FACT SHEET

United States Environmental Protection Agency (EPA)
Region 10
Park Place Building,
1200 Sixth Avenue, OW-130
Seattle, Washington 98101

NPDES Permit No :	WA-002612-3
Public Notice Start Date:	August 27, 2003
Public Notice End Date:	October 14, 2003
Technical Contact:	Lisa Jacobsen (206) 553-6917 1-800-424-4372 ext. 6917 (within Washington, Alaska, Oregon, and Idaho) Jacobsen.Lisa@epa.gov

PROPOSED ISSUANCE OF A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE POLLUTANTS AND TO DISPOSE OF SEWAGE SLUDGE PURSUANT TO THE PROVISIONS OF THE CLEAN WATER ACT (CWA)

City of Toppenish

has applied for reissuance of a NPDES permit to discharge pollutants and dispose of sewage sludge pursuant to the provisions of the CWA. This Fact Sheet includes (a) the tentative determination of the EPA to reissue the permit, (b) information on public comment, public hearing and appeal procedures, (c) the description of the current discharge, (d) a listing of tentative effluent limitations, schedules of compliance and other conditions, (e) a sketch or detailed description of the discharge location, and (f) a description of the proposed sludge disposal practices. We call your special attention to the technical material presented in the latter part of this document.

Persons wishing to comment on the tentative determinations contained in the proposed permit issuance may do so by the expiration date of the Public Notice. All written comments should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

After the expiration date of the Public Notice, the Director, Office of Water, will make final determinations with respect to the permit issuance. The tentative determinations contained in the draft permit will become final conditions if no substantive comments are received during the public notice period.

If no substantive comments are received, the permit will be effective immediately upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 33 days after the issuance date, unless the permit is appealed to the Environmental Appeals Board within 33 days.

The proposed NPDES permit and other related documents are on file and may be inspected at the above address any time between 8:30 a.m. and 4:00 p.m., Monday through Friday. Copies and other information may be requested by writing to EPA at the above address to the attention of the Water Permits Section, or by calling (206) 553-0523. The draft permit and fact sheet are also available from the EPA Washington Operations Office, c/o State of Washington, Department of Ecology, P.O. Box 47600, Olympia, Washington 98504-7600.

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TECHNICAL INFORMATION

I. APPLICANT

City of Toppenish

NPDES Permit No. WA-002612-3

Mailing Address:
21 West First Avenue
Toppenish, WA 98948

Facility Address:
501 Annahat
Toppenish, WA 98948

Contact:

Ed Martindale
City of Toppenish Public Works Director

II. FACILITY INFORMATION:

A. Facility Description

The City of Toppenish owns and operates a municipal sewage treatment facility that provides secondary treatment and disinfection of wastewater. The facility and receiving water are within the boundaries of the Yakama Indian Reservation. After treatment, the facility discharges the effluent to the Toppenish Drain. The facility design flow is 1.90 million gallons per day (mgd) and has an average daily flow rate of 0.889 mgd. This facility supports a population of 8,946. The plant receives domestic wastewater from residential and commercial sources. There is no industrial input to the plant. The collection system has no combined storm water with sanitary wastewater sewers. A description of the facility's treatment process can be found in Appendix B. A map of this facility is included in Appendix A, showing the location of the facility and outfall.

B. Facility Background Information

1. Compliance History
Prior to 1997, the discharge from the Toppenish facility was regulated by a NPDES permit issued by the State of Washington, Permit No. WA-002068-1. After 1997, EPA issued the NPDES permit and the number

was changed to WA-002612-3. Permit No. WA-002068-1 is no longer used for Toppenish and has been inactivated.

The City was awarded a contract for a treatment plant improvement project. Construction began in 1996 and was completed in 1997. The design flow was increased from 1.3 mgd to 1.9 mgd. The facility has generally been in compliance with the limits established in the NPDES permit. Although the fecal coliform limit of 100FC/100ml was exceeded 9 times prior to May 31, 1999, ranging from 188 to 1266 FC/100ml, there have been no exceedances since that time.

III. RECEIVING WATER

A. Outfall location

The treated effluent from the City of Toppenish wastewater treatment facility is discharged from the outfall 001 located at:
Latitude 46 deg. 22 min. 67 sec
Longitude 120 deg. 13 min. 24 sec.
to the Toppenish Drain.

B. Description of Receiving Water and Receiving Water Flow

The Toppenish Drain is within the Wapato Irrigation Project and eventually empties into the Yakima River. The volume of flow changes in the drain according to whether it is the wet season or the dry season.

The data base available for stream flow at the facility is not large enough to calculate a statistically significant 7Q10 flow. The best available data base is the recent monitoring done by the permittee. Instead of the 7Q10 value, the smallest measurement of the flow values from the data collected by the permittee was used to represent the conservative low-flow of 1.26 million gallons per day (MGD).

There are no issues of concern with a total maximum daily load review (TMDL) in the drain. The drain is not part of the Yakima River TMDL, so the City of Toppenish has no waste load allocation (WLA) from the TMDL. The drain is on

tribal land so it was not included, and the discharge is considered diluted before it reaches the river.

C. Water Quality Standards

The facility and receiving water are within the boundaries of the Yakama Indian Reservation. The Washington State water quality standards only apply to waters of the State. The State does not have legal authority over tribal waters.

The Yakama Nation Department of Natural Resources Environmental Management Program is currently working to establish regulations for point sources that discharge on the Yakama Indian Reservation and water quality standards for waters on the Reservation. The Yakama Nation has not yet adopted standards, therefore, there are no standards that apply to this portion of the Toppenish Drain. Furthermore, because the Yakama Nation does not have delegated NPDES permit authority, EPA is the permitting authority on the Yakama Indian Reservation.

In situations where facilities are discharging into Indian Reservation waters, and the Indian Nation has not yet adopted water quality standards for that water body, it has been EPA's practice to apply adjacent or downstream standards to the reservation waters for the purpose of developing permit limitations and conditions. Federal regulations 40 CFR 131.10(b) and 40 CFR 122.4(d) give EPA the authority to protect the waters downstream of the facility. In this permit, the State of Washington water quality standards, which are applicable to waters adjacent to and downstream of the Reservation, were applied to the Toppenish Drain for the purpose of developing this permit.

The water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve (domestic water supply, fish and shellfish, recreation, etc.) The numeric and/or narrative water quality criteria are the criteria deemed necessary to support the beneficial use classification of each water body. The anti-degradation policy is the approach that is used to maintain and protect existing water quality when the existing quality is better than that required to meet the standard and to prevent water quality from being degraded below the standard when existing quality just meets the standard.

In the State of Washington, water bodies are classified into one of five different classes. Each classification protects the water for specific uses and for specific water quality criteria. Classifications are found in the Water Quality Standards for Surface Waters of the State of Washington, WAC 173-201A-130, Specific Classifications - Freshwater. The Toppenish Drain is not directly classified in the standards, however, the regulations specify that all unclassified surface waters within the state shall be classified as Class A (WAC 173-201A-120 (6)). Conversations prior to 1996, with representatives from the State of Washington Department of Ecology and the Yakama Nation Department of Natural Resources Environmental Management Program, confirmed that the Toppenish Drain is classified as Class A (see also, Ecology Report October 1991, "Toppenish Sewage Treatment Plant Class II Inspection"). Class A designation under the State of Washington Water Quality Standards protects this water body for the following uses: water supply (domestic, industrial, agricultural), stock watering, fish and shellfish, wildlife habitat, recreation, and commerce and navigation.

IV. PROPOSED EFFLUENT LIMITATIONS

A. Basis for Effluent limitations

In general, the Clean Water Act requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. A technology-based effluent limit requires a minimum level of treatment for municipal point source based on currently available treatment technologies. A water quality-based effluent limit is designed to ensure that the water quality standards of a water body are being met. The basis for the proposed effluent limits in the draft permit are provided in Appendix C.

B. Proposed Effluent Limitations

Table 1 and the following list summarizes the effluent limitations that are in the draft permit.

1. The effluent pH range shall be between 6.5 and 8.5 standard units (s.u.).
2. For BOD_5 and TSS, the monthly average effluent removal must not be less than 85%.
3. There must be no discharge of floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.

Table 1 Proposed Effluent Limitations Compared to Current Limitations for Outfall 001						
Parameters	Average Monthly		Average Weekly		Maximum Daily	
	Proposed	Current	Proposed	Current	Proposed	Current
BOD_5 mg/l lbs/day	30 475	30 475	45 713	45 713		--- ---
TSS mg/l lbs/day	30 475	30 475	45 713	45 713		--- ---
Fecal coliform[1] colonies #/100ml	100	100		---		---
Total Ammonia as N mg/l lbs/day	 1.23 19.5	 --- ---			 2.04 32.3	 --- ---
Total Residual Chlorine[2] mg/l lbs/day	 0.002 0.03	 0.008			 0.02 0.32	 0.02
Copper µg/l lbs/day	6.5 0.10	---			9.4 0.15	---
Zinc µg/l lbs/day	45.9 0.73	---			91.1 1.44	---

Footnotes

1. Fecal coliform organisms levels must both not exceed a geometric mean value of 100 colonies/100ml and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 200.
2. The effluent limits for chlorine are not quantifable using EPA approved analytical methods. The permittee will be in compliance with the effluent limits provided the total chlorine residual is at or below the compliance evaluation level of 0.1 mg/l (100µg/l).

C. Compliance Schedule

The water quality criteria for ammonia and metals are found in the Washington water quality standards for surface waters (WAC 173-201A-040). The ammonia and metals limits calculated for the draft permit are much lower than the ammonia and metals concentrations from recent monitoring. Therefore, a schedule of compliance is proposed for the City of Toppenish and is located in the draft permit. The draft permit requires the facility to come into compliance with the new ammonia, copper and zinc limits in Table 1 by 4 years and six months from

the effective date of the final permit.

Until compliance with the effluent limits is achieved, the permittee must not exceed the concentrations that it is currently discharging. Maximum concentrations limits are listed below:

Parameter	Daily Max.
Ammonia, mg/l	11
Copper, µg/l	17
Zinc, µg/l	100

The permittee must submit an Annual Report of Progress which outlines the progress made towards reaching the compliance date for the ammonia and metals effluent limitations.

V. PROPOSED MONITORING REQUIREMENTS

A. Basis for Effluent and Receiving Water Monitoring

Section 308 of the Clean Water Act and federal regulation 40 CFR 122.44(i) require effluent monitoring in NPDES permits to determine compliance with effluent limitations. Section 308 also allows additional effluent and receiving water monitoring to gather data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) to EPA.

B. Proposed 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. Table 2 presents the proposed effluent monitoring requirements for the draft permit.

Table 2 Proposed Monitoring Frequency of Effluent			
Parameter	Sample Location	Sample Frequency	Sample Type
Flow mgd	Influent or effluent	continuous	recording
BOD_5 [1,2] mg/l	Influent and effluent	weekly	24 hour composite
TSS [1,2] mg/l	Influent and effluent	weekly	24 hour composite
pH S.U.	Effluent	daily	grab
Dissolved oxygen mg/l	Effluent	weekly	grab
Chlorine, Total Residual µg/l	Effluent	weekly	grab
Fecal coliform #/100ml	Effluent	weekly	grab
Temperature, °C	Effluent	daily	grab
Total Ammonia as N, mg/l	Effluent	weekly	24 hour composite
Total Phosphorus as P, mg/l	Effluent	monthly	24 hour composite
Orthophosphate as P, mg/l	Effluent	monthly	24 hour composite
Nitrate/Nitrite, mg/l	Effluent	monthly	24 hour composite
Hardness as CaCo3 µg/l	Effluent	monthly	24 hour composite
Kjeldahl Total Nitrogen, (as N) mg/l	Effluent	monthly	24 hour composite
Antimony[2,3,4], µg/l	Effluent	semi-annual	24 hour composite
Arsenic[2,3,4], µg/l	Effluent	semi-annual	24 hour composite
Copper[2,3,4] µg/l	Effluent	semi-annual	24 hour composite
Lead[2,3,4] µg/l	Effluent	semi-annual	24 hour composite
Selenium[2,3,4] µg/l	Effluent	semi-annual	24 hour composite
Zinc[2,3,4] µg/l	Effluent	semi-annual	24 hour composite
Footnotes; 1. Effluent and Influent sampling to be done within the same 24 hour period. 2. 24 hour composite shall be collected in intervals of no less than 15 minutes apart (total 96 samples) in a 24 hour time period. 3. Metals shall be analyzed and reported as total recoverable metals. Test methods must achieve the minimum detection levels listed in the permit. 4. Samples shall be taken twice a year, once during dry season and once during the wet season.			

C. Method Detection Limits

The aquatic life/human health criteria for metals is very low. In order to determine if the effluent discharged from the facility has the potential to cause or contribute

to a exceedance of these criteria, the permittee must use analytical test methods with a detection limit below the aquatic life/human health criteria. The draft permit requires the permittee to use test methods that achieve the method detection limits listed in the draft permit in Table 2.

D. Whole Effluent Toxicity (WET) Testing

During the final year of the current permit the facility did conduct chronic whole effluent toxicity tests of the effluent. The results were included in the Final Report Toxicity Evaluation of an Effluent to Selenastrum capricornutum, Ceriodaphnia dubia, and Pimephales promelas, prepared for The City of Toppenish by Parametrix, Inc. December 2001. This single test shows that at the edge of the mixing zone there is not toxicity. Since the results from the tests showed no toxicity, whole effluent toxicity based limitations will not be developed for this proposed permit. However during the 5-year cycle of the proposed permit, the permittee will be required to submit 3 priority pollutant scans and 4 WET tests.

E. Proposed Receiving Water Monitoring

The purpose of the receiving water monitoring is to determine receiving water quality conditions as part of the effort to evaluate the reasonable potential for the discharge to cause an instream excursion above water quality criteria (40 CFR 122.44). The instream monitoring station shall be located where the effluent and receiving water are fully mixed. Table 3 presents the proposed receiving water monitoring requirements for the draft permit.

Table 3 Proposed Receiving Water Monitoring

Parameter	units	Sampling Frequency	Type of Sample	Location
pH	standard units	semi-annual	grab	Downstream
flow	mgd	semi-annual	grab	Upstream
Temperature	°C	semi-annual	grab	Downstream
Total Ammonia as N	mg/l	semi-annual	grab	Downstream
Hardness as CaCo3	µg/l	semi-annual	grab	Upstream
Total Phosphorous as P	mg/l	semi-annual	grab	Upstream and Downstream
Orthophosphate as P	mg/l	semi-annual	grab	Upstream and Downstream

Nitrate/Nitrite, mg/l	mg/l	semi-annual	grab	Upstream and Downstream
Kjeldahl Total Nitrogen, (as N) mg/l	mg/l	semi-annual	grab	Upstream and Downstream
Antimony[1]	µg/l	semi-annual	grab	Upstream
Arsenic[1]	µg/l	semi-annual	grab	Upstream
Copper[1]	µg/l	semi-annual	grab	Upstream
Lead[1]	µg/l	semi-annual	grab	Upstream
Selenium[1]	µg/l	semi-annual	grab	Upstream
Zinc[1]	µg/l	semi-annual	grab	Upstream
Footnotes: 1 Metals shall be analyzed and reported as dissolved and total recoverable				

Downstream ammonia, pH, temperature, nitrate/nitrite, Kjeldahl total nitrogen, orthophosphate, and total phosphorus data will also be gathered to gain a better understanding of ammonia and nutrient concentrations downstream of the facility near the edges of the potential acute and chronic mixing zones. The permittee will select the sampling locations and submit them to EPA and the Yakama Nation Department of Natural Resources Environmental Management Program for approval. The samples will be collected twice a year, once during dry season and once during the wet season, which reflects the seasonal variation of flow in the drain. Ambient water sampling will be conducted only for three years of the permit (six sampling events). All samples will be grab.

VI. SPECIALS CONDITIONS

A. Quality Assurance Plan (QAP)

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop a QAP to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The permittee is required to develop a QAP and notify EPA within 60 days of the effective date of the final permit and implement the QAP within 120 days of the effective date of the final permit. The QAP must consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Best Management Practices (BMP) Plan

Section 402 of the Clean Water Act and federal regulations 40 CFR 122.44(k)(2) and (3) authorize EPA to require best management practices, or BMPs, in NPDES permits. BMPs are measures for controlling the generation of pollutants and their release to waterways. For municipal facilities, these measures are typically included in the facility's Operation & Maintenance (O&M) manual. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires the City of Toppenish to incorporate appropriate BMPs into their O&M manual for their POTW within 180 days of the effective date of the final permit. Specifically, the City of Toppenish should consider spill prevention and control, optimization of chlorine and chemical use, public education aimed at controlling the introduction of household hazardous materials to the sewer system, and water conservation. To the extent that any of these issues have already been addressed in the facility's current O&M manual, the City of Toppenish need only reference the O&M manual in the BMP plan. The BMP plan must be revised as new practices are developed for the facility.

The draft permit also requires the City to develop a plan when the annual average flow exceeds 85% of the design flow of the plant. The plan requires the City to develop a strategy for remaining in compliance with the effluent limits in the permit.

C. Sewage Sludge

Section 405 of the Clean Water Act requires NPDES permits to include sewage sludge use and disposal standards unless these requirements are included in another permit. However, the sewage sludge standards at 40 CFR Part 503 are self-implementing, which means the permittee is required to comply with them whether or not they have a NPDES permit that includes sewage sludge requirements. Since EPA Region 10 has recently decided to separate wastewater and sewage sludge permitting, sewage sludge requirements are not included in this draft permit. EPA will issue a sludge-only permit to this facility at a later date.

Until the issuance of a sludge-only permit, the facility's sludge activities will continue to be subject to the national sewage sludge standards and any

requirements of the State. The Part 503 regulations require that the permittee have a current sewage sludge application on file with EPA.

VII. OTHER LEGAL REQUIREMENTS

A. Endangered Species

Sections 7(a) and (c) of the Endangered Species Act require federal agencies to request a consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) regarding potential effects an action may have on species listed as threatened or endangered. EPA has requested a list of threatened and endangered species in the vicinity of the Toppenish Wastewater Treatment facility from NMFS and USFWS. The website for NMFS indicated that there were no threatened or endangered species in the vicinity of the facility that are listed or proposed for listing under its jurisdiction of these agencies. A letter from the USFWS dated
May 23, 2002, indicated that the bald eagle *(Haliaeetus leucocephalis)*, Bull trout *(Salvelinus confluentus)*, and Ute ladies'-tresses *(Spiranthes diluvialis),* all of which are listed as threatened, may occur in the vicinity of the facility. No other species are listed or proposed for listing as threatened or endangered under their jurisdiction, in the vicinity of the facility. EPA has determined that the discharge for the Toppenish Wastewater Treatment Plant will have no affect on the listed species. See Appendix E for further details.

B. Essential Fish Habitat

Essential fish habitat (EFH) is defined as 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 EPA to consult with the National Marine Fisheries Service (NMFS) when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. The EPA has tentatively determined that the reissuance of this permit will not adversely affect any EFH species in the vicinity of the discharge, therefore, consultation is not required for this action. This fact sheet and the draft permit will be submitted to NMFS for review during the public notice period. Any recommendations received from NMFS regarding EFH

will be considered prior to final reissuance of this permit. See Appendix F for further details.

C. Water Quality Standards Certification

Since the discharge is from a facility located within the boundaries of the Yakama Indian Reservation, the provisions of Section 401 of the Clean Water Act requiring state certification of the permit do not apply.

D. Interstate Waters

Under 40 CFR 124.10 (c)(1)(iii), EPA must give notice of this permit action to any affected state. Notice has been given to the Washington Department of Ecology and other Washington state agencies (as defined in this regulation) potentially affected by this action. A copy of the proposed permit action has also been provided to the Yakama Indian Tribe, Bureau of Indian Affairs, and Bureau of Land Management.

E. Standard Permit Provisions

Sections II, III, and IV of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are regulations, they can not be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

F. Permit Expiration

Section 402(1)(B) of the Clean Water Act requires that NPDES permits are issued for a period not to exceed five years; therefore, this permit will expire five years from the effective date of the permit.

APPENDIX A - CITY OF TOPPENISH MAP OF FACILITY

APPENDIX B - CITY OF TOPPENISH WASTE STREAMS AND TREATMENT PROCESSES

I. Discharge Composition

In its NPDES application, the City of Toppenish reported the pollutants listed in Table B-1 as being detected in its discharge from outfall 001. The toxic and conventional pollutant categories are defined in the regulations (40 CFR 401.15 and 401.16, respectively). The category of nonconventional pollutants includes all pollutants not included in toxic or conventional categories.

Table B-1 Pollutants Detected in Discharge

Pollutant Type	Parameter	Maximum Reported Concentration
Conventional	5-day biochemical oxygen demand (BOD5), weekly average	28 mg/l 207 lbs/day
	Total suspended solids (TSS) weekly average	19.6 mg/l 165.6 lbs/day
	pH, min - max	7 - 8
	Fecal coliform bacteria weekly average	1266 FC/100ml (Reported in Nov.30 1998) 97 FC/100ml (since May 31, 1999)
Non-Conventional	Chlorine, daily average	1.3 mg/l
	Ammonia, single sample	16 mg/l
Toxic	Copper, single sample	17 µg/l
	Zinc, single sample	370 µg/l

II. Treatment Process

The following is a summary of the treatment processes at the Toppenish facility:

The headworks facility includes the flowmeter, gravity, grit chamber, two aerated grit basins and self-cleaning rotating screen. Grit collected in the aerated grit basins is pumped into a degritting building where the grit is cleaned in a cyclone

and grit classifier.

A primary clarifier and the existing clarifier are used as a standby primary or secondary clarifier. Submerged biological contactors (SBCs) provide secondary treatment to the wastewater. The SBCs normally operate in series with the existing rotating biological contactors (RBCs). A blower building houses blowers for the SBCs and RBCs, and primary sludge pumps. Air is supplied by a blower located in the blower building. Electronic load cells have been installed on each RBC shaft. New secondary sludge pumps and magnetic flowmeters have been installed in the basement of the operations building. New baffles were installed in the chlorine mixer basins to improve mixing of the chlorine with treated wastewater. Sludge is stabilized in the primary and secondary anaerobic digesters and then dewatered on the sludge drying beds before final disposal at the Cheynne municipal solid waste landfill.

APPENDIX C - BASIS FOR EFFLUENT LIMITATIONS

I. Statutory and Regulatory Basis for Limits

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the Clean Water Act provide the basis for the effluent limitations and other conditions in the draft permit. The EPA evaluates discharges with respect to these sections of the CWA and the relevant NPDES regulations to determine which conditions to include in the draft permit.

In general, the EPA first determines which technology-based limits must be incorporated into the permit. EPA then evaluates the effluent quality expected to result from these controls, to see if it could result in any exceedances of the water quality standards in the receiving water. If exceedances could occur, EPA must include water quality-based limits in the permit. The draft permit limits reflect whichever requirements (technology-based or water quality-based) are more stringent. The limits that EPA is proposing in the draft permit are found in Section IV in the body of this fact sheet. This Appendix describes the technology-based and water quality-based evaluation for the City of Toppenish.

II. Technology-based Evaluation

The 1972 Clean Water Act required publicly owned treatment works (POTWs) to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the Act established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977.

More specifically, Section 301(b)(1)(B) of the Clean Water Act requires that EPA develop secondary treatment standards for POTWs as defined in Section 304(d)(1) of the CWA. Based on this statutory requirement, EPA developed secondary treatment regulations which are specified in 40 CFR Part 133.102. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH and have been included in Table C-1

Table C-1: Secondary Treatment Requirements

Parameter	Average Monthly	Average Weekly	Percent Removal
BOD_5	30 mg/l	45 mg/l	85%

TSS	30 mg/l	45 mg/l	85%
pH	between 6.0 and 9.0 standard units		

BOD_5 and TSS, mass based limits: Federal regulations at (40 CFR § 122.45 (f)) require BOD and TSS limitations to be expressed as mass based limits using the design flow of the facility. The loading is calculated as follows: concentration X design flow X conversion factor of 8.34.

BOD_5 and TSS loading, monthly average = 30 mg/l X 1.9 mgd X 8.34 = 475 lbs/day
BOD_5 and TSS loading, weekly average = 45 mg/l X 1.9 mgd X 8.34 = 713 lbs/day

III. Water Quality-based Evaluation

In addition to the technology-based limits discussed above, EPA evaluated the discharge to determine compliance with Section 301(b)(1)(C) of the Clean Water Act. This section requires the establishment of limitations in permits necessary to meet water quality standards by July 1, 1977.

The regulations at 40 CFR 122.44(d)(1) implement section 301(b)(1)(C) of the Clean Water Act. These regulations require that NPDES 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 water quality standard, including narrative criteria for water quality." The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation (WLA).

In determining whether water quality-based limits are needed and in developing those limits when necessary, EPA uses the approach outlined below:

A. Determine the appropriate water quality criteria
B. Determine whether there is "reasonable potential" to exceed the criteria
C. If there is "reasonable potential", develop a WLA
D. Develop effluent limitations based on the WLA

The following sections provide a detailed discussion of each step. Appendix D provides example calculations to illustrate how these steps are implemented.

A. Determine Water Quality Criteria

The first step in developing water quality-based limits is to determine the applicable water quality criteria. Because the Yakama Nation has not yet adopted water qualtiy standards for the Reservation waters, it is EPA's practice to apply adjacent or downstream standards to reservation waters. For Washington, the State water quality standards are found at Chapter 173-201A WAC. The applicable criteria are determined based on the beneficial uses of the receiving water as identified in Section III, Receiving Water, of the Fact Sheet. For any given pollutant, different uses may have different criteria. To protect all beneficial uses, the permit limits are based on the most stringent of the water quality criteria applicable to those uses.

B. Reasonable Potential Evaluation

To determine if there is "reasonable potential" to cause or contribute to any exceedances of the water quality criteria for a given pollutant, the EPA compares applicable water quality criteria to the maximum expected receiving water concentrations for a particular pollutant. If the expected receiving water concentration exceeds the criteria, there is "reasonable potential" and a water quality-based effluent limit must be included in the permit.

EPA used the recommendations in Chapter 3 of the Technical Support Document for Water Quality-based Toxics Control (TSD, EPA 1991) to conduct this "reasonable potential" analysis for the City of Toppenish Wastewater Facility. An example reasonable potential (RP) analysis for chlorine is found in Appendix D, Step 2.

The maximum expected receiving water concentration C_d is determined using the following mass balance equation.

$$C_d \times Q_d = (C_e \times Q_e) + (C_u \times Q_u) \quad \text{or}$$

$$C_d = \frac{(C_e \times Q_e) + (C_u \times Q_u)}{Q_d}$$

where,

C_d = receiving water concentration downstream of the effluent discharge
C_e = maximum projected effluent concentration
= maximum reported effluent value X reasonable potential multiplier

Q_e = maximum effluent flow
C_u = upstream concentration of pollutant
Q_d = flow downstream of the effluent discharge
= $Q_e + Q_u$
Q_u = upstream flow

Sections 1 through 4 below discuss each of the factors used in the mass balance equation to calculate C_d. Section 5 discusses the actual "reasonable potential" calculation for the city of Toppenish's discharge.

1. Effluent Concentration (C_e)

The maximum projected effluent concentration (C_e) in the mass balance equation is represented by the 99th percentile of the effluent data set, calculated using the statistical approach recommended in the TSD. The 99th percentile effluent concentration is calculated by multiplying the maximum reported effluent concentration by a reasonable potential multiplier (RPM). The reasonable potential multiplier accounts for uncertainty in the data. The multiplier decreases as the number of data points increases and variability of the data decreases. Variability is measured by the coefficient of variation (CV) of the data. When there are not enough data to reliably determine a CV, the TSD recommends using 0.6 as a default value. A partial listing of reasonable potential multipliers can be found in Table 3-1 of the TSD.

EPA evaluated the most recent City of Toppenish permit application and discharge monitoring reports *(*DMRs) from January 1998 through July 2002, to determine the maximum reported effluent concentrations. See Table C-2 in section 5, below*,* for a summary of maximum reported effluent concentrations, reasonable potential multipliers, and maximum projected effluent concentrations.

2. Effluent Flow

The effluent flow used in the equation is the facility's design flow of the facility of 1.9 mgd.

3. Upstream Concentration (C_u)

The upstream concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the City of Toppenish's discharge. For criteria that are expressed as maxima (for example, ammonia), the 95th percentile of the ambient data is generally used as an estimate of worst-case. For criteria that are expressed as minima (for example, dissolved oxygen), the 5th percentile of the ambient data is generally used as an estimate of worst-case. These percentiles were calculated for the data submitted by the City of Toppenish. Where there were no data to determine the ambient concentration, zero was used in the mass balance equation.

4. Upstream Flow

Dischargers are generally not authorized to use the entire upstream flow for dilution of their effluent. Instead, the standards contain the following considerations on mixing zones for determining compliance with chronic criteria:

No mixing zone shall be granted unless the supporting information clearly indicates the mixing zone would not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health as determined by the department.

The size of the mixing zone and the concentration of pollutants present shall be minimized.

The size of the mixing zone shall comply with the following:

- Not to extend in a downstream direction for a distance from the discharge greater than 300 feet plus depth of water over the discharge, or extend upstream for a distance of over one hundred feet.
- Not to utilize greater than 25% of the flow.
- Not occupy greater than 25% of the width of the water body.
- For the acute criteria, the mixing zone shall not utilize greater than

2.5% of the stream.

To simplify the calculations for this particular permit, 25% of stream flow for chronic criteria, and 2.5% of stream flow for acute criteria, were used in a mass-balanced equation in order to determine facility effluent limits.

5. "Reasonable Potential" Calculation

Table C-2 summarizes the data, multipliers, and criteria used to determine "reasonable potential" to exceed criteria. In Appendix D, Step 2 provides example calculations for determining the reasonable potential to exceed the criterion. The projected downstream concentration is compared to the most stringent criterion, and when the downstream concentration is larger than the most stringent criterion that parameter must have a limit. Limits have been put into the permit for, chlorine, ammonia, copper, and zinc. Section IV, below, provides a detailed discussion of the development of water quality-based effluent limitations for specific pollutants. In this situation all four parameters have a reasonable potential to exceed the criterion and must have limits.

TABLE C-2: Reasonable Potential Calculations

Parameter	Maximum Reported Effluent Concentration	CV	RPM	Maximum Projected Effluent Concentration (C_e)	Upstream Concentration (C_u)	Projected Downstream Concentrations (C_d)		Most Stringent Criterion	
						acute	chronic	acute	chronic
Chlorine, µg/l	1300	1.3	1	1300	0	1280	1120	19	11
Ammonia, µg/l	14200	0.4	1.3	24140	190	23750	20730	20100	10880
Copper, µg/l	17	0.6	3.3	56.1	6	55.3	49.0	13.0	8.9
Zinc, µg/l	370	0.6	3.3	1105.5	19	1087	951	89.8	82.0

C. Wasteload Allocation and Long Term Average Concentration Development

Once EPA has determined that a water quality-based limit is required for a pollutant, the first step in determining a permit limit is development of a wasteload allocation (WLA) for the pollutant. A WLA is the concentration (or loading) of a pollutant that

the permittee may discharge without causing or contributing to any exceedances of water quality standards in the receiving water. Waste Load Allocations can be calculated in different ways such as: based on a mixing zone; based on a WLA established as part of a TMDL; or based on meeting water quality criteria at "end-of-pipe". WLAs for this permit were calculated in two ways: based on a mixing zone for chlorine and ammonia, and based on meeting water quality criteria at "end-of-pipe" for pH, fecal coliform, and copper. Appendix D, Step 3 describes an example calculation to determine waste load allocations and long term allocations.

The following paragraphs briefly summarize the three methods for developing WLA.

1. Mixing zone-based WLA

   Water quality criteria must not be violated outside of the boundary of the mixing zone. The allowed mixing zones must not impair the integrity of the water body as a whole, allow lethality to organisms passing through, or pose any serious health risks. The Washington water quality standards state that for acute and chronic criteria, the mixing zone shall not utilize greater than 2.5% and 25% of the stream flow, respectively. The regulation also limits mixing zone dimensions upstream and downstream from the discharge point as well as limiting the percent of the width of the receiving water that is available for mixing. To simplify the calculations for this particular permit, 25% of stream flow for chronic criteria, and 2.5% of stream flow for acute criteria, were used in a mass-balanced equation in order to determine facility limits.

   The wasteload allocation (WLA) is calculated using a mass balance equation which accounts for effluent flow, available dilution, when appropriate, background concentrations and flow, and the State approved water quality criteria. When the receiving water exceeds the criterion for the pollutant or there is no authorized mixing zone for a particular pollutant then there is no dilution available for the effluent and the State adopted criterion becomes the WLA. The parameters that have a mixing zone are chlorine, ammonia, copper, and zinc.

2. "End-of-Pipe" WLA

   In some cases, there is no dilution available, either because the receiving water exceeds the criteria or because a mixing zone for a particular pollutant has not been authorized. When there is no dilution, the criterion becomes the WLA.

Establishing the criterion as the WLA ensures that the permittee does not contribute to any exceedances of the criterion. The parameters which do not have a mixing zone and are monitored at the end-of-pipe are pH and fecal coliform.

D. Permit Limit Derivation

Once the WLA has been developed, EPA applies the statistical permit limit derivation approach described in Chapter 5 of the TSD to obtain daily maximum and monthly average permit limits. This approach takes into account effluent variability (through the CV), sampling frequency, and the difference in time frames between the monthly average and daily maximum limits.

The daily maximum limit is based on the CV of the data and the probability basis, while the monthly average limit is dependent on these two variables and the monitoring frequency. As recommended in the TSD, EPA used a probability basis of 95 percent for the monthly average limit calculation and 99 percent for the daily maximum limit calculation. As with the reasonable potential calculation, when there were not enough data to calculate a CV, EPA assumed a CV of 0.6 for both monthly average and daily maximum calculations. Appendix D contains an example permit limit calculation.

The NPDES regulations at 40 CFR 122.45(d) require that permit limits for publicly owned treatment works (POTW) be expressed as average monthly limits (AMLs) and average weekly limits (AWLs) unless impracticable. Additionally, federal regulations do not prohibit a Permittee from increasing their sampling events above what is required in a NPDES permit. This is significant because a Permittee may collect as many samples as necessary during a week to bring the average of the data set below the average weekly effluent limit. In such cases, spikes of a pollutant could be masked by the increased sampling. While this is not a concern with pollutants that are not toxic, such as total suspended solids or phosphorus, it is a significant concern when toxic pollutants, such as chlorine or ammonia, are being discharged. Using a maximum daily limit will ensure that spikes do not occur, and will be protective of aquatic life. In this case, an average weekly limit is not protective of water quality standards, therefore, it is not included in the permit. The final permit contains an average monthly limit and a maximum daily limit for chlorine, ammonia, copper, and zinc.

E. Antidegradation

In addition to water quality-based limitations for pollutants that could cause or contribute to exceedances of numeric or narrative criteria, EPA considers the State's Antidegradation policy. This policy is designed to protect existing water quality when the existing quality is better than that required to meet the standard and to prevent water quality from being degraded below the standard when existing quality just meets the standard. For high quality waters, Antidegradation requires a finding that allowing lower water quality is necessary to accommodate important economic or social development before any degradation is authorized. This means that, if water quality is better than necessary to meet the water quality standards, increased permit limits can be authorized only if they do not cause degradation. Most of the limits in the draft permit are as stringent as or more stringent than those in the current permit.

The antidegradation policy of the state of Washington is stated as follows;

- Existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed.
- Whenever the natural conditions of said waters are of a lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria.
- Water quality shall be maintained and protected in waters designated as outstanding resource waters.
- Whenever waters are of a higher quality than the criteria assigned for said waters, the existing water quality shall be protected and pollution of said waters which will reduce the existing quality shall not be allowed, except in those instances where:
    - It is clear, after satisfactory public participation and intergovernmental coordination, that overriding considerations of the public interest will be served;
    - All wastes and other materials and substances discharged into said waters shall be provided with all known, available, and reasonable methods of prevention, control, and treatment by new and existing point sources before discharge. All activities which result in the pollution of waters from nonpoint sources shall be provided with all known, available, and reasonable best management practices; and
    - When the lowering of water quality in high quality waters is authorized, the lower water quality shall still be of high enough quality to fully support all existing beneficial uses.

The effluent limits in the draft permit are based on current water quality criteria or technology-based limits that have been shown to not cause or contribute to an exceedance of water quality standards. Therefore, the discharges as authorized in the draft permit will not result in degradation of the receiving water.

IV. Pollutant-specific Analysis

The following parameters have been evaluated for compliance with technology and water quality-based criteria. The more stringent criteria has been included in the draft permit when applicable.

A. Biochemical Oxygen Demand and Total Suspended Solids

Water quality-based criteria are not available for BOD_5 and TSS, therefore, the technology-based criteria for secondary treatment apply. These include a weekly average limit of 45 mg/l and a monthly average limit of 30 mg/l. The technology-based limits also require 85% removal of BOD and TSS. The removal requirements are determined using the 30-day average values of the effluent concentrations.

Federal regulations at (40 CFR § 122.45 (b) and 122.45 (f)) require BOD5 and TSS limitations to be expressed as mass-based limits using the design flow (1.9 mgd) of the facility. The loading is calculated as follows:

concentrations X design flow X conversion factor (8.34).

Using this formula, the facility's BOD5 and TSS permit limits are:

monthly average = 30 mg/l X 1.9 mgd X 8.34 = 475 lbs/day
weekly average = 45 mg/l X 1.9 mgd X 8.34 = 713 lbs/day

B. Total Ammonia (as N)

The toxicity of ammonia is dependent upon pH and temperature, and the criteria are also pH and temperature dependent. EPA calculated the total ammonia criteria using

pH and temperature values at the edge of the mixing zone. The 95th percentile temperature (16.6°C) and pH (7.6 pH) were used to represent reasonable worst-case conditions. Based on this analysis, the acute and chronic criteria for the protection of freshwater (WAC 173-201A-040) are 0.13 mg/l and 0.03 mg/l, respectively.

Average Monthly Limit	1.23 mg/l, 19.5 lbs/day
Maximum daily Limit	2.04 mg/l, 32.3lbs/day

C. Excess Nutrients

The Washington state water quality standards require that surface waters shall 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. The Drain is becoming more nutrient enriched by showing signs of algal blooms and increased turbidity. It is believed that excess nutrients, such as phosphorus and nitrogen, could be the cause of this problem. Phosphorus and nitrogen monitoring have been included in the permit to determine if a significant amount is coming from the POTW.

D. Temperature

The water quality standards require ambient water temperature of 18°C, and when natural conditions exceed 18.0°C, no temperature increases will be allowed which will raise the receiving water temperature by greater than 0.3°C.

Ambient and effluent monitoring for temperature have been incorporated into the draft permit, to determine if effluent limits for temperature may be necessary in the future.

E. Fecal Coliform

The water quality standards for the State of Washington require the fecal coliform organism levels in class A waters to not exceed a geometric mean value of 100 colonies/100ml, and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100ml.

Fecal coliform bacteria data were collected on a monthly basis in 1994 by the Yakama

Nation upstream and downstream from the facility. Very high levels of fecal coliform were detected and, as the result of these high values, there is no ability for the receiving water to dilute effluent discharge to the water quality standards. Therefore, the water quality standard for fecal coliform for class A waters was incorporated into the current permit and will continue to be the same in the draft permit as an end-of-pipe effluent limit for the facility.

F. Total Residual Chlorine

The acute and chronic water quality criteria for total residual chlorine for protection of aquatic life (WAC 173-201A-040) are 19 µg/L and 11 µg/L, respectively.

It is determined that there is a reasonable potential to exceed the water quality criteria for total chlorine. Therefore, limits are necessary in the draft permit to ensure that the discharge will not exceed water quality standards.

The draft permit contains total residual chlorine limits of 2 and 9 µg/l, as monthly average and maximum daily limits, respectively. See Appendix D for the calculations.

Average Monthly Limit	2.0 µg/l, 0.03 lbs/day
Maximum Daily Limit	9.0 µg/l, 0.14 lbs/day

G. pH

In addition to limits on BOD_5 and TSS, 40 CFR 133.102 requires that effluent pH be within the range of 6.0 to 9.0 s.u. for POTWs. Also, the State water quality standards for protection of class A waters (WAC 1373-201A-040) requires pH to be between 6.5 to 8.5 standard units. Therefore, the minimum and maximum ranges in the draft permit are water quality-based 6.5 to 8.5 s.u.

H. Metals (Copper and Zinc)

During the 1990 the Department of Ecology inspection an effluent sample was analyzed for the presence of metals. The following metals were detected:

Table 3. Effluent Metals Analysis	
Metal	Effluent (mg/L)
Antimony	.001
Arsenic	.004
Copper	.019
Lead	.003
Mercury	.0004
Selenium	.002
Zinc	.087
Note: Total recoverable metals analysis except mercury, which is a total metal analysis.	

Copper, present in the effluent at 19 ug/L, exceeded the acute (13.4 ug/L) and chronic (9.2 ug/L) criteria for freshwater calculated using the 5th percentile of four hardness measurements made in the Toppenish Drain. Lead, mercury, and zinc were measured at levels exceeding chronic criteria.

The only effluent data for metals is the single sample collected during the Ecology inspection and there is no instream metals data. Determining a reasonable potential for exceedance is difficult with one data point using a statistically based methodology. Due to lack of both effluent and ambient metal data and the difficulty in determining the reasonable potential, the current permit did not have effluent limits for metals; rather, additional monitoring requirements were established. Also affecting the decision not to write metals limits at that time was the fact that there is no known industrial contributor to the sewage wastewater treatment plant. The purpose of additional metals monitoring was to develop a statistically stronger data base in order to better understand the metals character of the effluent.

The City has monitored its effluent for antimony, arsenic, copper, lead, mercury, selenium, and zinc within the past five years. A reasonable potential analysis was performed using the data collected by the City to determine if the effluent had the

potential to cause or contribute to an exceedance of the allowable metals criteria in the Toppenish Drain. Antimony, arsenic, lead, and selenium were determined to be non-detectable, because of method detection limits that were too high. [Only mercury had an acceptable method detection limit, and it was determined that mercury was not detected in the effluent or the receiving water, so there is no further need to monitor for mercury at this time.] This permit will repeat the requirement for the metals monitoring except mercury, and includes what method detection limits must be used.

Water-quality based effluent limits have been developed for copper and zinc because they had the reasonable potential to violate the water quality criteria. The 5th percentile effluent and ambient hardness was used to determine the effluent limits, consistent with Region 10's policy.

Copper:		
Average Monthly Limit	6.5 µg/l	0.10 lbs/day
Maximum Daily Limit	9.4 µg/l	0.15 lbs/day
Zinc:		
Average Monthly Limit	45.9µg/l	0.73 lbs/day
Maximum Daily Limit	91.1 µg/l	1.44 lbs/day

APPENDIX D - SAMPLE EFFLUENT LIMITATION CALCULATIONS

NPDES Permit Limit Calculation for Chlorine

Step 1: Determine the appropriate criteria

1A. Determine the uses

The Toppenish Drain is protected for the following uses: water supply (domestic, industrial, and agricultural) stock watering, fish and shellfish, wildlife habitat, recreation, and commerce and navigation.

1B. Determine the most stringent criterion to protect the uses

The most stringent criterion associated with these uses is for the protection of fish and shellfish. The acute and chronic criteria for total chlorine residual are 19µg/l as a one-hour average and 11µg/l as a four-day average, respectively.

Step 2: Determine whether there is "reasonable potential" to exceed the criteria

2A. Determine the "reasonable potential" multiplier

The "reasonable potential" multiplier is based on the coefficient of variation (CV) of the data and the number of data points. Where there are fewer than 10 data points to calculate a CV, the TSD recommends using 0.6 as a default value. In this case, there were 1203 data points, and the CV of the data set is 1.3. Using the equations in section 3.3.2. of the TSD, the "reasonable potential" multiplier (RPM) is calculated as follows:

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

where,

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

$$p_n = (1-0.99)^{1/1203}$$
$$p_n = 0.99$$

This means that the largest value in the data set of 1203 data points is greater than the 99th percentile.

This brings the ratio to 99th/99th which equals 1. Therefore, the ratio and the RPM are equal to 1. In other cases when fewer data points are available the ratio of the 99th percentile to the Xth percentile is calculated, based on the equation:

$$C_p = \exp(z\sigma - 0.5\sigma^2)$$

where,

$\sigma^2 = \ln(CV^2 + 1)$

CV = coefficient of variation

z = normal distribution value
= 2.33 for the 99th percentile
= x for the xth percentile

$$C_{99} = \exp(2.33*0.995 - 0.5* \ln(CV^2 + 1))$$

$$C_x = \exp(x*0.995 - 0.5* \ln(CV^2 + 1))$$

$$RPM = C_{99}/C_x$$

2B. Calculate the concentration of the pollutant at the edge of the mixing zone

There is reasonable potential to exceed criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated from the following equation:

$$C_d = \frac{(C_e * Q_e) + (C_u * (Q_u * \%MZ))}{Q_e + (Q_u * \%MZ)}$$

where,

C_d = receiving water concentration at the edge of the mixing zone
C_e = maximum projected effluent concentration
= maximum reported effluent concentration * reasonable potential multiplier

(1.3 mg/l *1= 1.3 mg/l)

Q_e = maximum effluent flow (1.9mgd)

C_u = upstream concentration of pollutant (0 mg/l)

Q_u = upstream flow 1.26 mgd for acute and chronic

%MZ = % of upstream flow allowed for mixing zone (2.5% for acute and 25% for chronic)

For the acute criterion, use the acute flow

$$C_d = \frac{(1.3*1.9) + (0*1.26*2.5\%)}{1.9 + (1.26*2.5\%)}$$

C_d = 1.28 mg/l

For the chronic criterion, use the chronic flow

$$C_d = \frac{(1.3*1.9) + (0*1.26*25\%)}{1.9 + (1.26*25\%)}$$

C_d = 1.12 mg/l

The projected chlorine concentrations at the edges of the acute and chronic mixing zones are greater than the criteria, therefore a limit must be included in the permit.

Step 3: Calculate the wasteload allocations

Wasteload allocations (WLAs) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the acute or chronic criteria and C_e is replaced by the acute or chronic WLA. The equation is rearranged to solve for the WLA, becoming:

$$WLA_a = \frac{(C_d Q_u * \%MZ) + (C_d * Q_e) - (Q_u * C_u * \%MZ)}{Q_e}$$

For the acute criterion

$$WLA_a = \frac{(0.019*0.0315) + (0.019*1.9) - (0*1.26*2.5\%)}{1.9}$$

$\mathbf{WLA_a}$ **= 0.019 mg/l**

For the chronic criterion

$$WLA_c = \frac{(0.011*0.315) + (0.011*1.9) - (0*1.26*25\%)}{1.9}$$

$\mathbf{WLA_c}$ **= 0.013 mg/l**

The WLAs are converted to long-term average concentrations, using the following equations from EPA's Technical Support Document for Water Quality-based Toxics Control (TSD):

$$LTA_a = WLA_a * \exp[0.5\sigma^2 - z\sigma]$$

$$LTA_c = WLA_c * \exp[0.5\sigma_4^2 - z\sigma_4]$$

where,

σ^2 = $\ln(CV^2 + 1)$
= 0.990
σ_4^2 = $\ln(CV^2/4 + 1)$
= 0.352
z = 2.33 for 99th percentile probability basis

LTA_a = 0.019 * exp[0.5 * 0.990 - 2.33 *0.995]

$\mathbf{LTA_a}$ **= 0.003 mg/l**

LTA_c = 0.013 * exp[0.5 * 0.352 - 2.33 * 0.995]

$\mathbf{LTA_c}$ **= 0.0015 mg/l**

The LTAs are compared and the most stringent is used to develop the daily maximum and monthly average permit limits. In this case, the chronic LTA is the most stringent.

Step 4: Derive the maximum daily (MDL) and average monthly (AML) permit limits

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

$$MDL = LTA_c * \exp[z\sigma - 0.5\sigma^2]$$

where:

σ^2 = $\ln(CV^2 + 1)$
= 0.990
z = 2.33 for 99th percentile probability basis
CV = coefficient of variation

$$MDL = 0.0015 * \exp[2.33 * 0.995 - 0.5 * 0.990]$$

MDL= 0.009 mg/l

$$AML = LTA_c * \exp[z\sigma - 0.5\sigma^2]$$

where:

σ^2 = $\ln(CV^2/n + 1)$
= 0.055
z = 1.65 for 95th percentile probability basis
CV = coefficient of variation 1.3
n = number of sampling events required per month (30)

$$AML = 0.0015 * \exp[1.65 * 0.234 - 0.5 * 0.055]$$

AML= 0.002 mg/l

The following table is a summary of calculated limits for the parameters of ammonia, copper, and zinc. Each was calculated the same as the limit for chlorine. The reasonable potential values are in Table C-2.

Table D-1 Summary of Permit Limit Derivation for Outfall 001 at Toppenish Drain							
Parameter µg/l	Wasteload Allocation (WLA)		Long Term Average (LTA)		Effluent Limits		
	Acute WLA	Chronic WLA	Acute LTA	Chronic LTA	Basis	maximum daily limit (MDL)	average monthly limit (AML)
Chlorine	19.0	13.0	3.0	1.5	chronic	9.0	2.0
Ammonia	2040	2310	890	1470	acute	2040	1230
Copper	13.11	9.4	4.24	3.04	chronic	9.4	6.5
Zinc	91.0	92.3	29.5	48.6	acute	91.1	45.9

APPENDIX E - ENDANGERED SPECIES ACT

As discussed in Section VII. A. of this Fact Sheet, Section 7 of the Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife (USFWS) regarding potential affects a federal action may have on threatened and endangered species.

I. Threatened and Endangered Species

According to a letter from the USFWS, the following federally-listed species are in the vicinity of the discharge:

Endangered Species:

none

Threatened species:

Bald eagle (*Haliaeetus leucocephalus*)
Bull Trout (*Salvelinus confluentus*)
Steelhead *(Oncorhynchus mykiss)*
Ute ladies'-tresses (*Spiranthes diluvialis*)

II. Potential Effects for Species

A. Bald eagle (*Haliaeetus leucocephalus*) - Threatened

Bald eagles begin to appear at wintering sites in early November and concentrate at locations with open water during the colder months when smaller or slower moving waterbodies freeze (Spahr 1990). Diet includes fish species, mule deer, ground squirrels, rabbits, waterfowl, and other small mammals (Sphar 1990). Consumption of fish relative to other species declines in the colder months as water bodies freeze. Water quality could potentially affect bald eagles through four avenues: prey displacement or quantitative decline, prey mortality, bioaccumulation in prey, or direct consumption. One of the general recommendations for augmenting bald eagle populations is to reduce mortality through exposure to contaminants.

The bald eagle historically ranged throughout North America except for extreme northern

Alaska and Canada and central and southern Mexico. A significant population of bald eagles winters in Washington, and some are presumed to remain in the state year round.

As discussed above, the primary threats to bald eagles are prey displacement or mortality, bioaccumulation of contaminants through prey species, or direct exposure to contaminants. Reissuance of the NPDES permit for the City of Toppenish for its domestic wastewater treatment plant discharge would not affect prey availability/distribution. Additionally, it would not result in a potential increase of toxic compounds in prey species or an increase in the potential for direct exposure to toxics. The facility discharges only domestic waste. The proposed permit requires monitoring for potentially harmful contaminants, hence, it is not expected that reissuance of the wastewater discharge permit to the City of Toppenish Wastewater Treatment Plant (WWTP) would affect the bald eagle.

B. Bull Trout (Salvelinus confluentus) - Threatened

The bull trout is a member of the char subgroup of the family Salmonidae. Bull trout population are known to exhibit two distinct life history forms: 1) resident bull trout that spend their entire life cycle in the same (or near) streams in which they were hatched, and 2) migratory bull trout which can exhibit either a fluvial life history - spawning in tributary streams where the young rear from one to four years before migrating to a river, or an adfluvial form - spawning in tributary streams where the young rear before migrating to a lake (Farley and Shepard 1989).

Bull trout generally mature at between 5 and 7 years of age (Farley and Shepard 1989; Goetz 1989; Leathe and Enk 1985). Spawning occurs from August through November (Armstrong and Murrow 1980; Brown 1994; McPhail and Murray 1979). Embryos incubate over winter and hatch in late winter or early spring (Weaver and White 1985). Emergence has been observed over a relatively short period of time after a peak in stream discharge from early April through May (Rieman and McIntyre 1993).

In-stream habitat requirements make bull trout exceptionally sensitive to activities which directly or indirectly affect stream channel integrity and natural flow patterns, including groundwater flow. Stream flow, bed load movement, and channel instability influence the survival of juvenile bull trout (Weaver 1985; Goetz 1989). The presence of fine sediments reduces pool depth, alters substrate composition, reduces interstitial spaces in substrate, and causes channel braiding, all of which can negatively impact the survival of bull trout

eggs and fry. Cover, such as large woody debris, undercut banks, boulders, pools, side margins, and beaver ponds, is heavily utilized by all life stages of bull trout for rearing, foraging and resting habitat, as well as for protection from predators (USFWS) 1998a). Bull trout prefer cold water, and temperatures in excess of 15°C are considered to limit their distribution (Rieman and McIntyre 1993). USACE (1999) suggested that water temperature in fact influences bull trout distribution more than any other habitat factor. Finally, migration corridors are important for sustaining bull trout populations, allowing for gene flow and connecting wintering areas to summer/foraging habitat (Rieman and Mcintyre 1993).

The bull trout is threatened by habitat degradation (e.g. land management activities with negative impacts on water quality or spawning habitat); passage restrictions, mortality, or entrapment at dams; and competition from non-native lake and brook trout (USFWS 1998b). According to USACE (1999), bull trout populations are likely affected by dam operation, as well as augmentation (i.e., spill) used to mitigate effects on salmon migration by increasing fish passage efficiency. Bull trout growth, survival and long-term population persistence are correlated with stream habitat conditions such as cover, channel stability, substrate composition, temperature, and migratory corridors (Rieman and McIntyre 1993). These habitat features are often impaired as the result of land management activities such as forest harvest, road building, hydropower development, irrigation diversions, and grazing. Mining has altered stream channel morphology, increased sediment transport and deposition, decreased vegetative cover, and contributed to acidic water discharge and heavy metal water pollution (Chapman et al. 1991).

Reissuance of this NPDES permit to the City of Toppenish WWTP would not affect bull trout. As discussed above, the primary threats to bull trout are changes in water temperature and habitat degradation. Reissuance of the City of Toppenish NPDES permit would not lead to increased habitat degradation. In addition, the facility will be required to monitor for temperature in both its effluent and downstream of the discharge. Therefore, reissuance of the permit would not affect bull trout.

C. Steelhead (*Oncorhynchus mykiss*) - Threatened

Steelhead have the most complex life histories of any Pacific salmon species. These fish have variable run timing and degree of anadromy and are capable of more than one spawning cycle. Inland steelhead of the Middle Columbia River Basin are 'stream-maturing' as they enter freshwater in a sexually immature state and require several months in freshwater before they mature then spawn. These stream maturing fish are referred to as 'summer run' based on the time that they enter freshwater. Summer steelhead of the Columbia River

subbasin have generally one potential run timing, which is the A-run. The A-run enters freshwater from June to August. A-run fish have generally spent one year in the ocean.

Steelhead can have various life histories in terms of the degree of anadromy. The anadromous form that migrates between the ocean and freshwater are termed 'steelhead', while the non-anadromous or 'resident' form does not migrate and is called 'rainbow trout'. Like steelhead, rainbow trout spawn in winter/spring and emerge in spring/early summer. In inland *O. mykiss* populations, including the Middle Columbia River basin, both anadromous and non-anadromous forms commonly co-occur. Nonanadromous *O. mykiss* of the inland type are often called Columbia River redband trout. Although both the anadromous and non-anadromous forms are classified as the same species taxonomically, the relationship of the two forms in a given area is typically unclear. The migratory and resident forms of this species may be ecophenotypes within a common gene pool or they may be distinct due to reproductive isolation (Zimmerman and Reeves 2000).

The primary factors that have affected Steelhead populations are dam construction (which restricts the ability of individuals to reach their spawning areas); and habitat loss and degradation due to human activities such as land development, logging, mining, and agriculture.

The Steelhead salmon has been listed as threatened in the *Middle Columbia River* basin. However, reissuance of the wastewater discharge permit to the City of Toppenish WWTP would not affect Steelhead. As discussed above, the primary threats to Steelhead are dams and habitat degradation. Reissuance of the NPDES permit to the City of Toppenish WWTP would not lead to increased dam construction or habitat degradation. Therefore, reissuance of this permit would not affect Steelhead.

D. Ute ladies' - tresses (*Spiranthes diluvialis*) - Threatened

Ute ladies' - tresses is a perennial terrestrial orchid (family Orchidaceae). This species generally inhabits riverbanks where inundation occurs infrequently (Sheviak 1984). Ute ladies' tresses is endemic to moist soils in mesic or wet meadows near springs, lakes, and perennial streams. The elevation range of known occurrences is 4,000 to 7,000 feet. Generally, this species occurs in areas where the vegetation is relatively open (e.g., grass and forb dominated sites), but some populations are found in riparian woodlands. This orchid is found in several areas of the interior western United States. This species has only recently been recorded on a few sites in central Washington, where it can occur at relatively low elevations (down to roughly 700 feet in Chelan County).

Urban development and watershed alterations in riparian and wetland habitat adversely affect this plant. It may also be threatened by invasions of exotic plant species such as purple loosestrife, whitetop and reed canary grass.

Reissuance of the NPDES permit to the City of Toppenish Wastewater Treatment Plant would not cause an increase in any of the identified threats to the Ute ladies' - tresses. Therefore, reissuance of this permit would not have an affect on this species.

APPENDIX F - ESSENTIAL FISH HABITAT ASSESSMENT

Essential fish habitat (EFH) is defined as 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 EPA to consult with the National Marine Fisheries Service (NMFS) when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. The EPA has tentatively determined that the issuance of this permit will not affect any EFH species in the vicinity of the discharge, therefore no consultation is required. This fact sheet and the draft permit will be submitted to NMFS for review during the public notice period. Any recommendations received from NMFS regarding EFH will be considered prior to final issuance of this permit.

The NMFS has requested that EFH assessments contain the following requirements:

1. **Species in the Facility Area** The NMFS recommended the following websites for specific EFH information relating to the project area:
   - http://www.nwr.noaa.gov/1habcon/habweb/msa.htm/

   The Habitat Assessment Reports indicated that the Toppenish Drain has not been designated to support any species for EFH.

2. **Facility Description and Discharge Location**. The facility activities and wastewater sources are described in Part II of this Fact Sheet, and the discharge location is described in Part III.

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

   a. The proposed permit has been developed in accordance with the Washington water quality standards to protect aquatic life species in the Drain. The NPDES permits are established to protect water quality in accordance with State water quality standards. The standards are developed to protect the designated uses of the waterbody, including growth and propagation of aquatic life and wildlife. Self-monitoring conducted by the applicant indicates that the facility will be able to comply with all limits of the proposed permit.

   b. The derivation of permit limits and monitoring requirements for an NPDES discharger include the basic elements of ecological risk analysis as specified in the TSD (EPA, 1991). This analysis includes, but is not limited to, the

following: effluent characterization, pollutants of concern identification, threshold concentration determination, exposure considerations, dilution modeling and analysis, multiple sources and natural background consideration, fate and transport variability, and monitoring duration and frequency.