarding how chlorinated compounds at concentrations which will harm endangered aquatic species in the receiving waters. These actions potentially constitute a "taking" of ESA-listed fish which is specifically not authorized according to Section S16.C of the draft permit.

Ecology notes NMFS comments and the shares concerns about the impacts of dioxin/furan and other bioaccumluative compounds.

To address these pollutants, EPA established federal limits to reduce the concentration in the discharge to the extent practicable. The limits are based on the minimum quantitation levels achievable by the labs. The minimum level is based on the detection limit. The detection limit is the level below which:

- *The presence of the pollutant is unknown; and*
- *The concentration of the pollutant, if present, is unknown.*

Because of the unknowns inherent in the laboratory methods, the impacts of pollutants (below detection limit) on ESA-listed species may be unclear.

The quantitation levels represent the lowest concentrations of an analyte that can be measured with suitable precision and accuracy. In the permit, Ecology required analytical results to meet the lowest MDL/QL that labs can reasonably achieve, with consideration for matrix interference. Appendix A of the permit contains a list of pollutants and their respective detection limits and quantitation levels.

43. The permit will omit COD monitoring requirements and discharge limits. However, the Mill's BMP assessment at 3.1 relies in part on testing and monitoring of COD. Since tracking of COD loading is an element of the BMP procedures, monitoring and limiting of COD should remain in the permit. The agency may need to compare the effluent concentrations for COD, to the Mill's internal COD monitoring result as part of their BMP.

    G-P conducts internal COD monitoring as a BMP. The BMP plan and its updates are already incorporated into the permit under condition S9.

44. The permit omits ammonia or phosphorus limits for the effluent. The Mill apparently adds these materials to the wastewater processing units. These materials can cause adverse water quality impacts at elevated concentrations. There are water quality standards for these materials and their concentrations should be monitored and subject to technology-based permits.

    The permit requires monitoring for ammonia and phosphorus in S2.A as part of the priority pollutant scan (Appendix A).

    G-P uses the compounds as part of its secondary treatment process. The compounds are nutrients to be consumed by micro-organisms as part of the treatment. Analysis in the Fact Sheet (Table 23, page 60) showed ammonia in the discharge has no potential to exceed the water quality standard. There is no water quality criteria for phosphorus at this time. Therefore, the permit does not contain limits for these compounds.

45. The permit reduces Chloroform monitoring to once every five years. However the permit still contains daily maximum and monthly average Chloroform limits. The permit and fact sheet should explain how Ecology can determine compliance with the daily and monthly limits, from just a single sample taken every 5 years.

    The Camas mill has eliminated elemental chlorine bleaching. Performance records from 2003 to 2009 showed that the facility was consistently below the limits on a monthly basis. Chloroform was less than half of the limit, indicating exemplary performance. Based on the data, Ecology reduced the monitoring frequency for chloroform.

46. The Permit omits requirements for the Mill to list its surfactants, algaecides, fungicides, biocides and like materials utilized to prevent fouling of its piping and process systems. As a result, reviewers are unable to determine the toxicity and potential water quality impacts from those chemicals. You explained that the scans and/or WET testing would "catch" the presence of these materials.

However scans would reveal the presence of these chemicals if they were virulently toxic. These chemicals may only be introduced to the mill effluent as intermittent "slugs," and in that case those would not be present in all WET effluent samples.

The Whole Effluent Toxicity (WET) testing is to address the effects of the discharge with all its constituents. The WET test protocols take into consideration the mortality, growth, and preproduction of fish and invertebrate. WET testing has been conducted over several permit cycles for this facility. Previous tests were quarterly, followed by 6 sampling events over the course of one year. The number and frequency of the tests provide sufficient data to cover the variability and address "slugs" of chemicals in the effluent.

47. The Application at C-4 states the Clarifier lacks a synthetic liner and is bottomed with clay. Likewise the aeration basins also lack synthetic liners. You stated the clarifier is periodically dredged to remove accumulated soils. Those solids have tested positive for detectable concentrations of dioxin.

    However the Fact Sheet at p. 36 claims the Mill does not discharge to groundwater. The Fact Sheet and other permit related documents lacks evidence that the clay bottoms of the clarifier and basins do not allow seepage of effluent into the groundwater, especially since the groundwater is likely high on that island. Dredging of the clarifier could also damage the clay liner and promote infiltration into groundwater. The Permit should contain certain requirements such as monitoring wells to insure the clarifier and basins are not discharging to groundwater.

    The clay liners at the clarifier and basins are designed to prevent seepage of wastewater to groundwater. G-P estimated that dredging of the ponds is needed every 5 to 15 years. In accordance with the treatment O&M manual, the dredging uses suction technology which minimizes disturbance of the clay liners. Therefore, Ecology will not require groundwater monitoring at this time.

48. The draft permit lacks a dissolved oxygen minimum for the effluent. A DO requirement would provide additional protection. Otherwise the Mill could shut down or truncate its water treatment operations and aeration as long as it maintained compliance with the BOD requirements.

    Ecology believes DO monitoring is not necessary to ensure proper treatment operations. The permit does not allow the facility to shut down or "truncate" the treatment, even if BOD is below the limits. These actions would constitute a "bypass." A bypass is regulated under 40 CFR 122.4(m) and condition S4.B of this permit.

49. The draft permit omits TCDD/TCDF monitoring requirements for the primary and secondary sludge. This omission weakens the permit even though sludge monitoring results in Table B-15 of the Application revealed detectable concentrations of TCDD/TCDF.

    The current 2008 permit did not contain a requirement for sludge testing. However, the accompanying Fact Sheet for the 2008 permit discussed sludge testing requirements for dioxin and furan. This discrepancy was also carried forward in the proposed permit and

Fact Sheet that was provided for public review. G-P followed the Fact Sheet and conducted the tests in 2009 and 2010. This is consistent with Ecology's intent.

Ecology revised the permit to be consistent with the 2008 Fact Sheet. Sludge testing requirements are now included in condition S2.A.of the permit.

Mr. Miles Johnson at Columbia Riverkeeper (Comments 50-56)

50. I. GP Camas toxic discharges may harm salmon and steelhead, and people who eat them. Discharges from the GP Camas mill contain toxic substances such as 2,3,7,8-tetrachlorodibenzo-p-dioxin (hereinafter "dioxin"), as well as furans, phenols, chloroform, and toxic metals. While Ecology proposes effluent limits for some of these pollutants, it is not clear that the Draft Permit's proposed limits would actually protect the Columbia River's Endangered Species Act- listed salmon and steelhead, and people who eat locally-caught fish.

Ecology notes the concern regarding dioxin and its impacts in the Columbia. The permit applied effluents limits based on the quantitation level (QL), which is consistent with the federal effluent guidelines. Dioxin in the discharge is below the quantitation level (QL). This means that dioxin is at such a low level that the laboratory method is unable to measure the actual concentration.

Labs may be able to lower the QL in the future with advancements in technology. At this time, the permit requires results submitted to meet the lowest QL and detection limit that labs can reasonably achieve (see Response #42).

51. 1. Ecology's fact sheet does not discuss bio magnification of persistent toxic chemicals like dioxins.

The Draft Permit and Fact Sheet do not adequately analyze factors like bio magnification, additive toxicity, and multiple exposure pathways that impact how toxic pollutants actually effect aquatic organisms. For example, Ecology states that "[t]oxic pollutants…are near-field pollutants; their adverse effects diminish rapidly with the mixing in the receiving water." This is not true with respect to persistent toxic pollutants like dioxins or PCB's, which can accumulate to dangerous levels in fish and other organisms even when ambient levels of these chemicals in the water are below thresholds that Ecology deems safe.

Ecology should revise the permit and Fact Sheet to explain and ensure that toxic pollution from the mill will not violate Washington's narrative water quality standards, which protect beneficial uses of the Columbia River like salmon and steelhead survival and human fish consumption. WAC 173-201A-510(1); WAC 173-201A-240. Specifically, the Fact Sheet should explain how bioaccumulation and bio magnification of extremely toxic pollutants such as dioxins and furans will impact aquatic organisms. Washington's narrative water quality standard for toxic pollution requires that toxic substances in a discharge not have the potential, either singularly or cumulatively, to harm sensitive aquatic life like salmon and steelhead, or adversely impact characteristic water uses like fish consumption.[1] Because the Fact Sheet does not discuss factors like bio magnification, additive toxicity, and multiple toxic exposure pathways regarding dioxin and its congeners, the effluent limits in the Draft

Permit may authorize toxic discharges that violate the narrative water quality standards, in violation of 40 C.F.R 122.44(d)(l)(i) and WAC 173-201A-501(l).

[1] Ecology, *Water Quality Program Permit Writer's Manual*, p. VI-4 (2011) (citing WAC 173-201A-240).

As noted in the comment, the Fact Sheet did not include discussion of bioaccumulative effects with respect to dioxin. The Fact Sheet referenced the February 1991 Total Maximum Daily Load (TMDL) study published by the EPA. The TMDL study contained discussions of the bioacccumulative effects. The study also contained an implementation plan to minimize the impacts and achieve compliance with water quality criteria in Chapter 173-201A WAC.

52. 2. Ecology must explain why the GP Camas mill cannot adopt Total Chlorine Free technology.

Ecology should have considered whether switching to total chlorine free technology would be reasonable, and therefore required. Every NPDES permit issued by Ecology must require the permittee to apply "[a]ll known, available, and reasonable methods of prevention, control, and treatment" to decrease pollution discharges. WAC 173-216-110(l)(a); WAC 173-216-020(l). This standard, commonly called "AKART," is the underlying legal standard for technology-based effluent limits in NPDES permits issued by Ecology. The use of total chlorine free technology would eliminate the mill's production of dioxins and some other toxics, but the Fact Sheet never even mentions this possibility. Instead, Ecology cites the 17-yearold federal standards for pollution control technologies at Kraft pulp mills and concludes- without explanation- that "G-P's" wastewater treatment system constitutes AKART." Fact Sheet, pp. 15-16. Technology to keep some of the most toxic chemicals on earth out of the Columbia River is known and available; Ecology must explain why it would not be "reasonable" for the mill to use this technology.

As suggested in the comment, Ecology updated page 17 of the Fact Sheet to include a discussion of the bleach plant AKART. The following information is added to the Fact Sheet:

"G-P completed the Total Chlorine Free (TCF) Study following the permit issuance in 2003. The results showed that it is unfeasible to convert from elemental chlorine free (ECF) to TCF bleaching due to high costs and global market outlook. This is evident as G-P's K3 bleach plant, which was converted to TCF in March 2000, was subsequently shut down in October 2001 because it had not been economically viable. Recent TCF studies by other Kraft mills are consistent with this analysis. Ecology determined that G-P's ECF process meets the bleach plant AKART."

53. 3. The dioxin effluent limit in the Draft Permit appears too high.
a. Why didn't the dioxin limit decrease based on the mill's decreased production?
The mill's total production has declined, so the amount of dioxin that the mill is allowed to emit should also decline. Otherwise, Ecology is allowing the mill to become less efficient at controlling at controlling dioxin pollution (a result that would violate the AKART standard). Ecology must, and has, set mass-based, production-normalized effluent limits for the pollutants in the mill's discharge. *See* Draft Permit, p.7. The Fact Sheet repeatedly explains that the mill's paper production has declined in recent years, and that the volume of effluent

has declined as a result. In order to maintain appropriate limits, Ecology decreased the mass-based, production-normalized effluent limits for BOD, TSS, AOX, and Chloroform in this version of the permit. *See* Fact Sheet, Table 17. The mass-based production-normalized effluent limit for dioxin, however, stayed the same. *Id.* If the mill discharges less total effluent, it should discharge less total dioxin- regardless of the existence of a 25-year old dioxin waste load allocation.

Comment noted. The dioxin limits in the permit are TMDL-based limits, based on EPA's Columbia River TMDL study. The study includes an implementation plan which took into consideration discharge from G-P and other sources to the Columbia. The revision of a dioxin limit would require comprehensive review and revision of the TMDL, as authorized by the EPA. Revision of TMDL limits is outside the scope of an individual NPDES permit.

54. b. The 1.31.mg/day limit for dioxin does not ensure compliance with the mill's waste load allocation.

The mill's proposed effluent limit for dioxin appears to be based on the waste load allocation in EPA's Total Maximum Daily Load ("TMDL") for dioxin discharges into the Columbia River.[2] However, the daily dioxin limit in the Draft Permit is not sufficient to ensure compliance with the mill's waste load allocation. The TMDL expresses the mill's waste load allocation as a long-term average of 0.41 mg/day (mg/day) of dioxin. Fact Sheet, p.27. The Draft Permit purports to meet that waste load allocation by imposing a maximum daily dioxin limit of 1.31 mg/day, and requiring monitoring just once a year. Draft Permit, pp.7, 11. EPA recommends an average monthly limit for dioxin- not just a daily maximum- to ensure that the mill complies with the TMDL's waste load allocation over the long term.[3] Furthermore, federal regulations require Ecology to apply an average monthly limit for dioxin in the permit. *See* 40 C.F.R. 122.45 (d)(l). Accordingly, the final permit must contain an average monthly (or annual) dioxin limit of 0.41 mg/day, in addition to the maximum daily limit, to ensure that the mill does not exceed its long-term waste load allocation. Applying only a maximum daily dioxin limit of 1.31 mg/day is not sufficient to ensure compliance with the TMDL.[4]

[2] See EPA, Total Maximum Daily Load to Limit Discharges of 2, 3, 7, 8-tetrachlorodihenzo-p-dioxim (TCDD) to the Columbia River (Feb. 25 1991).

[3] EPA, Technical Support Document for Water Quality-based Toxic Control, p.105 (March 1991).

[4] See Attachment 1: EPA, Comments on Draft Weyerhaeuser Longview NPDES Permit No. WA0000124, p.3 (Feb.14, 2014)

This comment is consistent with EPA's comment #19 (see Response #19 for discussion). Ecology revised the 2,3,7,8-TCDD (dioxin) TMDL limit based on the comments received. The maximum daily limit is revised from 1.3 mg/day to 0.62 mg/day. Ecology also incorporated the WLA of 0.42 mg/day into an average limit.

55. II. GP Camas' thermal pollution contributes to human-induced water quality violations; Ecology must set limits on the mill's thermal effluent.

Summertime temperatures in the Columbia River are too hot to support juvenile salmon and steelhead, and GP Camas' discharge exacerbate this problem. Ecology determined that juvenile salmon and steelhead need water cooler than 17.5° C (63.5° F) for rearing and migration. WAC 173-201A-200. According to the Fact Sheet, the summertime temperatures in the Columbia River at Camas already reach 21.5° C (70.7° F) for sustained periods of time-much higher than is safe for young salmon and steelhead. Fact Sheet, p.10. On top of that, the GP Camas mill discharges water that averages 22.8° C (73.0° F) and can be as hot as 31.2° C (88.2° F). *Id* at 12. The heat in the mill's effluent is making a bad situation worse and, by Ecology's own definition, harming the Columbia's ability to produce salmon and steelhead smolts.

Because the Columbia River's summertime temperatures exceedances are human caused rather than naturally occurring, Ecology may not allow the GP Camas mill to increase the temperature of the Columbia River. A basic rule of NPDES permitting is that discharges may not contribute to a water quality violation. WAC 173-201A-501(l). But as the preceding paragraph explained, that is precisely what the mill's discharge does. Ecology attempts to avoid this rule by relying on WAC 173-201A-200(l)(c)(i) and explaining that the mill's discharge will not increase water temperature by more than .3°C at the edge of the mixing zone.[5] Fact Sheet, pp.31-34. Assuming WAC 173-201A-200(l)(c)(i) comports with the Clean Water Act, Ecology's approach is illegal. WAC 173-201A-200(l)(c)(i)'s .3° C increase exception only applies when the receiving water is violating the applicable temperature standard "due to natural conditions." Nowhere in the Draft Permit or Fact Sheet does Ecology determine of assert that the summertime temperatures in the Columbia are 'due to natural conditions.' In fact, the Columbia's summertime temperatures exceedances were previously determined to be caused by humans.[6] Accordingly, Ecology must not permit GP Camas to contribute to the Columbia's temperature problems.

Ecology must set effluent temperature limits for the mill below the applicable water quality criteria of 17.5° C (63.5° F) for salmon and steelhead rearing and migration. *See* WAC 173-201A-200. Ecology must also require monitoring and reporting of the temperature of Outfall 001's effluent to ensure compliance with the temperature limit.

[5] Even if Ecology could legally allow an increase of .3° C, the point of compliance would be the end of the pipe, not the edge of the mixing zone. Application of AKART to a discharge is a pre-requisite for authorizing a mixing zone. WAC 173-201A-400(2). There is no evidence in the Draft Permit or Fact Sheet that the GP Camas mill has applied AKART with regard to temperature.

[6] See EPA, Draft Total Maximum Daily Load for Temperature in the Mainstream Columbia and Snake Rivers (2002).

As the comment noted, the temperature of the Columbia River is higher than the water quality criteria of 17.5ºC. The Columbia River is on the 303(d)-list, identifying it as impaired for temperature. Because the Columbia River is considered interstate waters, an EPA-developed TMDL is needed to address the impairment. The TMDL would assign the waste load allocations used to develop permit limits. At this time, there is no temperature TMDL for the Columbia.

Until the completion of a TMDL, Ecology's policy is to allow each point source to warm water at the edge of the chronic mixing zone by 0.3°C (Fact Sheet, page 34). Ecology estimates this would result in river temperature increase of 0.075°C or less, at full mixing for all human sources combined (Fact Sheet, page 35). G-P's discharge meets the policy's criteria as demonstrated by field temperature study from 2002-2006. Therefore, the permit will not require additional temperature monitoring. Monitoring and limits may be required by a TMDL in the future.

56. III. Outfall 002 to Blue Creek and the mill's filter backwash.

Riverkeeper understands that GP Camas is working towards eliminating the discharge of filter backwash into Blue Creek from the water filtration plant. The mill apparently intends to pipe the filter backwash into the mill's main wastewater treatment system which discharges through OF 001, or eliminate filtration (and filter backwash) entirely. A letter from Ecology to GP Camas purports to be an extension to a compliance schedule, giving the mill until May 1, 2016 to complete an AKART engineering report, and until November 1, 2016 to implement the chosen treatment approach.

River appreciates that the mill intends to stop discharging its filter backwash into the relatively small and highly impacted Blue Creek. Riverkeeper offers the following comments on Outfall 002 and the implementation of AKART for filter plant backwash:

- Blue Creek- not the Columbia River of Camas Slough- is the receiving water for Outfall 002. While the page 9 of the Fact Sheet admits this, and the January 2013 AKART study makes this clear, the Draft Permit obscures this point. Rather, page 10 of the Draft Permit cagily states that the mill may discharge water "to the Columbia River via the permitted location (Outfall 002)."
- Ecology never discusses the impacts of Outfall 002 on the water quality of Blue Creek. Ecology has an affirmative duty to ensure that permitted discharges will not cause or contribute to violations of water quality standards in receiving waters. WAC 173-201A-501(l). Fulfilling this obligation starts by describing the characteristics of the receiving waters. *See, e.g.*, Draft Fact Sheet, pp. 10-11. Based on the Fact Sheet, Ecology never considered the water quality in the relevant receiving water- Blue Creek- or whether or not the filter backwash from Outfall 2 will cause or contribute to water quality violations.
- GP Camas' forthcoming Engineering Report and AKART determination should have been subject to public review and comment in this permit renewal process. The requirements to ascertain and apply AKART goes to the very heart of the NPDES permitting process. Unfortunately, Ecology's practice of de-coupling AKART studies and analyses from the permit renewal process deprives the public of the ability to review, understand, and provide meaningful input on why a facility is or is not applying "all known and reasonable technology" to reduce water pollution.

The filter plant backwash discharges to Blue Creek, which flows to the Camas Slough. Camas Slough is an arm of the Columbia River. The use designations for Blue Creek are the same as those for the Columbia River. Likewise, the same water quality criteria are applied to Blue Creek and the Columbia (see page 27 of the Fact Sheet). Ecology referred to Blue Creek flow and Outfall 002 to Columbia interchangeably. To be consistent, Ecology revised the description on page 10 of Fact Sheet to include Blue Creek.

G-P's discharge to Blue Creek includes filter plant backwash and freshwater overflow from Lacamas Lake. The filter plant backwash will be eliminated, as noted in the comment. The Camas mill does not discharge process wastewater or industrial stormwater to this outfall. The lake water overflows are unlikely to cause violations of the water quality criteria.

Submittals, including AKART studies, are available for public review at Ecology's headquarters office in Lacey. The public also has to opportunity to comment at the time of permit renewal.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
WATER AND WATERSHEDS

MAR 23 2015

Ms. Cheryl Niemi
Washington Department of Ecology
Water Quality Program
P.O. Box 47600
Olympia, Washington 98504-7600

Re: EPA's Comments on Proposed Revisions to Washington's Human Health Criteria and New and Revised Implementation Provisions

Dear Ms. Niemi:

I am writing to submit the U.S. Environmental Protection Agency's comments on the Washington Department of Ecology's proposed human health criteria and new and revised implementation provisions issued on January 12, 2015. If adopted, this proposed rulemaking would revise the following sections of Washington's water quality standards:

- Human Health Criteria and Other Narrative Revisions (WAC 173-201A-240)
- Variances (WAC 173-201A-420)
- Intake Credits (WAC 173-201A-460)
- Compliance Schedules (WAC 173-201A-510(4))

The EPA fully supports Ecology's efforts to adopt human health criteria, and we appreciate the leadership that Ecology and the Governor's Office have shown thus far in developing Washington's human health criteria for toxics. Over the last several years, Ecology undertook an extensive public process to discuss options for rule development. The EPA supports Ecology's effort to use regional and local fish consumption data by proposing to adopt human health criteria based on a fish consumption rate of 175 grams per day. As we have previously stated, the best available data includes evidence of fish consumption rates well above 6.5 grams per day among high fish consumers in Washington, including tribal members with treaty-protected rights, which raises concerns that the human health criteria in effect for Clean Water Act purposes in Washington are not sufficiently protective. In fact, the best available data indicates fish consumption rates among some tribal members with treaty-protected fishing rights well above 175 grams per day.

Other elements of Ecology's rule proposal, such as its revision to the state's long-standing cancer risk level from 10^{-6} to 10^{-5}, do not fully reflect the best available science, including local and regional information, as well as applicable EPA policies, guidance, and legal requirements. Specifically, a cancer risk level of 10^{-5} does not provide appropriate risk protection for all Washington citizens, including tribal members with treaty-protected fishing rights, when coupled with a fish consumption rate of 175 grams per day or higher. By using a 10^{-5} cancer risk level, the state has substantially offset the environmental benefits of raising the fish consumption rate for carcinogenic human health criteria. For

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tribes with treaty-protected fishing rights, this approach to the cancer risk level will not advance health protections consistent with their treaty-reserved right to harvest and eat fish and shellfish. In addition, Ecology has not provided sufficient justification for its proposed 10^{-5} cancer risk level and how it will result in criteria that provide for the attainment and maintenance of the WQS of downstream waters, consistent with the EPA's regulations at 40 CFR 131.10(b). Finally, in addition to the fish consumption rate and cancer risk level, Ecology should use the best available science to derive its human health criteria and, in many instances, EPA's 2014 draft CWA section 304(a) recommended criteria represent that information.

As a result, Ecology should reconsider certain elements of its proposal to ensure that final human health criteria adopted by the state provide appropriate levels of protection for all Washington citizens, including communities that eat higher amounts of fish, specifically tribes with treaty-protected fishing rights. The EPA's concerns are outlined in the enclosed comments. We remain committed to working with the state to ensure that the human health criteria Ecology ultimately chooses to adopt are protective of designated uses and based on a sound scientific rationale, consistent with 40 CFR 131.11(a).

In addition, the EPA appreciates Ecology's efforts to consider implementation of these criteria by proposing new and revised implementation tools. The EPA recognizes that industry and local governments in Washington have raised valid concerns about the challenges of meeting more stringent water quality standards. We believe there is broad recognition that workable, effective implementation will be critical to ultimately realizing the protections that revised human health criteria are intended to provide. The EPA recognizes the importance of implementation tools in making progress toward improved water quality while accounting for the needs of the regulated community. We firmly believe that Ecology can adopt a water quality standards package that offers protective human health criteria while giving industry reasonable time to comply with more stringent water quality-based effluent limits through implementation tools. Such an approach can support a thriving economy while adequately protecting higher fish consuming populations. The EPA remains committed to assisting Ecology during its development and utilization of implementation tools.

As you are aware, the EPA has initiated a federal rulemaking process to amend Washington's existing human health criteria in the National Toxics Rule, which were last updated in 1992. The EPA is encouraged that Ecology proposed its own rule and we hope that Ecology will finalize a scientifically defensible rule that protects the health of Washington's citizens. As stated in Regional Administrator Dennis McLerran's December 18, 2014 letter to Director Maia Bellon, despite our having initiated a federal rulemaking, if Washington submits a final rule to the EPA for Clean Water Act review and action prior to our completion of a federal proposal, the EPA will fulfill its Clean Water Act duty to review and act on the state's submittal.

As previously noted, attached are the EPA's detailed comments for your consideration. We have appreciated our work together throughout this process and remain committed to providing technical assistance as you work on revisions to this proposed rule.

If you have any questions concerning our comments or desire the EPA's assistance, please contact me at (206) 553-1855 or Angela Chung at (206) 553-6511.

Sincerely,

Daniel D. Opalski, Director
Office of Water and Watersheds

Enclosure

U.S. Environmental Protection Agency, Region 10
Comments on Washington Department of Ecology's Proposed Human Health Criteria and Implementation Tools Rule

March 23, 2015

Public Notice of Proposal Dated January 12, 2015

The Washington Department of Ecology (Ecology) provided draft surface water quality standards (WQS) revisions found at Chapter 173-201A WAC to the public for review and comment on January 12, 2015.[1] With these WQS revisions, Ecology is proposing to adopt human health criteria and revise or establish new implementation tools. The EPA reviewed the state's draft rule and associated documents and provides the following comments for Ecology's consideration. The comments are organized as follows:

1. Human Health Criteria and Other Narrative Revisions (WAC 173-201A-240)
    A. Fish Consumption Rate (FCR)
    B. Cancer risk level
    C. Relative Source Contribution (RSC)
    D. Body Weight
    E. Drinking Water Intake
    F. Reference Dose (RfD) and Cancer Slope Factor (CSF)
    G. Bioconcentration Factor (BCF)
    H. Polychlorinated Biphenyls (PCBs)
    I. Arsenic
    J. Methylmercury
    K. Pollutant Scope
    L. Downstream Waters and Other Narrative Revisions

2. Implementation tools and definitions
    A. Variances (WAC 173-201A-420)
    B. Intake Credits (WAC 173-201A-460)
    C. Compliance Schedules (WAC 173-201A-510(4))

Please note that the EPA's positions described in the comments below, regarding the state's proposed WQS, are preliminary in nature and do not constitute an approval or disapproval by the EPA under the Clean Water Act (CWA) Section 303(c). Approval and/or disapproval decisions will be made by the EPA following adoption of the new and revised standards by the state of Washington and submittal of revisions to the EPA. In addition, the EPA's comments do not constitute, and are not intended to be, an Administrator determination under CWA Section 303(c)(4)(B).

[1] Department of Ecology. 2015. *Proposed Human Health Criteria and Implementation Tools Rule proposal – public review.* http://www.ecy.wa.gov/programs/wq/ruledev/wac173201A/1203inv.html.

1. Human Health Criteria and Other Narrative Revisions (WAC 173-201A-240)

The EPA established Washington's existing human health criteria for toxic pollutants in the 1992 national toxics rule (NTR).[2] Ecology now proposes to adopt human health criteria for 96 different toxic pollutants into the state's WQS. Ecology added these proposed criteria values to Table 240 in the state's WQS, which also contains aquatic life criteria. In most cases, Ecology calculated criteria for each pollutant using the EPA's recommended 304(a) human health criteria equations for carcinogens and non-carcinogens with state-selected inputs. However, in the case of human health criteria for arsenic, copper, and asbestos, Ecology derived those values differently using Safe Drinking Water Act Maximum Contaminant Levels. In addition, the Washington Governor's Office provided a policy overlay that no criterion concentration would become less protective than the corresponding existing NTR criterion concentration, with the exception of arsenic.[3]

Below are the EPA's comments on the individual input parameters that Ecology used to derive its proposed human health criteria along with comments on Ecology's proposed narrative revisions to WAC 173-201A-240. The EPA's comments will assist the state in developing final water quality criteria that protect applicable designated uses and are based on sound scientific rationale consistent with 40 CFR 131.11(a), and protect downstream WQS consistent with 40 CFR 131.10(b).

The EPA would like to point out three overarching themes raised in our comments:

(1) Tribal Treaty Rights. When acting on a state's WQS submission, the EPA must ensure that the WQS comply with the CWA as well as any other applicable law, including federal treaties.[4] In Washington, many tribes hold a treaty-reserved right to take fish for subsistence, ceremonial, religious, and commercial purposes at all usual and accustomed fishing grounds and stations, which cover the majority of waters in the state. These areas cannot directly be protected by the tribal government and, therefore, this responsibility falls to the state and federal governments to ensure their protection.[5] In order to effectuate the rights that these federal treaties afford to those tribes, and to harmonize those treaty rights with the CWA, the EPA and Ecology must interpret the state's designated uses[6] to include subsistence fishing. Therefore, both the EPA and the state need to consider what level of water quality is necessary to allow the tribes to safely consume fish in light of their treaty-reserved rights. In order to protect a subsistence fishing use, the state

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[2] EPA. 1992. *Toxics Criteria for Those States Not Complying with Clean Water Act*, section 303(c)(2)(B). 40 CFR Part 131.36. http://water.epa.gov/lawsregs/rulesregs/ntr/. Amended in 1999 for PCBs. http://water.epa.gov/lawsregs/rulesregs/ntrfact.cfm.

[3] Governor Jay Inslee Policy Brief. July 2014. *Ensuring Safe, Clean Water for Healthy People and a Strong Economy: Updating Washington's Water Quality Standards to Meet Today's Toxic Threats.* http://www-dev.governor.wa.gov/sites/default/files/policy_briefs/pb_CleanWater_2014.pdf.

[4] In addition to treaties, executive orders or federal statutes, such as land claim settlement acts, may also apply to tribal resources.

[5] Note that this analysis does not pertain to trust and reservation lands, where the applicable tribe can obtain treatment in a similar manner to a state (TAS) status and set their own WQS, including human health criteria.

[6] As defined in Washington's WQS (WAC 173-201A-600 and WAC 173-201A-610), these uses include the following: Fresh waters – Harvesting (Fish harvesting); Marine waters – Shellfish Harvesting (shellfish (clam, oyster, and mussel) harvesting) and Harvesting (salmonid and other fish harvesting, and crustacean and other shellfish (crabs, shrimp, scallops, etc.) harvesting).

must adopt criteria that will protect the tribal population exercising the subsistence fishing use as the target general population, not as a high-consuming subpopulation of the state. The data used to determine the fish consumption rate (FCR) also must reasonably represent tribal subsistence consumers' practices unsuppressed by fish availability or concerns about the safety of the fish available for them to consume. In addition, the cancer risk level selected must ensure a minimum level of protection for that tribal target population when consuming fish at unsuppressed levels. If data regarding unsuppressed fish consumption levels are unavailable, consultation with affected tribes is important in deciding, among other things, which fish consumption data should be used and the appropriate cancer risk level.

(2) Best Available Science. Along with using local and regional FCR data, Ecology should use the best available science to derive its human health criteria and, in many instances, the EPA's 2014 draft 304(a) recommended criteria represents that information. If the EPA's criteria recommendations become final before Ecology adopts a final human health criteria rule, the EPA recommends that the state use that information instead of the 2014 draft criteria information.

(3) Protection of Downstream Waters. Ecology has not provided sufficient justification for its proposed 10^{-5} cancer risk level and how it will result in criteria that provide for the attainment and maintenance of the WQS of downstream waters, consistent with the EPA's regulations at 40 CFR 131.10(b). Most of Washington's rivers are in the Columbia River basin and are, therefore, upstream of Oregon's portion of the Columbia River. Approximately 90% of Washington's proposed human health criteria are higher than Oregon's 2011 EPA-approved criteria for the same pollutants.[7]

A. Fish Consumption Rate (FCR)

In Ecology's proposed rule, the state derived human health criteria using a FCR of 175 grams per day (g/day). Ecology stated that this value is representative of state-specific information and was determined through a process that included consideration of EPA guidance and precedent, and input from multiple stakeholder organizations. Specifically, Ecology stated that this value is representative of FCRs for highly exposed populations that consume both fish and shellfish from Puget Sound waters and is considered an "endorsed" value.[8]

In 1992, the EPA used the national default FCR at that time, 6.5 g/day, to derive human health criteria for Washington in the NTR. In 2000, the EPA updated its methodology for deriving human health criteria and associated 304(a) recommendations using a national default FCR of 17.5 g/day.[9] More recently in 2014, the EPA updated the national default FCR to 22 g/day.[10]

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[7] The EPA acknowledges that Washington uses fish tissue equivalent concentrations to trigger waterbody impairments based on the human health criteria in their 303(d) listing methodology.

[8] Department of Ecology. January 2015. *Washington State Water Quality Standards: Human Health Criteria and Implementation Tools. Overview of Key Decisions in Rule Amendment.* Page 17. https://fortress.wa.gov/ecy/publications/publications/1410058.pdf.

[9] EPA. 2000. *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health.* U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA-822-B-00-004. http://www.epa.gov/waterscience/criteria/humanhealth/method/complete.pdf.

[10] 79 FR 27303. *Updated National Recommended Water Quality Criteria for the Protection of Human Health.*

The EPA's 2000 Human Health Methodology recommends that states use local or regional data over the EPA's national default recommended FCR. Surveys of local residents in the Pacific Northwest, including tribes and recreational anglers, reflect high consumption levels of fish and shellfish – much higher than the national default FCR the EPA used in 1992 to derive Washington's currently applicable human health criteria. Ecology now has sufficient scientifically sound regional and local fish consumption data to consider when choosing an FCR, including:

- *A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin* (Columbia River Inter-Tribal Fish Commission (CRITFC), 1994).
- *A Fish Consumption Survey of the Tulalip and Squaxin Island Tribes of the Puget Sound Region* (Toy et al., 1996).
- *Fish Consumption Survey of the Suquamish Indian Tribe of the Port Madison Indian Reservations, Puget Sound Region* (Suquamish Tribe, 2000).
- *Asian and Pacific Islander Seafood Consumption Study* (Sechena et al., 1999).

Washington's proposal to use 175 g/day to calculate its revised human health criteria is consistent with the 95th percentile of the 1994 CRITFC study listed above, and is the same FCR that the state of Oregon used to derive its human health criteria, which the EPA approved in 2011.[11] That said, in draft documents, Ecology considered FCRs as high as 267 g/day.[12]

The EPA is encouraged that Ecology is choosing to protect high fish consumers in Washington by deriving the state's human health criteria using local and regional fish consumption data. The EPA is also very supportive of the state's decision to include anadromous fish in the FCR used to derive the criteria, which is appropriate given the species that reside in Washington's nearshore and coastal waters, especially Puget Sound. Ecology's approach is consistent with the EPA's recommendation to use scientifically sound regional and local fish consumption data and is a significant improvement from the FCR used to derive the state's current human health criteria. That said, the EPA recognizes that fish consumption by tribes or other high consumers within the state may be suppressed due to issues including local availability of fish or concerns about the safety of the fish available for them to consume; existing data suggest an unsuppressed FCR would be higher than 175 g/day.[13] As discussed previously, to adequately protect the tribes' treaty-reserved fishing rights, the data used to determine the FCR for the target general population must reasonably represent consumption levels that are unsuppressed. The EPA

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[11] EPA. October 2011. *Technical Support Document for Action on the State of Oregon's New and Revised Human Health Water Quality Criteria for Toxics and Associated Implementation Provisions Submitted July 12 and 21, 2011.* http://www.epa.gov/region10/pdf/water/or-tsd-hhwqs-2011.pdf.

[12] Department of Ecology. *Fish Consumption Rates Technical Support Document.* Final issued in January 2013. Draft issued in October 2011. http://www.ecy.wa.gov/programs/tcp/regs/fish/2012/FCR-doc.html.

[13] The EPA is unaware of any data that reliably establish an unsuppressed FCR for all or part of Washington. However, a number of authors have reported heritage average FCRs for the Columbia River Basin Tribes ranging from 401 to 995 g/day (Craig and Hacker (1940) & Hewes (1947); Swindell (1942); Marshall (1977); Walker (1967)). Upper percentile values are not reported in these heritage studies but would be higher than the reported average values. The highest estimated current FCRs in Washington come from a study on the Suquamish Tribe, with reported FCRs as high as 1600 g/day (Suquamish 2000, Table C5). The 95th percentile Suquamish FCR is 767 grams per day (Ecology 2013).

acknowledges, however, that the tribes within the state have generally viewed 175 g/day as a compromise minimum value for current criteria-setting purposes, so long as it is coupled with a cancer risk level of 10^{-6} (see section B). Based on the EPA's review of existing data in Washington, in conjunction with consultation with the tribes, the EPA supports Washington's decision to derive the human health criteria using a FCR of 175 g/day so long as the state also retains a cancer risk level of 10^{-6}. A 10^{-6} cancer risk level is necessary to ensure that the target population of tribal fish consumers exercising their treaty-reserved rights, including those whose consumption is not suppressed, are adequately protected.

B. Cancer Risk Level

The EPA used a cancer risk level of 10^{-6} (1 in 1,000,000) to derive Washington's human health criteria for carcinogens in the 1992 NTR. The EPA selected this cancer risk level with input from Washington, which adopted around the same time a WQS provision that states: *"Risk-based criteria for carcinogenic substances shall be selected such that the upper-bound excess cancer risk is less than or equal to one in a million"* (WAC 173-201A-240(6)), that the EPA approved in 1993. In Ecology's proposed rule, the state derived human health criteria for carcinogens using a cancer risk level of 10^{-5} (with the exception of PCBs), which increases the cancer risk level from 1 in 1,000,000 to 1 in 100,000. Ecology stated that this decision is a state-specific risk management decision that included considerations of engineering, social, economic, and political concerns.[14] Ecology's rationale for this decision includes that the cancer risk level for highly exposed populations is 10^{-5} due to the state's decision to derive its human health criteria using a FCR of 175 g/day.

The EPA's 2000 Human Health Methodology[15] states that use of 10^{-6} or 10^{-5} in the derivation of human health criteria may be an acceptable level of risk for the target general population.[16] Here, the state has not demonstrated how its use of a cancer risk level of 10^{-5} would result in water quality criteria that adequately protect tribal fish consumers as the target general population as opposed to a highly exposed subpopulation within the broader general population in Washington. For example, the cancer risk level for tribal members whose consumption is not suppressed (i.e., greater than 175 g/day), would very likely be higher than 10^{-5}. It should also be noted that the 2000 Human Health Methodology did not consider how CWA decisions should account for applicable treaty-reserved fishing rights, and the treaties themselves may require higher levels of protection. Therefore, the EPA supports the state's decision to derive the human health criteria using a FCR of 175 g/day so long as the state also

[14] Department of Ecology. January 2015. *Washington State Water Quality Standards: Human Health Criteria and Implementation Tools. Overview of Key Decisions in Rule Amendment.* Page 17. https://fortress.wa.gov/ecy/publications/publications/1410058.pdf.

[15] EPA. 2000. *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health.* U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA-822-B-00-004. http://www.epa.gov/waterscience/criteria/humanhealth/method/complete.pdf.

[16] The Methodology also notes that states and authorized Tribes can always choose a more stringent risk level, such as 10^{-7}. Page 1-12.

retains a cancer risk level of 10^{-6}, which the tribes have generally viewed as a compromise minimum value in tribal consultation.[17]

As further discussed below in section L, Ecology also has not provided sufficient justification for its proposed 10^{-5} cancer risk level and how it will result in criteria that provide for the attainment and maintenance of the WQS of downstream waters, consistent with the EPA's regulations at 40 CFR 131.10(b).

C. Relative Source Contribution (RSC)

The RSC is a factor applied in development of criteria for non-carcinogens and nonlinear carcinogens, to account for sources of exposure other than drinking water and freshwater and estuarine fish consumption (e.g. marine fish, non-fish food consumption, dermal exposure). In Ecology's proposed rule, the state derived human health criteria using a RSC value of 1.0. Ecology stated that this is an appropriate risk management decision due to the limited ability of the CWA to control exposure to sources outside of its jurisdiction. While the EPA commends some of the risk management choices that the state is making with respect to sources of exposure, consistent with the EPA's 2000 Human Health Methodology, the EPA recommends that Ecology derive its human health criteria for non-carcinogens and nonlinear carcinogens using a RSC value between 0.2 and 0.8.

In the 1992 NTR, the EPA did not incorporate a RSC value into the equation to derive Washington's human health criteria for non-carcinogens. The EPA's 2000 Human Health Methodology recommends default RSC values between 0.2 and 0.8 to be used in the calculation of human health criteria. The EPA established a ceiling of 0.8 for the RSC to ensure protection of individuals whose exposure could be greater than indicated by current data and to account for unknown sources of exposure. In the EPA's 2014 draft updated 304(a) recommendations, the EPA applied a RSC for all of the updated national criteria for non-carcinogens and one nonlinear carcinogen.[18]

Again, the EPA commends Ecology for incorporating anadromous fish in the proposed FCR. This is particularly appropriate since data exist that show adult salmon in Washington can accumulate a substantial fraction of their contaminant body burden during their residence time in Puget Sound (O'Neill and West, 2009) and near coastal marine waters (O'Neill 2006) that are under the jurisdiction of the CWA.[19, 20] The EPA's human health criteria FAQs clarify that,

[17] In a July 1, 2014 response letter to Washington Senator Doug Ericksen from Dennis McLerran, EPA Region 10 Administrator, the EPA provided several reasons why Ecology should maintain its current cancer risk level of 10^{-6}, including the protection of reserved fishing treaty rights.

[18] EPA. 2014. *DRAFT: Updated National Recommended Water Quality Criteria – Human Health.* http://water.epa.gov/scitech/swguidance/standards/criteria/current/hhdraft.cfm.

[19] O'Neill, S.M., and J.E. West. 2009. Marine distribution, life history traits, and the accumulation of polychlorinated biphenyls in Chinook salmon from Puget Sound, Washington. Transactions of the American Fisheries Society 138: 616-632.

[20] O'Neill, S.M., G.M. Ylitalo, J.E. West, J. Bolton, C.A. Sloan, and M.M. Krahn. 2006. Regional patterns of persistent organic pollutants in five Pacific salmon species (*Oncorhynchus spp*) and their contributions to

where a state's FCR includes freshwater, estuarine, and all marine fish consumption, states can adjust the RSC to reflect a greater proportion of the reference dose being attributed to marine exposures.[21] Therefore, the EPA recognizes that a default RSC value of 0.2 could be overprotective when anadromous fish are included in the FCR. However, even when accounting for anadromous fish in the FCR, Ecology has not adequately justified using a RSC value of 1.0 to derive human health criteria for all non-carcinogens and nonlinear carcinogens, nor has it adequately explained why it is appropriate to ignore all other routes of exposure, including air, soil, and other marine fish and shellfish. Further, the EPA considers whether there are multiple health-based criteria or regulatory standards for the same chemical in determining the RSC. Therefore, the EPA strongly recommends that Ecology choose an appropriate RSC in the recommended range of 0.2 to 0.8 using the Exposure Decision Tree approach as described in EPA's 2000 Human Health Methodology to calculate human health criteria that are protective of the designated use and based on sound science.

D. Body Weight

In Ecology's proposed rule, the state derived human health criteria using a body weight assumption of 80 kg based on tribal survey data relevant to Washington and EPA's 2011 Exposure Factors Handbook.[22] In general, the EPA is supportive of Ecology assuming a body weight of 80 kg to derive human health criteria.

In the 1992 NTR, the EPA used a body weight assumption of 70 kg in the equation to derive Washington's human health criteria. Although 70 kg is the EPA's current default assumption in its 304(a) recommendations, the EPA derived its 2014 draft 304(a) recommendations using an updated body weight assumption of 80 kg, the national mean based on a more current survey of the U.S. population and described in the EPA's 2011 Exposure Factors Handbook.[23] Consistent with the EPA's guidance, Ecology is using local and regional specific data in deriving this value. In addition, this value is consistent with the national default assumption the EPA will incorporate into its revised 304(a) recommendations for human health criteria.

E. Drinking Water Intake

In Ecology's proposed rule, the state derived human health criteria using a drinking water intake rate of 2 L/day. Ecology states that since data specific to drinking water consumption in Washington are not available, the state cannot compare local data to the available national estimate and, therefore, Ecology proposes to use the EPA's current default rate of 2 L/day. In the absence of reliable local or regional data, the EPA recommends that the state refer to the most current available national data on drinking water intake rates.

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contaminant levels in northern and southern resident killer whales (*Orcinus orca*). 2006 Southern Resident Killer Whale Symposium, NOAA Fisheries Service Northwest Regional Office April 3-5, 2006. Seattle, WA. Extended Abstract. 5pp.

[21] EPA. January 2013. *Human Health Ambient Water Quality Criteria and Fish Consumption Rates: Frequently Asked Questions.* http://water.epa.gov/scitech/swguidance/standards/criteria/health/methodology/upload/hhfaqs.pdf.

[22] EPA. 2011. EPA Exposure Factors Handbook. 2011 edition (EPA 600/R-090/052F). http://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252.

[23] Id.

In the 1992 NTR, the EPA used a drinking water intake rate of 2 L/day in the equation to derive Washington's human health criteria. Although 2 L/day is the EPA's current default rate in its 304(a) recommendations, the EPA derived its 2014 draft 304(a) recommendations using a drinking water intake rate of 3 L/day. This rate represented a *consumer-only* estimate of combined direct and indirect water ingestion for *all sources* of water at the 90th percentile for adults ages 21 and older.[24] In response to public comments that focused on the most current national drinking water data, the EPA will finalize the updated 304(a) criteria using a drinking water intake rate of 2.4 L/day, which represents the *per capita* estimate of combined direct and indirect *community water* ingestion at the 90th percentile for adults ages 21 and older.[25]

If Ecology cannot obtain reliable local or regional data, the EPA encourages Ecology to consider the new information used to update the EPA's national default rate, including EPA's 2011 Exposure Factors Handbook.[26]

F. Reference Dose (RfD) and Cancer Slope Factor (CSF)

New research led to updates of several toxicity values for non-carcinogenic effects (reference doses or RfDs) and carcinogenic effects (cancer slope factors or CSFs) since the EPA promulgated the NTR in 1992. The EPA used updated toxicity factors to recalculate its 304(a) recommended human health criteria for certain pollutants various times since 1992. The EPA's Integrated Risk Information System[27] (IRIS) is the primary recommended source for RfD and CSF information; however, in some cases, more current peer-reviewed and publically-available toxicological data are available from other EPA program offices (e.g., Office of Pesticide Programs, Office of Water, Office of Solid Waste and Emergency Response), other national and international programs, and state programs. The EPA conducted a systematic search of nine peer-reviewed, publicly available sources to obtain the most current RfDs and CSFs to derive the 2014 draft 304(a) recommendations. The criteria are based on the more sensitive endpoint based on cancer or non-cancer assessments, presuming a cancer risk level of 10^{-6}. If a higher cancer risk level is used, it is possible that the non-cancer endpoint becomes the driver for the criterion.

The EPA recommends Ecology consider adopting final criteria that reflect the latest scientific information on toxicity that the EPA used in its draft recommendations or in the final national criteria recommendations if they are available before Ecology adopts a final rule. If Ecology chooses not to use updated toxicity values, the EPA recommends that Ecology provide a rationale for choosing not to integrate the latest science regarding toxicity into its human health criteria.

G. Bioconcentration Factor (BCF)

In Ecology's proposed rule, the state derived human health criteria using BCFs. Ecology's stated rationale is that Bioaccumulation Factors (BAFs) account for uptake from sources other than

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[24] Id.
[25] Id.
[26] Id.
[27] EPA. *Integrated Risk Information System (IRIS).* U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C. www.epa.gov/iris.

water (e.g., sediment, other food sources), and, therefore, are overprotective because some of the sources included could have pollutant burdens that come from areas and waters outside of Washington's CWA jurisdiction (e.g., mercury from air deposition). Pollutants from sources other than the water column can accumulate in fish that people consume, particularly if they have chemical properties that cause the pollutants to accumulate in fish dietary items. To account for bioaccumulation, the EPA's 2000 Human Health Methodology recommends use of BAFs that account for uptake of a contaminant from all sources by fish and shellfish, rather than BCFs that only account for uptake from the water column. In the 1992 NTR, the EPA used BCFs in the equation to derive Washington's human health criteria. Although the EPA's current 304(a) recommendations use BCFs, the EPA's 2014 draft 304(a) recommendations replace BCFs with BAFs. The EPA will finalize the updated 304(a) criteria using BAFs, where data are available.

BAFs account for biomagnification in the food chain, which is an essential pathway that Ecology is missing by using BCFs. For example, studies show that dietary uptake is associated with 98% of PCB bioaccumulation in Lake Michigan Lake Trout.[28] The EPA strongly recommends Ecology consider adopting final criteria that reflect the latest scientific information on bioaccumulation that the EPA used in its draft recommendations. If Ecology chooses not to use the latest scientific information on bioaccumulation, the EPA strongly recommends that Ecology provide a rationale for choosing not to integrate the latest science regarding bioaccumulation into its human health criteria.

H. Polychlorinated Biphenyls (PCBs)

For PCBs, Ecology proposed criteria that are the same as those currently in effect under the NTR (as revised in 1999): 0.00017 µg/L for both the criteria for water & organisms and organisms only. In developing the proposed criteria, Ecology used a chemical-specific cancer risk level of 4×10^{-5} or 0.00004, which exclusively applies to PCBs. Ecology states that it chose this cancer risk level for consistency with the level of risk in the toxicity factor that the Washington Department of Health uses to develop fish advisories for PCBs.[29] When Ecology used the 4×10^{-5} cancer risk level along with its other proposed inputs to calculate PCB criteria, the resulting criteria were less stringent than the currently effective 1999 NTR values. Therefore, the state proposed to adopt the 1999 NTR criteria for PCBs.

In general, the EPA does not support Ecology using a chemical-specific cancer risk level for PCBs. Instead, consistent with the EPA's comments related to the need for Ecology to evaluate potential risks to the tribes as a target general population in section B above, the state should calculate human health criteria for all carcinogenic pollutants, including PCBs, using a 10^{-6} cancer risk level.

The EPA recognizes that PCBs provide unique challenges due to the fact that they are pervasive, widespread, long-lasting, and difficult to detect. However, this does not warrant setting the

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[28] Thomann R. V., and Connolly, J. P. 1984. Model of PCB in the Lake Michigan lake trout food chain, Environ. Sci. Technol., 18(2), 65-71.
[29] Department of Ecology. January 2015. *Washington State Water Quality Standards: Human Health Criteria and Implementation Tools. Overview of Key Decisions in Rule Amendment.* Page 39. https://fortress.wa.gov/ecy/publications/publications/1410058.pdf.

human health criteria at less stringent levels. Instead, the EPA would like to work with Ecology to further discuss PCBs and how they can be addressed through the state's implementation tools – such as variances – without adjusting the cancer risk level.

I. Arsenic

For arsenic, Ecology proposed to adopt a criterion of 10 μg/L, which is the Maximum Contaminant Level (MCL) for arsenic under the Safe Drinking Water Act. Ecology also proposed requirements relating to arsenic pollution minimization. Arsenic is the only pollutant for which Ecology proposed human health criteria less stringent than the values currently in effect under the NTR (0.018 μg/L for water & organism and 0.14 μg/L for organisms only).

The EPA recognizes that developing human health criteria for arsenic can be challenging, particularly because naturally occurring levels in Washington could exceed the EPA's recommended criteria. The EPA is willing to work with Ecology to explore options for deriving protective arsenic criteria that consider the special circumstances associated with natural levels of arsenic in Washington's waters. The EPA would also like to offer assistance in exploring how arsenic can be addressed using the state's revised implementation tools. However, at this point Ecology has not provided an adequate rationale to depart from its own decision to ensure the newly adopted criteria are no less stringent than the currently effective criteria under the NTR.

J. Methylmercury

Ecology decided to defer the adoption of human health criteria for methylmercury to allow for time to develop a comprehensive implementation plan in a future rulemaking. Therefore, the NTR human health criteria for total mercury would remain in effect for Washington. Ecology has not provided sufficient rationale for why the state is not considering the latest scientific information on methylmercury, beyond the difficulties anticipated in implementation.

In 2001, the EPA updated its 304(a) recommended methylmercury criterion for protection of human health after considering the latest science and data regarding health effects from intake of mercury and the primary routes of exposure. The 2001 methylmercury criterion is expressed as a fish tissue concentration and replaced the EPA's previous recommended water column concentration for total mercury.[30]

As part of the development of the EPA's 2001 recommended methylmercury criterion, the EPA reviewed the sources and forms of mercury that humans are exposed to when eating fish or consuming water from the nation's waters. The EPA found that humans are exposed primarily to methylmercury rather than to inorganic mercury, and the dominant exposure pathway is through consumption of contaminated fish and shellfish rather than from ambient water. The EPA found that a criterion addressing the potential health effects from methylmercury would protect humans from the most toxic form of mercury and the primary route of exposure. Thus, in considering the

[30] EPA. January 2001. *Water Quality Criterion for the Protection of Human Health: Methylmercury.* U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA 823-R-01-001. http://water.epa.gov/scitech/swguidance/standards/criteria/health/upload/2009_01_15_criteria_methylmercury_mercury-criterion.pdf.

fate of mercury in the environment and available toxicological data, the EPA concluded that it is more appropriate to derive a water quality criterion for methylmercury rather than inorganic mercury. In addition, the data and science on methylmercury exposure, effects, and environmental fate supported the derivation of a fish tissue residue criterion.

The EPA strongly encourages Ecology to consider adoption of a methylmercury criterion using appropriate input parameters discussed above. Ideally, Ecology would consider adoption of this criterion in this rulemaking. However, if that is not feasible, the EPA recommends that Ecology provide a definitive timeframe for when it plans to adopt a methylmercury criterion.

Regarding implementation of a fish tissue criterion for methylmercury, the EPA published guidance in 2010 to assist states and tribes.[31] The EPA recognizes that there are unique challenges with implementing fish tissue criteria as opposed to water column criteria. The EPA recommends that Ecology consider the information available in the EPA's methylmercury criterion implementation guidance and would like to offer assistance in determining how best to implement a methylmercury fish tissue criterion in Washington.

K. Pollutant Scope

Ecology proposed human health criteria for all CWA Section 307(a) priority toxic pollutants, with the exception of methylmercury. The number of distinct pollutants in Ecology's proposal outnumbers the pollutants in the NTR because Ecology included additional priority pollutants for which the EPA developed 304(a) recommended criteria since last revising the NTR. The EPA also developed 304(a) recommendations for several non-priority pollutants, but Ecology did not propose to adopt criteria for any non-priority pollutants.

The EPA encourages Ecology to consider adopting human health criteria for the non-priority pollutants for which the EPA developed 304(a) recommendations. Although the state's existing narrative criterion for toxic pollutants at WAC 173-201A-240(1) provides coverage for these pollutants, the EPA recommends that states use numeric criteria instead of narrative criteria when available, consistent with 40 CFR 131.11(b). In the event Ecology has data or information suggesting that any of these pollutants do not warrant concern in Washington's waters, the EPA understands that Ecology could choose not to adopt human health criteria for those select non-priority pollutants.

L. Downstream Waters and Other Narrative Revisions

Ecology made several revisions to the provisions at WAC 173-201A-240, which provide background and organize the toxic substances section of Washington's WQS.

The EPA has no comments on Ecology's revisions to WAC 173-201A-240(3), (4), (5), and (5)(a). These revisions help clarify and organize the proposed rule.

[31] EPA. April 2010. *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion*. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA 823-R-10-001. http://water.epa.gov/scitech/swguidance/standards/criteria/health/upload/mercury2010.pdf.

The EPA has specific comments on WAC 173-201A-240(5)(b). In general, the EPA supports Ecology's revisions to this provision, which explain the purpose of the criteria, criteria derivation, and the format of Table 240. However, the EPA would like to address the proposed language regarding protection of downstream waters in further detail.

Ecology proposed to add the following language:

"All waters shall maintain a level of water quality when entering downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters, including the waters of another state."

This is consistent with the EPA's regulation at 40 CFR 131.10(b). In addition, EPA's 2014 guidance on Protection of Downstream Waters states that:

"Adoption of narrative criteria or numeric criteria (or both) that are protective of downstream waters are viable options under 40 CFR 131.10(b). States/tribes have discretion in choosing their preferred approach. The EPA expects that many states/tribes will consider using a combination of narrative and numeric criteria depending on their circumstances." [32]

However, the guidance also suggests that states and tribes can consider a more tailored and specific narrative criterion and/or a numeric criterion in certain situations, such as when more stringent numeric criteria are in place downstream and/or environmental justice issues are relevant.

As mentioned above, most of Washington's rivers are in the Columbia River basin and are, therefore, upstream of Oregon's portion of the Columbia River. In addition, the Columbia River creates most of the Washington–Oregon border. Since approximately 90% of WA's proposed human health criteria are higher than Oregon's EPA-approved criteria for the same pollutants, the EPA strongly encourages Ecology to consider adopting numeric criteria (either in addition to or instead of narrative criteria) that ensure the attainment and maintenance of Oregon's downstream WQS, or to provide additional rationale detailing how the use of a narrative downstream protection criterion alone will protect Oregon's more stringent WQS. For waters flowing into Oregon, criteria that are equally stringent or more stringent than Oregon's human health criteria would better ensure the attainment and maintenance of Oregon's downstream WQS consistent with 40 CFR 131.10(b). This aligns with the EPA's previous statements regarding a desire for regional consistency in human health criteria among Region 10 states.

In addition, as stated in the comments above on the cancer risk level, Ecology should not delete the language at WAC 173-201A-240(6), which pertains to protection from carcinogens at a one in one million cancer risk level.

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[32] EPA. June 2014. *Protection of Downstream Waters in Water Quality Standards: Frequently Asked Questions.* http://water.epa.gov/scitech/swguidance/standards/library/upload/downstream-faqs.pdf.

2. Implementation Tools and Definitions

Ecology proposed to revise procedures/authorizing provisions for two of the state's existing implementation tools (variances and compliance schedules) and added a new tool for intake credits. In addition, the state proposed to adopt a definition for each of these implementation tools at WAC 173-201A-020.

As mentioned in the cover letter to our comments, the EPA recognizes the importance of implementation tools in order to make progress toward improved water quality while accounting for the needs of those affected, such as industry and local municipalities. To that end, the EPA supports use of these tools particularly in instances where more stringent human health criteria would create difficulties for the regulated community.

Below are the EPA's comments on each of the implementation tools Ecology proposed to revise and adopt, to assist the state in ensuring the final implementation tools are approvable under CWA Section 303(c).

A. Variances (WAC 173-201A-420)

Ecology proposed to add a new definition at WAC 173-201A-020 to define variances and substantially revise the state's variance procedures at WAC 173-201A-420. The revised procedures establish minimum qualifications for granting variances for individual dischargers, stretches of waters, and multiple dischargers.

The EPA is in the process of specifying its federal requirements for variances.[33] Keeping in mind the regulatory revisions being considered, below are the EPA's comments on Ecology's revisions to the variance provision and definition of variance:

1. The EPA requests that Ecology clarify that the temporary modification referred to in the variance definition and revised provision is time-limited and does not replace the underlying WQS.

2. Ecology proposed to remove its current five-year term limit on variances. Instead, Ecology expects the timeframe of a variance not to exceed the term of the permit, except under certain circumstances. If a variance term is issued for more than five years, Ecology proposed that the Department will complete mandatory five-year reviews. In general, the EPA supports this revision to the timeframe for variances as it provides flexibility for situations where the term of a permit would not be a reasonable duration for a variance. The EPA will review each variance submittal from Ecology and consider the justification for the term of the variance when making CWA approval/disapproval decisions.

[33] EPA. September 4, 2013. *Water Quality Standards Regulatory Clarifications; Proposed Rule (40 CFR Part 131).* Federal Register Vol. 78, No. 171. 54518-54546. http://www.gpo.gov/fdsys/pkg/FR-2013-09-04/pdf/2013-21140.pdf.

3. The EPA is supportive of Ecology's proposed language regarding public process, pollutant minimization plans, and conditions in which variances would be considered for renewal (as long as reasonable progress toward meeting the underlying WQS is being made), shortened, or terminated.

4. Ecology also proposed consideration of variances for individual dischargers, multiple dischargers, and waterbodies. The EPA anticipates working closely with the state, especially for multiple discharger variances or waterbody variances, to ensure that each variance meets all applicable federal requirements. The EPA suggests that Ecology review the EPA's FAQs on multiple discharger variances.[34]

5. The EPA requests that Ecology consider adding language into the variance authorizing provision that clearly articulates that any variance adopted by the state must identify the highest attainable condition and interim WQS applicable during the duration of the variance. Even if Ecology chooses not to include this language in its variance authorizing provision, the EPA still expects Ecology to specify this in any variances that it adopts and submits to the EPA.[35]

6. Once Ecology submits its final variance provision, the EPA will review the specified sections of Ecology's variance procedures as a "general policy" under 40 CFR 131.13 and will base its review on whether the procedure is consistent with the CWA and federal regulations. Ecology is still required to submit each individual variance to the EPA for review and action before it is effective for purposes of the CWA because the variances themselves are also WQS. Accordingly, each variance submitted for the EPA's review must include the Attorney General's certification and be consistent with the CWA and the EPA's implementing regulations, including all applicable public participation requirements. Thus, the EPA's review of Ecology's variance procedure need not evaluate each hypothetical variance the state could issue under this regulation and consider whether such a variance would be consistent with the CWA and the EPA's implementing regulation. If the EPA does approve Ecology's variance procedure, the EPA's approval would not be an automatic approval of any future variance the state wishes to grant.

B. Intake Credits (WAC 173-201A-460)

Ecology proposed to add a new provision at WAC 173-201A-460 and an associated definition at WAC 173-201A-020 that addresses situations where a pollutant that a facility discharges also exists in the facility's intake water. The proposed new language provides regulatory relief relative to National Pollutant Discharge Elimination System (NPDES) permit requirements for point sources that do not increase the mass of a background pollutant above their intake water

[34] EPA. March 2013. *Discharger-specific Variances on a Broader Scale: Developing Credible Rationales for Variances that Apply to Multiple Dischargers. Frequently Asked Questions.* http://water.epa.gov/scitech/swguidance/standards/upload/Discharger-specific-Variances-on-a-Broader-Scale-Developing-Credible-Rationales-for-Variances-that-Apply-to-Multiple-Dischargers-Frequently-Asked-Questions.pdf.

[35] Id. Pages 6-7.

levels. This language is patterned after the language from the EPA's Great Lakes Initiative (GLI) as promulgated at 40 CFR 132, Appendix F, Procedure 5.D and 5.E.

1. Ecology's proposed language at WAC 173-201A-460(2)(a) parallels, in part, the GLI language. Specifically, the rule provides that water quality-based effluent limits (WQBELs) may be established "so there is no net addition of the pollutant in the discharge compared to the intake water" if certain specified conditions are met. This provision is similar to the GLI's "No Net Addition" (NNA), and the conditions are essentially parallel to those included in the GLI provision.

2. However, the GLI regulation also contained an additional intake credit provision (the "reasonable potential procedure"), which allowed the permitting authority to consider intake pollutants in determining whether the discharge had reasonable potential to cause or contribute to an excursion of the water quality criteria. Under the GLI, if the facility did not add any mass of the intake pollutant to its wastewater (e.g. use of intake water for once-through cooling), and met other specified conditions, the permit writer could find that there was no reasonable potential, and thus no WQBEL was required. It is not clear from the existing regulatory text whether Ecology intends to include such a "reasonable potential procedure." Ecology's language states "(t)he department may determine *if there is* [emphasis added] reasonable potential for the discharge," but does not explain how such a determination would be made, and specifically, whether and how intake pollutants would be considered in such determination. To the extent that Ecology intends to include such a provision, the EPA requests that the regulation clarify this by separating out the "reasonable potential procedure" (allowing consideration of intake pollutants in assessing reasonable potential) from the NNA provision (allowing the WQBEL to be set at the level of the intake pollutant).

The EPA does not consider this new implementation tool to be a WQS under CWA Section 303(c) since it is an NPDES permitting implementation provision.

C. Compliance Schedules (WAC 173-201A-510(4))

Ecology proposed to add a new definition at WAC 173-201A-020 to define compliance schedules and revise the compliance schedule authorizing provision at WAC 173-201A-510(4). This revised provision removes the specific time limit for compliance schedules and describes circumstances when a compliance schedule can go beyond the term of a permit and ensures that compliance is achieved as soon as possible. The Washington legislature directed Ecology to extend the maximum length of compliance schedules to more than 10 years when appropriate (RCW 90.48.605). Ecology also added language to describe the interaction with TMDLs.

The EPA considers Ecology's compliance schedule authorizing provision to be a WQS and, therefore, expects to take action on the revisions under CWA Section 303(c). However, unlike individual variances which must be approved by the EPA, the use of individual compliance schedules is not subject to the EPA's approval under CWA Section 303(c). The EPA maintains NPDES permit oversight to ensure that compliance schedules are implemented in a manner consistent with the CWA.

The EPA supports Ecology's new definition for compliance schedules. Below are the EPA's comments on Ecology's revisions to its compliance schedule provision:

1. The EPA requests that Ecology clarify that compliance schedules cannot be established for WQS themselves. Instead, compliance schedules can be authorized for WQBELs that are based on certain WQS.

2. The EPA compared the proposed provision to the language in federal regulations at 40 CFR 122.47(1), which requires "compliance as soon as possible...". Ecology's proposed provision retains language in its current provision, which requires compliance "in the shortest practicable time." By definition, the term "practicable" implies feasible or achievable; therefore, could be implemented in a manner less stringent than "possible." Ecology uses these terms interchangeably throughout the compliance schedule authorizing provision and supporting documentation. The EPA requests clarification to ensure the proposed provision language is as stringent as federal regulations.

3. The EPA acknowledges that Ecology proposed to replace its existing maximum compliance schedule duration of 10 years with language specifying that compliance schedules shall generally not exceed the term of the permit at WAC 173-201A-510(4)(d). This is consistent with applicable guidance[36] and applicable NPDES regulations so long as compliance schedules are authorized to meet a NPDES permit's WQBELs *as soon as possible.*

4. The EPA supports Ecology's decision to delete WAC 173-201A-510(4)(a)(v) from its existing compliance schedule provision. This language regarding "resolution of pending water quality standards issues" is inconsistent with the EPA's guidance and applicable law. In addition, the EPA supports the language Ecology proposed to add to WAC 173-201A-510 (4)(b)(iv). This language clarifies that compliance schedules can be issued for the completion of water quality studies only if such studies are related to implementation of permit requirements to meet WQBELs. Without this clarification, it was unclear if Ecology envisioned such studies to include support for a Use Attainability Analysis (UAA) or a site-specific criteria revision, which would be inconsistent with the EPA's guidance and applicable NPDES regulations.

5. Based on direction from the Washington Legislature, Ecology proposed language regarding how compliance schedules interact with TMDLs at WAC 173-201A-510(4)(e). This new language explains situations in which Ecology can determine a longer time period is needed to come into compliance with applicable WQS beyond the term of a NPDES permit. In any of these situations, the actions specified in the compliance schedule must be sufficient to achieve WQS *as soon as possible* according to WAC 173-201A-510(4)(e)(iv). This is consistent with the EPA's guidance and applicable NPDES regulations.

[36] EPA. May 10, 2007. *Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES Permits.* Memorandum from James A. Hanlon, Director, Office of Wastewater Management. http://water.epa.gov/lawsregs/guidance/wetlands/upload/signed-hanlon-memo.pdf.

6. Lastly, the EPA acknowledges that Ecology constructed the compliance schedule provision to apply to aquatic life uses (WAC 173-201A-510(4)(a)(i)) and uses other than aquatic life (WAC 173-201A-510(4)(a)(ii)). If Ecology adopts this proposed rule language, the state can implement the compliance schedule authorizing provision upon the EPA's approval without ESA consultation for uses other than aquatic life.