Response to Comments on the Draft NPDES Permit for the City of Toppenish

US Environmental Protection Agency
Region 10
NPDES Permits Unit
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Overview

On September 28, 2012, the EPA issued a draft reissued National Pollutant Discharge Elimination System (NPDES) permit for the City of Toppenish for public review and comment. The public comment period closed on October 29, 2012. The EPA received comments from the City of Toppenish, the Yakama Nation, and the South Central Washington Resource Conservation and Development Council (SCWRCD). This document provides the EPA's responses to the comments received on the draft permit.

Technology-based Effluent Limits

Comment #1

The City of Toppenish stated that the Average Monthly Limit of 440 lb/day and Average Weekly Limit of 661 lb/day for five-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS) are incorrectly based on a design flow of 1.76 mgd. The City stated that these limits should be based on the correct design (maximum month) flow of 1.67 mgd, as indicated in the 2005 Wastewater Facility Plan and the 2007 construction plans for the treatment plant. The City stated that the BOD_5 and TSS loading limits should be 418 lb/day average monthly and 627 lb/day average weekly.

Response #1

The EPA agrees that the *City of Toppenish Wastewater Facility Plan* (Gray and Osborne 2005) states that the maximum month design flow of the POTW is 1.67 mgd, not 1.76 mgd as stated in the Fact Sheet. Federal regulations require that, "in the case of POTWs, permit effluent limitations, standards, or prohibitions shall be calculated based on design flow" (40 CFR 122.45(b)(1)). Thus, the correct technology-based loading limits for BOD_5 and TSS are as follows:

Concentration limit (mg/L) × design flow (mgd) × 8.34[1] = Mass based limit (lb/day)

Average Monthly Limit:

30 parts per million (ppm) × 1.67 mgd × 8.34 lb/gallon = 418 lb/day

Average Weekly Limit:

45 parts per million × 1.67 mgd × 8.34 lb/gallon = 627 lb/day

Water Quality-based Effluent Limits

Comment #2

The City of Toppenish stated that the pH effluent limit of 6.5 to 8.5 was developed by EPA without allowance for a mixing zone in the receiving water. A mixing zone is permitted by Washington State

[1] 8.34 is a conversion factor equal to the density of water in pounds per gallon.

Water Quality Standards (WQS) in WAC 173-201A. The limit should be changed to 6.0 to 9.0 since dilution within the mixing zone will prevent violation of WQS at the zone boundary.

Response #2

The Washington WQS do, in fact, include mixing zone provisions (WAC 173-201A-400). Some of the water quality-based effluent limits in the draft permit were calculated using a mixing zone (see the Fact Sheet at pages C-2 – C-3).

The EPA has evaluated whether the effluent pH limit could, in fact, be changed from the proposed limit of 6.5 to 8.5 to the technology-based limit of 6.0 to 9.0 (see 40 CFR 133.102(c)), while ensuring compliance with water quality criteria at the edge of a mixing zone.

According to receiving water monitoring data provided by the City of Toppenish (a total of seven results), the minimum pH measured in the Toppenish Drain is 5.82 standard units, and the maximum is 7.65 standard units. Two of the seven measurements (29%) were less than the 6.5 standard unit minimum pH requirement in the Washington WQS (WAC 173-201A-200(1)(g)). Because the minimum pH measured in Toppenish Drain is less than the minimum allowed under the WQS, the receiving water cannot consistently provide dilution of an effluent with a pH of less than 6.5, and the lower-bound pH limit must remain at 6.5 standard units.

However, the receiving water can provide dilution an effluent with a pH higher than 8.5 standard units. From October - April, the effluent pH can be 8.8 standard units while ensuring compliance with Washington's upper bound pH criterion of 8.5 standard units at the edge of a mixing zone encompassing 25% of the receiving water flow. From May - September, the effluent pH can be 9.0 standard units while ensuring compliance with Washington's upper bound pH criterion of 8.5 standard units at the edge of a mixing zone encompassing 25% of the receiving water flow. Therefore, the EPA has changed the pH effluent limits in the final permit to 6.5 to 8.8 standard units from October – April and 6.5 – 9.0 standard units from May – September. The technology-based pH limits for POTWs do not allow an upper bound pH limit higher than 9.0 standard units (40 CFR 133.102(c)).

See Appendix A to this response to comments for the calculations supporting the revised effluent limits for pH.

Comment #3

The City requested that the EPA delete the justification of the need for a Tier II analysis to only revise effluent limits for ammonia and copper by a 10% increase. This justification is invalid because there is no increase in the amount of pollution or plant capacity caused by the requested revision of these effluent limits. The effluent limits were originally incorrect in the prior (2003) permit, due to errors in EPA calculations of these limits, and, consequently, the corrected limits should have been the baseline for any change in the new NPDES permit. Since the corrected effluent limits are consistent with Washington State WQS, and, thus are protective of the receiving water, there is no degradation of water quality in the Toppenish Drain.

Response #3

Under the State of Washington's antidegradation policy, an increase to an existing monthly average or annual average mass or concentration effluent limit greater than 10% is defined as an expansion which is subject to Tier II antidegradation requirements (see the *Supplemental Guidance on Implementing Tier II Antidegradation,* or "Washington Tier II Guidance" at Page 6). Neither the Washington Tier II Guidance nor the State of Washington's antidegradation policy (WAC-173-201A-320) exempt prior effluent limits from antidegradation requirements because they were incorrectly calculated. Therefore, any revised average monthly effluent limits for ammonia and copper must ensure compliance with the State of Washington's antidegradation policy and guidance (CWA Sections 303(d)(4)(B), 402(o)(3)).

Comment #4

In subsection Washington State WQS, High Quality Waters or Tier II, EPA justifies the continued use of miscalculated effluent limits for ammonia, copper and zinc based on the desire to avoid a Washington State Tier II antidegradation analysis of a permit revision that would correct errors made by EPA in the calculation of effluent limits in the prior (2003) NPDES permit. If a Tier II analysis is required, consistent with Washington State guidance and antidegradation policy, to correct these effluent limits, it is requested that EPA perform this analysis, or EPA allow the City of Toppenish to perform this analysis, and to have Washington State Department of Ecology review the resulting analysis for need and conclusion, before any new effluent limits are issued.

Response #4

There Were no Errors in the Calculation of Zinc Limits in the 2003 Permit

The commenter stated that "EPA justifies the continued use of miscalculated effluent limits for ammonia, copper and zinc…." The commenter is correct that the ammonia and copper effluent limits in the 2003 permit were incorrectly calculated, and these errors were acknowledged in the fact sheet (see Page 13). However, there were no errors in the calculation of zinc limits in the 2003 permit. Appendix D to the City of Toppenish Wastewater Facility Plan ("Facility Plan") identifies errors in the effluent limits for ammonia and copper, but not for zinc.[2] Although Appendix D to the Facility Plan states that there was a discrepancy in the maximum reported effluent concentration for zinc between the 2003 fact sheet and the underlying calculations, this discrepancy is relevant only to the reasonable potential analysis for zinc (i.e., to the determination of whether or not water quality-based effluent limits for zinc are necessary) as opposed to the effluent limit calculations themselves. The discrepancy in the maximum projected effluent concentration would not have changed the outcome of the reasonable potential analysis for zinc. Although Appendix D to the facility plan provides re-calculated effluent limits for zinc, all of the re-calculated limits are within 3% of the zinc effluent limits in the prior permit.

The EPA has addressed the Substantive Issue Raised by this Comment

The substantive issue raised by this comment is whether the effluent limits for ammonia, copper and zinc are appropriate. The EPA has responded to these substantive concerns in the responses to

[2] Appendix D to the facility plan also identifies errors in the effluent limits for chlorine. However, any errors in the calculation of the chlorine limits are moot because the chlorine effluent limits have been deleted in the reissued permit. See the fact sheet at Page 18.

comments 5, 6 and 12 below. In these responses, the EPA has considered both of the available alternatives to a Tier II antidegradation analysis showing that lowering of water quality is necessary and in the overriding public interest. First, similar to the fact sheet (Pages 12 – 15), the effluent limits were increased by 10% if such increased limits would ensure compliance with water quality criteria. In doing so, the calculation of water quality-based effluent limits from water quality criteria was revised to use the correct design flow for the POTW (1.67 mgd) and was done on a seasonal basis as opposed to year-round. In some cases, the effluent limits could be increased by more than 10%, if such increased limits would not cause a measurable increase in the concentration of the limited parameter at the mouth of the East Toppenish Drain (and would also ensure compliance with water quality criteria). Only new or expanded actions that are expected to cause a measurable change in water quality are subject to Tier II antidegradation review (WAC 173-201A-320(3)). Also, since the Washington Tier II guidance states that "'expanded' means…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 EPA has not considered increases to maximum daily limits, specifically, to be "expanded" actions that are subject to Tier II antidegradation review.

Any Further Increases in the Ammonia and Copper Effluent Limits Would Require a Tier II Antidegradation Review

As explained above and in the responses to comments 5, 6 and 12 below, the average monthly effluent limits for ammonia, copper and zinc have been increased relative to the corresponding limits in the 2003 permit to the maximum extent permissible without a Tier II antidegradation review (i.e., either the increased average monthly limits do not measurably change the water quality at the mouth of the East Toppenish Drain, or they are not increased by more than 10% relative to the corresponding limits in the prior permit). No such review has been performed to date. Even if such a review were performed, it would not necessarily result in a finding that allowing lower water quality is necessary and in the overriding public interest.

Comment #5

The City of Toppenish stated that the Average Monthly Limit for Total Ammonia as N should be revised to 1.82 mg/L and 25.3 lb/day and the Maximum Daily Limit revised to 3.39 mg/L and 47.2 lb/day to reflect the design flow of 1.67 mgd and to correct calculation errors made by EPA during the development of the existing permit limits. These calculation errors are described in Appendix D WATER QUALITY EVALUATION in the 2005 Wastewater Facility Plan.

Response #5

The substantive issue raised by this comment is whether the proposed effluent limits for ammonia are appropriate. The effluent limits for ammonia must ensure compliance with WQS, including the State's antidegradation policy (40 CFR 122.4(d), 122.44(d)(1), CWA Section 301(b)(1)(C), and must also be consistent with the anti-backsliding provisions of the CWA (Sections 303(d)(4) and 402(o)).

In the fact sheet, on Page 13, the EPA acknowledged the calculation errors that were made when the ammonia effluent limits in the 2003 permit were developed. However, errors are not, in and of

themselves, a basis to make water quality-based effluent limits in a reissued permit less stringent than those in the prior permit.

Under CWA Section 402(o)(2)(B)(ii), technical mistakes or mistaken interpretations of law are a basis to establish less-stringent effluent limits only for technology-based effluent limits established based on best professional judgment (i.e. based on CWA Section 402(a)(1)(B), see also the Permit Writers' Manual at Section 7.2.1.3). The ammonia effluent limits in the 2003 permit were water quality-based effluent limits. Thus, the fact that technical mistakes were made in the calculation of those limits is not a basis to relax those limits.

According to Section 7.7.2 of the *US EPA NPDES Permit Writers' Manual* ("EPA Permit Writers' Manual," EPA 2010) for water quality-based effluent limits, the permit writer should apply the provisions of CWA Sections 303(d)(4) and 402(o) directly. Water quality-based effluent limits for parameters that are not causing water quality impairments may be made less stringent if the revision is consistent with the State's antidegradation policy (CWA Section 303(d)(4)(B)). Furthermore, even if another exception to anti-backsliding were applicable, any revised effluent limits must ensure compliance with WQS, including antidegradation requirements (CWA Section 402(o)(3)). Thus, in the draft permit, the EPA revised the ammonia effluent limits in a manner consistent with the State of Washington's antidegradation policy and guidance.

However, for the final permit, the EPA has further revised the ammonia effluent limit calculations. The revisions were based on the following factors:

- The EPA has used the corrected design flow of the POTW (1.67 mgd).
- The EPA has calculated ammonia limits on a seasonal basis (similar to the new effluent limits for lead and selenium).
- The Washington Tier II Guidance states that "expanded" actions include "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 guidance does not state that increases to maximum daily limits, specifically, are considered expanded actions. Thus, in the final permit, the EPA has applied Washington's antidegradation policy and guidance to the prior permit's average monthly limits but not to the maximum daily limits.
- The EPA has performed calculations to determine if the increase in the ammonia concentration, due to less-stringent average monthly effluent limits, would be measurable at the mouth of the East Toppenish Drain, which is the nearest point at which the State of Washington's WQS directly apply. An action causing a change in water quality that is not measurable is not required to undergo a Tier II antidegradation analysis (WAC 173-201A-320).

When determining whether a change in water quality is measurable, for toxic pollutants such as ammonia, the State of Washington's Supplemental Guidance on Implementing Tier II Antidegradation states that "The increase in concentration…needs to be compared with the method detection limit to determine whether there is a measurable change." The method detection limit of EPA Method 350.1, which is an approved method for the analysis of ammonia for NPDES permits, is 0.01 mg/L (10 µg/L).

Thus, an increase in the ammonia concentration at the mouth of the East Toppenish Drain greater than 0.01 mg/L would be considered measurable under the State of Washington's antidegradation policy. The results of the recalculated ammonia limits are summarized in Table 1, below. The scenario that produced the limits in the final permit is shown in italic type and shaded.

As shown in Table 1, when the average monthly effluent limits for ammonia are recalculated based on the water quality criteria on a seasonal basis, such limits represent an increase of more than 10% relative to the limits in the 2003 permit. Also, since average monthly limits increased by 10% relative to those in the 2003 permit could cause a measurable change in ammonia concentrations at the mouth of the East Toppenish Drain, the average monthly effluent limits cannot be increased by more than 10% without a tier II antidegradation review. The average monthly effluent limit proposed by the City (1.82 mg/L and 25.3 lb/day) would not be consistent with the State of Washington's antidegradation policy.

However, maximum daily effluent limits for ammonia, calculated based on water quality criteria, are less stringent than those proposed by the City and have been included in the final permit.

Table 1: Effluent Limit Scenarios for Ammonia

Scenario	Units	Average Monthly Limit	Maximum Daily Limit
October – April			
Prior Permit	mg/L	1.23	2.04
	lb/day	19.5	32.3
2012 Draft Permit	mg/L	1.32	2.244
	lb/day	19.4	35.53
10% Increase over prior permit limits	mg/L	*1.35*	N/A
	lb/day	*21.5*	N/A
Recalculated based on Criteria	mg/L	2.06	*6.22*
	lb/day	28.7	*86.6*
Measurable Increase in Concentration from Limits Based on Criteria?		Yes	N/A
Measurable Increase in Concentration from 10% Increase to Limits?		Yes	N/A
Limits in Final Permit	**mg/L**	**1.35**	**6.22**
	lb/day	**21.5**	**86.6**
May – September			
Prior Permit	mg/L	1.23	2.04
	lb/day	19.5	32.3
2012 Draft Permit	mg/L	1.32	2.244
	lb/day	19.4	35.53
10% Increase over prior permit limits	mg/L	*1.35*	N/A
	lb/day	*21.5*	N/A
Recalculated based on Criteria	mg/L	1.73	*5.23*
	lb/day	24.1	*72.8*
Measurable Increase in Concentration from Limits Based on Criteria?		Yes	N/A
Measurable Increase in Concentration from 10% Increase to Limits?		Yes	N/A
Limits in Final Permit	**mg/L**	**1.35**	**5.23**
	lb/day	**21.5**	**72.8**

Comment #6

The City of Toppenish stated that the Maximum Daily Limit for Copper should be revised to 13.1 ug/L and 0.18 lb/day to reflect the design flow of 1.67 mgd and to correct calculation errors made by EPA during the development of the existing permit limits. The City stated that these calculation errors are described in Appendix D WATER QUALITY EVALUATION in the 2005 Wastewater Facility Plan.

Response #6

The substantive issue raised by this comment is whether the proposed effluent limits for copper are appropriate. The effluent limits for copper must ensure compliance with WQS, including the State's antidegradation policy (40 CFR 122.4(d), 122.44(d)(1), CWA Section 301(b)(1)(C), and must also be consistent with the anti-backsliding provisions of the CWA (Sections 303(d)(4) and 402(o)).

In the fact sheet, on Page 13, the EPA acknowledged the calculation errors that were made when the copper effluent limits in the 2003 permit were developed. However, errors are not, in and of themselves, a basis to make water quality-based effluent limits in a reissued permit less stringent than those in the prior permit.

Under CWA Section 402(o)(2)(B)(ii), technical mistakes or mistaken interpretations of law are a basis to establish less-stringent effluent limits only for technology-based effluent limits established based on best professional judgment (i.e. based on CWA Section 402(a)(1)(B), see also the Permit Writers' Manual at Section 7.2.1.3). The copper effluent limits in the 2003 permit were water quality-based effluent limits. Thus, the fact that technical mistakes were made in the calculation of those limits is not a basis to relax those limits.

According to Section 7.7.2 of the EPA Permit Writers' Manual (EPA 2010), for water quality-based effluent limits, the permit writer should apply the provisions of CWA Sections 303(d)(4) and 402(o) directly. Water quality-based effluent limits for parameters that are not causing water quality impairments may be made less stringent if the revision is consistent with the State's antidegradation policy (CWA Section 303(d)(4)(B)). Furthermore, even if another exception to anti-backsliding were applicable, any revised effluent limits must ensure compliance with WQS, including antidegradation requirements (CWA Section 402(o)(3)). Thus, in the draft permit, the EPA revised the copper effluent limits in a manner consistent with the State of Washington's antidegradation policy and implementation guidance.

However, for the final permit, the EPA has further revised the copper effluent limit calculations. The revisions were based on the following factors:

- The EPA has used the corrected design flow of the POTW (1.67 mgd).
- The EPA has calculated copper limits on a seasonal basis (similar to the new effluent limits for lead and selenium).
- The Washington Tier II Guidance states that "expanded" actions include "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 guidance does not state

that increases to maximum daily limits, specifically, are considered expanded actions. Thus, in the final permit, the EPA has applied Washington's antidegradation policy and guidance to the prior permit's average monthly limits but not to the maximum daily limits.

- The EPA has performed calculations to determine if the increase in the copper concentration, due to less-stringent effluent limits, would be measurable at the mouth of the East Toppenish Drain, which is the nearest point at which the State of Washington's WQS directly apply. An action causing a change in water quality that is not measurable is not required to undergo a Tier II antidegradation analysis (WAC 173-201A-320).

When determining whether a change in water quality is measurable for toxic pollutants such as copper, the State of Washington's Supplemental Guidance on Implementing Tier II Antidegradation states that "The increase in concentration…needs to be compared with the method detection limit to determine whether there is a measurable change." The method detection limit of EPA Method 200.7, which is an approved method for the analysis of copper for NPDES permits, is 3 µg/L (Martin et al. 1994). Thus, an increase in the copper concentration at the mouth of the East Toppenish Drain greater than 3 µg/L would be considered measurable under the State of Washington's antidegradation policy. The results of the recalculated copper limits are summarized in Table 2, below. The scenario that produced the limits in the final permit is shown in italic type and shaded.

As shown in Table 2, average monthly effluent limits for copper based on water quality criteria are more than 10% greater than the effluent limits in the prior permit, but nonetheless will not cause a measurable increase in the copper concentration at the mouth of the East Toppenish Drain.

In all cases, the maximum daily copper limits in the final permit are calculated based on water quality criteria and are less stringent than those proposed by the City in its comment.

Table 2: Effluent Limit Scenarios for Copper

Scenario	Units	Average Monthly Limit	Maximum Daily Limit
October – April			
Prior Permit	µg/L	6.5	9.4
	lb/day	0.10	0.15
2012 Draft Permit	µg/L	6.8	10.34
	lb/day	0.10	0.165
10% Increase over prior permit limits	µg/L	7.15	N/A
	lb/day	0.11	N/A
Recalculated based on Criteria	µg/L	*9.40*	*15.8*
	lb/day	*0.13*	*0.22*
Measurable Increase in Concentration from Limits Based on Criteria?		No	N/A
Measurable Increase in Concentration from 10% Increase to Limits?		No	N/A
Limits in Final Permit	**µg/L**	**9.40**	**15.8**
	lb/day	**0.13**	**0.22**
May – September			
Prior Permit	µg/L	6.5	9.4
	lb/day	0.10	0.15

Table 2: Effluent Limit Scenarios for Copper			
Scenario	**Units**	**Average Monthly Limit**	**Maximum Daily Limit**
2012 Draft Permit	µg/L	6.8	10.34
	lb/day	0.10	0.165
10% Increase over Prior Permit Limits	µg/L	7.15	N/A
	lb/day	0.11	N/A
Recalculated based on Criteria	µg/L	*9.71*	*16.3*
	lb/day	*0.14*	*0.23*
Measurable Increase in Concentration from Limits Based on Criteria?		No	N/A
Measurable Increase in Concentration from 10% Increase to Limits?		No	N/A
Limits in Final Permit	**µg/L**	**9.71**	**16.3**
	lb/day	**0.14**	**0.23**

Comment #7

The City of Toppenish stated that the effluent limits for Nitrate + Nitrite as N are based on the EPA's interpretation of Yakama Tribal WQS and Washington State WQS for receiving waters that are used as drinking water sources. The City stated that neither the Yakama Tribe nor Washington State has designated the Toppenish Drain as a source of drinking water. The City also stated that Washington State has not issued any NPDES permits with effluent nitrate or nitrite limits for wastewater treatment plant discharges to the Yakima River. The City stated that the proposed Nitrate + Nitrite as N limit is not consistent with any existing local WQS. The City requested that the Nitrate + Nitrite as N limit be deleted.

Response #7

The issues raised by this comment are whether the receiving water's designated uses include drinking water supply, and whether the proposed effluent limits for nitrate + nitrite as N should be deleted.

As stated in the fact sheet at Page 15, under the Yakama Nation's WQS, Class IV waters such as the Toppenish Drain are protected for the uses of agricultural water supply and/or drainage, livestock watering, and domestic water. Furthermore, the Yakama WQS state that "Nitrates recorded as Nitrogen shall not exceed 10 mg/L discharged to Class IV waters" (Section 20.1.6.2.4). Therefore under the Yakama Nation WQS, the designated uses for the East Toppenish Drain include domestic water.

The Fact Sheet acknowledges that the Washington WQS are not directly applicable within the Tribal reservation (see the Fact Sheet at Page 9). However, as explained in Pages 9 and 10 of the Fact Sheet, the Toppenish and East Toppenish Drains provide little dilution of the effluent under critical conditions. Furthermore, the maximum concentration of nitrate + nitrite in the Toppenish Drain, upstream from the discharge, is 9.32 mg/L, which is very close to the interpretation of the State of Washington's narrative toxics criterion (10 mg/L). Thus, the discharge may affect water quality in the Yakima River, downstream from the discharge, which is among the waters of the State of Washington, and to which the Washington WQS apply. Therefore, the EPA must condition the permit to ensure compliance with Washington's WQS (40 CFR 122.4(d), 122.44(d)(4)).

The Yakima River is specifically designated for domestic water supply in Table 602 of the Washington WQS. Due to the limited dilution available within the Toppenish Drain, effluent limits for nitrate + nitrite would be necessary to protect water quality in the Yakima River, even if the Toppenish Drain were not designated for domestic water supply. Therefore, the EPA has not deleted the effluent limits for nitrate + nitrite from the permit.

However, the EPA has determined, based on more recent effluent data, that the required monitoring frequency for nitrate + nitrite can be reduced to once every two weeks instead of once per week as proposed in the draft permit, while still ensuring adequate characterization of the discharge. The change in sampling frequency resulted in a change to the average weekly effluent limit, from 19.8 mg/L and 291 lb/day to 17.3 mg/L and 241 lb/day.

Comment #8

The City of Toppenish stated that the effluent limits for Total Phosphorus as P (TP) are based on EPA's interpretation of narrative "aesthetics" criteria in the Washington State WQS in WAC 173-201A, despite this WAC stating in Section 600 that "the water quality standards for surface waters for the State of Washington do not apply to segments of waters that are on Indian reservations." The City stated that there are no numeric WQS for TP in the Washington WQS, for any receiving waters. The City stated that effluent phosphorus limits are established by Washington State following the completion of a Total Maximum Daily Load (TMDL) Study for the receiving water, and Washington State has not performed a TMDL study for the Yakima River system. The City stated that until this study is conducted, there is no scientific basis for allocation of phosphorus waste loads to point source discharges to the Yakima River system. The City stated that, consequently, Washington State has not issued any NPDES permits with effluent phosphorus limits for wastewater treatment plant discharges to the Yakima River. The City stated that the Yakama Tribal WQS do not include any phosphorus standards for Class IV waters, which is the designation of the Toppenish Drain in the Tribe's WQS. The City stated that the proposed TP limit is not consistent with any existing local WQS. The City requested that the effluent limit for TP be deleted from the draft permit.

Response #8

Narrative and Numeric Water Quality Criteria for Nutrients and Aesthetics are Applicable to the Yakima River

The commenter asserts that the State of Washington's narrative water quality criterion for aesthetics (WAC 173-201A-260(2)(b)) does not apply to waters of the Yakama Reservation (e.g., the Toppenish Drain and East Toppenish Drain), and that, since the draft permit's effluent limits for total phosphorus (TP) are based upon this criterion, the TP limits should therefore be deleted from the permit.

It is not necessary to address the question of whether the State of Washington's narrative criterion for aesthetics is applicable to waters of the Yakama Reservation in order to respond to this comment, because the TP limits in both the draft and final permits are based on the loading capacity for TP in the Yakima River, as opposed to the Toppenish Drain or the East Toppenish Drain. The Yakima River is part of the waters of the State of Washington and is specifically designated for aesthetics in Table 602 of the

Washington WQS. Therefore, the State of Washington's narrative water quality criterion for aesthetics is applicable to the Yakima River.

All of the water quality-based effluent limits in both the draft and final permits are based upon Washington's WQS, because Washington's WQS have been approved by the EPA and are therefore in effect for Clean Water Act purposes, and because federal regulations prohibit the EPA from issuing a permit when the "imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected states," including downstream states (40 CFR 122.4(d)).

Although the Yakama Nation WQS are not in effect for Clean Water Act purposes, as stated in the fact sheet at Pages 15 and C-5 – C-6, the EPA has considered the Yakama Nation WQS in developing the draft permit, consistent with EPA policy (EPA 1993). As stated in the fact sheet at Page C-3, the Yakama Nation has a narrative water quality criterion which reads "all waters at all times and at all places, including any established mixing zones, shall meet the minimum conditions of being free from substances, materials, floating debris, oil, grease, or scum attributable to any point source discharge or nonpoint source activity that…are in concentrations or combinations that will cause or contribute to the growth of aquatic plants or algae to such a degree as to create a nuisance; be visually displeasing; be harmful to human, animal, plant aquatic life or the ecosystem; or otherwise impair the beneficial uses…" (WQS Section 13.3.2.5). Note that this narrative criterion applies to "all waters at all times and at all places," including not only the Yakima River but also Class IV waters such as the Toppenish Drain and East Toppenish Drain. In addition, the Yakama Nation has a numeric water quality criterion for TP which applies to Class III waters, including the Yakama River.

As explained on Page C-6 of the fact sheet, the EPA believes that TP limits based on Washington's narrative criteria for aesthetics, interpreted using the recommendation of *Quality Criteria for Water 1986*, will be protective of the Yakama Nation's WQS for the Yakima River as well as the Washington WQS.

Water Quality-based Effluent Limits are Necessary Even Though no TMDL Has Been Completed

While federal regulations state that permits must include effluent limits that are consistent with the assumptions and requirements of any available wasteload allocation for the discharge in an EPA-approved TMDL (40 CFR 122.44(d)(1)(vii)(B)), this is not the only possible basis for water quality-based effluent limits.

The Clean Water Act requires that NPDES permits contain effluent limits necessary to meet WQS (Section 301(b)(1)(C)). Federal regulations implementing this section of the CWA state that "limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality" (40 CFR 122.44(d)(1)(i)). As explained in the fact sheet at Page C-6 – C-7, the City's discharge of TP has the reasonable potential to cause or contribute to excursions above WQS for aesthetics, thus, effluent limits are necessary for TP.

Having determined that effluent limits are necessary for TP, the EPA developed effluent limits for TP consistent with Section 301(b)(1)(C) of the CWA and its implementing regulations (40 CFR 122.44(d)(1)(vi)(B) and 122.44(d)(1)(vii)(A)).

Comment #9

The EPA received similar comments from both the Yakama Nation Department of Natural Resources (YNDNR) and the South Central Washington Resource Conservation and Development Council (SCWRCD) regarding the proposed TP limits in the draft permit.

Both the YNDNR and the SCWRCD noted that the City of Toppenish WWTP has already undergone extensive upgrades to remove nitrogen and phosphorus from its effluent and is one of the more advanced WWTPs in the Yakima River watershed, in terms of its nutrient removal capabilities.

The YNDNR stated that they understood that the draft permit, as written, would require the City of Toppenish to install expensive new technology to remove phosphorous from its effluent.

The YNDNR also stated that the Toppenish WWTP also discharges into an agricultural drain and that it is not clear from the fact sheet that the WWTP effluent significantly degrades the water quality in a water body that already carries substantial nutrient loads from agricultural drainage. In fact, the water quality in the Toppenish and East Toppenish Drains is influenced by multiple sources of nutrients and sediment, including but not limited to the TWWTP.

The YNDNR requested that the EPA defer issuing this permit for a period of time so that more comprehensive nutrient reduction approaches can be studied.

The SCWRCD stated that the Permit appears to arbitrarily set Water Quality Based Effluent limits for TP more based on the plants optimal running condition rather than a realistic study of the receiving water or the Yakima River. The SCWRCD stated that the draft permit and draft fact sheet do not make a clear argument whether or not Washington State Standards or Yakama Nation Standards are being used for this analysis.

The SCWRCD also stated that the stream flow data used for determining flow of the Yakima River through the project area does not include data past 1978. There is a continuous record of flow for the Yakima River at Parker from 1908 until present. In addition, the data set is biased because there has been an instream flow minimum requirement at Parker gauge of 300 cfs. The draft fact sheet uses 14 cfs and 174 cfs. The Parker gauge has not read below 235 cfs since at least 1995.

The SCWRCD stated that the fact sheet in its current draft does not provide sufficient technical information to support the position that a small decrease in phosphorous load from the TWWTP would lead to significantly better water quality in the Yakima River, which is the natural system of interest.

Response #9

The issues raised by these comments are 1) whether a water quality-based effluent limit for TP is necessary for the City of Toppenish, 2) a lack of clarity regarding the WQS that were used to develop the

TP limits 3) whether the specific TP limits proposed in the draft are appropriate, and 4) whether the issuance of the permit should be deferred.

Phosphorus Effluent Limits are Necessary

As explained in the response to comment #8 and in the fact sheet at Page C-6 – C-7, the City's discharge of TP has the reasonable potential to cause or contribute to excursions above WQS for aesthetics, thus, effluent limits are necessary for TP.

The WWTP's Contribution to Phosphorus Loading in the Toppenish Drain and the Yakima River is Significant

In its comment, the YNDNR questioned whether the WWTP effluent significantly degrades the water quality in a water body that already carries substantial nutrient loads from agricultural drainage. As explained below, the EPA believes the WWTP contributes a significant TP load to both the East Toppenish Drain and the Yakima River.

As stated in the fact sheet at Page C-7, the City of Toppenish was required to collect flow and TP data for the Toppenish Drain, upstream from the discharge, as a condition of its prior (2003) permit. The median TP load in the Toppenish Drain, upstream from the discharge, was 18.1 lb/day. As stated in the fact sheet at Page C-6, the median effluent TP load discharged by the Toppenish WWTP after treatment upgrades were completed in June 2010 is 17.2 lb/day. Thus, the WWTP's discharge of TP is roughly the same as the upstream TP load in the Toppenish Drain. In other words, the WWTP approximately doubles the TP loading of TP in the Toppenish Drain. The median upstream concentration of TP in the Toppenish Drain is 0.23 mg/L. The median effluent concentration of TP from June 2010 – December 2012 is 2.1 mg/L. Thus, in addition to increasing the TP loading in the Toppenish Drain, the WWTP increases the TP concentration in the drain as well. Therefore, the discharge significantly degrades water quality in the Toppenish Drain, with respect to nutrients.

As stated in the fact sheet at Page C-6, "In the summer of 2004, the USGS measured a TP load of 89 lb/day in the Yakima River at station #12505330, immediately above the East Toppenish Drain (Wise et al. 2009, Page 104). The effluent load is…about 19% of the TP load in the Yakima River immediately above the East Toppenish Drain. The EPA considers this a significant contribution to the loading of TP in the Yakima River."

Water Quality Standards

The Washington WQS were used to develop all of the water quality-based effluent limits in the draft permit, including those for TP. The Fact Sheet states, on Page 10, that "…the City of Toppenish discharge may affect the quality of waters of the State of Washington. Because Washington is an affected State, the EPA must condition the permit to ensure compliance with Washington's WQS (40 CFR 122.4(d), 122.44(d)(4))."

Regarding TP specifically, the Fact Sheet States on Page C-5 that "EPA has interpreted the State's of Washington's narrative criterion for aesthetics using the recommendations in *Quality Criteria for Water 1986*, which states that 'a desired goal for the prevention of plant nuisances in streams or other flowing waters not discharging directly to lakes or impoundments is 100 µg/L total P.'" Also, Table C-4, on Page

C-12 of the Fact Sheet states that the water quality standard upon which the TP limit is based is WAC 173-201A-260(2)(b).

Consistent with the EPA's policy on Tribal WQS that are not in effect for Clean Water Act purposes, the EPA also considered the Yakama Nation's WQS, in addition to Washington's WQS (EPA 1993). The EPA determined that effluent limits for TP based on the EPA's interpretation of Washington's narrative criterion for aesthetics would also ensure compliance with the Yakama Nation's WQS (see the fact sheet at Page C-6). There are no effluent limits in the draft permit that are directly based on the Yakama Nation's WQS.

Specific Phosphorus Limits

The EPA has re-evaluated the TP limits in the draft permit. In doing so, the EPA considered the more-recent Yakima River flow data referenced by the SCWRCD in its comment as well as the City's phosphorus loading measured since the WWTP upgrades were completed.

Yakima River Flow

The EPA agrees that more-recent flow data than those referenced in the fact sheet are available for the Yakima River at Parker. The EPA used these more-recent data to recalculate the 30-day, 5-year low flow rate (30Q5) of the Yakima River at Parker. The recalculated 30Q5, for March – October, using data from 1997-2012, is 397 CFS or 257 mgd. The March – October 30Q5 flow rate used in the fact sheet, which was calculated using flow data measured from 1943 – 1977, was 173 CFS.

Treatment Plant Performance

The summary statistics for the City of Toppenish's effluent loading of TP, from June 2010 through December 2012, are as follows:

Table 3: City of Toppenish Effluent TP Loading Summary Statistics

Statistic	TP Load (lb/day)
Minimum	0.8
Average	23.3
Maximum	74.3
Standard Deviation	16.0

The EPA used the effluent data to calculate a performance-based effluent limit for TP loading. The performance-based effluent limit was calculated as follows:

Average Monthly Limit

Once the long-term average has been established, the formula for calculating an average monthly effluent limit (AML) is as follows (see the Technical Support Document for Water Quality-based Toxics Control at Table 5-2).

$$AML = LTA \times \exp(z_a\sigma_n - 0.5\sigma_n^2)$$

Where:

$\sigma_n^2 = \ln(CV^2/n + 1)$
$\sigma_n = \sqrt{\sigma_n^2}$
z_a = 2.326 for 99th percentile probability basis
n = number of sampling events required per month (4 in this case)

The coefficient of variation (CV) is the standard deviation of the data set divided by the mean. In this case it is:

16.0 ÷ 23.3 = 0.688

Thus, using the actual average discharge as the long term average yields the following performance-based average monthly effluent limit:

$\sigma_n^2 = \ln(0.688^2/4 + 1) = 0.1118$
$\sigma_n = 0.3343$
AML = 23.3 lb/day × exp(2.326 × 0.3343 - 0.5 × 0.1118)
= 23.3 lb/day × 2.06
= 48 lb/day

Average Weekly Limit

The equation for the average weekly limit (AWL) is the same as for the average monthly limit; the only difference is that "n" is set equal to the number of samples per week (one sample in this case) instead of the number of samples per month.

Thus:

$\sigma_n^2 = \ln(0.688^2/1 + 1) = 0.3873$
$\sigma_n = 0.6223$
AWL = 23.3 lb/day × exp(2.326 × 0.6223 - 0.5 × 0.3873)
= 23.3 lb/day × 3.50
= 82 lb/day

Interpretation of Washington's Narrative Aesthetics Criterion

As stated in the fact sheet at Page C-5, "EPA has interpreted the State's of Washington's narrative criterion for aesthetics using the recommendations in *Quality Criteria for Water 1986*, which states that 'a desired goal for the prevention of plant nuisances in streams or other flowing waters not discharging directly to lakes or impoundments is 100 µg/L total P.'"

Loading Capacity

The total TP loading capacity is the loading of TP that the Yakima River can carry under low flow conditions while still meeting the interpreted narrative criterion. The total TP loading capacity, under 30Q5 river flow conditions, is:

257 mgd × 0.1 ppm × 8.34 lb/gal = 214 lb/day

The EPA used available water quality data to estimate existing TP loads and, in turn, the remaining loading capacity. Thirty water quality samples from five USGS monitoring stations located between the

Zillah WWTP (river mile 89.2) and the East Toppenish Drain (river mile 86.0), taken between 2004 and 2007, were used to estimate the current TP loading in the Yakima River, upstream from the East Toppenish Drain. The median TP concentration is 44 µg/L (0.044 mg/L). Thus, the current TP load in the Yakima River, immediately upstream from the East Toppenish Drain, under 30Q5 flow conditions, is:

257 mgd × 0.044 ppm × 8.34 lb/gal = 94.2 lb/day

The City of Toppenish was required to collect flow and TP data for the Toppenish Drain, upstream from the discharge, as a condition of its prior (2003) permit. The median TP load in the Toppenish Drain, upstream from the discharge, was 18.1 lb/day.

Thus, the remaining assimilative capacity is:

214 lb/day – 94.2 lb/day - 18.1 lb/day = 102 lb/day

Final TP Effluent Limit

Setting the final average monthly effluent limit equal to the performance-based effluent limit of 48 lb/day would require allocating 47% of the estimated remaining TP assimilative capacity in the Yakima River (102 lb/day, see above), to the Toppenish WWTP. This is somewhat larger than the 43% of the estimated remaining assimilative capacity that the EPA proposed to allocate to the Toppenish WWTP in the fact sheet. However, the EPA believes the performance-based limit nonetheless represents a reasonable interim approach to controlling nutrient discharges from the City of Toppenish WWTP, prior to the development of a TMDL that establishes load and wasteload allocations for all sources of nutrients in the lower Yakima River.

Therefore, the TP effluent limits in the final permit are an average monthly limit of 48 lb/day and an average weekly limit of 82 lb/day.

Compliance Schedule, Interim Limits and Deferring Permit Issuance

There is no basis for the EPA to defer issuing a final permit for the City of Toppenish. However, the draft permit proposed a compliance schedule of 1 year for the new water quality-based effluent limits for TP (see the fact sheet at Pages 19-20). Although the effluent limits in the final permit are performance-based, they still carry some risk of noncompliance. Between June 2010 and December 2012, the effluent TP load has been greater than the final average monthly limit on two occasions.

However, no major capital improvements should be necessary to achieve the water quality-based effluent limits for TP; rather, the effluent limits should be achievable through operational changes at the facility, to optimize the existing biological phosphorus removal processes. A 2-year schedule of compliance has been authorized in order to allow the City two full nutrient removal seasons to optimize the biological phosphorus removal processes, in order to achieve consistent compliance with the final effluent limits for TP.

Similar to the draft permit, the final permit includes interim effluent limitations, which apply during the term of the compliance schedule. The EPA has decided to require monitoring of the effluent TP once per month at times when the new water quality-based effluent limits are not in effect, including during

the term of the compliance schedule. As explained above, the performance-based effluent limit, when compliance is based on only one sample, is 82 lb/day (i.e., the performance-based average weekly limit when sampling is performed once per week or less). Therefore, the interim average monthly effluent limit for TP in the final permit is 82 lb/day. NPDES regulations state that effluent limits for POTWs that discharge continuously must be stated as average monthly and average weekly discharge limitations. Therefore, the EPA has also included an interim average weekly effluent limit in the final permit. The interim average weekly effluent limit is the same as that proposed in the draft permit (149 lb/day).

Comment #10

The SCWRCD stated that the Permit appears to arbitrarily set Water Quality Based Effluent limits for nitrogen more based on the plant's optimal running condition rather than a realistic study of the receiving water or the Yakima River.

Response #10

The permit limits two forms of nitrogen: ammonia and nitrate + nitrite. It is unclear which of these effluent limits the commenter is referring to, thus, the EPA will address the proposed limits on both forms of nitrogen in this response. As explained below, the effluent limits for nitrogen are water quality-based effluent limits and are not based on the WWTP's optimal running condition.

Ammonia

As shown in the fact sheet at Table C-4, on page C-12, the ammonia limits proposed in the draft permit were based on a combination of Washington's numeric water quality criteria for ammonia (WAC 173-201A-240(3)), anti-backsliding (CWA Sections 303(d)(4) and 402(o)), and antidegradation (WAC 173-201A-320).

As explained in the response to comment #5, above, the ammonia limits in the final permit are different from those in the draft permit, however, the ammonia limits in the final permit are nonetheless based on a combination of Washington's water quality criteria for ammonia, anti-backsliding, and antidegradation.

Nitrate + Nitrite

As shown in the fact sheet at Table C-4, on page C-12, the nitrate + nitrite limits in the draft permit are water quality-based effluent limits that are based on the EPA's interpretation of the State of Washington's narrative water quality criterion for toxic substances (WAC 173-201A-240(1)).

A detailed description of the derivation of the water quality-based effluent limits for nitrate + nitrite appears on Pages C-8 – C-9 of the fact sheet.

The EPA did determine that the City could comply with the new water quality-based effluent limits for nitrate + nitrite immediately upon the effective date of the final permit, and thus did not authorize a compliance schedule for the new water quality-based effluent limits for nitrate + nitrite. However, this does not mean that the nitrate + nitrite limits are based on the WWTP's optimal running condition.

Comment #11

The City of Toppenish stated that all seasonal limits for Lead and Selenium in Table 1 should be calculated using matched sets of summer (May - September) and winter (October- April) treatment plant design flows and Toppenish Drain flows. EPA calculated these limits using different seasonal Toppenish Drain flows, but the same treatment plant design flow. The calculations should have been performed using a lower treatment plant design flow during the winter season. Winter design flow for the wastewater treatment plant is estimated at 0.8 mgd. Please revise the winter effluent limits using the correct winter design flow for the treatment plant.

Response #11

The EPA acknowledges that the actual effluent flows during the "winter" or non-irrigation season (October – April) are lower than during the "summer" or irrigation season (May – September). Specifically, the average effluent flow from October – April is 0.873 mgd, while the average effluent flow from May –September is 1.278 mgd.

However, the design flow is independent of the actual flows; i.e., it is a characteristic of the treatment plant itself. The design flow of a POTW is the wastewater flow rate that the plant was built to handle (40 CFR 122.21(j)(1)(vi)). As stated in the response to comment #1, the design flow of the Toppenish WWTP is 1.67 mgd (Gray and Osborne 2005). Federal regulations require that, "in the case of POTWs, permit effluent limitations, standards, or prohibitions shall be calculated based on design flow" (40 CFR 122.45(b)(1)).

The City provided no basis for its estimated winter design flow of 0.8 mgd. Furthermore, this estimated design flow is less than the average actual effluent flow from October – April. The monthly average effluent flows from October – April are greater than or equal to 0.8 mgd 69% of the time, and the maximum monthly average flow measured during April – October is 1.32 mgd. Finally, the *City of Toppenish Wastewater Facility Plan* does not provide different design flows for different seasons (Gray and Osborne 2005). Therefore, the design flow of 1.67 mgd has been used to calculate all of the effluent limits in the permit, consistent with 40 CFR 122.45(b)(1).

Comment #12

The City of Toppenish requested that effluent limits for copper and zinc be expressed as seasonal effluent limits (similar to the lead and selenium effluent limits proposed in the draft permit) as opposed to year-round limits.

Response #12

As explained in the response to comment #6, above, the EPA has established seasonal effluent limits for copper in the final permit. As explained below, the EPA has also re-evaluated the proposed effluent limits for zinc on a seasonal basis.

According to Section 7.7.2 of the EPA Permit Writers' Manual (EPA 2010), for revised water quality-based effluent limits, the permit writer should apply the provisions of CWA Sections 303(d)(4) and 402(o) directly. The zinc effluent limits in the 2003 permit were water quality-based effluent limits.

Water quality-based effluent limits for parameters that are not causing water quality impairments may be made less stringent if the revision is consistent with the State's antidegradation policy (CWA Section 303(d)(4)(B)). Furthermore, even if another exception to anti-backsliding were applicable, any revised effluent limits must ensure compliance with WQS, including antidegradation requirements (CWA Section 402(o)(3)). Thus, in the draft permit, the EPA revised the zinc effluent limits in a manner consistent with the State of Washington's antidegradation policy and implementation guidance.

However, for the final permit, the EPA has further revised the zinc effluent limits. The revisions were based on the following factors:

- The EPA has used the corrected design flow of the POTW (1.67 mgd).
- The EPA has calculated zinc limits on a seasonal basis (similar to the new effluent limits for lead and selenium).
- The Washington Tier II Guidance states that "expanded" actions include "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 guidance does not state that increases to maximum daily limits, specifically, are considered "expansions." Thus, in the final permit, the EPA has applied Washington's antidegradation policy and guidance to the prior permit's average monthly limits but not to the maximum daily limits.
- The EPA has performed calculations to determine if the increase in the zinc concentration, due to less-stringent effluent limits, would be measurable at the mouth of the East Toppenish Drain, which is the nearest point at which the State of Washington's WQS directly apply. An action causing a change in water quality that is not measurable is not required to undergo a Tier II antidegradation analysis (WAC 173-201A-320).

When determining whether a change in water quality is measurable for toxic pollutants such as zinc, the State of Washington's Supplemental Guidance on Implementing Tier II Antidegradation states that "The increase in concentration…needs to be compared with the method detection limit to determine whether there is a measurable change." The method detection limit of EPA Method 200.7, which is an approved method for the analysis of zinc for NPDES permits, is 2.0 µg/L (Martin et al. 1994). Thus, an increase in the zinc concentration at the mouth of the East Toppenish Drain greater than 2.0 µg/L would be considered measurable under the State of Washington's antidegradation policy. The results of the recalculated zinc limits are summarized in Table 3, below. The scenario that produced the limits in the final permit is shown in italic type and shaded.

The October – April average monthly effluent limits for zinc in the final permit are 10% greater than those in the prior permit. This ensures that the revised limits comply with the State of Washington's antidegradation policy. From May – September, a 10% increase to the average monthly limit would not cause a measurable increase to the zinc concentration at the mouth of the East Toppenish Drain. Thus, from May – September, the zinc average monthly limit may increased by more than 10% without causing a measurable increase in the zinc concentration at the mouth of the East Toppenish Drain. The maximum daily limits have been recalculated based on Washington's water quality criteria. The maximum daily limits are slightly higher during the irrigation season (May – September).

Table 3: Effluent Limit Scenarios for Zinc			
Scenario	**Units**	**Average Monthly Limit**	**Maximum Daily Limit**
October – April			
Prior permit	µg/L	45.9	91.1
	lb/day	0.73	1.44
10% Increase over prior permit limits	µg/L	*50.49*	N/A
	lb/day	*0.803*	N/A
Recalculated based on Criteria	µg/L	73.4	*106*
	lb/day	1.02	*1.48*
Measurable Increase in Concentration from Limits Based on Criteria?		Yes	N/A
Measurable Increase in Concentration from 10% Increase to Limits?		Yes	N/A
Limits in Final Permit	**µg/L**	**50.49**	**106**
	lb/day	**0.803**	**1.48**
May – September			
Prior permit	mg/L	45.9	91.1
	lb/day	0.73	1.44
10% Increase over prior permit limits	mg/L	50.49	N/A
	lb/day	0.803	N/A
Recalculated based on Criteria	mg/L	77.0	*112*
	lb/day	1.07	*1.56*
Measurable Increase in Concentration from Limits Based on Criteria?		Yes	N/A
Measurable Increase in Concentration from 10% Increase to Limits?		No	N/A
Limits in Final Permit	**µg/L**	**57.4**	**112**
	lb/day	**0.803**	**1.56**

Comment #13

The City of Toppenish stated that the EPA states in the Fact Sheet that "effluent data indicate that the City can comply with the new water quality-based effluent limits for selenium immediately…" The City stated that, if compliance is expected, then an effluent selenium limit is unnecessary. The City requested that the EPA delete the selenium effluent limits from the permit.

The City also stated that the wastewater treatment plant is not designed to remove selenium and requested a compliance schedule of 4 years and 11 months for any effluent limits for selenium.

Response #13

The fact that the EPA expects that the City will be able to comply with the new water quality-based effluent limits for selenium immediately upon the effective date of the final permit does not mean that effluent limits for selenium are not necessary. Federal regulations require effluent limits to be established for all pollutants which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard (40 CFR 122.44(d)(1)(i)). As shown in Table D-2 of the Fact Sheet, the discharge from the City of Toppenish

WWTP has the reasonable potential to cause or contribute to excursions above WQS for selenium, during both the irrigation and non-irrigation seasons. In the Fact Sheet, the EPA used a design flow of 1.76 mgd instead of the correct design flow of 1.67 mgd. This caused the dilution factors to be marginally less than they should have been, however, the difference was not large enough to change the outcome of the reasonable potential analysis. That is to say, even with the correct, marginally greater dilution factors, the City has the reasonable potential to cause or contribute to excursions above WQS for selenium. The reasonable potential calculations were performed using procedures established in EPA permitting guidance (i.e. the Technical Support Document for Water Quality-based Toxics Control). See Appendix B to this response to comments for the corrected dilution factors and reasonable potential calculations. Therefore, effluent limits are necessary for selenium.

The EPA determined that the City could comply with the new water quality-based effluent limits for selenium by calculating performance-based effluent limits. The performance-based effluent limits use the effluent limit calculation procedures in Appendix E to the *Technical Support Document for Water Quality-based Toxics Control* (EPA 1991). Performance-based effluent limits are calculated based on the logarithmic transformed mean and variance of the actual effluent data, and are estimates of the maximum expected monthly average and maximum daily effluent concentrations. This is in contrast to the water quality-based effluent limits, which are calculated based on wasteload allocations which, in turn, are calculated from the WQS.

The performance-based maximum daily effluent limit for selenium is 11.2 µg/L. The performance-based average monthly limit depends on the required sampling frequency; it is 4.02 µg/L if the required sampling frequency is once per week (i.e. 4 samples per month), and 5.65 µg/L if the required sampling frequency is once per month.

Because the performance-based effluent limits are less than the new water quality-based effluent limits, the City should be able to comply with the new water quality-based effluent limits for selenium immediately upon the effective date of the final permit. Therefore, no compliance schedule may be authorized. However, from April – October, if the City samples only once per month, the City has a 9% probability of violating the average monthly limit for selenium. Thus, more-frequent sampling of the effluent for selenium than required by the permit may be necessary at times, from May – September, in order to ensure compliance with the selenium limits. The City has the option of sampling more frequently if necessary (see the permit at Part III.D).

Monitoring and Reporting Requirements

Comment #14

The City of Toppenish stated that weekly monitoring of phosphorus, lead and selenium is excessive. If these limits are retained, there should only be monthly or quarterly monitoring. The City stated that the proposed monitoring schedule will present a significant burden on plant staff, and will involve significant labor and analytical costs. The City has spent a considerable amount of money to upgrade their

treatment process, which is reflected in significant recent increases to the City's sewer rates. Additional monitoring costs will be difficult to absorb.

The City stated that it is unreasonable to expect weekly testing of phosphorus, lead and selenium since the turn-around time for outside laboratory results is two weeks without incurring "rush" results. It is requested that monthly monitoring rather than weekly be required.

The City stated that, although the Toppenish WWTF does not fall under the jurisdiction of the Washington State Department of Ecology, the provisions of the most recent version of the Ecology's Permit Writer's Manual provide a useful comparison. The Permit Writer's Manual recommends quarterly testing for activated sludge plants below 2 mgd design flow, unless there are issues such as frequent upsets, O&M failures or concerns about toxicity. For an additional comparison, the City of Puyallup, another facility regulated by EPA, with a design flow almost ten times higher than that of Toppenish (13.98 mgd, with an acute dilution factor of 1.8x), only has to test for effluent metals monthly.

Response #14

The EPA has re-evaluated the proposed required monitoring frequencies for phosphorus, lead, and selenium and has made changes to the final permit, as explained below.

Washington Permit Writers' Manual Recommendations

The commenter asserts that the Washington Department of Ecology's *Water Quality Program Permit Writer's Manual* (Ecology Permit Writer's Manual) recommends quarterly testing for phosphorus, lead, and selenium for activated sludge plants below 2 mgd design flow, unless there are issues such as frequent upsets, O&M failures or concerns about toxicity.

The commenter appears to be referring to Table XIII-2C of the Ecology Permit Writer's Manual. This table does suggest an influent and effluent monitoring frequency of quarterly for metals, however, this recommendation is not applicable to monitoring for the purpose of determining compliance with effluent limits, rather, it is for monitoring related to a pretreatment program (e.g, for developing local limits, see also the Ecology Permit Writer's Manual at Chapter XIII, section 2.1.4). For all parameters in Table XIII-2C for which monitoring frequencies are recommended for the purpose of determining compliance with effluent limits (flow, pH, BOD_5, TSS, total residual chlorine, and fecal coliform) the recommended frequency is at least twice per week. Table XIII-2C does not suggest a monitoring frequency for TP.

The Ecology Permit Writer's Manual does not provide specific monitoring frequency recommendations for metals or TP, for POTWs, in order to determine compliance with effluent limits for these parameters. However, in the context of conventional pollutants, the Ecology Permit Writer's Manual states that once per week is "a reasonable minimum frequency for monitoring compliance with effluent limits" (Page XIII-27).

Furthermore, the Ecology Permit Writer's Manual states that "the tables represent the minimum recommended frequencies" (emphasis in original) and states that reasons for more monitoring may

include a CV greater than 0.6 (Page XIII-28). The coefficients of variation for phosphorus, lead, and selenium are 0.688, 1.213, and 1.211, respectively.

Therefore, an effluent monitoring frequency of weekly would not be inconsistent with the recommendations of the Ecology Permit Writer's Manual.

However, as explained below, if less-frequent monitoring would adequately characterize the discharge, the EPA has proposed less-frequent monitoring for phosphorus, lead and selenium.

Monitoring Frequencies for Phosphorus, Lead and Selenium in the Final Permit

The monitoring frequencies for phosphorus, lead and selenium in the final permit are as follows:

Total Phosphorus

The required monitoring frequencies for TP, in the final permit, are weekly at times when the final water quality-based effluent limits are in effect (i.e., March – October, beginning two years after the effective date of the final permit). This is the same frequency proposed in the draft permit.

The EPA has determined that, if water quality-based effluent limits are not in effect, the monitoring frequency for TP may be reduced to monthly. Thus, the monitoring frequency for TP, at times when the final water quality-based effluent limits are not in effect, including during the two-year compliance schedule for the new TP limits, is once per month.

Lead

The proposed monitoring frequencies for lead, in the draft permit, were as follows:

- 1/month for May – September.
- 1/month for October – April while interim effluent limits are in effect.
- 1/week for October – April after the final water quality-based effluent limits take effect.

From October – April, the required monitoring frequency for lead has been reduced to once per month. Regardless of the frequency of sampling, effluent data indicate the City would not be able to consistently comply with the new water quality-based effluent limits for lead. Since reductions in effluent lead concentrations will be necessary regardless of the sampling frequency, the EPA believes it is reasonable to require sampling for lead once per month, from October – April.

Selenium

The proposed monitoring frequencies for selenium, in the draft permit, were as follows:

- 1/month for May – September.
- 1/week for October – April.

As explained in the response to comment #13, above, effluent data indicate that 4 samples per month may be necessary to ensure consistent compliance with the new water quality-based effluent limits for selenium. However, to reduce the City's monitoring costs, the EPA has reduced the required monitoring

frequency for selenium to once per month year-round. The City has the option of sampling more frequently if necessary (see the permit at Part III.D).

Laboratory Turn-Around Time

As explained in the response to comment #15, below, the issue of laboratory turn-around time has been addressed by allowing DMRs to be submitted by the 20th day of the month following the monitoring month. Even if a sample is taken on the last day of a given month, and it takes two weeks to receive the results, the results will be available in time to allow the DMR to be postmarked or submitted electronically by the 20th day of the following month.

Comment #15

The City stated that expecting the results of monthly testing to be submitted in the DMR by the 10th of each month is extremely unreasonable, due to the delay in receiving outside laboratory results. It is requested that the DMR submittal deadline be changed from the 10th of each month to the 20th.

Response #15

The EPA has the discretion to establish reporting requirements on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year (40 CFR 122.44(i)(2). In this case, the EPA agrees that submitting DMRs no later than the 20th day of the month following the monitoring month would be acceptable.

Comment #16

The City of Toppenish stated that the MDL specified in the permit for TP analysis in surface water is 10 µg/L. The TP detection limit for the City's analysis using the Hach DR 3900 spectrophotometer is 50 µg/L. It is requested that the authorized MDL for this surface water monitoring for TP be increased from 10 µg/L to 50 µg/L to enable use of Hach Method 10209 TNT plus LR, which is equivalent to EPA Methods 365.1 and 365.3. This revision would save the city considerable testing costs by allowing the city to use its own laboratory equipment to perform these surface water analyses.

Response #16

The minimum monthly average effluent TP concentration measured between June 2010 and May 2012 is 100 µg/L, and the minimum concentration of TP in the East Toppenish Drain downstream from the discharge is 148 µg/L (see the Fact Sheet at Page C-4). Because the minimum concentration of TP in both the effluent and receiving water is at least 100 µg/L, an MDL for of 50 µg/L will adequately characterize the TP concentration in both the effluent and receiving water. Therefore, the EPA agrees with the City that an MDL of 50 µg/L for TP is acceptable for effluent and receiving water monitoring in this case.

Comment #17

The City of Toppenish stated that benzene and methylene chloride are most often detected in municipal WWTF effluent as a result of laboratory contamination. Monitoring should be reduced to twice per permit cycle, and a method blank should be tested and reported to assess the possibility of laboratory contamination.

Also, previous data submitted on the permittee's permit application is data for the old SBC/RBC treatment process. Additional testing submitted at the request of the permit writer removed the reasonable potential to violate Washington WQS for methylene chloride, benzene, nickel, and silver. City of Toppenish requests that effluent testing above and beyond the NPDES Application Form 2A Expanded effluent testing be removed from the permit as it is included in this testing and has to be performed 3 times within 5 years.

Response #17

As stated on Page 22 of the Fact Sheet, benzene and methylene chloride (along with arsenic, nickel, and silver) have been detected in the effluent from the City of Toppenish WWTP, and the EPA proposed semi-annual monitoring for those pollutants in order to better characterize the effluent concentrations.

However, benzene and methylene chloride have not been detected in the effluent since 2004. Therefore, the EPA agrees that the required monitoring frequency for benzene and methylene chloride should be reduced. The frequency cannot be reduced to twice per permit cycle as suggested by the commenter, because, as stated by the commenter, in order to comply with the expanded effluent testing requirements of NPDES application form 2A (EPA form 3510-2A, see also Appendix J to 40 CFR Part 122), the permittee must analyze a minimum of three effluent samples for benzene and methylene chloride.

The EPA has also re-evaluated the need for semi-annual monitoring for nickel. The maximum projected receiving water concentration for nickel is two orders of magnitude less than both the aquatic life and human health water quality criteria. Thus, the EPA believes that the three sampling events required to produce a complete application for renewal of this permit will be adequate to characterize the City's discharge of nickel. The EPA has therefore deleted the requirement for semi-annual monitoring for nickel.

Comment #18

The City of Toppenish stated that the frequency of Whole Effluent Toxicity (WET) Testing required is unclear. Under the stipulations of Section I.C.1, a split sample must be tested quarterly for the parameters in Section 1.B in addition to the toxicity testing specified. However, Section I.C.2 specifies semi-annual monitoring.

The City stated that quarterly or semi-annual monitoring for WET, including analysis of a split sample for the parameters in Part 1.B, is excessive. The City stated that this frequency of testing would only be appropriate if the City had failed a recent test. The City stated that it has minimal industrial discharges and little potential to discharge toxic substances.

The City stated that the proposed monitoring schedule will present a significant burden on plant staff, and will involve significant labor and analytical costs. The City stated that it has spent a considerable amount of money to upgrade their treatment process, which is reflected in significant recent increases to the City's sewer rates. The City stated that additional monitoring costs will be difficult to absorb.

The City stated that, for an additional comparison, the City of Puyallup, another facility regulated by EPA with a design flow almost ten times higher than that of Toppenish (13.98 mgd, with an acute dilution factor of 1.8x), only has to test for whole effluent toxicity annually.

Response #18

Clarification of Required WET Testing Frequency

The proposed required monitoring frequency for WET, in the draft permit, is twice per year, as stated in Part I.C.2 of the draft permit, which reads: "For outfall 001, chronic tests must be conducted twice per year, once between January 1st and June 30th and once between July 1st and December 31st."

The language in Part I.C.1 of the draft permit does not concern the frequency of monitoring required for WET, rather, it requires that splits of the WET samples required by Part I.C.2 of the draft permit must be analyzed for certain chemical and physical parameters, specifically those which have a required monitoring frequency (in Part I.B) of once per quarter or more frequently. These chemical and physical parameters are: BOD_5, TSS, pH, total ammonia as N, nitrate + nitrite as N, TP, total recoverable copper, total recoverable lead, selenium, total recoverable zinc, temperature, hardness, alkalinity, total dissolved solids, and total Kjeldahl nitrogen. The WET testing report must also include the effluent flow rate at the time of sample collection (see Part I.C.4.b).

Note that Part I.C.1 also provides that, "when the timing of sample collection coincides with that of the sampling required in Part I.B, analysis of the split sample will fulfill the requirements of Part I.B as well." Thus, Part I.C.1 does not require additional sampling beyond what is required by Parts I.B and I.C.2 of the draft permit, rather, it ensures that the analysis for certain chemical and physical parameters occurs contemporaneously with the WET monitoring.

To clarify this requirement, the EPA has listed the parameters that must analyzed for in the split samples, rather than referencing Part I.B of the permit.

Basis for Semi-annual WET Testing

The requirement for semi-annual WET testing is not excessive. The draft permit proposed semi-annual WET testing so that, at the end of the 5-year permit term, at least 10 WET samples will have been collected. As explained below, in this case, due to the limited dilution available at the point of discharge, 10 WET results is the minimum number of samples necessary to perform an accurate reasonable potential analysis for WET when the permit is reissued.

The TSD states on Page 53 that, "for less than 10 items of data, the uncertainty in the CV is too large to calculate a standard deviation or mean with sufficient confidence." Thus, for reasonable potential analyses, the TSD recommends assuming that the CV is equal to 0.6, if there are less than 10 data points available. As explained below, infrequent WET sampling resulting in a small number of WET results, combined with the assumption that the CV is equal to 0.6, would result in a relatively large reasonable potential multiplying factor (see the TSD at Table 3-1). The large reasonable potential multiplying factor, in combination with the limited dilution available at the point of discharge, would mean that, when the EPA reissues this permit, the EPA would find that the City of Toppenish WWTP had the reasonable

potential to cause or contribute to excursions above narrative water quality criteria for toxicity and would therefore be required to include an effluent limit for WET in the reissued permit (40 CFR 122.44(d)(1)(v)), even if the measured toxicity was consistently low.

For example, if the WET sampling frequency were to be reduced to annually, there would be five WET samples collected within the permit term. When performing a reasonable potential analysis with only five effluent samples, the CV would be assumed to be equal to 0.6, so the reasonable potential multiplying factor would be 4.2 (see the TSD at Table 3-1). Thus, even if the maximum actual WET result was 1.0 TU_c (i.e., a NOEC or IC_{25} of 100% effluent), the maximum projected effluent toxicity (i.e., the maximum actual result multiplied by the reasonable potential multiplying factor) would be 1.0 TU_c × 4.2 = 4.2 TU_c. The City of Toppenish's chronic dilution factor is 1.24:1 during the non-irrigation season and 2.07:1 during the irrigation season. Thus, the maximum projected receiving water concentration would be 3.4 TUc during the non-irrigation season and 2.0 TUc during the irrigation season. These projected receiving water concentrations are greater than 1.0 TUc, which is the EPA's recommended interpretation of narrative toxics criteria, for chronic toxicity (See the TSD at Section 2.3.3).

By ensuring that there are at least 10 data points available at the end of the permit term, the EPA will be able to use the actual CV in the WET reasonable potential analysis when the permit is reissued, instead of making the assumption that the CV is equal to 0.6. If the maximum actual WET result and the actual CV are small, then the reasonable potential multiplier will also be small, and the EPA may find that the facility does not have the reasonable potential to cause or contribute to excursions above WQS for WET. As explained above, this outcome will not be possible if less than 10 WET results are available at the time the permit is reissued. That is to say, if there are less than 10 WET results available, because of uncertainty, the EPA will be forced to use conservative assumptions in its WET reasonable potential analysis (e.g., assuming the CV is equal to 0.6), which will very likely result in a finding of reasonable potential to cause or contribute to excursions above WQS for WET, even if more data would result in a finding of no reasonable potential. Therefore, the EPA has maintained the twice-per-year WET sampling frequency proposed in the draft permit.

Comment #19

The City of Toppenish stated that, under the stipulations of Section I.C.6, the City would need to "implement the initial investigation TRE workplan within 48-hours of the permittee's receipt of the toxicity results demonstrating the exceedance." The City stated 48 hours should be changed to two weeks, as sufficient time needs to be provided to evaluate the results, and secure the necessary professional assistance, and determine the appropriate course of action.

The City stated that, in the event of a WET result greater than 1.23 TU_c, the permit requires the the City to "conduct six more bi-weekly (every two weeks) chronic toxicity tests, over a 12-week period. This accelerated testing shall be initiated within 10 calendar days of receipt of the test results indicating the initial exceedance." The City stated that the requirement for six bi-weekly tests is excessive and should be changed to three. The City stated that 10 calendar days should be changed to 15 to provide adequate time for securing a lab that has availability.

Response #19

As stated on Page 4-1 of EPA's *Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Testing Programs*, "while TREs and (Toxicity Identification Evaluations) are generally site-specific and the TRE's details can only be determined once it has been triggered, generic TRE plans can be made ahead of time. Where the permitting authority includes a TRE provision in the permit, EPA recommends that the discharger be required to submit, within 60 to 90 days of the effective date of the permit, a plan for responding to noncompliance with the WET limit or permit requirement." Because the initial investigation TRE workplan must be prepared ahead of time, it is not necessary to allow two weeks to implement the plan.

As stated on Page 4-3 of the EPA's *Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Testing Programs* (EPA 1996), the TSD "recommends that in cases where toxicity is repeatedly or periodically present above effluent limits (or other trigger levels) more than 20 percent of the time, a TRE should be required. In order to determine if effluent toxicity is in fact repeated or periodic; EPA Regions 9 and 10 require accelerated testing, consisting of 6 tests to be conducted during the following 12 weeks, after the first exceedance of a permit requirement. Regions 9 and 10 consider this accelerated testing to be the first step of the TRE."

The requirement for accelerated testing consisting of six bi-weekly tests is consistent with the recommendation in the *Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Testing Programs*.

However, the EPA agrees with the City that it is reasonable to allow 15 calendar days to begin the accelerated testing, instead of the 10 days proposed in the draft permit.

Comment #20

The Yakama Nation Water Code Administration (YNWCA) requested that the permit require copies of all mandatory reporting requirements listed in the draft permit to be sent to the YNWCA.

Response #20

The EPA agrees that the permit should require the City to send copies of reports required by the permit to the YNWCA, in addition to the Yakama Nation Environmental Protection Program. The final permit has been changed accordingly.

Comment #21

The YNWCA recommended that the EPA consider incorporating testing and establish limits for pharmaceutical chemicals. Scientific studies and reports have been conducted that point to wastewater treatment plants as contributors for chemicals, such as, erythromycin, fluoxetine, sulfamethoxazole, triclosan, diphenhydramine, carbamazepine and tonalide to list a few. As studies become more prevalent regarding pharmaceuticals and their effects on the ecosystem the YNWCA views the need for testing and establishing limits for pharmaceutical chemicals will become more pronounced in the future.

Response #21

The EPA has no basis to require monitoring or to establish effluent limits for any of the chemicals named in the YNWCA's comment. The EPA has no information demonstrating that the City of Toppenish discharges any of the chemicals named in the YNWCA's comment. Furthermore, neither the State of Washington nor the Yakama Nation has developed water quality criteria for any of these chemicals, nor has the EPA developed recommended water quality criteria for any of these chemicals. None of these chemicals are among those for which the City must provide effluent data in order to produce a complete application for renewal of its NPDES permit (see Appendix J to 40 CFR Part 122).

Special Conditions

Comment #22

The City stated that, in Part II.C of the draft permit, the facility design flow should be corrected from 1.76 mgd to 1.67 mgd, and the value for 85% of the design flow changed from 1.496 mgd to 1.42 mgd, to be consistent with 2005 Wastewater Facility Plan and the 2007 construction plans for the treatment plant.

Response #22

The EPA agrees that the facility's design flow is 1.67 mgd as opposed to 1.76 mgd. Therefore, the EPA has changed the flow values in Part II.C of the permit accordingly.

Standard Conditions

Comment #23

The City of Toppenish stated that the meaning of Section IV.G.l is unclear:

"Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee meets the requirements of paragraph 2 of this Part. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review."

Additionally, the City asked, if an upset provides some legal protection, why only for technology-based permit effluent limitations?

Response #23

As stated on Page 26 of the Fact Sheet, "Sections III, IV and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because these requirements are based directly on NPDES regulations, they cannot be challenged in the context of an NPDES permit action."

Part IV.G of the permit is a standard condition, which federal regulations require to be included in all NPDES permits, either expressly or by reference (see 40 CFR 122.41(n)). The upset provision is explained

on Page 10-3 of the *United States Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) Permit Writers' Manual* (EPA 2010) as follows:

> *An upset (i.e., an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limits because of factors beyond the permittee's control) can be used as an affirmative defense in actions brought against the permittee for noncompliance. An upset does not include noncompliance to the extent caused by operational error, improperly designed or inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation. The permittee (who has the burden of proof to demonstrate that an upset has occurred) must have operational logs or other evidence that shows*
>
> - *When the upset occurred and its causes.*
> - *The facility was being operated properly.*
> - *Proper notification was made.*
> - *Remedial measures were taken.*

Federal regulations define an "upset" as "an exceptional incident in which there is unintentional and temporary noncompliance with *technology based permit effluent limitations* because of factors beyond the reasonable control of the permittee…." (40 CFR 122.41(n)(1), emphasis added). Because the regulations define "upset" as "…temporary noncompliance with technology based permit effluent limitations…," the upset provision may only be used as an affirmative defense to actions bought for noncompliance with technology-based effluent limits (as opposed to water quality-based effluent limits or other permit conditions).

Fact Sheet

The City of Toppenish made several comments on the Fact Sheet for the draft permit. The purpose of the Fact Sheet is to briefly set forth the principal facts and the significant factual, legal, methodological and policy questions considered in preparing the *draft* permit (40 CFR 124.8). Any provisions of the draft permit that have been changed in the final permit decision, and the reasons for these changes, shall be explained in this response to comments (40 CFR 124.17(a)(1)). Therefore, the Fact Sheet will not be edited. To the extent that the City's comments on the Fact Sheet may influence the conditions in the permit, the EPA will respond to comments on the Fact Sheet in this response to comments.

Comment #24

The City stated that the design flow of the Toppenish WWTF should be corrected to 1.67 mgd, or 2.58 CFS, to be consistent with 2005 Wastewater Facility Plan and the 2007 construction plans for the treatment plant.

Response #24

As stated in the response to comment #1, the EPA agrees that the correct design flow of the POTW is 1.67 mgd, which is 2.58 CFS. To prepare the final permit, the EPA has re-calculated technology-based loading limits for BOD_5 and TSS based on the correct design flow as explained in the response to comment #1. The EPA has also recalculated the dilution factors for reasonable potential and water quality-based effluent limit calculations. The revised reasonable potential and water quality-based effluent limit calculations are shown in Appendices B and C to this response to comments.

Comment #25

The City stated that the Toppenish Drain 1st percentile flow of 3.91 CFS stated in Section III.B of the Fact Sheet (Page 9) is inconsistent with paragraph 4 of Fact Sheet Section III.A (Page 8), which states: "The 1st percentile flow rate of the East Toppenish Drain, for May- September, is 13.7 CFS or 8.83 mgd."

The City stated that, based on the East Toppenish Drain critical flow of 13.7 CFS or 8.83 mgd, and the corrected treatment plant flow of 1.67 mgd, the treatment plant flow is less than 25% of the Drain flow and should not be reported as the "majority" of the Drain flow.

Response #25

The issue raised by this comment is whether the EPA has accurately stated the low flows of the East Toppenish Drain and the POTW's contribution to those flows in the Fact Sheet.

The 1st percentile flow rate for the East Toppenish Drain stated on Page 9 (Section III.B) of the Fact Sheet (3.91 CFS) is the 1st percentile of all of the flow measurements, for all months of the year. The 1st percentile flow rate for the East Toppenish Drain listed on Page 8 (Section III.A) of the Fact Sheet is the 1st percentile flow rate for May – September, specifically.

Using the year-round 1st percentile flow rate of the East Toppenish Drain (3.91 CFS), the statement on Page 9 of the Fact Sheet that "under critical conditions, the effluent flow can comprise the majority of the flow in the East Toppenish Drain" is accurate, even when the correct design flow of 2.58 CFS is used, because the design flow of the POTW is 66% of the year-round 1st percentile flow rate of the East Toppenish Drain.[3]

Comment #26

The City of Toppenish states that the EPA states in Section III.B of the Fact Sheet (Page 9) that the 7Q10 flow rate of the Yakima River, from USGS station #12505000 near Parker, WA, is 14.7 CFS. The City stated that this statement does not recognize that there is a mandated minimum flow for Yakima River at Parker of 300 CFS and a recommended flow of 600 CFS. Since the Yakima Basin Water Enhancement Program was passed in 1994, there have been only a few days (less than 1 %) when the minimum flow has been below 300 CFS.

[3] 2.58 CFS ÷ 3.91 CFS = 66%

Response #26

The EPA agrees that, using more recent flow data, the 7Q10 flow rate of the Yakima River is greater than stated on Page 9 of the fact sheet.

On Page 9 of the Fact Sheet, the EPA stated that "the 7Q10 flow rate of the Yakima River, calculated using data from USGS station #12505000 (Yakima River near Parker, WA) is 14.7 CFS." As stated in footnote #1 on Page 9 of the fact sheet, this was based on flow data from April 1, 1959 through March 31, 1978, and that later data were not available for this station. The most recent flow data available for this gauging station on the USGS National Water Information System web interface are from 1978.[4]

As stated by the City in its comment letter, more recent flow data are available at this location from the United States Bureau of Reclamation (USBR). The EPA has re-calculated the 7Q10 flow rate for the Yakima River near Parker, using the more-recent flow data from the USBR. Using flow data from 1997 – 2012, the 7Q10 flow rate of the Yakima River near Parker, WA, is 315 CFS.

Comment #27

The City of Toppenish stated that, in footnote 1 on Page 9 of the Fact Sheet, EPA notes that the period of record for this USGS station at Parker is April 1, 1959 – March 31, 1978. The City stated that this statement is not accurate, and that the actual period of record for this station is from year 1908 to the present. The City provided a uniform resource locator (URL) for a query to retrieve flow data for the Parker gauge from the United States Bureau of Reclamation (USBR) website.

The City stated that the federally set minimum in-stream flow at the Parker station is 300 CFS. As part of a settlement on Yakima adjudications, the USBR/SVID agreed to put an additional 50 CFS into the river. Normal river operations during low flow periods target 600 CFS at Parker, as recommended by the System Operations Advisory Committee (SOAC). The true 7Q10 low flow at the Parker station is probably closer to 400 CFS. If the minimum flow of 300 CFS is used, the dilution of the East Toppenish Drain flow by the Yakima River flow, at 7Q10 flow conditions, is almost 80:1, not 12:1 as indicated in the Fact Sheet. Also, the design flow of the Toppenish WWTP (1.67 mgd or 2.58 CFS) is about 0.8% of the Yakima River flow at 7Q10 flow conditions, not 19% as indicated in the Fact Sheet. Consequently, the flow from the Toppenish WWTP is a minor portion of the Yakima River flow, and the effect of the Toppenish WWTP discharge on the Yakima River water quality is similarly minor.

Response #27

The footnote referenced by the City reads in full, "This calculation used data from April 1, 1959 – March 31, 1978. Later data were not available for this station." Thus, the footnote does not state that the entire period of record for USGS station #12505000 (Yakima River near Parker, WA) is April 1, 1959 - March 31, 1978, rather, it states that data from that span of time were used to calculate the 7Q10 flow of the Yakima River, and that "later data were not available for this station." The most recent flow data available for this gauging station on the USGS National Water Information System web interface are

[4] http://waterdata.usgs.gov/wa/nwis/dv/?site_no=12505000&agency_cd=USGS&referred_module=sw

from 1978.[5] At the time the fact sheet was prepared, the EPA was not aware that more recent flow data were available at this location from the USBR.

With the exception of TP, all of the water quality-based effluent limits in the draft permit are calculated based on the dilution available within the Toppenish Drain. Therefore, higher flow rates in the Yakima River will not influence the effluent limits for parameters other than TP. The EPA has re-calculated the effluent limits for TP, taking into account the more-recent river flow data referenced by the commenter (see the response to comment #9).

Comment #28

The City of Toppenish stated that, in the subsection of the Fact Sheet titled "Washington State Water Quality Standards: Designated Uses" (Page 10) discusses the application of Washington State WQS for assigning designated uses for waters in the Toppenish Drain and East Toppenish Drain. EPA quotes from WAC 1 73-20 1 A-600 to establish water uses in these drains. EPA fails to also note the following section of WAC 173-20 1 A-600:

> *(2) The water quality standards for surface waters for the state of Washington do not apply to segments of waters that are on Indian reservations, except for surface waters overlying fee lands on the Puyallup reservation consistent with the Puyallup Tribe Land Claims Settlement of 1989.*

Since WAC 173-20 1 A-600 specifically excludes Indian reservations, EPA should delete use of this Washington State rule to justify effluent limits at the Toppenish WWTP, which is located on the Yakama Indian Reservation.

Response #28

This comment concerns the applicability of the Washington WQS to waters within the Yakama Indian Reservation.

The Fact Sheet acknowledges that the Washington WQS are not directly applicable within the Tribal reservation (see the Fact Sheet at Page 9). However, as explained in Pages 9 and 10 of the Fact Sheet, the Toppenish and East Toppenish Drains provide little dilution of the effluent under critical conditions. Thus, the discharge may affect water quality in the Yakima River, which is among the waters of the State of Washington, and to which the Washington WQS apply. Therefore, the EPA must condition the permit to ensure compliance with Washington's WQS (40 CFR 122.4(d), 122.44(d)(4)).

As stated in the fact sheet, the Yakima River is designated for the uses of salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values, although it has a site-specific temperature criterion (WAC 173-201A-602).

[5] http://waterdata.usgs.gov/wa/nwis/dv/?site_no=12505000&agency_cd=USGS&referred_module=sw

Comment #29

The City of Toppenish stated that the dilution modeling and derivation of metals limits in the new draft permit are based on static modeling which inherently and conservatively assumes an unlikely combination of events. The City stated that the EPA should evaluate the possibility of using dynamic modeling to more accurately examine the impact of the City's effluent in the receiving water. As noted in Ecology's Permit Writer's Manual "The use of dynamic modeling is an acceptable alternative to the static modeling discussed above in those situations where the discharger is willing to meet the data requirements and submit the analysis for approval."

The City stated that Ecology recently conducted dynamic modeling to evaluate the discharge of the City of Sumner, WA WWTF on the White River. The City stated that the results indicated that there was no reasonable potential for copper, and the existing effluent copper limitations were removed.

Response #29

Although the City's comment mentions metals limits specifically, in fact, all of the water quality-based effluent limits in the draft permit that consider the dilution of the effluent in the receiving water were based on steady-state modeling.

The City is correct that dynamic modeling can be used as an alternative to static, steady-state modeling under some circumstances. However, as stated in the quote from the State of Washington's *Water Quality Program Permit Writer's Manual*, a discharger who wishes to have their permit limits calculated based on dynamic modeling must provide adequate data and submit the dynamic analysis to the permitting authority for approval (see Page VI-33).

The City has not provided the EPA with a dynamic water quality modeling analysis demonstrating that any of the water quality-based effluent limits in the draft permit limits could be made less stringent or removed.

Washington's *Water Quality Program Permit Writer's Manual* references the EPA's TSD for a more complete discussion of dynamic modeling. The TSD discusses three dynamic modeling techniques in Section 4.5.1. Continuous simulation models may require as much as 20 to 25 years of continuous daily flow data. Unlike continuous simulation models, Monte Carlo and lognormal probabilistic dilution models do not require time series data, but nonetheless require more input data than a steady-state model. Specifically, there must be enough data to determine the probability distributions of the effluent and receiving water flows and concentrations. For the City of Sumner's permit that was referenced by the City of Toppenish in its comment, Ecology used daily plant flows and corresponding river flows for a period of six years (i.e., about 2,190 daily effluent and stream flow measurements) (Ecology 2011).

There are only six flow measurements available for the Toppenish Drain, and at most six upstream concentration measurements for the pollutants of concern. Of these, only two were measured during the irrigation season (May – September). Upstream concentrations of copper, lead, selenium, and zinc were frequently reported as less than the detection or reporting limit. The required effluent monitoring frequency for copper, lead, selenium and zinc in the prior permit was semi-annual, and the effluent

concentrations of copper, lead, selenium and zinc were frequently reported as less than the detection or reporting limit.

Therefore, there are not enough data for the effluent or receiving water flow or concentration to allow the EPA to apply any of the dynamic modeling techniques discussed in the TSD.

Comment #30

The City's NPDES permit limit for copper is based on WQS that utilize equations that are not considered the state-of-the-art methods for evaluating metal toxicity, and use only hardness and dilution in the receiving water as inputs. EPA's most recent guidance regarding copper toxicity assessment (published in 2007 Update of Ambient Water Quality Criteria for Copper) takes into account the impact of additional receiving water parameters relevant to toxicity. Based on data obtained from other water bodies in the State, it is likely the effluent and the receiving water may be more protective against copper toxicity than predicted based on the hardness-based equation. This is likely due to differences in metal speciation (e.g., complexation with organic ligands) between the receiving water and effluent and the default conditions that are used to determine the regulatory WQS.

The ratio of metals concentrations that actually produce toxicity at a specific site to that based on the default conservative assumptions is called a Water Effect Ratio (WER). A preliminary run of the Biotic Ligand Model (BLM), a mechanistic model of metal bioavailability and toxicity published by EPA, could be made to determine if the water quality limit for copper might be increased (i.e., result in a WER greater than one) without compromising sensitive aquatic species in the receiving water. EPA used the Biotic Ligand Model to update its freshwater criteria in its 2007 Update of Ambient Water Quality Criteria for Copper. EPA is developing similar criteria for zinc.

Charles Delos of EPA Office of Water, a national expert on aquatic toxicity and site specific testing, stated in a phone conference at EPA Region 10 on April 14, 2005 that it is extremely unlikely that copper in treatment plant effluent will cause toxicity. Conducting WER/BLM studies using the City's effluent and receiving water would be the best approach for determining the actual toxicity of constituents in the City's effluent in the receiving water, and to develop and implement measures that actually reduce effluent toxicity.

Response #30

As stated on Page VI-6 of the Washington Department of Ecology's *Water Quality Program Permit Writer's Manual*, the use of a site-specific water effect ratio (WER) to adjust metal criteria on a site-specific basis "currently requires an amendment to the Water Quality Standards and therefore can only be granted for exceptional circumstances." Because the Washington WQS for the receiving waters have not been amended to provide a site-specific WER for the receiving water, the EPA cannot use a site-specific water effect ratio to develop effluent limits in the City of Toppenish permit.

The commenter is correct that the EPA's current recommended water quality criteria for copper use the biotic ligand model (BLM) (72 FR 7983). However, the State of Washington has not adopted water

quality criteria for copper that are based on the BLM. Washington's water quality criteria for copper are based exclusively on hardness (WAC 173-201A-240(3)).

Comment #31

The City of Toppenish stated that the sensitivity of the analytical methods used for much of the testing that generated the data set used in the Reasonable Potential Analysis (RPA) for lead and selenium is not sufficient for a meaningful RPA.

The City stated that, for the testing to date at Toppenish, these analytes have been determined with Flame AA, Graphite Furnace AA, ICP-AES and ICP-MS, when in fact, all of the tests should have been performed with the most sensitive method, ICP-MS (Method 200.8) so that a meaningful RPA could be completed.

The City stated that the recent instances where selenium and lead have been detected in the Toppenish WWTF effluent are when the effluent has been tested with Graphite Furnace AA. When detected with this method, the reported concentrations have not been significantly higher than Method Reporting Limits or MRLs (i.e., the concentrations are within a factor of 5 of the MRLs). The City stated that, with concentrations this close to the MRLs, with the Graphite Furnace AA method, analytical interferences arising from background and matrix effects can lead to false positives.

The City stated that there were no cases since monitoring began in 2003 where either lead or selenium were actually detected above the reporting limit when the most sensitive analytical method (ICP-MS, EPA Method 200.8) was employed.

The City requested a compliance schedule to test their effluent bimonthly for two years with EPA Method 200.8 (ICP-MS), using clean sampling techniques, and a laboratory experienced with ultra-trace analysis. Following two years of testing, the Reasonable Potential should be re-evaluated.

Response #31

The complete effluent data for lead and selenium upon which the reasonable potential analysis was based are shown in Table 1 below, along with the methods used and the minimum reporting levels (MRLs).

Table 1: Effluent Data for Lead and Selenium						
Date	Lead Result (µg/L)	Lead MRL (µg/L)	Selenium Result (µg/L)	Selenium MRL (µg/L)	Method Number	Method Description
12/18/2003	ND	Not Specified	ND	Not Specified	EPA 200.8	ICP-MS
6/3/2004	ND	2	ND	5	EPA 200.7	ICP-AES
12/2/2004	ND	2	ND	5	EPA 6010	ICP-AES
6/9/2005	1	2	ND	5	EPA 200.8	ICP-MS
12/8/2005	ND	Not Specified	ND	Not Specified	EPA 200.8	ICP-MS
6/8/2006	ND	Not Specified	ND	Not Specified	EPA 200.8	ICP-MS
12/6/2006	1	1	ND	5	EPA 200.8	ICP-MS
6/7/2007	ND	5	ND	5	EPA 200.8	ICP-MS
12/6/2007	ND	2	ND	5	EPA 200.8	ICP-MS
6/4/2008	ND	Not Specified	ND	Not Specified	EPA 200.9	GFAA
12/4/2008	ND	2	ND	5	EPA 200.9	GFAA
6/11/2009	ND	2	ND	5	EPA 200.9	GFAA
12/2/2009	7.0	2.0	8.8	5	EPA 200.9	GFAA
6/10/2010	14.2[2]	2	ND	5	EPA 200.9	GFAA
12/1/2010	ND	2	6	5	SM 3113B	GFAA
6/1/2011	2.32	Not Specified	ND	6[3]	EPA 200.9	GFAA
12/2/2011	ND	0.5	ND	5	EPA 200.9	GFAA
6/8/2012	5.79	1	ND	2	EPA 200.9	GFAA
12/2/2012	1.36	1	ND	2	EPA 200.9	GFAA
Maximum	7[2]		8.8			
Average[1]	1.53[2]		1.81			
Std. Dev.[1]	1.86[2]		2.20			
CV	1.21[2]		1.21			

Acronyms and abbreviations used in this table:
CV means Coefficient of Variation
GFAA means Graphite Furnace Atomic Absorption
ICP-AES means Inductively Coupled Plasma - Atomic Emission Spectrometry
ICP-MS means Inductively Coupled Plasma - Mass Spectrometry
MRL means Minimum Reporting Level
ND means Not Detected
SM means Standard Methods for the Examination of Water and Water and Wastewater

Notes:
1. The average and standard deviation were estimated using maximum likelihood estimation, assuming that the data are lognormally distributed. Effluent data are generally lognormally distributed (EPA 1991).
2. The 14.2 µg/L lead result observed on 6/10/2010 was determined to be a statistical outlier and was not used in the reasonable potential analysis. The next-highest result of 7.0 µg/L was used instead. The figures for the average, standard deviation, and CV reported in the table, for lead, do not consider this the 14.2 µg/L outlier. Even though the 14.2 µg/L outlier was discarded, the EPA found that the City of Toppenish discharge had the reasonable potential to cause or contribute to excursions above WQS for lead.
3. The laboratory results for June 2011 did not include a column labeled "MRL," however, the selenium result was reported as "< 6 µg/L."

The City states that an ICP-MS method such as EPA method 200.8 should have been used, because it is more sensitive. Method 200.8 is more sensitive than ICP-AES and GFAA methods for lead, however, ICP-MS is not necessarily more sensitive than GFAA or ICP-AES for selenium. Note that, in Table 1, the MRLs for the selenium analyses using GFAA or ICP-AES methods were close to or less than those using ICP-MS.

Furthermore, the published MDL for selenium for method 200.9 (GFAA) is 0.6 µg/L (Creed, Martin and O'Dell 1994), whereas the published MDL for selenium for method 200.8 (ICP-MS) is 0.5 – 7.9 µg/L (Creed, Brockhoff and Martin 1994). Thus, the use of ICP-MS would not necessarily produce more accurate results for selenium.

The GFAA and ICP-MS methods that produced the quantifiable results for lead and selenium are adequately sensitive to perform a reasonable potential analysis. GFAA can produce quantitative results at concentrations as low as 1 µg/L for lead and 5 µg/L for selenium (personal communication with Katie Adams, chemist, US EPA Region 10 Laboratory, November 8, 2012). The published MDLs for method 200.9 (GFAA) are 0.7 µg/L for lead and 0.6 µg/L for selenium (Creed, Martin and O'Dell 1994). As shown in Table 1, the MRLs for the quantifiable lead results were 1 – 2 µg/L, except for the June 2011 analysis for which the MRL was not specified. However, the June 2011 analysis used the same GFAA method (EPA method 200.9) that produced MRLs of 0.5 – 2.0 µg/L for lead, for other samples. The maximum result for lead (14.2 µg/L) was more than 7 times the MRL and more than 20 times the published MDL for the method used. The maximum result for selenium was 1.76 times the MRL and 14.7 times the published MDL for the method used. Therefore, the maximum lead and selenium results upon which the reasonable potential analysis was based were quantifiable with the methods used. As shown in Appendix D to the fact sheet and Appendix B to this response to comments, the available effluent data for lead and selenium show that the discharge has the reasonable potential to cause or contribute to excursions above WQS for these pollutants, and effluent limits for these pollutants are therefore required (40 CFR 122.44(d)(1)(i – iii), TSD Section 3.3).

Comment #32

The City stated that the EPA should state whether the Officer-in-Charge has declared if the Toppenish Drain is to be used for domestic water.

Response #32

The EPA is unaware of whether or not the Officer-in-Charge has declared if the Toppenish Drain is to be used for domestic water. However, as stated in the response to comment #7, effluent limitations are nonetheless necessary for nitrate + nitrite.

Other Changes to the Draft Permit

The EPA deleted the definition of chronic toxic unit (TU_c) from Part VI of the permit, because this term is defined in Part I.C.2.d.

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Appendix A: Water Quality-based Effluent Limit Calculations for pH

October – April

INPUT	
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	1.241
2. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	14.50
pH:	7.65
Alkalinity (mg CaCO3/L):	57.00
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	15.00
pH:	8.80
Alkalinity (mg CaCO3/L):	150.00

OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.42
Effluent pKa:	6.42
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.94
Effluent Ionization Fraction:	1.00
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	60.39
Effluent Total Inorganic Carbon (mg CaCO3/L):	150.63
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	14.90
Alkalinity (mg CaCO3/L):	131.94
Total Inorganic Carbon (mg CaCO3/L):	133.10
pKa:	6.42
pH at Mixing Zone Boundary:	8.48

May – September

INPUT	
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	2.072
2. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	18.50
pH:	7.65
Alkalinity (mg CaCO3/L):	57.00
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	20.00
pH:	9.00
Alkalinity (mg CaCO3/L):	150.00

OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.39
Effluent pKa:	6.38
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.95
Effluent Ionization Fraction:	1.00
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	60.15
Effluent Total Inorganic Carbon (mg CaCO3/L):	150.36
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	19.22
Alkalinity (mg CaCO3/L):	101.89
Total Inorganic Carbon (mg CaCO3/L):	103.69
pKa:	6.39
pH at Mixing Zone Boundary:	8.14

Appendix B: Revised Dilution Factors and Reasonable Potential and Effluent Limit Calculations

Dilution Factors

The fact sheet reported the design flow of the POTW as 1.76 mgd. The correct design flow is 1.67 mgd. Correcting the design flow resulted in changes to the dilution factors, as shown in Table B-1 below.

Table B-1: Dilution Factors

Scenario	Dilution Factor from Fact Sheet (1.76 mgd effluent)	Corrected Dilution Factor (1.67 mgd effluent)
Acute Aquatic Life, May – September	1.10	1.11
Chronic Aquatic Life, May – September	2.00	2.07
Acute Aquatic Life, October – April	1.02	1.02
Chronic Aquatic Life, October – April	1.23	1.24
Human Health, year – round	1.71	1.75

Reasonable Potential Calculations

The general procedures and equations used in the reasonable potential calculations are explained in Appendix D to the fact sheet. Revised reasonable potential calculations are summarized in Tables B-2 and B-3, below. The revised reasonable potential calculations incorporate the revised dilution factors shown in Table B-1, above, as well as additional effluent data collected after the fact sheet was prepared. The outcome of the reasonable potential analysis (i.e. the findings of whether or not effluent limits were necessary for given pollutants) did not change based on the revisions to the reasonable potential calculations.

Effluent Limit Calculations

The general procedures and equations used in the effluent limit calculations are explained in Appendix E to the fact sheet. Revised effluent limit calculations are summarized in Tables B-4 and B-5, below. The revised effluent limit calculations incorporate the following revisions, relative to those shown in the fact sheet:

- Revised dilution factors as shown in Table B-1, above.
- Effluent limits for ammonia and copper were re-calculated on a seasonal basis.
- Effluent limits for zinc were re-calculated.
- For copper and zinc, the actual sampling frequency of once per month was used to calculate the average monthly limits, instead of assuming four samples per month as was done in the fact sheet. This may be done for these parameters because the acute long-term average (LTA) wasteload allocation (WLA) is the limiting LTA. Thus, it is not necessary to assume a sampling frequency of four samples per month in order to ensure that the average monthly limit is less than or equal to the chronic WLA. For all parameters, the average monthly limits are less than the chronic WLAs.

For ammonia and zinc, the average monthly limits in the final permit are more stringent than those calculated in Table B-4. More-stringent average monthly limits for ammonia and zinc are necessary in order to ensure compliance with the anti-backsliding provisions of the Clean Water Act and with the State of Washington's antidegradation policy (WAC 173-201A-320). See the responses to comment #5 and comment #12.

Table B-2: Reasonable Potential Calculations for Aquatic Life Criteria and Nitrate + Nitrite

Effluent Percentile value	99%																
				State Water Quality Standard		Max concentration at edge of...											
Parameter	Metal Criteria Translator as decimal Acute	Metal Criteria Translator as decimal Chronic	Ambient Concentration (metals as dissolved) ug/L	Acute ug/L	Chronic ug/L	Acute Mixing Zone ug/L	Chronic Mixing Zone ug/L	LIMIT REQ'D?	Pn	Max effluent conc. measured (metals as total recoverable) ug/L	Coeff Variation CV	s	# of samples n	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	COMMENTS
Arsenic (aquatic life)	1.00	1.00		340	150	118	98	NO	0.763	15.5	2.02	1.28	17	7.81	1.024	1.241	
Lead (Non-Irrigation)	0.8101	0.8101	0.0010	56.0	2.18	24.7	20.4	YES	0.774	7.00	1.21	0.951	18	4.47	1.024	1.241	Outlier Discarded
Lead (Irrigation)	0.8101	0.8101	0.0010	56.0	2.18	22.9	12.2	YES	0.774	7.00	1.21	0.951	18	4.47	1.107	2.072	Outlier Discarded
Nickel (Non-Irrigation)	0.998	0.997		1267	141	10	8.2	NO	0.631	3.3	0.61	0.57	10	3.09	1.024	1.241	Only Method 200.8 data considered
Selenium (Non-Irrigation)	1.00	1.00		20.0000	5.0000	37.0	30.6	YES	0.785	8.80	1.21	0.95	19	4.31	1.024	1.241	
Selenium (Irrigation)	1.00	1.00		20.0000	5.0000	34.3	18.3	YES	0.785	8.80	1.21	0.95	19	4.31	1.107	2.072	
Silver (Non-Irrigation)	0.850			2.7528		2.62		NO	0.599	1.00	0.60	0.55	9	3.16	1.024		
Zinc (Non-Irrigation)	0.978	0.986	40	102	94	99.3	89.6	NO	N/A	103.0	0.60	0.55		1.00	1.024	1.241	Previous Max. Daily Load Limit
Nitrate + Nitrite (mg/L)	1.00	1.00	9.32		10.0		33.3	YES	0.774	23.0	0.54	0.51	18	2.23		1.748	

Table B-3: Reasonable Potential Calculations for Human Health Criteria

Revised 3/00																
Parameter	Ambient Concentration (Geometric Mean) ug/L	Water Quality Criteria for Protection of Human Health ug/L	Max concentration at edge of chronic mixing zone. ug/L	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT ug/L	MAXIMUM DAILY EFFLUENT LIMIT ug/L	Estimated Percentile at 95% Confidence	Pn	Max effluent conc. measured ug/L	Coeff Variation CV	S	# of samples from which # in col. K was taken n	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
Antimony	0.00	14.00	0.19	NO	1.00	NONE	NONE	0.50	0.84	12.2	1.94	1.249	17	0.29	0.33	1.75
Benzene	0.00	1.20	0.11	NO	1.00	NONE	NONE	0.50	0.76	2.90	1.49	1.081	11	0.46	0.20	1.75
Chloroform	0.00	5.70	0.24	NO	1.00	NONE	NONE	0.50	0.76	1.70	0.60	0.555	11	0.67	0.41	1.75
Methylene Chloride	0.00	4.70	0.031	NO	1.00	NONE	NONE	0.50	0.76	10.5	2.88	1.494	11	0.35	0.05	1.75
Nickel	0.00	610	1.31	NO	1.00	NONE	NONE	0.50	0.74	3.30	0.61	0.566	10	0.69		1.75
Phenol	0.00	21000	70	NO	1.00	NONE	NONE	0.50	0.37	102	0.60	0.555	3	1.20		1.75
Selenium	0.00	170	1.23	NO	1.00	NONE	NONE	0.50	0.84	8.80	0.73	0.654	17	0.52	2.16	1.75

Table B-4: Effluent Limit Calculations for Two-Value Aquatic Life Criteria

Statistical variables for permit limit calculation																	
LTA Probability Basis	99%																
MDL Probability Basis	99%																
AML Probability Basis	95%																

Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.

	Permit Limit Calculation Summary										Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations						
PARAMETER	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator Acute	Metal Criteria Translator Chronic	Ambient Concentration *ug/L*	Water Quality Standard Acute *ug/L*	Water Quality Standard Chronic *ug/L*	Average Monthly Limit (AML) ug/L	Maximum Daily Limit (MDL) ug/L	Comments	WLA Acute *ug/L*	WLA Chronic *ug/L*	LTA Acute *ug/L*	LTA Chronic *ug/L*	Limiting LTA *ug/L*	Coeff. Var. (CV) *decimal*	# of Samples per Month *n*
Lead (non-irrigation)	1.024	1.241	0.8101	0.8101	0.001	55.97	2.181	**2.28**	**6.18**		70.7	3.34	12.2	1.063	1.063	1.213	4.00
Lead (irrigation)	1.107	2.072	0.8101	0.8101	0.001	55.97	2.181	**3.81**	**10.31**		76.5	5.58	13.16	1.774	1.774	1.213	4.00
Selenium (non-irrigation)	1.024	1.241	1.00	1.00		20	5.00	**4.24**	**11.5**		20.48	6.21	3.53	1.98	1.98	1.211	4.00
Selenium (irrigation)	1.107	2.072	1.00	1.00		20	5.00	**7.08**	**19.2**		22.14	10.4	3.81	3.30	3.30	1.211	4.00
Copper (non-irrigation)	1.024	1.241	0.960	0.960	9.0	15.0	10.1	**9.40**	**15.8**		15.8	10.9	3.58	4.42	3.58	0.89	1.00
Copper (irrigation)	1.107	2.072	0.960	0.960	9.0	15.0	10.1	**9.71**	**16.3**		16.3	11.8	3.70	4.83	3.70	0.89	1.00
Ammonia (non-irrigation, mg/L)	1.024	1.241	1.00	1.00	1.28	9.64	2.07	**2.06**	**6.22**		9.85	2.26	2.64	1.671	1.671	0.74	30.00
Ammonia (irrigation, mg/L)	1.107	2.072	1.00	1.00	1.28	9.64	1.58	**1.73**	**5.23**		10.54	1.90	2.83	1.404	1.404	0.74	30.00
Zinc (non-irrigation)	1.024	1.241	0.978	0.986	40	102	94	**73.4**	**106**		106	108	34.8	57.7	34.8	0.59	1.00
Zinc (irrigation)	1.107	2.072	0.978	0.99	40	102	94	**77.0**	**112**		112	153	36.5	81.8	36.5	0.59	1.00

Table B-5: Effluent Limit Calculations for Nitrate + Nitrite

AML Probability Basis	95%								
MDL Probability Basis	99%								
Parameter	Ambient Concentration *mg/L*	Water Quality Criteria for Protection of Human Health *mg/L*	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT *ug/L*	AVERAGE WEEKLY EFFLUENT LIMIT *ug/L*	Coeff Variation *CV*	Dilution Factor
Nitrate + Nitrite	9.32	10.00	**YES**	**2.00**	**10.5**	**17.3**	0.525	1.75