Fact Sheet

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Proposed Reissuance of a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA)

City of Toppenish
Wastewater Treatment Plant

EPA Proposes To Reissue NPDES Permit
The EPA proposes to reissue the NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

Public Comment
Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to the EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, the EPA's regional Director for the Office of Water and Watersheds will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, the EPA will address the comments and issue the permit. The permit will become

effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days pursuant to 40 CFR 124.19.

Documents are Available for Review

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting the EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at "http://epa.gov/r10earth/waterpermits.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OWW-130
Seattle, Washington 98101
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

EPA Washington Operations Office
300 Desmond Drive SE Suite 102
Lacey, WA 98503
(360) 753-9437

Toppenish Library
1 South Elm
Toppenish, WA 98948
(509) 865-3600

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Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 30-day average flow.
30Q5	30 day, 5 year low flow
AML	Average Monthly Limit
AWL	Average Weekly Limit
BOD_5	Biochemical oxygen demand, five-day
BMP	Best Management Practices
°C	Degrees Celsius
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
HUC	Hydrologic Unit Code
IC	Inhibition Concentration
I/I	Infiltration and Inflow
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit

N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observable Effect Concentration
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SSO	Sanitary Sewer Overflow
s.u.	Standard Units
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TRC	Total Residual Chlorine
TRE	Toxicity Reduction Evaluation
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
TU_a	Toxic Units, Acute
TU_c	Toxic Units, Chronic
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
WET	Whole Effluent Toxicity
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater treatment plant

I. Applicant

A. General Information

This fact sheet provides information on the draft NPDES permit for the following entity:

City of Toppenish
Wastewater Treatment Plant
NPDES Permit # WA0026123

Physical Address:
501 Annahat Road
Toppenish, WA 98948

Mailing Address:
21 West 1st Avenue
Toppenish, WA 98948

Contact:
Lance Hoyt, Public Works Director

B. Permit History

The most recent NPDES for the Toppenish Wastewater Treatment Plant (WWTP) was issued on November 19, 2003, became effective on November 25, 2003, and expired on November 25, 2008. An NPDES application for permit issuance was submitted by the permittee on July 30, 2008. The EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6, the 2003 permit has been administratively extended and remains fully effective and enforceable.

The first NPDES permit issued by the EPA to this facility was issued on August 7, 1997. Prior to 1997, the City of Toppenish held an NPDES permit issued by the State of Washington Department of Ecology (permit #WA0020681).

The WWTP was originally constructed in 1953; major upgrades were completed in 1979, 1995, and 2010.

II. Facility Information

A. Treatment Plant Description

The City of Toppenish owns, operates, and maintains a WWTP located in Toppenish, WA, which is in Yakima County and within the boundaries of the Yakama Reservation. The secondary treatment plant discharges treated municipal wastewater to the Toppenish Drain. The collection system has no combined sewers and no categorical or significant industrial users. The facility serves a resident population of about 9,100. The maximum month design flow of the facility is 1.76 mgd (Gray and Osborne 2005). Details about the wastewater treatment process and a map showing the location of the treatment facility and discharge are included in Appendices A and B, respectively.

III. Receiving Water

This facility discharges to the Toppenish Drain near the eastern terminus of Germantown Road near Toppenish, Washington. The Toppenish Drain is tributary to the East Toppenish Drain, which, in turn, is tributary to the Yakima River.

A. Low Flow Conditions

The *Technical Support Document for Water Quality-Based Toxics Control* (hereafter referred to as the TSD) (EPA 1991) recommends the flow conditions for use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD states that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria (see the TSD at Page D-6).

For the Toppenish Drain, there are not enough flow data available to calculate the 1Q10 or 7Q10. However, like all irrigation drains in the Wapato Irrigation Project, flows are higher during the irrigation season (roughly May – September, according to flow data for the East Toppenish Drain, downstream from the discharge) than they are during the rest of the year, when irrigation is not occurring.

Therefore, for the non-irrigation season (October – April) the EPA has used the minimum measured flow rate in the Toppenish Drain, upstream of the discharge, which is 1.61 mgd, in place of the 1Q10 and 7Q10.

During the irrigation season (May – September), there were only two flow measurements taken for the Toppenish Drain, upstream from the discharge; these were 21.9 mgd on June 7th, 2005 and 16.2 mgd on June 8th, 2006. However, from May – September, there are 90 flow measurements taken by the USGS for the East Toppenish Drain, downstream from the discharge. For the Yakima River, the 7Q10 flow rate is roughly the same as the 1st percentile flow rate. The 1st percentile flow rate of the East Toppenish Drain, for May – September, is 13.7 CFS or 8.83 mgd. The EPA has estimated the upstream critical low flow rate, for May – September, by subtracting the design flow of the POTW (1.76 mgd) from the 1st percentile downstream flow rate. Thus, the estimated critical low flow rate of Toppenish Drain, upstream from the discharge, for May – September, is 8.83 mgd - 1.76 mgd = 7.07 mgd.

For human health criteria, the TSD recommends the 30Q5 flow rate for non-carcinogens, and the harmonic mean flow rate for carcinogens (see Section 4.6.2). There are not enough flow data available for the Toppenish Drain to calculate the 30Q5 flow rate. The harmonic mean flow rate of the Toppenish Drain upstream from the discharge, calculated from six measurements taken by the permittee from 2004-2006, is 5.00 mgd. Because there are not enough flow data to calculate the 30Q5, the EPA has used the harmonic mean for all human health criteria, instead of using the 30Q5 for non-carcinogens and the harmonic mean exclusively for carcinogens. Because human health criteria are generally based on long exposure periods, seasonal differences in flow rate were not considered for human health criteria.

B. Water Quality Standards

General Information

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires that NPDES permits contain limitations, including those necessary to meet water quality standards (WQS), treatment standards, or schedules of compliance, established pursuant to any State law or regulations, or any federal law or regulation, or required to implement any applicable water quality standard pursuant to the CWA.

Under the CWA implementing regulations, WQS consist of designated uses for waterbodies (e.g., aquatic life, contact recreation, etc), numeric or narrative criteria to protect those uses, and an antidegradation policy to maintain water quality (40 CFR 131). Such standards serve both as a description of the desired water quality for particular waterbodies and as a means of ensuring that such quality is attained and maintained.

Washington State Water Quality Standards

The Washington WQS are contained in Chapter 173-201A of the Washington Administrative Code (WAC).

Applicability

The City of Toppenish WWTP, the Toppenish Drain, and the East Toppenish Drain are all within the boundaries of the Yakama Nation in south central Washington. Waters of the State of Washington (i.e., the Yakima River) are downstream from the discharge. The State of Washington has EPA-approved WQS; however, Washington does not have the authority to issue NPDES permits on tribal lands. Moreover, since Washington does not have Clean Water Act authority on tribal lands or in tribal waters, the Washington WQS are not directly applicable within the tribal reservation.

However, 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)). Furthermore, federal regulations require that the EPA include permit requirements necessary to "conform to applicable water quality requirements under section 401(a)(2) of CWA when the discharge affects a State other than the certifying State." The closest downstream waterbody that is waters of the State of Washington is the Yakima River, about 3 miles downstream of the discharge.

The 1st percentile flow of the East Toppenish Drain at USGS station #12505350, downstream from the discharge, is 3.91 CFS. The design flow of the Toppenish WWTP is 1.76 mgd, which is 2.72 CFS. Thus, under critical conditions, the effluent flow can comprise the majority of the flow in the East Toppenish Drain.

The 7Q10 flow rate of the Yakima River, calculated using data from USGS station #12505000 (Yakima River near Parker, WA) is 14.7 CFS.[1] The flow rates measured at the Washington State Department of Ecology (Ecology) monitoring station number 37A170, which is located near Toppenish, at the State Route 22 (Buena Way) bridge, are nearly

[1] This calculation used data from April 1, 1959 – March 31, 1978. Later data were not available for this station.

identical to those measured at station number 12505000, near Parker.[2] The only surface water inflow to the Yakima River between the Parker gauge (River Mile 103.7) and the East Toppenish Drain (River Mile 86) is the Zillah WWTP, at River Mile 89.2 (Fuhrer et al. 1999, Figure 2).

The design flow of the City of Toppenish WWTP (2.72 CFS) is thus 19% of the 7Q10 flow of the Yakima River upstream from the East Toppenish Drain (14.7 CFS). If a low flow in the East Toppenish Drain occurred simultaneously with a 7Q10 low flow in the Yakima River, the effluent would be diluted by a factor of about 12:1 in the Yakima River, downstream from the East Toppenish Drain.[3]

Because of the proximity of the discharge to waters of the State of Washington, and the low critical flows of the East Toppenish Drain and the Yakima River, 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)). In addition, the EPA has notified the State of Washington of the issuance of this permit. If the State of Washington determines that the discharge will affect the quality of its waters as to violate any of its water quality requirements (including WQS), the State of Washington may object to the issuance of this permit, as provided for in CWA Section 401(a)(2). The State of Washington may also provide comments on the draft permit, during the public comment period.

Designated Uses

Toppenish Drain and East Toppenish Drain are not specifically designated for uses in Table 602 of the Washington WQS. According to WAC 173-201A-600, "All surface waters of the state not named in Table 602 are to be protected for the designated 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." The Yakima River is designated for these same uses; however, the Yakima River has a site-specific temperature criterion (WAC 173-201A-602).

Washington Water Quality Criteria

The effluent limits in the draft permit are sufficiently stringent to assure compliance with the State of Washington's numeric and narrative water quality criteria for the uses described above (WAC 173-201A-200, 240, 260). The water quality-based effluent limits for total phosphorus are based on the State of Washington's narrative water quality criteria for aesthetics (see Appendix C). The water quality criteria that have been adopted by the State of Washington to protect these designated uses are discussed in more detail in Appendix C. The details of the reasonable potential and effluent limit calculations based on Washington's numeric water quality are provided in Appendices C, D, and E.

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[2] There are not enough flow data to directly calculate critical low flows at station number 37A170.

[3] The average effluent flow is 1.04 mgd, or 1.61 CFS. The critical low flows of the East Toppenish Drain and the Yakima River, are 3.91 CFS and 14.7 CFS, respectively. Thus, the dilution factor of the effluent in the Yakima River, downstream from the East Toppenish Drain, would be (3.91 CFS + 14.7 CFS)/1.61 CFS = 12:1.

Antidegradation

Overview

The EPA is required under Section 301(b)(1)(C) of the Clean Water Act (CWA) and implementing regulations (40 CFR 122.4(d) and 122.44(d)) to establish conditions in NPDES permits that ensure compliance with State and Tribal WQS, including antidegradation requirements.

Washington's antidegradation policy is divided into three tiers of protection (WAC 173-201A-300(2)(e)):

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

As explained in detail below, the reissued permit ensures that the existing in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected consistent with the requirements of WAC 173-201A-310 and 40 CFR 131.12(a)(1). In addition, as explained below, relative to the prior permit issued in 2003, the reissued permit does not allow lower water quality for those parameters where the receiving water quality "exceeds levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water," consistent with the requirements of WAC 173-201A-320 40 CFR 131.12(a)(2).

The antidegradation policy for outstanding resource waters is not applicable to this reissued permit because the State of Washington has not designated the Toppenish Drain, the East Toppenish Drain, or the Yakima River as an "outstanding resource water" (WAC-173-201A-330).

The draft reissued permit ensures compliance with the State of Washington's antidegradation policy and CWA regulations because the permit conditions ensure protection of existing uses and do not allow lower water quality relative to the prior permit.

EPA Antidegradation Analysis

Protection of Existing Uses or Tier I (WAC-173-201A-310 and 40 CFR 131.12(a)(1))

As explained above, Toppenish Drain 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.

The effluent limits in the draft reissued permit ensure compliance with the State of Washington's numeric and narrative water quality criteria. The numeric and narrative water quality criteria are set at levels that ensure protection of the designated uses. As there is no information indicating the presence of existing beneficial uses in Toppenish Drain other than those that are designated, the draft permit ensures a level of water quality necessary to protect

the designated uses and, in compliance with WAC 173-201A-310 and 40 CFR 131.12(a)(1), also ensures that the level of water quality necessary to protect existing uses is maintained and protected.

If the EPA receives information during the public comment period demonstrating that there are existing uses in the receiving waters other than those that are designated, the EPA will consider this information before issuing a final permit and will establish additional or more stringent permit conditions if necessary to ensure protection of existing uses.

High Quality Waters or Tier II (WAC 173-201A-320 and 40 CFR 131.12(a)(2))

Whenever a water quality constituent is of a higher quality than a criterion designated for that water under the Washington WQS, new or expanded actions within certain categories, including NPDES permits, that are expected to cause a measurable change in the quality of the water may not be allowed unless the Washington Department of Ecology determines that the lowering of water quality is necessary and in the overriding public interest.

With the exceptions of ammonia, copper, total residual chlorine, and zinc, all of the effluent limits in the reissued permit are as stringent as or more stringent than the corresponding limits in the prior (2003) permit. For those parameters with limits that are as stringent as or more stringent than the corresponding limits in the prior permit, the reissued permit will not allow lower water quality.

The total residual chlorine limits in the 2003 permit were deleted because the facility now uses ultraviolet disinfection. Because there is no longer a source of chlorine in the discharge, the deletion of the chlorine limits will not allow lower water quality.

The ammonia, copper, and zinc effluent limits proposed in the draft permits are, in some cases, less stringent than the corresponding limits in the prior permit. Available water quality data indicate that Toppenish Drain is of higher quality than the water quality criteria for ammonia, copper, and zinc, thus, Washington's Tier II antidegradation requirements (WAC 173-201A-320) are applicable to these pollutants. However, as explained below, the revised limits are nonetheless consistent with the State of Washington's Tier II antidegradation policy.

Washington's antidegradation policy states that Tier II reviews will only be conducted for new or expanded actions conducted under certain authorizations, including NPDES permits (WAC 173-201A-320(2)). The State of Washington has published the *Supplemental Guidance on Implementing Tier II Antidegradation* ("Washington Tier II Guidance") which defines the actions that are considered "expanded" in the context of its Tier II antidegradation requirements (Ecology 2011). On Page 6, the Washington Tier II Guidance states that:

> *"'Expanded' means:*
>
> *• A physical expansion of the facility (production or wastewater system expansions with a potential to allow an increase the volume of wastewater or the amount of pollution) or activity.*
>
> *• An increase…to an existing permitted concentration or permitted effluent mass limit (loading) to a water body greater than 10%.*
>
> *• The act of re-rating the capacity of an existing plant greater than 10%."*

The Toppenish WWTP has not been physically expanded or re-rated to a higher capacity since the prior permit was issued in 2003. On the contrary, the design flow of the upgraded facility is marginally less than that of the plant as it existed in 2003 (1.76 mgd as opposed to 1.9 mgd). However, notwithstanding any physical expansions or re-rating of the permitted facility, increases to existing concentration or mass limits are "expansions."

There were errors in the calculations of the effluent limits for ammonia and copper in the prior permit, which caused the effluent limits to be more stringent than necessary to ensure compliance with water quality standards (see Gray and Osborne 2005 at Appendix D). The draft permit includes revised effluent limits for ammonia and copper which correct for these errors. However, as explained below, the limits are increased by no more than 10% above the prior permit limits, to ensure consistency with the State's antidegradation policy.

Table 1, below, shows the prior permit's effluent limits for copper and ammonia, as well as re-calculated limits based on meeting water quality criteria at the edges of acute and chronic mixing zones. The prior permit limits represent the initial baseline effluent mass and concentration loadings. The table also shows limits that represent a 10% increase over the prior permit's effluent limits. The scenario that produced the limits in the draft permit is shown in italic type and shaded.

Since the prior permit's effluent limits for ammonia and copper applied year round, the re-calculated limits do not consider seasonal changes in receiving water flow and are based on the low flows for the non-irrigation season. These limits will be protective during the irrigation season as well.

Table 1: Effluent Limit Scenarios for Copper and Ammonia

Scenario	Units	Average Monthly Limit	Maximum Daily Limit
Copper			
Prior permit	µg/L	6.5	9.4
	lb/day	0.10	0.15
10% Increase over prior permit limits	µg/L	7.15	*10.34*
	lb/day	0.11	*0.165*
Recalculated based on Criteria	µg/L	*6.80*	15.8
	lb/day	*0.10*	0.232
Limits Proposed in Draft Permit	**µg/L**	**6.80**	**10.34**
	lb/day	**0.10**	**0.165**
% Increase Relative to 2003 Permit	Conc.	4.6%	10%
	Load	0%	10%
Ammonia			
Prior permit	mg/L	1.23	2.04
	lb/day	19.5	32.3
10% Increase over prior permit limits	mg/L	1.35	*2.244*
	lb/day	21.5	*35.53*
Recalculated based on Criteria	mg/L	*1.32*	2.90
	lb/day	*19.4*	42.6
Limits Proposed in Draft Permit	**mg/L**	**1.32**	**2.244**
	lb/day	**19.4**	**35.53**
% Increase Relative to 2003 Permit	Conc.	7.3%	10%
	Load	-0.5%	10%

For zinc, there were no errors in the calculation of the effluent limits in the prior permit. However, the EPA determined that the prior permit's zinc loading limits (i.e. lb/day) would be stringent enough to ensure compliance with Washington's water quality criteria for zinc, even if the concentration limits were increased in proportion to the reduced design flow of the upgraded POTW (1.76 mgd as opposed to 1.9 mgd). Thus, the EPA has maintained the zinc loading limits in the prior permit, but has increased the concentration limits in proportion to the reduced design flow. The revised zinc concentration limits are increased by 8% relative to the limits in the prior permit.

Because the proposed effluent limits for ammonia, copper and zinc are no more than 10% higher than the corresponding limits in the prior permit, the limits do not constitute an "expansion" as defined in the Washington Tier II Guidance, and it is not necessary to make a finding that allowing lower water quality is necessary and in the overriding public interest. Therefore, the proposed effluent limits for ammonia, copper and zinc are consistent with the State of Washington's Tier II antidegradation requirements.

Furthermore, the average monthly loading (i.e., lb/day) limits for ammonia and copper and both the average monthly and maximum daily loading limits for zinc are at least as stringent as the corresponding limits in the prior permit, which ensures that the proposed limits will not allow any increase in the average effluent loading of ammonia, copper, or zinc, relative to the prior permit.

Total phosphorus (TP), nitrate + nitrite, lead, and selenium are present in the discharge and did not have effluent limits in the prior permit, but the reissued permit includes effluent limits for those pollutants. The new effluent limits for these pollutants are water quality-based effluent limits, based on a finding that the discharge, as measured in the past, and without effluent limits, has the reasonable potential to cause or contribute to excursions above WQS for those pollutants. Because the new effluent limits ensure a level of water quality that meets WQS, the new effluent limits will control the discharge to lower levels than had been projected in the reasonable potential analysis, which were shown to be too high to ensure compliance with WQS. Therefore, the new limits for TP, nitrate + nitrite, lead, and selenium will not allow lower water quality relative to the prior permit, which did not have effluent limits for these pollutants.

As to those pollutants present in the discharge that are not limited in either the draft reissued permit or the prior permit, there is no factual basis to expect that those pollutants will be discharged in greater amounts under the reissued permit than were authorized in the prior permit. Similarly, there is no factual basis to expect that the effluent contains any new pollutants that have not been discharged previously. The EPA reached these conclusions because the permit application and the discharge monitoring report data indicate no changes in the design flow, influent quality or treatment processes that could result in a new or increased discharge of pollutants.

Antidegradation Summary

As explained above, the effluent limits in the draft reissued permit are adequately stringent to ensure that existing uses are maintained and protected, in compliance with WAC 173-201A-310 and 40 CFR 131.12(a)(1).

The effluent limits in the reissued permit are as stringent as or more stringent than the corresponding limits in prior permit for all parameters except ammonia, copper, total residual chlorine and zinc, however, as explained above, the deletion of the chlorine effluent limits will not allow lower water quality because there is no longer a source of chlorine in the discharge, and the ammonia, copper and zinc limits have been increased by 10% or less, which means that the changes to these limits do not constitute an "expansion" that is subject to Tier II antidegradation review, according to the Washington Tier II Guidance. The reissuance of the City of Toppenish NPDES permit is therefore consistent with WAC 173-201A-320 and 40 CFR 131.12(a)(2).

Yakama Nation Tribal Water Quality Standards

Applicability

Section 518 of the CWA allows the Administrator of the EPA to treat a Tribe in the same manner as a State (i.e., commonly referred to as "treatment as a State" (TAS)) for purposes of various Clean Water Act provisions (e.g., implementing the WQS program, and developing WQS for CWA purposes) provided that the Tribe meets certain eligibility criteria. The EPA's implementing regulations at 40 CFR 131.8 contain the criteria in Section 518 of the CWA that Tribes must meet in order to be eligible to administer a WQS program. The regulation at 40 CFR 131.8 also establishes procedures for the EPA Regional Administrator to receive and make determinations on Tribal applications.

The Yakama Nation does not have TAS status, thus, there are no EPA-approved WQS for Clean Water Act permitting purposes on the Yakama Nation reservation.

Designated Uses for Toppenish Drain and East Toppenish Drain

The Yakama Nation's WQS state that "all irrigation waters, such as: canals, laterals, ditches, drains, settling basins, storage ponds or other waters used within the irrigation process are classified as Class IV, except as specifically classified otherwise." The Toppenish Drain and the East Toppenish Drain are not specifically classified. Class IV waters are protected for the uses of agricultural water supply and/or drainage, livestock watering, and domestic water.[4]

Ensuring Compliance with the Yakama WQS

In 1993, the EPA issued the *Guidance on EPA's NPDES and Sludge Management Permit Procedures on Federal Indian Reservations* (from Cynthia Dougherty to Water Management Division Directors Regions I – X, November 16, 1993) which set forth the EPA's position on NPDES permitting on tribal lands. This memo states that EPA Regions should work with Tribes who have adopted WQS not yet approved by the EPA to ensure that, to the extent practicable, NPDES permits issued on the reservation achieve compliance with those WQS. In addition, the memo states that "[u]ntil a Tribe is authorized under Section 303 [i.e., has TAS], EPA is the certification authority." The regulation 40 CFR 121.21(b) requires that the EPA issue 401 certifications where WQS have been established but there is no state/agency who has the authority to issue the certification (see also 40 CFR 121.1(e)).

[4] Class IV waters (irrigation waters) are to be used for domestic water only at the discretion of the Officer-in-Charge.

As discussed above, the Washington water quality standards, which have been used to develop the effluent limits in the draft permit, protect undesignated waters such as the Toppenish Drain and the East Toppenish Drain for additional uses relative to those designated under the Yakama WQS, specifically salmonid spawning, rearing, and migration; primary contact recreation; domestic and industrial water supply; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.

The Yakama WQS state that human health criteria for organisms only shall apply to Class IV waters (WQS Section 13.3.3.4.2). Washington's human health water quality criteria for fresh water are more stringent than the "organisms only" human health criteria of the Yakama Nation for pollutants detected in the Toppenish discharge, with the exception of nickel. The EPA determined that the discharge does not have the reasonable potential to cause or contribute to excursions above Washington's human health water quality criteria (as distinct from aquatic life criteria) for any pollutant. For those pollutants for which Washington's human health criteria are more stringent than the Yakama Nation's, this finding means that the discharge would not have reasonable potential to cause or contribute to excursions above the Yakama Nation's human health water quality criteria.

The Yakama Nation's human health water quality criterion for nickel, for organisms only, is 210 µg/L, and the State of Washington's human health water quality criterion for nickel, for fresh water, is 610 µg/L. However, in the reasonable potential analysis for human health, the projected concentration of nickel at the edge of the mixing zone is 1.34 µg/L, which is two orders of magnitude less than the human health criteria for either the State of Washington or the Yakama Nation. Thus, the discharge would not have the reasonable potential to cause or contribute to excursions above either the water quality standards for nickel, for either the State of Washington or the Yakama Nation.

Because the Toppenish Drain and the East Toppenish Drain are protected for additional designated uses (and are therefore generally subject to more stringent water quality criteria) under the Washington WQS relative to the Yakama WQS, effluent limits that ensure compliance with Washington WQS will also ensure compliance with the Yakama WQS.

IV. Effluent Limitations

A. Basis for Effluent Limitations

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the WQS applicable to a waterbody are being met and may be more stringent than technology-based effluent limits. The basis for the effluent limits proposed in the draft permit is provided in Appendices C, D, and E.

B. Proposed Effluent Limitations

Below are the proposed effluent limits that are in the draft permit.

1. Removal Requirements for BOD_5 and TSS: The monthly average effluent concentration must not exceed 15 percent of the monthly average influent concentration. Percent removal of BOD_5 and TSS must be reported on the Discharge

Monitoring Reports (DMRs). For each parameter, the monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month. Influent and effluent samples must be taken over approximately the same time period.

2. The permittee must not discharge any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.

Table 1 (below) presents the proposed average monthly, average weekly, and maximum daily effluent limits.

Table 1: Proposed Effluent Limits

Parameter	Units	Effluent Limits		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Five-Day Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	—
	lb/day	440	661	—
	% removal	85% (min)	—	—
Total Suspended Solids (TSS)	mg/L	30	45	—
	lb/day	440	661	—
	% removal	85% (min)	—	—
Fecal Coliform	#/100 ml	100 (geo. mean)	—	200
pH	s.u.	6.5 – 8.5		
Total Ammonia as N	mg/L	1.32	—	2.244
	lb/day	19.4	—	35.53
Nitrate + Nitrite as N	mg/L	10.5	19.8	—
	lb/day	154	291	—
Total Phosphorus as P (March – October, Interim)	lb/day	56	149	—
Total Phosphorus as P (March – October, Final)	lb/day	14.7	34.1	—
Copper, Total Recoverable	µg/L	6.80	—	10.34
	lb/day	0.10	—	0.165
Lead, Total Recoverable (May – September)	µg/L	3.54	—	9.96
	lb/day	0.0520	—	0.146
Lead, Total Recoverable (October – April, Interim)	µg/L	3.4	—	6.2
	lb/day	0.050	—	0.091
Lead, Total Recoverable (October – April, Final)	µg/L	2.17	—	6.10
	lb/day	0.0319	—	0.0895
Selenium (May – September)	µg/L	7.87	—	17.3
	lb/day	0.116	—	0.254
Selenium (October – April)	µg/L	4.83	—	10.6
	lb/day	0.0709	—	0.156
Zinc, Total Recoverable	µg/L	49.6	—	98.3
	lb/day	0.73	—	1.44

C. Basis for Deleting Total Residual Chlorine and for Less Stringent Ammonia, Copper and Zinc Limits

Statutory Prohibitions on Backsliding

Section 402(o) of the Clean Water Act (CWA) generally prohibits the establishment of effluent limits in a reissued NPDES permit that are less stringent than the corresponding limits in the previous permit (i.e. "backsliding") but provides limited exceptions. Section 402(o)(1) of the CWA states that a permit may not be reissued with less-stringent limits established based on Sections 301(b)(1)(C), 303(d) or 303(e) (i.e. water quality-based limits or limits established in accordance with State treatment standards) except in compliance with Section 303(d)(4). Section 402(o)(1) also prohibits backsliding on technology-based effluent limits established using best professional judgment (i.e. based on Section 402(a)(1)(B)), but in this case, the effluent limits being revised are water quality-based effluent limits (WQBELs).

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. Additionally, Section 402(o)(2) contains exceptions to the general prohibition on backsliding in 402(o)(1). According to the *U.S. EPA NPDES Permit Writers' Manual* (EPA-833-K-10-001) the 402(o)(2) exceptions are applicable to WQBELs (except for 402(o)(2)(B)(ii) and 402(o)(2)(D)) and are independent of the requirements of 303(d)(4). Therefore, WQBELs may be relaxed as long as either the 402(o)(2) exceptions or the requirements of 303(d)(4) are satisfied.

Even if the requirements of Sections 303(d)(4) or 402(o)(2) are satisfied, Section 402(o)(3) prohibits backsliding which would result in violations of WQS or effluent limit guidelines.

Total Residual Chlorine

The draft permit proposes to remove the total residual chlorine effluent limits in the prior permit. After the prior permit was issued in 2003, the chlorine disinfection system was replaced with ultraviolet disinfection, and the upgraded facility does not have a backup chlorine disinfection system. There is no longer a source of chlorine in the discharge, therefore, the facility is not subject to any technology-based effluent limits for chlorine and the facility does not have the reasonable potential to cause or contribute to excursions above WQS for chlorine, thus it does not require water quality-based effluent limits for chlorine.

One of the exceptions to the general prohibition on less-stringent effluent limits is "material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation" (CWA Section 402(o)(2)(A)). The replacement of the chlorine disinfection system with ultraviolet disinfection is a material and substantial alteration to the permitted facility, which occurred after the 2003 permit was issued, and which justifies the deletion of the chlorine effluent limits.

Ammonia, Copper, and Zinc

The 2003 permit included water quality-based effluent limits for ammonia, copper and zinc. There were errors in the calculations of the effluent limits for ammonia and copper which

caused the effluent limits to be more stringent than necessary to ensure compliance with water quality standards (Gray and Osborne 2005, Appendix D). An error in the calculation of a water quality-based effluent limit in a prior permit is not, in and of itself, an exception to the prohibition on backsliding.[5] However, another exception to anti-backsliding is applicable for ammonia, copper and zinc.

For waters where water quality standards are attained, water quality-based effluent limits may be revised if the revision is subject to and consistent with the State's antidegradation policy (CWA Section 303(d)(4)(B)). As explained above, under "Antidegradation," the revised effluent limits for ammonia, copper and zinc are consistent with the State of Washington's antidegradation policy. Therefore, the revised effluent limits are also consistent with the Clean Water Act's antibacksliding requirements.

Clean Water Act Section 402(o)(3) Requirements

Because there is no longer a source of chlorine in the discharge, the facility no longer has the reasonable potential to cause or contribute to excursions above water quality criteria for chlorine, and the deletion of the chlorine limits will not allow lower water quality.

The revised effluent limits for ammonia, copper and zinc are adequately stringent to ensure compliance with water quality criteria for those pollutants, and furthermore, the effluent limits are consistent with the State of Washington's Tier II antidegradation policy.

The secondary treatment technology-based effluent limits do not include effluent limits for ammonia, chlorine, copper, or zinc (40 CFR 133.102).

Because the effluent limits will continue to ensure that WQS are met and do not violate the secondary treatment effluent limits, the revised limits comply with Section 402(o)(3) of the CWA.

D. Compliance Schedule for New Water Quality-based Lead and Total Phosphorus Effluent Limits

Federal regulations (40 CFR 122.47) and the Washington WQS (WAC 173-201A-510(4)) allow for compliance schedules in permits. The federal compliance schedule rule allows compliance schedules "when appropriate," requires compliance with effluent limits "as soon as possible," and requires "interim requirements and the dates for their achievement." The Washington WQS require that schedules of compliance may in no case exceed ten years and shall generally not exceed the term of any permit. The Washington WQS also require interim effluent limits to be established as part of a compliance schedule, and the interim limits may be either numeric or non-numeric (WAC 173-201A-510(4)(b)).

Effluent data indicate that the permittee can comply immediately comply with all of the new water quality-based effluent limits proposed in the draft permit, except those for total phosphorus and the non-irrigation season (October - April) WQBEL for lead.

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[5] CWA Section 402(o)(2)(B)(ii) allows effluent limits to be revised if the Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under CWA Section 402(a)(1)(B). This exception only applies to case-by-case or best professional judgment technology-based effluent limits, not to water quality-based effluent limits. See the *U.S. EPA NPDES Permit Writers' Manual* at Section 7.2.1.3.

However, the upgraded WWTP is designed for biological phosphorus removal. Thus, it should be capable of effluent TP concentrations < 1 mg/L (Gray and Osborne 2005). The average monthly TP effluent limit of 14.7 lb/day is equivalent to a discharge of 1 mg/L TP at the facility's design flow of 1.76 mgd.

Thus, no major capital improvements should be necessary to achieve the water quality-based effluent limits for total phosphorus; rather, the effluent limits should be achievable through operational changes at the facility, to optimize the existing biological phosphorus removal processes. A 1-year schedule of compliance is proposed in order to allow the City time to optimize the biological phosphorus removal processes, in order to achieve compliance with the final effluent limits for total phosphorus.

The proposed average monthly limit for lead, for the non-irrigation season, is 2.17 µg/L. After discarding one result that was determined to be a statistical outlier, the EPA determined that the facility could comply with an average monthly limit of 3.4 µg/L. Therefore, the City cannot comply with the new water quality-based effluent limits for lead, for the non-irrigation season, immediately upon the effective date of the final permit. The draft permit proposes a schedule of compliance for the new water quality-based lead limits, for the months of October through April. Because capital improvements may be necessary to achieve compliance with the October – April lead effluent limits, the draft permit requires compliance with the final lead effluent limits within 4 years and 11 months of the effective date of the final permit.

Interim effluent limits for lead and total phosphorus have been established based on the performance of the WWTP. For total phosphorus, only effluent data measured after the WWTP upgrades were completed in 2010 were used to establish the WWTP's performance. The interim effluent limits apply during the terms of the compliance schedules.

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permit also requires the permittee to perform effluent monitoring required by parts B.6 and D of the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) or on the application for renewal, as appropriate, to the EPA.

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA-

approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits.

Table 3, below, presents the proposed effluent monitoring requirements for the Toppenish WWTP. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. The samples must be representative of the volume and nature of the monitored discharge. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Monitoring Changes from the Previous Permit

Monitoring frequencies for certain parameters have been reduced, relative to the previous permit. The reductions in monitoring frequency are based on the EPA's *Interim Guidance for Performance-based Reduction of NPDES Permit Monitoring Frequencies* (April 19, 1996). Table 3, below, summarizes the reductions in monitoring frequency that were made based on the guidance.

Effluent monitoring for chlorine has been discontinued because the facility now uses UV disinfection and therefore there is no source of chlorine in the discharge, nor are there any effluent limits for chlorine in the draft permit.

Effluent monitoring frequency for copper and zinc has been increased to once per month from semi-annually (twice per year). The EPA believes monthly sampling is the minimum frequency necessary in order to determine compliance with the effluent limits for those pollutants.

Table 2: Reductions in Monitoring Frequency

Parameter	Ratio of Long Term Average Discharge to Avg. Monthly Limit[1]	2003 Permit Monitoring Frequency	Reduced Monitoring Frequency[2]
BOD_5	12.5%	1/week	2/month
TSS	20.5%	1/week	2/month
Ammonia	11.3%	1/week	2/month

Note:
1. This calculation considers only effluent data collected after upgrades to the POTW were completed.
2. The guidance suggests a reduced monitoring frequency of once every two months in this situation; however, the EPA believes the listed reduced monitoring frequency is the minimum necessary to determine compliance with the effluent limits.

For selenium and lead, once per month monitoring is required from May – September and once per week sampling is required from October - April, in order to determine compliance with the new effluent limits. More frequent selenium sampling is necessary from October - April in order to better determine compliance with the more-stringent effluent limits that apply during that season.

Once per week monitoring is required for nitrate + nitrite and total phosphorus, in order to determine compliance with the new effluent limits for those pollutants.

The draft permit proposes to require quarterly monitoring for all parameters listed in Part B.6 of the application form for POTWs (EPA Form 3510-2A, revised 1-99, see also Appendix J to 40 CFR Part 122) that are not subject to effluent limitations, except for total residual

chlorine, which may be deleted because the facility does not use chlorine for disinfection.[6] Arsenic, benzene, Methylene chloride, nickel and silver have been detected in the effluent, so the EPA proposes semi-annual monitoring for these pollutants to better characterize the effluent concentrations. Effluent dissolved oxygen is to be sampled once per month.

Table 3: Effluent Monitoring Requirements

Flow	mgd	Effluent	Continuous	recording
BOD_5	mg/L	Influent & Effluent	1/2 weeks	24-hour composite
	lb/day	Influent & Effluent		calculation[1]
	% Removal	—	—	calculation[2]
TSS	mg/L	Influent & Effluent	1/2 weeks	24-hour composite
	lb/day	Influent & Effluent		calculation[1]
	% Removal	—	—	calculation[2]
pH	standard units	Effluent	5/week	grab
Fecal Coliform	#/100 ml	Effluent	1/week	grab
Total Ammonia as N	mg/L	Effluent	1/2 weeks	24-hour composite
	lb/day	Effluent		calculation[1]
Nitrate + Nitrite as N	mg/L	Effluent	1/week	24-hour composite
	lb/day	Effluent		calculation[1]
Total Phosphorus as P	mg/L	Effluent	1/week	24-hour composite
	lb/day	Effluent		calculation[1]
Copper, Total Recoverable	µg/L	Effluent	1/month	24-hour composite
	lb/day	Effluent		calculation[1]
Lead, Total Recoverable (October – April, final)	µg/L	Effluent	1/week	24-hour composite
	lb/day	Effluent		calculation[1]
Lead, Total Recoverable (October – April, interim)	µg/L	Effluent	1/month	24-hour composite
	lb/day	Effluent		calculation[1]
Lead, Total Recoverable (May – September)	µg/L	Effluent	1/month	24-hour composite
	lb/day	Effluent		calculation[1]
Selenium (October – April)	µg/L	Effluent	1/week	24-hour composite
	lb/day	Effluent		calculation[1]
Selenium (May – September)	µg/L	Effluent	1/month	24-hour composite
	lb/day	Effluent		calculation[1]
Zinc, Total Recoverable	µg/L	Effluent	1/month	24-hour composite
	lb/day	Effluent		calculation[1]
Hardness	mg/L as $CaCO_3$	Effluent	1/quarter	24-hour composite
Arsenic, Total Recoverable	µg/L	Effluent	Semi-annually	24-hour composite
Nickel, Total Recoverable	µg/L	Effluent	Semi-annually	24-hour composite
Silver, Total Recoverable	µg/L	Effluent	Semi-annually	24-hour composite
Oil and Grease	mg/L	Effluent	1/quarter	grab
Total Dissolved Solids	mg/L	Effluent	1/quarter	24-hour composite
Total Kjeldahl Nitrogen	mg/L	Effluent	1/quarter	24-hour composite
Dissolved Oxygen	mg/L	Effluent	1/month	grab
Benzene	µg/L	Effluent	Semi-annually	24-hour composite

[6] See 40 CFR 122.21(j)(4)(iii)

Table 3: Effluent Monitoring Requirements				
Methylene Chloride	µg/L	Effluent	Semi-annually	24-hour composite
NPDES Application Form 2A Expanded Effluent Testing	—	Effluent	3x/5 years	—
Whole Effluent Toxicity (WET)	TU_C	Effluent	Semi-annually	24-hour composite

Notes:
1. Loading is calculated by multiplying the concentration in mg/L by the flow in mgd and a conversion factor of 8.34. If the concentration is measured in µg/L, the conversion factor is 0.00834.
2. Percent removal is calculated using the following equation:
(average monthly influent – average monthly effluent) ÷ average monthly influent.

C. Surface Water Monitoring

Table 4 presents the proposed surface water monitoring requirements for the draft permit. The City of Toppenish should continue receiving water monitoring at the established locations. Surface water monitoring results must be submitted with the DMR.

The EPA proposes to discontinue surface water monitoring for antimony, arsenic, and selenium because prior receiving water monitoring generally showed that these constituents were not present in the Toppenish Drain upstream from the discharge in detectable concentrations. Receiving water monitoring for nitrate + nitrite, ammonia, copper, lead and zinc have been discontinued because effluent limits have already been established for those parameters.

The EPA proposes to discontinue surface water monitoring for orthophosphate and to replace surface water monitoring for nitrate + nitrite, ammonia, and total Kjeldahl nitrogen with monitoring for total nitrogen. Receiving water monitoring for total nitrogen and total phosphorus is proposed in order to better characterize the nutritive effects of the nitrogen and phosphorus in the receiving water. The concentrations of total phosphorus and total nitrogen are better indicators of a river or stream's trophic state than the concentrations of dissolved inorganic nutrients such as orthophosphate and nitrates (EPA 2000).

Table 4: Receiving Water Monitoring Requirements		
Parameter and Units	**Locations**	**Frequency**
Flow (mgd)	Upstream	1/month
Total phosphorus as P (µg/L)	Upstream and downstream	1/quarter
Total nitrogen as N (mg/L)	Upstream and downstream	1/quarter
Temperature (°C)	Upstream and downstream	1/month[1]
pH (s.u.)	Upstream and downstream	1/quarter
Hardness	Downstream	1/quarter

Notes:
1. Temperature monitoring must occur once per month during June, July, August, and September.

VI. Sludge (Biosolids) Requirements

EPA Region 10 separates wastewater and sludge permitting. The EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. The EPA may issue a sludge-only permit to each facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State or Tribe's biosolids program. The Part 503 regulations are self-implementing, which means that facilities must comply with them whether or not a permit has been issued.

VII. Other Permit Conditions

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. City of Toppenish is required to update the Quality Assurance Plan for the Toppenish WWTP within 180 days of the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Operation and Maintenance Plan

The permit requires the City of Toppenish to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for their facility within 180 days of the effective date of the final permit. The plan shall be retained on site and made available to the EPA and the Yakama Nation Environmental Protection Program upon request.

C. Sanitary Sewer Overflows and Proper Operation and Maintenance of the Collection System

Untreated or partially treated discharges from separate sanitary sewer systems are referred to as sanitary sewer overflows (SSOs). SSOs may present serious risks of human exposure when released to certain areas, such as streets, private property, basements, and receiving waters used for drinking water, fishing and shellfishing, or contact recreation. Untreated sewage contains pathogens and other pollutants, which are toxic. SSOs are not authorized under this permit. Pursuant to the NPDES regulations, discharges from separate sanitary sewer systems authorized by NPDES permits must meet effluent limitations that are based upon secondary treatment. Further, discharges must meet any more stringent effluent limitations that are established to meet WQS.

The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The permit requires that the permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system. The following specific permit conditions apply:

Immediate Reporting – The permittee is required to notify the EPA of an SSO within 24 hours of the time the permittee becomes aware of the overflow. (See 40 CFR 122.41(l)(6)).

Written Reports – The permittee is required to provide the EPA a written report within five days of the time it became aware of any overflow that is subject to the immediate reporting provision. (See 40 CFR 122.41(l)(6)(i)).

Third Party Notice – The permit requires that the permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limitation in the permit or that may endanger health due to a likelihood of human exposure. The permittee is required to develop, in consultation with appropriate authorities at the local, county, tribal and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR 122.41(l)(6)).

Record Keeping – The permittee is required to keep records of SSOs. The permittee must retain the reports submitted to the EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describes the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

Proper Operation and Maintenance – The permit requires proper operation and maintenance of the collection system. (See 40 CFR 122.41(d) and (e)). SSOs may be indicative of improper operation and maintenance of the collection system. The permittee may consider the development and implementation of a capacity, management, operation and maintenance (CMOM) program.

The permittee may refer to the Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (EPA 305-B-05-002). This guide identifies some of the criteria used by EPA inspectors to evaluate a collection system's management, operation and maintenance program activities. Owners/operators can review their own systems against the checklist (Chapter 3) to reduce the occurrence of sewer overflows and improve or maintain compliance.

D. Facility Planning

The permit retains the facility planning requirements from the previous permit. This provision requires the permittee to compare influent flow and loading to the facility's design flow and loading and prepare a facility plan for maintaining compliance with NPDES permit effluent limits when the annual average flow exceeds 85% of the design flow.

E. Electronic Submission of Discharge Monitoring Reports

The draft permit includes new provisions to allow the permittee the option to submit Discharge Monitoring Report (DMR) data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application. NetDMR allows participants to discontinue mailing in paper forms under 40 CFR § 122.41 and § 403.12. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

Under NetDMR, all reports required under the permit are submitted to the EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it is no longer required to submit paper copies of DMRs or other reports to the EPA and the Yakama Nation.

The EPA encourages permittees to sign up for NetDMR, and currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: http://www.epa.gov/netdmr.

F. Standard Permit Provisions

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. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VIII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. The EPA has determined that issuance of this permit will not affect any threatened or endangered species in the vicinity of the discharge (see Appendix F).

B. Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires the EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. The EFH regulations define an adverse effect as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. The EPA has prepared an EFH assessment which appears Appendix G.

The EPA has determined that issuance of this permit will have no effect on EFH in the vicinity of the discharge. The EPA has provided NOAA Fisheries with copies of the draft permit and fact sheet during the public notice period. Any comments received from NOAA Fisheries regarding EFH will be considered prior to reissuance of this permit.

C. State Certification

Section 401 of the CWA requires the EPA to seek State certification before issuing a final permit. Because the discharge originates within the exterior boundaries of the Yakima Reservation, and the Yakama Nation does not have TAS, there is no State or interstate agency with the authority to issue a CWA Section 401 certification. Under these circumstances, the EPA is the certifying agency (40 CFR 121.1(e), 121.21(b)).

D. Permit Expiration

The permit will expire five years from the effective date.

IX. References

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Appendix A: Facility Information

General Information

NPDES ID Number:	WA0026123
Physical Location:	501 Annahat Road Toppenish, WA 98948
Mailing Address:	21 West 1st Avenue Toppenish, WA 98948
Facility Background:	The most recent NPDES permit was issued on November 19, 2003, became effective on November 25, 2003, and expired on November 25, 2008. A timely and complete application for permit issuance was submitted by the permittee. Therefore, the permit has been administratively extended and remains fully effective and enforceable. The first NPDES permit issued by the EPA to this facility was issued on August 7, 1997. Prior to 1997, the City of Toppenish held an NPDES permit issued by the State of Washington Department of Ecology (permit #WA0020681). The WWTP was originally constructed in 1953; major upgrades were completed in 1979, 1995, and 2010.

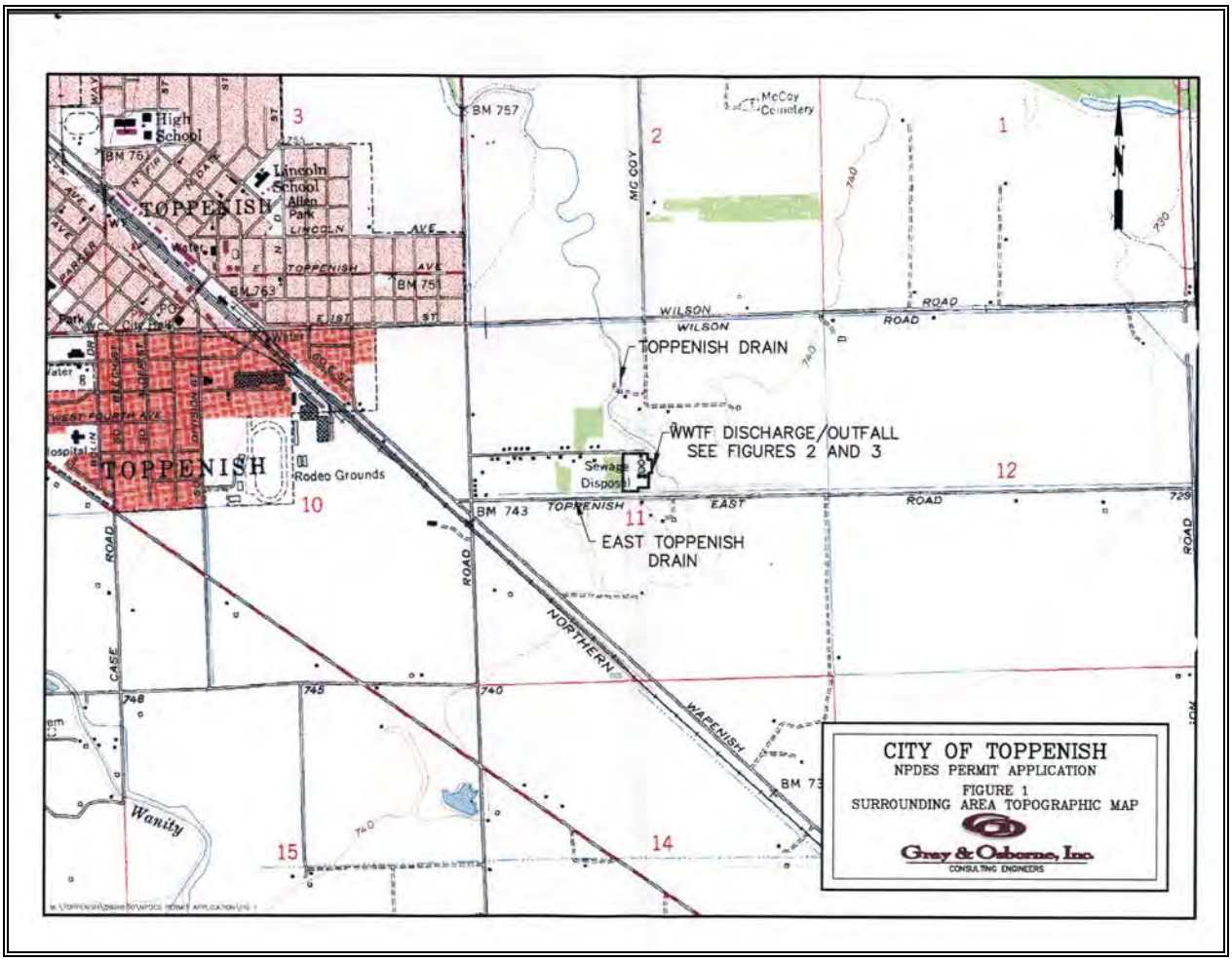
Facility Information

Type of Facility:	Publicly Owned Treatment Works (POTW)
Treatment Train:	Fine screening and grit removal, influent lift station and flow meter, primary clarification, splitter box and flash mixer, activated sludge with anoxic, anaerobic and aerobic zones for biological nitrification, denitrification, and phosphorus removal, caustic feed system, secondary clarification, ultraviolet disinfection, effluent flow meter (Parshall flume). Sludge treatment is by anaerobic digestion; sludge dewatering is by centrifuge.
Flow:	Design flow is 1.76 mgd.
Outfall Location:	latitude 46° 22’ 7” N, longitude 120° 16’ 59” W

Receiving Water Information

Receiving Water:	Toppenish Drain
Watershed:	Lower Yakima (HUC 17030003)
Beneficial Uses:	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.

Appendix B: Facility Map



Appendix C: Basis for Effluent Limits

The following discussion explains in more detail the statutory and regulatory basis for the technology and water quality-based effluent limits in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, and Part C discusses facility specific water quality-based effluent limits.

A. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

The CWA requires POTWs to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," which all POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated "secondary treatment" effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table C-1.

Table C-1: Secondary Treatment Effluent Limits (40 CFR 133.102)

Parameter	Average Monthly Limit	Average Weekly Limit	Range
BOD_5	30 mg/L	45 mg/L	—
TSS	30 mg/L	45 mg/L	—
Removal Rates for BOD_5 and TSS	85% (minimum)	—	—
pH	—	—	6.0 - 9.0 s.u.

Chlorine

The Toppenish WWTP uses ultraviolet (UV) disinfection. Therefore, there are no technology-based chlorine limits applicable to the discharge.

Mass-Based Limits

Effluent limits are generally calculated on a concentration basis. However, the federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are calculated as follows:

$$\text{Mass based limit (lb/day)} = \text{concentration limit (mg/L)} \times \text{design flow (mgd)} \times 8.34^{[1]}$$

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

Use of Technology-based Effluent Limits in the Draft Permit

The EPA has determined that the technology-based effluent limits for BOD_5 and TSS are stringent enough to ensure compliance with WQS. More stringent quality-based effluent limits are proposed for pH.

In addition, the EPA has determined that water quality-based effluent limits are necessary for ammonia, copper, lead, nitrate + nitrite, total phosphorus, selenium, and zinc.

B. Water Quality-based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet WQS. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. Federal regulations at 40 CFR 122.4(d) prohibit the issuance of an NPDES permit that does not ensure compliance with the WQS of all affected States. The NPDES regulation (40 CFR 122.44(d)(1)) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters 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 or Tribal water quality standard, including narrative criteria for water quality, and that the level of water quality to be achieved by limits on point sources is derived from and complies with all applicable WQS.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that WQS are met, and must be consistent with any available wasteload allocation.

Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed, based on numeric criteria, the EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. The EPA uses the concentration of the pollutant in the effluent and receiving water and, if appropriate, the dilution available from the receiving water, to project the receiving water concentration. If the projected concentration of the pollutant in the receiving water exceeds the numeric criterion for that specific chemical, then the discharge has the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard, and a water quality-based effluent limit is required.

Mixing Zones

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body and will decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and when the receiving water meets the criteria necessary to protect the designated uses of the water body. Some of the water quality-based effluent limits in this permit have been calculated using a

mixing zone that is consistent with the mixing zone provisions in the Washington WQS (WAC 173-201A-400).

Procedure for Deriving Water Quality-based Effluent Limits

The first step in developing a water quality-based effluent limit is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of WQS in the receiving water.

In cases where a mixing zone is not authorized (e.g., because the receiving water already exceeds the criterion, or the receiving water flow is too low to provide dilution) the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not cause or contribute to an exceedance of the criterion.

Once a WLA is developed, EPA calculates effluent limits which are protective of the WLA using statistical procedures described in Appendix F.

The following discussion details the specific water quality-based effluent limits in the draft permit.

C. Facility-Specific Water Quality-based Limits

Total Phosphorus

As explained below, the EPA has determined that the total phosphorus (TP) in the discharge has the reasonable potential to cause or contribute to excursions above Washington's WQS, and has therefore established water quality-based effluent limits for TP.

Applicable Water Quality Criteria

The State of Washington has a narrative water quality criterion which reads "Aesthetic values must not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste" (WAC 173-201A-260(2)(b)). The State of Washington does not have numeric water quality criteria for TP or total nitrogen (TN).

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). There are no numeric water quality criteria for TP or TN that apply to Class IV waters such as the Toppenish Drain and the East Toppenish Drain (WQS Section 20.1.6). The Yakama Nation does have a numeric water quality criterion for TP in Class III waters, including the Yakima River. The numeric criterion for Class III waters is "total phosphorus shall not exceed a median of 30 µg/l as sampled throughout a year" (WQS Section 20.1.5.4.1).

Status of Water Quality in the East Toppenish Drain

The concentration of TP in the East Toppenish Drain, downstream from the discharge, consistently exceeds EPA recommendations in both *Quality Criteria for Water 1986* (100 µg/L) and EPA's ecoregional nutrient criteria (30 µg/L) (EPA 2000, Table 3b). The minimum TP concentration in the East Toppenish Drain, from a total of 45 samples taken by the USGS and the Bureau of Reclamation between 2004 and 2008, was 148 µg/L, the median concentration was 290 µg/L, and the 95th percentile concentration was 656 µg/L. The median concentration of total nitrogen (TN) in the East Toppenish Drain, downstream from the discharge, is 3,280 µg/L, which is an order of magnitude greater than the EPA-recommended criterion for TN in this ecoregion (221 – 360 µg/L depending on whether reported or calculated TN concentrations are used) (EPA 2000, Table 3b).

The dissolved oxygen (DO) concentration in the East Toppenish Drain did not meet the applicable Washington water quality criterion 53% of the time. The criterion for salmonid spawning, rearing and migration is a minimum of 8.0 mg/L DO (WAC 173-201A-200(1)(d)). Available data do not indicate any violations of the upper-bound pH criterion (8.5 standard units) in the East Toppenish Drain.

Status of Water Quality in the Yakima River

The median TP concentration in the Yakima River, upstream from the East Toppenish Drain, is 44 µg/L, which exceeds the Yakama Nation's annual median TP criterion (30 µg/L) which is identical to the EPA's recommended TP criterion for this ecoregion (EPA 2000, Table 3b), and the maximum TP concentration is 520 µg/L, which exceeds the recommendation from *Quality Criteria for Water 1986* (100 µg/L). The median concentration of TN is 280 µg/L, which is close to the EPA-recommended criterion for TN in this ecoregion (221 – 360 µg/L depending on whether reported or calculated TN concentrations are used) (EPA 2000, Table 3b).

As a result of excess nutrients, periphytic algae in the reach of the Yakima River that receives the City of Toppenish discharge via the East Toppenish Drain frequently exceeded nuisance levels from 2004 – 2007. The EPA believes algal densities exceeding nuisance levels constitute violations of Washington's narrative water quality criterion for aesthetics. This periphytic algae was also likely responsible for daily variability in pH and dissolved oxygen concentrations which violated the State of Washington's water quality criteria for those parameters. Violations of Washington's daily maximum pH criteria in the reach of the Yakima River that receives the discharge were observed as early as March and continued through October (Wise et al. 2009).

Limiting Nutrient

Both nitrogen and phosphorus can contribute to violations of WQS that result from excess nutrients (i.e., nuisance algae or aesthetics, DO, and pH). Liebig's Law of the Minimum states that the nutrient that is less abundant relative to the biological requirements of algae is the limiting nutrient (i.e., the nutrient that controls primary productivity) (EPA 1972). Phosphorus is generally the limiting nutrient in freshwaters. This is because blue-green algae can "fix" elemental nitrogen from the air as a nutrient source or utilize nitrogen in the water column at very low concentrations and thereby grow in a low-nitrogen environment (EPA 1999), and because freshwater lakes, reservoirs, rivers, and streams are generally supported by large watershed areas, which capture, accumulate, and mobilize large amounts of nitrogen relative to

phosphorus (Paerl 2009). Blue-green algae have been observed in the reach of the Yakima River that receives the Toppenish discharge (Wise et al. 2009, Table 3).

In the case of the reach of the Yakima River that receives the City of Toppenish discharge, primary productivity is generally not nutrient-limited. That is to say, the supply of both nitrogen and phosphorus in the Yakima River generally exceeds the amount that can be consumed by the algae in the river (Wise et al. 2009, Page 42). However, this does not necessarily mean that both nitrogen and phosphorus loads must be reduced in order to control algae growth. If the loading of one nutrient (nitrogen or phosphorus) can be reduced to the point where it becomes limiting to aquatic growth, water quality for parameters influenced by excess nutrients, including nuisance algae growth, DO, and pH, can be improved through reductions of a single nutrient.

Furthermore, nitrogen and phosphorus are not equally treatable. According to EPA's *Municipal Nutrient Removal Technologies Reference Document*, "Special filters have proved effective in achieving low (TP) concentrations below 0.03 mg/L." This concentration is identical to the EPA's recommended criterion for TP in this ecoregion (EPA 2000, Table 3b). However, the best-performing POTWs in terms of nitrogen removal can only achieve annual average effluent TN concentrations of 1.5 – 2 mg/L (see the *Municipal Nutrient Removal Technologies Reference Document* at Tables 2-1 and 2-8). The EPA-recommended criterion for TN for this ecoregion is 0.36 mg/L (EPA 2000, Table 3b). Thus, it is possible for POTWs to reduce effluent TP to concentrations comparable to in-stream water quality criteria (or numeric interpretations of narrative criteria), but this is not possible for TN.

Because phosphorus is generally the long-term limiting nutrient in freshwater and because phosphorus is more treatable than nitrogen, EPA is controlling the City of Toppenish's discharges of nutrients through effluent limits on TP.[2]

Interpretation of Narrative Water Quality Criteria

Where a State or Tribe has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State or Tribal water quality standard, the permitting authority must establish effluent limits using one or more of the options provided in 40 CFR 122.44(d)(1)(vi).

EPA is establishing water quality-based effluent limits for TP based on 40 CFR 122.44(d)(1)(vi)(B), which allows the permitting authority to establish effluent limits using EPA's water quality criteria, published under Section 304(a) of the CWA. 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."

Yakama Water Quality Standards for the Yakima River

As explained in the body of this fact sheet, there are no EPA-approved WQS for Clean Water Act permitting purposes on the Yakama Nation reservation, however, it is EPA policy to

[2] The draft permit proposes limits on total ammonia as N and nitrate + nitrite as N, but these limits are based on direct toxicity to humans or aquatic life as opposed to the potential for the discharge to cause or contribute to water quality standards violations due to excess nutrients.

consider the Tribal WQS in drafting NPDES permits, as long as the WQS are consistent with Section 303 of the CWA, as well as EPA's implementing regulations at 40 CFR 131 (EPA 1993).

The Yakama WQS designate the Yakima River as a "Class III" waterbody (WQS Section 21.2.1). Class III waters are designated for the uses of cultural and religious uses, anadromous fish migration, spawning and rearing, aquatic life, wildlife habitat, recreation, ground water recharge, agricultural and industrial water supply, and livestock watering (WQS Section 19.3.2). Under the Washington WQS, the Yakima River is designated for the uses of salmonid spawning and rearing, primary contact recreation, domestic, industrial and agricultural water supply, livestock watering, wildlife habitat, harvesting, commerce and navigation, boating and aesthetics (WAC 173-201A-602).

Thus, the use designations for the Yakima River in the Washington WQS and the Yakma WQS are the same except for the Tribe's use categories of "cultural and religious uses" and "groundwater recharge." The EPA believes that water quality necessary to support the uses of domestic water supply, primary contact recreation, and the migration, rearing, spawning, and harvesting of salmonids and other aquatic life would also support the Tribe's cultural and religious uses and groundwater recharge. Thus, effluent limits for nutrients that are based on the designated uses and water quality criteria for the Yakima River in the Washington WQS will also protect the designated uses of the Yakima River in the Yakama WQS.

As stated above, the Yakama nation has adopted a numeric TP criterion for Class III waters, which is an annual median of 30 µg/L. The EPA is interpreting the Washington narrative criterion for aesthetics as 100 µg/L TP, consistent with the recommendation in *Quality Criteria for Water 1986,* as a maximum monthly average value. Because of the difference in the statistics associated with these two criteria (i.e., an annual median for the Yakama criterion as opposed to a maximum monthly average for the interpreted Washington criterion), it is not feasible to make a definitive comparison of the stringency of these two criteria. This is because the median value does not change when there are a small number of values that are much larger or smaller than the central tendency of the data, even though those values may result in an exceedance of the interpreted Washington criterion. That is to say, the median TP concentration sampled throughout a calendar year could be less than 30 µg/L (thus complying with the Tribe's annual median) even if there are months within that year when the monthly average TP concentration is greater than 100 µg/L. This could cause water quality problems if TP concentrations significantly greater than the annual median occur during the summer growing season.

Therefore, 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.

Reasonable Potential to Cause or Contribute to WQS Violations

The median effluent TP load discharged by the Toppenish WWTP after treatment upgrades were completed in June 2010 is 17.2 lb/day. 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 thus 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. Therefore, the TP in the discharge has the reasonable potential to cause or contribute to excursions above WQS for

nutrients and related parameters (nuisance algae/aesthetics, DO, and pH) in the Yakima River, and an effluent limit for TP is required (40 CFR 122.44(d)(1)(i – iii)).

Effluent Limit Calculation

The EPA calculated the effluent limits for TP using a mass balance. First, the EPA estimated the TP loading capacity of the Yakima River. Then, the EPA subtracted both the measured TP loading in the main stem of the Yakima River as well as the TP loading in the Toppenish Drain upstream from the point of discharge from the total loading capacity, to estimate the remaining loading capacity that could potentially be allocated to the Toppenish WWTP. Then, the EPA allocated a portion of the remaining loading capacity to the Toppenish WWTP.

The EPA is proposing seasonal effluent limits for TP, which apply from March 1st through October 31st each year, because this is the season during which violations of WQS for DO and/or pH (which are likely caused by excess periphytic algae growth which is in turn caused by excess nutrients) are observed in the reach of the Yakima River that receives the discharge, via the East Toppenish Drain.

The 30-day, 5-year low flow rate (30Q5) of the Yakima River, for the season of March 1st through October 31st, calculated using data from USGS Station #12505000, is 173 CFS, or 111.8 mgd. Thus, the TP loading capacity is:

111.8 mgd × 0.1 ppm × 8.34 lb/gal = 93.25 lb/day

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:

111.8 mgd × 0.044 ppm × 8.34 lb/gal = 41.03 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 18.07 lb/day.

Thus, the remaining assimilative capacity is:

93.25 lb/day - 41.03 lb/day - 18.07 lb/day = 34.15 lb/day

This is the loading that could be allocated to the Toppenish WWTP without causing the TP concentration in the Yakima River to exceed 100 µg/L, under 30Q5 low flow conditions. However, there are numerous point and non-point sources of TP in the Yakima River basin, so it would not be appropriate to allocate 100% of the loading capacity to any one source.

The upgraded WWTP is designed for biological phosphorus removal, thus, it should be capable of effluent TP concentrations < 1 mg/L (Gray and Osborne 2005). At the design flow of 1.76 mgd, 1 mg/L equates to 14.7 lb/day. This is 43% of the estimated remaining assimilative capacity in the Yakima River (34.15 lb/day).

Total Phosphorus Summary

Attainment of WQS for nutrients and related parameters (e.g., DO, pH, and nuisance aquatic growths) in the lower Yakima River will likely require a basin-wide effort to control discharges of nutrients from both point and non-point sources to both surface water and ground water, such as a total maximum daily load (TMDL). Lowering nutrient concentrations in this reach of the Yakima River may limit periphytic algal growth enough to improve DO and pH conditions, although attainment of water quality criteria for DO and pH may require reductions of nutrient inputs from both surface water and ground water (Wise et al. 2009).

However, as explained above, the City of Toppenish WWTP has the reasonable potential to cause or contribute to excursions above Washington's WQS due to excess nutrients, and thus requires effluent limits for nutrients (40 CFR 122.44(d)(1)(i – iii)). As explained above, the proposed average monthly limit of 14.7 lb/day TP is derived from and complies with Washington's WQS, and should be achievable by the City with the plant's existing biological phosphorus removal processes. Reductions in TP loading from the City of Toppenish will also contribute to improved DO and pH conditions in the Yakima River. The EPA believes this limit 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.

Average Weekly Limit

Consistent with 40 CFR 122.45(d)(2), EPA has established an average weekly discharge limitation for TP, in addition to the average monthly discharge limitation. To calculate the average weekly limit, EPA used Table 5-3 of the *Technical Support Document for Water Quality-based Toxics Control* (TSD). This table provides ratios between the average monthly and the maximum daily limit, however, when the required sampling frequency is once per week or less frequent, there is no practical difference between an average weekly limit and a maximum daily limit. The draft permit proposes a sampling frequency of once per week for TP. The coefficient of variation (CV) for TP loading, based on effluent data collected after June 2010, is 0.823. EPA has used the 95th percentile probability basis for the average monthly limit and the 99th percentile probability basis for the average weekly limit. This results in a ratio between the average monthly and average weekly limit of 2.32:1. Therefore, the average weekly limit is 14.7 lb/day × 2.32 = 34.1 lb/day.

Nitrate + Nitrite

The Washington WQS do not include numeric criteria for nitrate + nitrite. However, the State of Washington does have a narrative water quality criterion for toxic substances, which reads "toxic substances shall not be introduced above natural background levels in waters of the state which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department" (WAC 173-201A-240-1). Where a State or Tribe has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State or Tribal water quality standard, the permitting authority must establish effluent limits using one or more of the options provided in 40 CFR 122.44(d)(1)(vi). EPA is establishing water quality-based effluent limits for nitrate + nitrite based on 40 CFR 122.44(d)(1)(vi)(B), which allows the

permitting authority to establish effluent limits using EPA's water quality criteria, published under Section 304(a) of the CWA. The EPA-recommended water quality criterion for nitrate + nitrite for the consumption of water and organisms is 10 mg/L (EPA 1986). EPA has used this recommended criterion to interpret the State of Washington's narrative water quality criterion for toxic substances. It is appropriate to use the recommended criterion for water and organisms because the receiving waters are designated for domestic water supply.

EPA has determined that the discharge has the reasonable potential to cause or contribute to excursions above the 10 mg/L criterion, at the edge of a mixing zone encompassing 25% of the harmonic mean flow of Toppenish Drain. Furthermore, there are documented problems with elevated nitrate + nitrite concentrations in drinking water wells in the Yakima River basin, and there is exchange between ground and surface water (Washington State Departments of Agriculture, Ecology and Health, et al. 2010). The Yakama WQS designate Class III waters, including the Yakima River, downstream from the discharge, for groundwater recharge.

Consistent with the recommendations of section 5.4.4 of the TSD for establishing effluent limits based on human health criteria, the average monthly limit has been set equal to the wasteload allocation of 10.5 mg/L.

NPDES regulations require that effluent limitations for POTWs that discharge continuously be expressed as average monthly and average weekly discharge limitations, unless impracticable (40 CFR 122.45(d)(2)). Therefore, in addition to the average monthly limit, the permit proposes an average weekly limit for nitrate + nitrite. To calculate the average weekly limit, EPA used the equation printed Table 5-3 of the TSD. This table provides ratios between the average monthly and the maximum daily limit, however, when the required sampling frequency is once per week or less frequent, there is no practical difference between an average weekly limit and a maximum daily limit. The draft permit proposes a sampling frequency of once per week for nitrate + nitrite. The coefficient of variation (CV) for nitrate + nitrite concentration, based on effluent data collected after June 2010, is 0.525. EPA has used the 95th percentile probability basis for the average monthly limit and the 99th percentile probability basis for the average weekly limit. This results in a ratio between the average monthly and average weekly limit of 1.89:1. Therefore, the average weekly limit is 10.5 mg/L × 1.89 = 19.8 mg/L.

Hardness-Dependent Metals

The toxicities of some metals vary with the hardness of the water. Therefore, the water quality criteria for these metals also vary with hardness. EPA uses the hardness of the receiving water when mixed with the effluent to determine the water quality criteria for such metals. Since toxicity decreases (and numeric water quality criteria increase) as hardness increases, EPA has used the 5th percentile hardness measured downstream from the outfall (87.7 mg/L as $CaCO_3$) as a worst-case assumption for hardness.

The hardness-dependent water quality criteria for the metals of concern are expressed as dissolved metal. The dissolved fraction of the metal is the fraction that will pass through a 0.45-micron filter. However, the federal regulation at 40 CFR 122.45(c) requires that NPDES permit effluent limits must be expressed as total recoverable metal. Total recoverable metal is the concentration of the metal in an unfiltered sample. To develop effluent limits for total recoverable metals which are protective of the dissolved metals criteria, "translators" are used in the equations to determine reasonable potential and derive effluent limits. Translators can either be site specific numbers or default numbers. EPA has published guidance related to the use of

translators in NPDES permits in *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA 823-B-96-007, June 1996). In the absence of site specific translators, this guidance recommends the use of water quality criteria conversion factors as the default translators. Because site-specific translators were not available, EPA has used the conversion factors in Washington WQS in the reasonable potential and effluent limit calculations for the Toppenish WWTP discharge. Table C-2, below, shows the results of the calculations for water quality criteria for hardness-dependent metals in the Toppenish Drain downstream of the discharge.

Table C-2: Hardness-Dependent Metals Criteria Values

Parameter	Acute Criterion (µg/L)[1]	Chronic Criterion (µg/L)[1]
Copper	15.04	10.15
Lead	55.97	2.18
Nickel	1267	141
Silver	2.75	—
Zinc	102.4	93.51

1. All metals criteria are expressed as dissolved metal.

EPA determined that the effluent loading (i.e., lb/day) limits in the prior permit are stringent enough to ensure compliance with water quality criteria for zinc. Therefore, the zinc effluent loading limits have been continued in compliance with the antibacksliding provisions of the Clean Water Act and federal regulations (CWA Sections 303(d)(4) and 402(o), 40 CFR 122.44(l)). The zinc concentration limits have been re-calculated based on the reduced design flow of the upgraded facility (1.76 mgd as opposed to 1.9 mgd, see 40 CFR 122.45(b)(1)). The re-calculated zinc concentration limits are 8% higher than the corresponding limits in the prior permit. However, as explained under "Antidegradation," in this fact sheet, the revised zinc limits are consistent with Washington's antidegradation policy and with the anti-backsliding provisions of the Clean Water Act.

The prior permit included water quality-based effluent limits for copper, but there were errors in the calculation of these limits (see Gray and Osborne 2005 at Appendix D). The EPA recalculated the effluent limits for copper based on Washington's water quality criteria and the observed effluent variability. The recalculated effluent limits were less stringent than those in the prior permit. However, in order to ensure compliance with the antibacksliding requirements of the Clean Water Act and with Washington's Tier II antidegradation policy, the effluent limits could not be increased by more than 10%, relative to the effluent limits in the prior permit (Ecology 2011).

In addition to copper and zinc, for which effluent limits were established in the prior permit, EPA has determined that the discharge has the reasonable potential to cause or contribute to violations of Washington's water quality criteria for lead. Therefore, the permit contains water quality-based effluent limits for lead, in addition to copper and zinc. See Appendices D and E for reasonable potential and effluent limit calculations for metals.

In addition to the aquatic life criteria, State of Washington also has human health criteria for copper and nickel. The aquatic life water quality criteria for these pollutants are more stringent than the human health criteria. Therefore, the effluent limits for copper, which ensure compliance with the aquatic life water quality criteria, will also ensure compliance with the

human health water quality criterion. The finding that the discharge does not have the reasonable potential to cause or contribute to excursions above the chronic aquatic life water quality criterion for nickel is also valid for the human health criterion.

pH

The applicable water quality criterion for pH states that the pH must be within the range of 6.5 to 8.5 standard units, with a human-caused variation of less than 0.5 standard units (WAC 173-201A-200(1)(g)). The minimum effluent pH measured between December 2003 and January 2012 was 6.5 standard units and the maximum effluent pH was 7.8 standard units. The 5th percentile pH in the Toppenish Drain is 6.45 standard units and the 95th percentile pH is 7.7 standard units.

Thus, the pH of the effluent is similar to the pH of the receiving water. The EPA therefore does not expect the effluent to change the pH of the Toppenish Drain by more than 0.5 standard units. Mixing zones are generally not granted for pH, therefore the range component of the water quality criterion must be met before the effluent is discharged to the receiving water. The draft permit requires that the effluent have a pH of no less than 6.5 and no greater than 8.5 standard units. Effluent data indicate that the City can comply with these effluent limits.

Fecal Coliform

The applicable water quality criterion for fecal coliform states that "fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL" (WAC 173-201A-200(2)(b)).

No mixing zone is proposed for fecal coliform. The effluent limits in the draft permit directly implement the geometric mean criterion with a monthly geometric mean effluent limit. In addition, the permit proposes a maximum daily limit equal to 200 colonies per 100 mL. The proposed maximum daily limit is consistent with the water quality criteria because the required sampling frequency of once per week will result in less than ten samples per month.

Ammonia

The Washington WQS contain criteria for the protection of aquatic life from the toxic effects of ammonia. The receiving water is designated for salmonid spawning, rearing, and migration. Therefore, in order to ensure that the ammonia limits are protective of all life stages of fish, the EPA has applied ammonia criteria which are protective of salmonids, including early life stages (WAC 173-201A-240-3). The criteria are dependent on pH and temperature, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase. The following table details the equations used to determine water quality criteria for ammonia, and the values of these equations at the 95th percentile pH (7.8 standard units) and the 95th percentile temperature observed in the Toppenish Drain (19 °C). The applicable water quality criteria are a chronic criterion of 1.60 mg/L and an acute criterion of 9.64 mg/L.

The prior permit included water quality-based effluent limits for ammonia, but there were errors in the calculation of these limits (see Gray and Osborne 2005 at Appendix D). EPA recalculated the effluent limits for ammonia based on these criteria and the observed effluent variability since

plant upgrades were completed in May 2010. The recalculated effluent limits were less stringent than those in the prior permit. However, in order to ensure compliance with the antibacksliding requirements of the Clean Water Act and with Washington's Tier II antidegradation policy, the effluent limits could not be increased by more than 10%, relative to the effluent limits in the prior permit (Ecology 2011).

Selenium

EPA has determined that the City of Toppenish discharge has the reasonable potential to cause or contribute to excursions above the State of Washington's aquatic life water quality criteria for selenium. The chronic selenium criterion is 5 µg/L and the acute criterion is 20 µg/L. Because the aquatic life water quality criteria for selenium are much more stringent than the human health criterion (170 µg/L), the proposed selenium effluent limits, which are based on aquatic life criteria, will also ensure compliance with the State of Washington's human health criterion for selenium.

Effluent data indicate that the City can 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 for the new water quality-based effluent limits for selenium.

Summary of Effluent Limit Bases

The following table summarizes the general statutory and regulatory bases for the limits in the draft permit.

Table C-4 Summary of Effluent Limit Bases

Limited Parameter	Basis for Limit
BOD_5 and TSS	Clean Water Act (CWA) Section 301(b)(1)(B), 40 CFR 122.45(f), 40 CFR 133 (technology-based, mass limits)
Floating Solids, Oil and Grease	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d), WAC 173-201A-260(2)(b) (water quality-based, all affected States)
pH	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d), WAC 173-201A-200(1)(g) (water quality-based, all affected States)
Fecal Coliform	CWA Sections 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d), WAC 173-201A-200(2)(b) (water quality-based, all affected States)
Lead and Selenium	CWA Sections 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d), WAC 173-201A-240(3) (water quality-based, all affected States)
Zinc	CWA Section 402(o), WAC 173-201A-320, 40 CFR 122.4(d) (anti-backsliding, antidegradation, all affected States)
Ammonia and Copper	CWA Sections 301(b)(1)(C), 303(d)(4) and 402(o), WAC 173-201A-240(3), WAC 173-201A-320, 40 CFR 122.4(d), 40 CFR 122.44(d) (water quality-based, anti-backsliding, antidegradation, all affected States)
Total Phosphorus	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d)(1)(vi)(B), 40 CFR 122.45(f), WAC 173-201A-260(2)(b) (water quality-based, mass limits, narrative water quality criteria, all affected States)
Nitrate + Nitrite	CWA Section 301(b)(1)(C), 40 CFR 122.44(d)(1)(vi)(B), WAC 173-201A-240(1) (water quality-based, narrative water quality criteria, all affected States)

D. Other Pollutants Evaluated

Whole Effluent Toxicity

As required by their 2003 permit, the City performed four whole effluent toxicity (WET) tests between May 2007 and February 2008. The maximum toxicity measured was 13.9 chronic toxic units (TU_c).

In 2010, after the WET testing was completed, the city completed a major upgrade to the WWTP. Upgrades to the biological treatment process have substantially reduced the effluent concentration of ammonia, which is toxic to aquatic life. In addition, the new ultraviolet disinfection system has eliminated the source of chlorine in the discharge. Thus, the WET data collected in 2007 and 2008 are not representative of current effluent quality. Therefore, there are insufficient data to determine if the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for WET.

In addition, the draft permit includes effluent limits for ammonia, copper, lead, selenium, and zinc, which ensure compliance with aquatic life criteria with very little dilution. EPA has determined that the discharge does not have the reasonable potential to cause or contribute to excursions above aquatic life water quality criteria for arsenic, nickel or silver, also with very little dilution.

Federal regulations provide that limits on WET "are not necessary where the permitting authority demonstrates in the fact sheet or statement of basis of the NPDES permit…that chemical-specific limits for the effluent are sufficient to attain and maintain applicable numeric and narrative State water quality standards" (40 CFR 122.44(d)(1)(v)). Chemical-specific effluent limits have been established for all parameters for which the discharge has the reasonable potential to cause or contribute to excursions above aquatic life criteria. Thus, EPA believes the chemical-specific limits in the permit are sufficient to attain and maintain numeric and narrative water quality standards, including the State of Washington's narrative criterion for toxicity (WAC 173-201A-240-1).

The permit requires effluent monitoring for chronic WET twice per year. These data will be used to determine if the chemical-specific limits in the permit are in fact sufficient to prevent toxicity. If the WET data show that effluent limits for WET are necessary, in addition to the chemical-specific limits, EPA will establish effluent limits for WET when the permit is reissued.

Other Parameters

In addition to the pollutants discussed above, antimony, arsenic, benzene, chloroform, methylene chloride, nickel, phenol and silver have been detected in the City of Toppenish effluent. As shown in Appendix D, the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for those pollutants, thus, no effluent limits are required for any of those pollutants.

E. References

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Appendix D: Reasonable Potential Calculations

The following describes the process EPA has used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of the Washington WQS. EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA 1991) to determine reasonable potential.

To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit. This section discusses how the maximum projected receiving water concentration is determined.

A. Mass Balance

For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{(Equation D-1)}$$

where,

C_d = Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
C_e = Maximum projected effluent concentration
C_u = Measured upstream receiving water concentration
Q_d = Receiving water flow rate downstream of the effluent discharge = $Q_e + Q_u$
Q_e = Effluent flow rate (set equal to the design flow of the WWTP)
Q_u = Receiving water low flow rate upstream of the discharge (e.g., minimum flow or harmonic mean)

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e Q_e + C_u Q_u}{Q_e + Q_u} \qquad \text{(Equation D-2)}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with the receiving stream and that the mixing zone policy in the WQS allows 100% of the receiving stream volume to be used for mixing. If the mixing zone is based on less than complete mixing with the receiving water, the equation becomes:

$$C_d = \frac{C_e Q_e + C_u (Q_u \times MZ)}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation D-3)}$$

Where MZ is the fraction of the receiving water flow available for dilution. The Washington WQS require that mixing zones not utilize greater than 25% of the volume of the stream flow, except for acute aquatic life criteria (WAC 173-201A-400(7)(a)(ii)). Because the receiving stream flow is comparable to the discharge flow under low-flow conditions, EPA expects rapid and complete mixing under low flow conditions. Under high flow conditions, complete mixing of the effluent occurs within 300 feet downstream of the discharge (Andreasson and Heffner 1991). This will ensure that the State of Washington's restrictions on the downstream extent

and the width of the mixing zone (WAC 173-201A-400(7)(a)(i) and (iii)) are attained. Therefore, in cases where mixing zones are allowed, except for acute aquatic life criteria, "MZ" is equal to 25%, or 0.25.

The Washington WQS allow mixing zones for acute aquatic life criteria, but such mixing zones may not utilize more than 2.5% of the stream flow (WAC 173-201A-400(8)(a)(ii)). Therefore, for acute aquatic life criteria, "MZ" is equal to 2.5%, or 0.025.

If a mixing zone is not allowed, dilution is not considered when projecting the receiving water concentration and,

$$C_d = C_e \qquad \text{(Equation D-4)}$$

Where mixing zones are allowed, equation D-3 can be simplified by introducing a "dilution factor." For chronic aquatic life criteria, for example, the dilution factor is calculated as follows:

$$D = \frac{Q_e + 0.25 \times Q_u}{Q_e} \qquad \text{(Equation D-5)}$$

There are multiple values for the dilution factor, depending on the season and whether the discharge is being evaluated against human health criteria or aquatic life criteria. The dilution factors are shown in Table D-1, below.

Table D-1: Dilution Factors

Scenario	Dilution Factor
Acute Aquatic Life, May – September	1.10
Chronic Aquatic Life, May – September	2.00
Acute Aquatic Life, October – April	1.02
Chronic Aquatic Life, October – April	1.23
Human Health, year – round	1.71

After the dilution factor simplification, Equation D-3 becomes:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \text{(Equation D-6)}$$

If the criterion is expressed as dissolved metal, the effluent concentrations are measured in total recoverable metal and must be converted to dissolved metal as shown in Equation D-7.

$$C_d = \left[\frac{CF \times C_e - C_u}{D}\right] + C_u \qquad \text{(Equation D-7)}$$

Where C_e is expressed as total recoverable metal, C_u and C_d are expressed as dissolved metal, and CF is a conversion factor used to convert between dissolved and total recoverable metal.

In cases where dilution is not allowed, equation D-7 simplifies to:

$$C_d = CF \times C_e \qquad \text{(Equation D-8)}$$

Equations D-4, D-6, D-7, and D-8 are the forms of the mass balance equation which were used to determine reasonable potential and calculate wasteload allocations.

B. Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration for reasonable potential to exceed aquatic life criteria, EPA has used the procedure described in section 3.3 of the TSD, "Determining the Need for Permit Limits with Effluent Monitoring Data." In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration in the mass balance equation.

To calculate the maximum projected effluent concentration for reasonable potential to exceed human health criteria, EPA has used the procedures described in Chapter VII of the Washington State Department of Ecology's *Water Quality Program Permit Writers' Manual* (Bailey 2011). This is a similar procedure to that used for aquatic life criteria, but instead of calculating the 99th percentile effluent concentration at the 99% confidence level, this procedure calculates the 50th percentile effluent concentration at the 95% confidence level. For human health, if there are more than 10 samples available, the 50th percentile effluent concentration is calculated directly from the effluent data, instead of estimating it based on the maximum effluent concentration and the coefficient of variation.

For zinc, EPA has used the maximum daily limits in the prior permit as the maximum projected effluent concentration. The prior permit's maximum daily limits are used in this manner to determine if the prior permit's effluent limits are stringent enough to ensure compliance with water quality standards. In general, effluent limits in a reissued permit must be as stringent as the effluent limits in the prior permit (CWA Sections 303(d)(4) and 402(o), 40 CFR 122.44(l)).

Because there were errors in the calculation of the prior permit's ammonia and copper limits (Gray and Osborne 2005), those limits were checked against the water quality standards by re-calculating the limits, instead of using the prior permit's maximum daily limits as the maximum projected effluent concentration in the reasonable potential analysis.

Since there are a limited number of data points available, the 99th percentile or 50th percentile effluent concentration is calculated by multiplying the maximum reported effluent concentration by a "reasonable potential multiplier" (RPM). The RPM is the ratio of the 99th percentile or 50th percentile concentration to the maximum reported effluent concentration. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean, but when fewer than 10 data points are available, the TSD recommends making the assumption that the CV is equal to 0.6.

Using the equations in section 3.3.2 of the TSD, the reasonable potential multiplier (RPM) is calculated as follows. The following discussion presents the equations used to calculate the RPM, and also works through the calculations for reasonable for lead, for October – April, as an example. Reasonable potential calculations for all pollutants can be found in Tables D-2 and D-3.

First, the percentile represented by the highest reported concentration is calculated.

$$p_n = (1 - \text{confidence level})^{1/n} \quad \text{(Equation D-9)}$$

where,
p_n = the percentile represented by the highest reported concentration
n = the number of samples

confidence level = 99% = 0.99

The data set contains 16 lead samples collected from the effluent[1], therefore:

$p_n = (1-0.99)^{1/16}$
$p_n = 0.750$

This means that we can say, with 99% confidence, that the maximum reported effluent lead concentration is greater than the 75th percentile.

The reasonable potential multiplier (RPM) is the ratio of the 99th percentile concentration (at the 99% confidence level) to the maximum reported effluent concentration. This is calculated as follows:

$RPM = C_{99}/C_p$ (Equation D-10)

Where,
$C = \exp(z\sigma - 0.5\sigma^2)$ (Equation D-11)

Where,
$\sigma^2 = \ln(CV^2 + 1)$ (Equation D-12)
$\sigma = \sqrt{\sigma^2}$
CV = coefficient of variation = (standard deviation) ÷ (mean)
z = the inverse of the normal cumulative distribution function at a given percentile

In the case of lead:

CV = coefficient of variation = 1.359
$\sigma^2 = \ln(CV^2 + 1) = 1.046$
$\sigma = \sqrt{\sigma^2} = 1.023$
z = 2.326 for the 99th percentile = 0.6742 for the 75th percentile

$C_{99} = \exp(2.326 \times 1.023 - 0.5 \times 1.046) = 6.400$
$C_{75} = \exp(0.6742 \times 1.023 - 0.5 \times 10.46) = 1.181$

$RPM = C_{99}/C_{75} = 6.400/1.181$
RPM = 5.42

The maximum projected effluent concentration is determined by simply multiplying the maximum reported effluent concentration by the RPM:

$C_e = (RPM)(MRC)$ (Equation D-13)

where MRC = Maximum Reported Concentration

In the case of lead,

[1] One lead result was found to be an outlier and was discarded prior to any further analysis.

$$C_e = (5.42)(7.00\ \mu g/L) = 37.9\ \mu g/L$$

C. Maximum Projected Receiving Water Concentration

The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant. The maximum projected receiving water concentration is calculated from Equation D-6:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \text{(Equation D-6)}$$

Or, if the criterion is expressed as dissolved metal, the maximum projected receiving water concentration is calculated from Equation D-7:

$$C_d = \left[\frac{CF \times C_e - C_u}{D}\right] + C_u \qquad \text{(Equation D-7)}$$

Where C_e is expressed total recoverable metal, C_u and C_d are expressed as dissolved metal, and CF is the conversion factor.

Therefore, for lead, the acute receiving water concentration is:

$$C_d = \left[\frac{0.8101 \times 37.9 - 0.001}{1.023}\right] + 0.001 = 30.0$$

For lead, the chronic receiving water concentration is, in micrograms per liter:

$$C_d = \left[\frac{0.8101 \times 37.9 - 0.001}{1.229}\right] + 0.001 = 25.0$$

The acute and chronic water quality criteria for lead are 56.0 and 2.18 µg/L, respectively. The projected acute receiving water concentration is less than the acute criterion, but the projected chronic water quality criterion is greater than the chronic criterion. Therefore, a water quality-based effluent limit is necessary for lead.

Tables D-2 and D-3, below, summarize the reasonable potential calculations for aquatic life criteria and human health criteria for ammonia, antimony, arsenic, benzene, chloroform, copper, lead, methylene chloride, nickel, phenol, selenium, silver, and zinc.

Table D-2: Reasonable Potential Calculations for Aquatic Life Criteria

Effluent Percentile value	99%																
				State Water Quality Standard		Max concentration at edge of...											
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*		*Pn*	*ug/L*	*CV*	*s*	*n*				COMMENTS
Arsenic (aquatic life)	1.00	1.00		340	150	118	99	NO	0.763	15.5	2.02	1.28	17	7.81	1.023	1.229	
Lead (Non-Irrigation)	0.8101	0.8101	0.0010	56.0	2.18	30.0	25.0	YES	0.750	7.00	1.36	1.023	16	5.42	1.023	1.229	Outlier Discarded
Lead (Irrigation)	0.8101	0.8101	0.0010	56.0	2.18	27.9	15.3	YES	0.750	7.00	1.36	1.023	16	5.42	1.100	2.004	Outlier Discarded
Nickel (Non-Irrigation)	0.998	0.997		1267	141	10	8.3	NO	0.631	3.3	0.61	0.57	10	3.09	1.023	1.229	Only Method 200.8 data considered
Selenium (Non-Irrigation)	1.00	1.00		20.0000	5.0000	24.7	20.5	YES	0.763	8.80	0.73	0.65	17	2.87	1.023	1.229	
Selenium (Irrigation)	1.00	1.00		20.0000	5.0000	22.9	12.6	YES	0.763	8.80	0.73	0.65	17	2.87	1.100	2.004	
Silver (Non-Irrigation)	0.850			2.7528		2.63		NO	0.599	1.00	0.60	0.55	9	3.16	1.023		
Zinc (Non-Irrigation)	0.978	0.986	40	102	94	94.7	86.2	NO	N/A	98.1	0.60	0.55		1.00	1.023	1.229	Previous Max. Daily Load Limit
Nitrate + Nitrite (mg/L)	1.00	1.00	9.32		10.0		33.8	YES	0.774	23.0	0.54	0.51	18	2.23		1.710	

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

Revised 3/00																
	Ambient Concentration (Geometric Mean)	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence		Max effluent conc. measured	Coeff Variation		# of samples from which # in col. K was taken	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
Parameter	*ug/L*	*ug/L*	*ug/L*			*ug/L*	*ug/L*		*Pn*	*ug/L*	*CV*	**S**	*n*			
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	1.71
Benzene	0.00	1.20	0.12	NO	1.00	NONE	NONE	0.50	0.76	2.90	1.49	1.081	11	0.46	0.20	1.71
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	1.71
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	1.71
Nickel	0.00	610	1.34	NO	1.00	NONE	NONE	0.50	0.74	3.30	0.61	0.566	10	0.69		1.71
Phenol	0.00	21000	72	NO	1.00	NONE	NONE	0.50	0.37	102	0.60	0.555	3	1.20		1.71
Selenium	0.00	170	1.26	NO	1.00	NONE	NONE	0.50	0.84	8.80	0.73	0.654	17	0.52	2.16	1.71

D. References

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Appendix E: WQBEL Calculations - Aquatic Life Criteria

The following calculations demonstrate how the water quality-based effluent limits (WQBELs) in the draft permit were calculated. The new WQBELs for lead and selenium are intended to protect aquatic life criteria. The following discussion presents the general equations used to calculate the water quality-based effluent limits, then works through the calculations for the October – April lead WQBEL as an example. The calculations for all WQBELs based on aquatic life criteria are summarized in Table E-1.

A. Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis (Equations D-6 and D-7). To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation D-6 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \text{(Equation E-1)}$$

The Washington water quality criteria for some metals are expressed as the dissolved fraction, but the Federal regulation at 40 CFR 122.45(c) requires that effluent limits be expressed as total recoverable metal. Therefore, EPA must calculate a wasteload allocation in total recoverable metal that will be protective of the dissolved criterion. This is accomplished by dividing the WLA expressed as dissolved by the criteria translator, as shown in equation F-2. As discussed in Appendix C, the criteria translator (CT) is equal to the conversion factor, because site-specific translators are not available for this discharge.

$$C_e = WLA = \frac{D \times (C_d - C_u) + C_u}{CT} \qquad \text{(Equation E-2)}$$

If no mixing zone is allowed, the dilution factor is equal to 1, and these equations simplify to

$$C_e = WLA = C_d \qquad \text{(Equation E-3)}$$

And,

$$C_e = WLA = \frac{C_d}{CT} \qquad \text{(Equation E-4)}$$

In the case of lead, for the acute criterion,

$WLA_a = [1.023 \times (55.97 - 0.001) + 0.001]/0.8101$
WLA_a = 70.7 µg/L

For the chronic criterion,

$WLA_c = [1.229 \times (2.181 - 0.001) + 0.001]/0.8101$
WLA_c = 3.31 µg/L

The next step is to compute the "long term average" concentrations which will be protective of the WLAs. This is done using the following equations from EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD):

$LTA_a = WLA_a \times \exp(0.5\sigma^2 - z\sigma)$ (Equation E-5)
$LTA_c = WLA_c \times \exp(0.5\sigma_4^2 - z\sigma_4)$ (Equation E-6)

Where,

$\sigma^2 = \ln(CV^2 + 1)$
$\sigma = \sqrt{\sigma^2}$
$\sigma_4^2 = \ln(CV^2/4 + 1)$
$\sigma = \sqrt{\sigma_4^2}$
$z = 2.326$ for 99th percentile probability basis

In the case of lead,

$\sigma^2 = \ln(1.36^2 + 1) = 1.046$
$\sigma = \sqrt{\sigma^2} = 1.023$
$\sigma_4^2 = \ln(1.36^2/4 + 1) = 0.3795$
$\sigma = \sqrt{\sigma_4^2} = 0.6161$
$z = 2.326$ for 99th percentile probability basis

Therefore,

$LTA_a = 70.7\ \mu g/L \times \exp(0.5 \times 1.046 - 2.326 \times 1.023)$
LTA_a = 11.0 µg/L

$LTA_c = 3.31\ \mu g/L \times \exp(0.5 \times 0.3975 - 2.326 \times 0.6161)$
LTA_c = 0.954 µg/L

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below. For lead, the chronic LTA of 0.954 µg/L is more stringent.

B. Derive the maximum daily and average monthly effluent limits

Using the TSD equations, the MDL and AML effluent limits are calculated as follows:

$MDL = LTA \times \exp(z_m\sigma - 0.5\sigma^2)$ (Equation E-7)
$AML = LTA \times \exp(z_a\sigma_n - 0.5\sigma_n^2)$ (Equation E-8)

where σ, and σ^2 are defined as they are for the LTA equations (E-5 and E-6) and,

$\sigma_n^2 = \ln(CV^2/n + 1)$
$\sigma = \sqrt{\sigma_n^2}$
$z_a = 1.645$ for 95th percentile probability basis
$z_m = 2.326$ for 99th percentile probability basis
n = number of sampling events required per month (minimum of 4)

In the case of lead,

MDL = 0.954 µg/L× exp(2.326 × 1.023 - 0.5 × 1.046)
MDL = 6.10 µg/L

AML = 0.954 µg/L× exp(1.645 × 0.6161 - 0.5 × 0.3975)
AML = 2.17 µg/L

Table E-1, below, details the calculations for water quality-based effluent limits based on two-value aquatic life criteria.

Table E-1: Effluent Limit Calculations for Limits Based on Aquatic Life Criteria

Statistical variables for permit limit calculation																		
LTA Probability Basis	99%		Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.															
MDL Probability Basis	99%																	
AML Probability Basis	95%																	
			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)	1.023	1.229	0.8101	0.8101	0.001	55.97	2.181	**2.17**	**6.10**		70.7	3.31	11.0	0.954	0.954	1.36	4.00
Lead (irrigation)	1.100	2.004	0.8101	0.8101	0.001	55.97	2.181	**3.54**	**9.96**		76.0	5.39	11.88	1.556	1.556	1.36	4.00
Selenium (non-irrigation)	1.023	1.229	1.00	1.00		20	5.00	**4.83**	**10.6**		20.46	6.14	5.53	2.87	2.87	0.73	4.00
Selenium (irrigation)	1.100	2.004	1.00	1.00		20	5.00	**7.87**	**17.3**		22.01	10.0	5.95	4.68	4.68	0.73	4.00
Copper (year-round)	1.023	1.229	0.960	0.960	9.0	15.0	10.1	**6.80**	**15.8**		15.8	10.8	3.83	4.66	3.83	0.82	4.00
Ammonia (year-round, mg/L)	1.023	1.229	1.00	1.00	1.28	9.64	1.60	**1.32**	**2.90**		9.84	1.68	2.64	0.779	0.779	0.74	4.00

C. References

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control*. US Environmental Protection Agency, Office of Water, EPA/505/2-90-001. March 1991.

Appendix F: Endangered Species Act

A. Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) requires federal agencies to request a consultation with the National Oceanic and Atmospheric Administration-Fisheries (NOAA-Fisheries) and the U.S. Fish and Wildlife Service (USFWS) regarding potential effects an action may have on listed endangered species.

The following federally-listed endangered and threatened species may be located in the vicinity of the discharges. This list was developed from the Species List found on the U.S. Fish and Wildlife Services – Species Report at:

http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=WA&status=listed.

This Species List identifies those species under the jurisdiction of USFWS and NOAA-Fisheries.

Endangered Species:	None
Threatened Species:	Middle Columbia River steelhead (O. mykiss)
	Bull Trout (Salvelinus confluentus)
	Ute Ladies'-tresses (Spiranthes diluvialis)

B. Potential Effects for Species

EPA has prepared a Biological Evaluation for the issuance of the City of Toppenish permit and determined that the permitted discharges will have No Effect on the Bull trout, and Utes' Ladies Tresses, and the Mid Columbia steelhead. The permit may be modified during its 5-year term if new information on the effects of the discharges on listed species becomes available.

EPA will provide the NOAA-Fisheries with the draft permit and fact sheet and the Biological Evaluation during the public notice period. Any comments received from the agency regarding this determination will be considered prior to issuance of this permit.

C. References

USEPA. 2012. *Biological Evaluation for the Re-issuance of the NPDES Discharge Permit For City of Toppenish.* U.S. Environmental Protection Agency. Region 10. Office of Water and Watersheds. September 2012.

Appendix G: Essential Fish Habitat Assessment

A. Overview

An analysis of essential fish habitat (EFH), in consultation with NOAA Fisheries, is required for any federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities. The objectives of this EFH analysis are to determine whether the EPA action described this fact sheet would adversely affect designated EFH. For the purpose of this EFH analysis, EPA defines the Action Area as the Toppenish Drain and East Toppenish Drain.

According to the Magnuson-Stevens Fishery Conservation and Management Act (MSA §3), EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth and maturity. For the purpose of interpreting this definition of EFH: "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, and growth to maturity" covers a species' full life cycle (50 CFR 600.01). "Adverse effect" means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g. physical disruption), indirect (e.g. loss of prey), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

This fact sheet and the draft permit will be submitted to NOAA-Fisheries for review during the public notice period. Any recommendations received from NOAA-Fisheries regarding EFH will be considered prior to final reissuance of this permit.

NOAA Fisheries has requested that EFH assessments contain the following requirements:

B. Species in the Facility Area

The October 15, 2008 federal register lists EFH habitat for Chinook and Coho salmon in the Lower Yakima River, and all streams, estuaries, marine waters, and other waterbodies historically accessible to Chinook and Coho in the Lower Yakima (see 73 FR 60991).

C. Facility Description and Discharge Location

The facility activities and wastewater sources are described in Part II and Appendices A and B of this Fact Sheet, and the discharge location is described in Part III.

D. EFH Evaluation

The EPA has tentatively determined that the issuance of this permit will not affect any EFH species in the vicinity of the discharge for the following reasons:

1. The proposed permit has been developed to protect aquatic life species in the Toppenish Drain. NPDES permits are established to protect water quality in accordance with WQS. The standards are developed to protect the designated uses of the waterbody, including growth and propagation of aquatic life and wildlife.

2. The derivation of permit limits and monitoring requirements for an NPDES discharge include the basic elements of ecological risk analysis as specified in the *Technical Support Document for Water Quality-based Toxics Control* (TSD) (EPA 1991). This analysis includes, but is not

limited to, the following: effluent characterization, threshold concentration determination, exposure considerations, dilution modeling and analysis, multiple sources and natural background consideration, fate and transport variability, and monitoring duration and frequency.

E. References

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control*. US Environmental Protection Agency, Office of Water, EPA/505/2-90-001. March 1991.