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)

Town of Harrah
Wastewater Treatment Plant

EPA Proposes To Reissue NPDES Permit
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 EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, 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, 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 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

Harrah Public Library
21 East Pioneer
Harrah, WA 98933
(509) 848-3458

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
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
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
TKN	Total Kjeldahl Nitrogen
TRC	Total Residual Chlorine
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
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:

Town of Harrah
Wastewater Treatment Plant
NPDES Permit # WA0022705

Physical Address:
8761 Branch Road
Harrah, WA 98933

Mailing Address:
P.O. Box 10
Harrah, WA 98933

Contact: Garry Decker, Director of Public Works

B. Permit History

The most recent NPDES permit for the Town of Harrah Wastewater Treatment Plant (WWTP) was issued on August 1, 2006, became effective on October 1, 2006, and expired on September 30, 2011. An NPDES application for permit issuance was submitted by the permittee on January 18, 2011. EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6, the permit has been administratively extended and remains fully effective and enforceable. The first NPDES permit was issued to this facility in 1974.

II. Facility Information

A. Treatment Plant Description

The Town of Harrah owns, operates, and maintains a wastewater treatment plant (WWTP) located in Harrah, Washington, which is in Yakima County, within the boundaries of the Yakama Reservation. The facility uses a 3-cell aerated lagoon to provide equivalent-to-secondary treatment to municipal wastewater. The effluent is discharged to the Harrah Drain. The collection system has no combined sewers and no categorical or significant industrial users. The facility serves a resident population of about 630. The design flow of the facility is 0.055 mgd (55,000 gallons per day). The average actual flow measured between October 2006 and February 2012 is 0.036 mgd. A map showing the location of the treatment facility and discharge is included in Appendix A.

III. Receiving Water

This facility discharges to the Harrah Drain near Branch Road. The Harrah Drain flows into Marion Drain which is a tributary to the Yakima River.

A. Low Flow Conditions

The Harrah Drain is generally dry upstream of the discharge during the non-irrigation season (see the 2006 Fact Sheet at Page 7). Available flow data for the Harrah Drain collected by the permittee and the USGS indicate that the Harrah Drain flows between March and November. EPA will assume that the upstream flow rate from December through February is zero.

The *Technical Support Document for Water Quality-Based Toxics Control* (hereinafter 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. Because the chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years, EPA uses the 30B3 for the chronic ammonia criterion instead of the 7Q10. The 30B3 is a biologically-based flow rate designed to ensure an excursion frequency of no more than once every three years for a 30-day average flow rate. 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).

For the Harrah Drain, there are not enough flow data available to calculate the 1Q10, 7Q10, 30B3, or 30Q5, for March - November. EPA has therefore used the minimum measured flow rate in the Harrah Drain, which is 3 CFS, in place of the 1Q10, 7Q10, and 30B3, for March - November. The harmonic mean flow rate for March – November, calculated from 13 measurements taken by the permittee and USGS, is 8.73 CFS.

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, 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, water quality standards 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 Town of Harrah WWTP and the Harrah Drain are within the boundaries of the Yakama reservation in south central Washington. Waters of the State of Washington (i.e., the Yakima River) are 23 miles downstream from the discharge. The State of Washington has EPA-approved water quality standards; 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 water quality standards are not directly applicable within the Tribal reservation.

The regulation 40 CFR 122.4(d) does, however, prohibit EPA from issuing a permit when the "imposition of conditions cannot ensure compliance with the applicable water quality requirement of all affected States," including downstream States. The closest downstream waterbody that is waters of the State of Washington is the Yakima River. Because the design flow of the treatment plant is only 0.36% of the harmonic mean flow of Marion Drain near its mouth,[1] and the Yakima River is about 23 miles downstream of the discharge, the permitted discharge is not likely to affect the quality of waters of the State of Washington.

Yakama Nation Tribal Water Quality Standards

Section 518 of the CWA allows the Administrator of EPA to treat a Tribe in the same manner as a State (i.e., "treatment as a State" (TAS)) for purposes of various Clean Water Act provisions (e.g., implementing the water quality standards program, and developing water quality standards for CWA purposes) provided that the Tribe meets certain eligibility criteria.

The Yakama Nation submitted an application for TAS in 1994. However, EPA is awaiting additional information from the Yakama Nation before it can approve the TAS application. In November 2005, the Yakama Nation adopted the Yakama Nation Water Quality Standards (WQS). Since the Yakama Nation does not have TAS status, however, there are no EPA-approved water quality standards for Clean Water Act permitting purposes on the Yakama Nation reservation.

In 1993, 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 EPA's position on NPDES permitting on tribal lands. This memo states that EPA Regions should work with Tribes who have adopted water quality standards not yet approved by EPA to ensure that, to the extent practicable, NPDES permits issued on the reservation achieve compliance with those water quality standards. In addition, the memo states that "[u]ntil a Tribe is authorized under Section 303 [i.e., has TAS], EPA is the certification authority" pursuant to 40 CFR 121.21(b) which requires that EPA issue the 401 certification where water quality standards have been established but there is no State or interstate agency who has the authority to issue the certification (see also 40 CFR 121.1(e)).

Given the EPA guidance memo as well as the regulatory and statutory provisions discussed above, EPA believes it is appropriate to consider the Yakama Nation water quality standards when determining the applicable designated uses and criteria for Harrah Drain as long as the water quality standards are consistent with Section 303 of the CWA, as well as EPA's implementing regulations at 40 CFR 131, and they are protective of downstream waters (i.e., waters of the State of Washington). Because the Yakama Nation's WQS are generally as stringent as or more stringent than the Washington WQS, the permit conditions will also ensure compliance with Washington's WQS.

[1] The harmonic mean of Marion Drain at its mouth is 24 CFS, based on 22 measurements taken at USGS Stations 12505500 and 12505510 between 1981 and 2006.

Designated Uses for Harrah Drain

The Yakama Nation's water quality standards 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." Harrah Drain is one of the irrigation waters that are specifically classified. The Yakama WQS state that:

> *"Marion Drain and Harrah Drain are man-made waterways, associated with the Wapato Irrigation Project. However, they have become colonized by salmonids, including anadromous salmonids. Therefore, standards must recognize the purpose of these waterbodies for irrigation drainage and water supply while providing some measure of protection for the salmonids' use. For purposes of this Title, these waters will be considered as Class III with the following temperature variance: During the irrigation season, Temperature shall not exceed a seven-day average daily maximum of 18º C, with no single daily maximum over 20º C (68°F). When irrigation is not occurring, the regular temperature standard for Class III waters shall apply" (WQS Section 20.1.5.3.1.7).*

Class III waters are protected for the following designated uses: cultural and religious uses, anadromous and resident fish migration, spawning and rearing for those species historically found in these waters, support of aquatic life dependent upon the water quality criteria, wildlife habitat, recreation, ground water recharge, agricultural water supply, livestock watering, and industrial water supply (WQS Section 20.1.5.1).

Applicable Water Quality Criteria

The designated uses with the most protective water quality criteria in the Yakama Nation Water Quality Standards are anadromous spawning, rearing and migration, and cultural and religious uses. The water quality criteria associated with these designated uses will also be protective of the other applicable designated uses (e.g., aquatic life, wildlife habitat, etc).

Antidegradation

Overview

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 water quality standards, including antidegradation requirements.

The Yakama Nation's antidegradation policy (Section 14 of the WQS) is divided into three tiers of protection:

Tier I: Existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. Where designated uses of the waterbody are impaired, there shall be no further lowering of the water quality with respect to the pollutant or pollutants which are causing the impairment (WQS Section 14.1.2).

Tier II: Where, for any parameter, the water quality exceeds that level necessary to support the designated uses, the propagation of fish and wildlife, recreation in and on the waters, and

cultural uses, that water shall be considered of high quality for that parameter and that quality shall be maintained and protected unless the Yakama Nation finds that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation, the Department shall assure water quality adequate to fully protect existing uses and designated uses. Further, the Department shall assure that there shall be achieved the highest regulatory requirements for all new and existing point sources and all approved and applicable best management practices for nonpoint source pollution controls (WQS Section 14.1.3).

Tier III: Where high quality waters constitute an Outstanding Resource Water as designated in Section 22, that water quality shall be maintained and protected. To accomplish this, the Department may require water quality controls, maintenance of natural regimes, protection of instream habitat, and pursuit of land use practices protective of the watershed (WQS Section 14.1.4).

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 40 CFR 131.12(a)(1) and WQS section 14.1.2. In addition, relative to the prior permit issued in 2006, 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 40 CFR 131.12(a)(2) and WQS section 14.1.3.

The antidegradation policy for outstanding resource waters is not applicable in this reissued permit because Yakama Nation has not designated Harrah Drain as an "outstanding resource water" (WQS Section 14.1.4).

The draft reissued permit ensures compliance with the Yakama Nation'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. Under the circumstances of this draft reissued permit, EPA may issue an NPDES permit even though the Yakama Nation has not yet identified methods for implementing its antidegradation policy. In its antidegradation analysis below, EPA is applying a parameter-by-parameter approach in determining compliance with Yakama Nation's antidegradation requirements.

EPA Antidegradation Analysis

Protection of Existing Uses or Tier I (WQS Section 14.1.2 and 40 CFR 131.12(a)(1))

Harrah Drain, which receives the Town of Harrah's discharge, is an irrigation drain that is a tributary to the Yakima River via Marion Drain. The WQS designate Harrah Drain as a Class III waterbody, with a site-specific temperature criterion (WQS section 20.1.5.3.1.7). Class III waters are protected for the following designated uses: cultural and religious uses, anadromous and resident fish migration, spawning and rearing for those species historically found in these waters, support of aquatic life dependent upon the water quality criteria, wildlife habitat, recreation, ground water recharge, agricultural water supply, livestock watering, and industrial water supply (WQS Section 20.1.5.1).

The effluent limits in the draft reissued permit ensure compliance with 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 Harrah 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 section 14.1.2 of the WQS 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 EPA receives information during the public comment period demonstrating that there are existing uses in the Harrah Drain other than those that are designated, 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 (WQS Section 14.1.3 and 40 CFR 131.12(a)(2))

For any parameter for which the water quality exceeds that level necessary to support the designated uses, the propagation of fish and wildlife, recreation in and on the waters, and cultural uses, that water shall be considered of high quality for that parameter and that quality shall be maintained and protected unless the Yakama Nation finds that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located (WQS section 14.1.3, 40 CFR 131.12(a)(2)).

With the exception of fecal coliform and the upper pH limit from March – November, all of the effluent limits in the reissued permit are as stringent as or more stringent than the corresponding limits in the prior (2006) permit. Because the limits are as stringent as or more stringent than the corresponding limits in the prior permit, the reissued permit will not allow lower water quality for pollutants that were limited in the prior permit. As explained below, the revised pH limits and the replacement of the fecal coliform limits with E. coli limits will not allow lower water quality.

Unlike the State of Washington, the Yakama Nation has not identified implementation methods for its antidegradation policy that define how an antidegradation evaluation should be performed. To ensure consistency with other permits issued in the State of Washington, EPA has used the State of Washington's implementation methods as guidance when interpreting the Yakama Nation's Tier II antidegradation policy. The State of Washington requires an analysis to determine if allowing lower water quality is necessary for important economic and social development in the area in which the waters are located when an action has the potential to cause a measurable change in the physical, chemical, or biological quality of a waterbody (WAC 173-201A-320(3)). The State of Washington defines a measurable change in pH to be a change of 0.1 standard units or greater (WAC 173-201A-320(3)(d)). EPA has determined that the change in the upper pH limit from 8.5 to 9.0 standard units, from March – November, will increase the receiving water pH by 0.03 standard units under critical conditions (see Appendix E). Because this change is not measurable, it does not constitute a lowering of water quality and it is not necessary for the Yakama Nation to make a finding that allowing lower water quality is necessary for important economic and social development.

The draft permit, like the previous permit, includes effluent limits for bacteria, in order to protect contact recreation beneficial uses in the receiving water. The prior permit included effluent limits for fecal coliform, which were based on the State of Washington's water quality standards (see the 2006 fact sheet at pages 9 and C-6). The Yakama Nation has adopted water quality criteria for E. coli. The new effluent limits simply use the indicator

organism currently specified in the Yakama water quality standards (E. coli). E. coli is a better indicator of bacteria levels that may cause gastro-intestinal distress in swimmers, and the new E. coli limits provide the same level of protection for the beneficial use of primary contact recreation as was provided by the fecal coliform effluent limits in the previous permit. Therefore, the change from fecal coliform limits to E. coli limits will not allow lower water quality relative to the 2006 permit.

The prior permit did not contain effluent limits for ammonia. Based on data collected during the term of the prior permit, ammonia is present in the discharge in amounts which have the reasonable potential to cause or contribute to excursions above the Yakama Nation's WQS; therefore, the reissued permit includes effluent limits for ammonia (40 CFR 122.44(d)(1)(i – iii). The new effluent limits for ammonia will not allow lower water quality relative to the prior permit because the new limits will require a reduction in effluent ammonia concentrations and loads relative to current levels.

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. 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 Yakama Nation water quality standards 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 for fecal coliform and pH however, as explained above, the fecal coliform limits have been replaced with E. coli limits that do not allow lower water quality, and the change to the pH effluent limits will not measurably change the water quality in Harrah Drain. The reissuance of the Town of Harrah NPDES permit will therefore not allow lower water quality relative to the prior permit, in compliance with Yakama Nation Section 14 and 40 CFR 131.12(a)(2).

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 water quality standards 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 B, C, and D.

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 35 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.

Table 2 (below) presents the proposed average monthly, average weekly, and maximum daily effluent limits.

Table 2: Proposed Effluent Limits

Parameter	Units	Effluent Limits		
		Average Monthly Limit	**Average Weekly Limit**	**Maximum Daily Limit**
Flow	mgd	0.055	0.083	—
Five-Day Biochemical Oxygen Demand (BOD_5)	mg/L	39	59	—
	lb/day	18	27	—
	% removal	65% (min.)	—	—
Total Suspended Solids (TSS)	mg/L	70	92	—
	lb/day	32	42	—
	% removal	65% (min.)	—	—
pH March – November	s.u.	6.3 to 9.0 at all times		
pH December – February	s.u.	6.5 to 8.5 at all times		
E. coli	#/100 ml	100 (geometric mean)	—	200
Total Residual Chlorine[1]	µg/L	8	—	18
	gram/day	1.7	—	3.7
Total Ammonia as N[2] March – November	mg/L	1.93	—	4.83
	lb/day	0.885	—	2.22
Total Ammonia as N[2] December – February	mg/L	1.82	—	4.54
	lb/day	0.835	—	2.08

Notes:
1. The effluent limits for total residual chlorine are not quantifiable using EPA-approved methods. EPA will use the minimum level (ML), 50µg/L, as the compliance evaluation level for this parameter. The permittee will be compliant with the total residual chlorine limitations if the average monthly and maximum daily chlorine concentrations are less than 50 µg/L and the average monthly and maximum daily mass discharges of chlorine are less than 10.4 grams/day.
2. The ammonia limits are subject to a schedule of compliance and do not take effect until four years and 11 months after the effective date of the final permit.

C. Basis for Deleting Fecal Coliform Limits and Less Stringent pH Limits

Statutory Prohibitions on Backsliding

Section 402(o) of the 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 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 water quality standards or effluent limit guidelines.

Fecal Coliform

The draft permit proposes to replace the fecal coliform limits in the previous permit with E. coli limits. Because the change from fecal coliform limits to E. coli limits will not allow lower water quality relative to the 2006 permit, this change is consistent with the Yakama Nation's antidegradation policy (Yakama WQS Section 14). Since the revised effluent limits are consistent with the Yakama Nation's antidegradation policy, the limits also comply with the anti-backsliding provisions of the Clean Water Act (Section 303(d)(4)(B)).

Moreover, the E. coli limits apply current water quality criteria at the end-of-pipe, thus, the effluent limits are derived from and comply with water quality standards for E. coli. Further, the secondary treatment technology-based effluent limits do not include effluent limits for bacteria. Therefore, since the effluent limits will continue to ensure that water quality standards are met and do not violate the secondary treatment effluent limits, the revised limits comply with Section 402(o)(3) of the CWA.

pH (March – November)

The 2006 permit for the Town of Harrah required monitoring of the alkalinity of both the effluent and the receiving water. This monitoring allowed EPA to determine the effect of the discharge on the pH of the receiving water.

EPA determined that, from March – November, the facility could discharge at the technology-based upper pH limit of 40 CFR 133.102(c), which is 9.0 standard units (instead of 8.5 standard units, as required by the prior permit), and still meet the Yakama Nation's water quality standards for pH (WQS Section 20.1.5.2.4). Furthermore, the change to the

upper pH limit will result in an increase in the receiving water pH of only 0.03 standard units under critical conditions (see Appendix E). This change in pH is not measurable and therefore does not constitute a lowering of water quality. Because the change in the pH limit will not allow lower water quality relative to the 2006 permit, this change is consistent with the Yakama Nation's antidegradation policy (Yakama WQS Section 14). Because the revised effluent limits are consistent with the Yakama Nation's antidegradation policy, the limits also comply with the anti-backsliding provisions of the Clean Water Act (Section 303(d)(4)(B)).

Moreover, the revised pH limits are at least as stringent as the secondary treatment requirements for pH (40 CFR 133.102(c)). Therefore, since the effluent limits will continue to ensure that water quality standards 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 Ammonia Limits

Effluent data indicate that the permittee cannot comply with the proposed water quality-based effluent limits for total ammonia as N immediately. The proposed average monthly limits for ammonia are 1.82 mg/L or 1.93 mg/L, depending on the season. The 92nd percentile effluent ammonia concentration (an estimate of the maximum monthly average effluent concentration) from December 2006 through December 2011 was 29 mg/L.

Federal regulations (40 CFR 122.47) and the Yakama WQS (Section 18) 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 Yakama WQS allow for compliance schedules for achieving water quality criteria, and require compliance "with all water quality criteria in the shortest practicable time but not to exceed five years unless extenuating circumstances indicate more time is needed."

The draft permit proposes a schedule of compliance for the new water quality-based ammonia limits. The schedule includes the following interim milestones:

- By 1 year after the effective date of the final permit, the permittee must provide written notification to EPA and the Yakama Nation Environmental Protection Program that it has selected a preferred alternative for achieving compliance with the ammonia effluent limits.
- By 2 years after the effective date of the final permit, the permittee must provide EPA and the Yakama Nation Environmental Protection Program with a report of progress on the design of the preferred alternative.
- By 3 years after the effective date of the final permit, the permittee must provide written notification to EPA and the Yakama Nation Environmental Protection Program that it has completed design of the preferred alternative.
- By 3 years and 6 months after the effective date of the final permit, the permittee must provide written notification to EPA and the Yamaka Nation Environmental Protection Program that it has begun construction of the preferred alternative.

- By 4 years and 6 months after the effective date of the final permit, the permittee must provide written notification to EPA and the Yamaka Nation Environmental Protection Program that it has substantially completed construction of the preferred alternative.

The draft permit requires compliance with the final ammonia effluent limits within 4 years and 11 months of the effective date of the final permit.

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 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 Harrah 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.

Table 3: Effluent Monitoring Requirements

Parameter	Unit	Sample Location	Sample Frequency	Sample Type
Flow	mgd	Effluent	Daily	measure
BOD_5	mg/L	Influent and Effluent	2/month	8-hour composite
	lbs/day		2/month	calculation[1]
	% Removal	% Removal	1/month	calculation[2]
TSS	mg/L	Influent and Effluent	2/month	8-hour composite
	lbs/day		2/month	calculation[1]
	% Removal	% Removal	1/month	calculation[2]
Total Residual Chlorine	mg/L	Effluent	1/week	grab
	lb/day			calculation
Total Ammonia as N	mg/L	Effluent	1/week	8-hour composite
	lb/day			calculation
pH	standard units	Effluent	2/week	grab
Temperature	ºC	Effluent	2/week	grab
E. Coli	#/100 ml	Effluent	2/month	grab

Table 3: Effluent Monitoring Requirements				
Parameter	**Unit**	**Sample Location**	**Sample Frequency**	**Sample Type**
Dissolved Oxygen	mg/L	Effluent	1/week	grab
Alkalinity	mg/L	Effluent	1/quarter	8-hour composite
Total Phosphorus as P	mg/L	Effluent	1/6 months	8-hour composite
Total Nitrogen as N[3]	mg/L	Effluent	1/6 months	8-hour composite
Nitrate + Nitrite as N[3]	mg/L	Effluent	1/6 months	8-hour composite

Notes:
1. Loading is calculated by multiplying the concentration in mg/L by the average daily flow in mgd and a conversion factor of 8.34.
2. Percent removal is calculated using the following equation: (average monthly influent – average monthly effluent) ÷ average monthly influent.
3. Effluent sampling for nitrate + nitrite must coincide with effluent sampling for total nitrogen.

Monitoring Changes from the Previous Permit

The monitoring frequency for total residual chlorine has been reduced relative to the previous permit. The effluent concentration of total residual chlorine has consistently been less than the analytical quantification limit since the final total residual chlorine effluent limits in the 2006 permit became effective on October 1st, 2009. Therefore, EPA has reduced the required monitoring frequency for total residual chlorine from twice per week to once per week.

Once-per week monitoring is required for total ammonia as N in order to determine compliance with the new effluent limits.

Twice-per year effluent monitoring for total nitrogen has been added to better characterize the potential effects of nutrients in the discharge. Monitoring for orthophosphate has been discontinued because 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).

C. Surface Water Monitoring

Table 4 presents the proposed surface water monitoring requirements for the draft permit. Town of Harrah should continue receiving water monitoring at the established locations. Surface water monitoring results must be submitted with the DMRs.

Table 4: Surface Water Monitoring Requirements			
Parameter (units)	**Sample Locations**	**Sample Frequency[1]**	**Sample Type**
Flow (CFS)	Upstream	2/year	Measure
Total Phosphorus as P (µg/L)	Upstream and Downstream	2/year	Grab
Nitrate + Nitrite as N (mg/L)	Upstream and Downstream	2/year	Grab
Total Nitrogen as N (mg/L)	Upstream and Downstream	2/year	Grab
Dissolved Oxygen (mg/L)	Upstream and Downstream	2/year	Grab

Notes:
1. Receiving water samples must be taken when the Harrah Drain flows upstream of the discharge and must coincide with effluent sampling.

EPA proposes to discontinue surface water monitoring for ammonia, orthophosphate, pH, alkalinity and temperature. The ammonia and pH monitoring was included in the 2006

permit to determine if the discharge had the reasonable potential to cause or contribute to excursions above water quality standards for ammonia. EPA has determined that the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for ammonia and has proposed effluent limits for ammonia in the draft permit. Also, EPA has determined that, from March – November, the discharge has a very small impact on the pH of the receiving water. Therefore, receiving water monitoring for pH is no longer necessary.

EPA has determined that the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for temperature. Therefore, it is not necessary to continue surface water monitoring for temperature.

Receiving water monitoring for orthophosphate has been discontinued and monitoring for total nitrogen has been established because 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).

VI. Sludge (Biosolids) Requirements

EPA Region 10 separates wastewater and sludge permitting. EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. 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'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. Town of Harrah is required to update the Quality Assurance Plan for the Harrah 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. The plan shall be retained on site and made available to EPA and the Yakama Nation Environmental Protection Program upon request.

B. Operation and Maintenance Plan

The permit requires the Town of Harrah 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 one year of the effective date of the final permit. The plan shall be retained on site and made available to 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 EPA-approved state water quality standards.

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. 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 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 EPA and the Yakama Nation.

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.

E. 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. 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 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. EPA has prepared an EFH assessment which appears Appendix G.

EPA has determined that issuance of this permit will not affect EFH in the vicinity of the discharge. 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 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, 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

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.

EPA. 2000. *Nutrient Criteria Technical Guidance Manual: Rivers and Streams.* US Environmental Protection Agency. Office of Water. Office of Science and Technology. July 2000.

Appendix A: Facility Map

Map source: Google Maps. © 2006 Google. Imagery © 2006 DigitalGlobe. Map Data © 2006 NAVTEQ.

Appendix B: 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

In sections 301(b)(1)(B) and 304(d)(1), the Act established a performance level, referred to as "secondary treatment," which all POTWs were required to meet by July 1, 1977. EPA developed and promulgated "secondary treatment" regulations that are found in 40 CFR 133. These technology-based effluent limits apply to all municipal wastewater treatment plants, and identify the minimum level of effluent quality attainable by secondary treatment in terms of BOD_5 TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table B-1.

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

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

Treatment Equivalent to Secondary

Some POTWs which use waste stabilization ponds (lagoons) or trickling filters may have difficulty complying with the secondary treatment effluent limits in Table C-1. To address this, EPA has established a level of effluent quality called "treatment equivalent to secondary." Effluent limits for facilities eligible for "treatment equivalent to secondary" generally may not be less stringent than those listed in Table B-2.

Table B-2: Treatment Equivalent to Secondary Effluent Limits
(40 CFR 133.105(a)-(c))

Parameter	Average Monthly Limit	Average Weekly Limit	Range
BOD_5 and TSS	45 mg/L	65 mg/L	—
Removal Rates for BOD_5 and TSS	65% (minimum)	—	—
pH	—	—	6.0 - 9.0 s.u.

In order to be eligible for "treatment equivalent to secondary" (TES) effluent limits, the POTW must meet the following requirements in 40 CFR 133.101(g):

- The BOD_5 and TSS concentrations consistently achievable through proper operation and maintenance must be higher than the "secondary treatment" effluent limits,
- A trickling filter or waste stabilization pond (lagoon) must be used as the principal treatment process, and

- The treatment works must provide significant biological treatment of municipal wastewater, meaning that the treatment works can consistently achieve 65 percent removal of BOD_5.

EPA has determined that the Harrah WWTP is eligible for TES effluent limits because it uses waste stabilization ponds as the principal treatment process, it can consistently achieve greater than 65% removal of BOD_5, and, the "effluent concentrations consistently achievable through proper operation and maintenance," of BOD_5 and TSS, as defined in 40 CFR 133.101(f), are higher than the "secondary treatment" effluent limits.

Alternative State Requirements

Alternative State Requirements (ASR) are authorized by 40 CFR 133.105(d) and allow for less stringent TSS limits than the "treatment equivalent to secondary" effluent limits for facilities eligible for "treatment equivalent to secondary" within a certain geographical area. The ASR for the State of Washington is a 30-day average TSS limit of 75 mg/L (49 FR 37005, September 20th, 1984). EPA believes that the technical analysis supporting Washington's EPA-approved ASR TSS effluent limitation of 75 mg/L (30-day average) is valid within the Yakama reservation as well as elsewhere within the State of Washington. Therefore, the TSS effluent limits in the draft permit are based on the State of Washington's ASR.

Limitations on Permit Adjustments for Treatment Equivalent to Secondary and Alternative State Requirements

The federal regulation 40 CFR 133.105(f) states that permitting authorities shall require more stringent limitations than authorized by the treatment equivalent to secondary rule or ASRs (40 CFR 133.105(a – d)) if the permitting authority determines that the treatment works could achieve more stringent effluent limits through proper operation and maintenance.

EPA has determined that the Town of Harrah WWTP can consistently achieve BOD_5 effluent limits that are more stringent than the TES effluent limits. The Town of Harrah has only exceeded the 39 mg/L effluent BOD_5 concentration limit in its prior permit once between October 2006 and February 2012, and it has never exceeded the prior permit's average weekly limit of 59 mg/L in that span of time. Therefore, consistent with 40 CFR 133.105(f), EPA has carried forward the prior permit's BOD_5 effluent limits, which are more stringent than the TES effluent limits.

EPA has also determined that the Town of Harrah WWTP can consistently achieve TSS effluent limits that are more stringent than the ASR effluent limits. Federal regulations define the "effluent concentrations consistently achievable through proper operation and maintenance" as the 95th percentile value for the 30-day average effluent quality achieved by a treatment works, and a 7-day average value equal to 1.5 times that value (40 CFR 133.101.(f)). The Town of Harrah's 95th percentile monthly average TSS concentration is 69.5 mg/L, which is less than the ASR limit (75 mg/L) and equal to the TSS effluent limit in the prior permit (70 mg/L), if rounded to the nearest whole number. Therefore, consistent with 40 CFR 133.105(f), EPA has carried forward the prior permit's TSS effluent limits, which are more stringent than the ASR effluent limits.

Chlorine

Chlorine is often used to disinfect municipal wastewater prior to discharge. The Town of Harrah wastewater treatment plant uses chlorine disinfection, and is also equipped with dechlorination.

A 0.5 mg/L technology-based average monthly limit for chlorine is derived from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after 15 minutes of contact time. Therefore, a wastewater treatment plant that provides adequate chlorine contact time can meet a 0.5 mg/L total residual chlorine limit on a monthly average basis. In addition to average monthly limits (AMLs), NPDES regulations require effluent limits for POTWs to be expressed as average weekly limits (AWLs) unless impracticable (40 CFR 122.45(d)(2)). The AWL is calculated to be 1.5 times the AML, consistent with the "secondary treatment" limits for BOD_5 and TSS. This results in a technology-based AWL for chlorine of 0.75 mg/L.

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:

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

Use of Technology-based Effluent Limits in the Draft Permit

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

In addition, EPA has determined that water quality-based effluent limits are necessary for ammonia and E. coli bacteria.

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 water quality standards by July 1, 1977. 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 water quality standards 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 water quality standards.

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

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

receiving water. The limits must be stringent enough to ensure that water quality standards 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, EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. 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.

The Yakima Nation's mixing zone policy is in Section 16 of the WQS. Mixing zones are not allowed for acute aquatic life criteria (WQS Section 16.3). Mixing zones for chronic aquatic life criteria must not utilize more than 20% of the volume of the low flow of the receiving water (WQS Section 16.11.4).

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 Section 16 of the Yakama WQS. EPA may establish mixing zones that are consistent with the Yakama WQS because EPA is the certifying agency under Section 401 of the CWA (40 CFR 121.1(e) and 121.21(b)).

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 water quality standards in the receiving water.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the State does not authorize one, 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. The following discussion details the specific water quality-based effluent limits in the draft permit.

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

C. Facility-Specific Water Quality-based Limits

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 0.2 standard units. The minimum effluent pH measured between October 2006 and February 2012 was 7.0 standard units and the maximum effluent pH was 8.2 standard units. The 5th percentile pH in the Harrah Drain is 7.5 standard units and the 95th percentile pH is 8.08 standard units. Thus, the pH of the effluent is similar to the pH of the receiving water. EPA therefore does not expect the effluent to change the pH of the Harrah Drain by more than 0.2 standard units.

From December – February, there is no flow in the receiving water upstream from the discharge; therefore, the effluent must meet the pH criterion (a range of 6.5 to 8.5 standard units) at the point of discharge.

From March – November, the receiving water can provide dilution of the effluent. EPA has determined that the Yakama Nation's water quality criteria for pH will be achieved in the receiving water if the effluent pH is within the range of 6.3 to 9.0 standard units (see Appendix E).

Ammonia

The Yakama WQS contain criteria for the protection of aquatic life from the toxic effects of ammonia. In order to ensure that the ammonia limits are protective of all life stages of fish, EPA has applied ammonia criteria which are protective of salmonids, including early life stages. 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. For March – November, the criteria were calculated using the 95th percentile pH (8.08 standard units) and the 95th percentile temperature observed in the Harrah Drain (15.8 °C). For December - February, the criteria were calculated using the 95th percentile of the maximum effluent pH measurements observed from December – February (8.11 standard units), and the maximum effluent temperature measured from December – February (8.5 °C).

Table C-5: Water Quality Criteria for Ammonia

	Acute Criterion	**Chronic Criterion**
Equations:	$\frac{0.275}{1+10^{7.204-pH}}+\frac{39}{1+10^{pH-7.204}}$	$\left(\frac{0.0577}{1+10^{7.688-pH}}+\frac{2.487}{1+10^{pH-7.688}}\right)\times MIN\left(2.85,1.45\times10^{0.028\times(25-T)}\right)$
March - November	4.83	1.99
December - February	4.54	2.07

EPA has determined that the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for ammonia. Therefore, EPA has established water quality-based effluent limits for ammonia in the draft permit (40 CFR 122.44(d)(1)(i – iii)).

EPA has determined that the facility cannot comply with the new water quality-based effluent limits for ammonia immediately upon the effective date of the final permit. Therefore, the draft permit proposes a compliance schedule for the new water quality-based ammonia effluent limits.

Chlorine

EPA has determined that the water quality-based chlorine effluent limits in the prior permit are stringent enough to ensure compliance with the Yakama Nation's water quality criteria for chlorine. Therefore, EPA has retained the prior permit's chlorine effluent limits, consistent with the anti-backsliding provisions of the Clean Water Act (Section 402(o)) and the Yakama Nation's antidegradation policy (WQS Section 14).

Summary of Effluent Limit Bases

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

Table C-5 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 122.44(d), WQS Section 13.3.2 (water quality-based)
pH	CWA Section 301(b)(1)(C), 40 CFR 122.44(d), WQS Sections 16, 20.1.5.2.4 (water quality-based, with mixing zone)
E. Coli	CWA Sections 301(b)(1)(C), 40 CFR 122.44(d), WQS Section 20.1.5.2.1 (water quality-based)
Ammonia	CWA Sections 301(b)(1)(C), 40 CFR 122.44(d), WQS Appendix C (water quality-based)
Chlorine	CWA Section 402(o), WQS Section 14 (anti-backsliding, antidegradation)

D. Other Pollutants Evaluated

Total Phosphorus

In its 2006 permit, the Town of Harrah was required to monitor the effluent and receiving water for total phosphorus (TP). The median effluent total phosphorus concentration measured between December 2006 and December 2011 was 5.78 mg/L. The median effluent flow is 0.038 mgd. The median effluent TP load, as estimated based on the median effluent flow and median effluent concentration, is 1.8 lb/day.

The median TP load in Marion Drain (estimated from the median flow and TP concentration in the drain) near its mouth is 40 lb/day. Thus, the effluent loading of TP from the Town of Harrah WWTP is less than 5% of the TP load in Marion Drain. In the summer of 2004, the USGS measured a TP load of 164 lb/day in the Yakima River at station #12505440, about a half-mile upstream from Marion Drain (Wise et al. 2009). The effluent load is thus about 1% of the TP load in the Yakima River near Marion Drain. These calculations assume that TP is a conservative pollutant, however, some portion of the TP in the effluent is likely taken up by algae and aquatic plants in Harrah and Marion drains before reaching the mouth of Marion Drain.

Because the effluent loading of TP is very small relative to the total loading in the Yakima River or Marion Drain, EPA has not established effluent limits for total phosphorus. EPA has proposed to require continued monitoring for TP in the draft permit.

Temperature

The Yakama Nation's water quality criteria for temperature in Class III waters are a 7-day average of the daily maximum temperatures of 16 °C with no single daily maximum over 18 °C (WQS Section 20.1.5.3). During the irrigation season, Harrah Drain and Marion Drain have site-specific temperature criteria, which are a 7-day average of the daily maximum temperatures of 18 °C with no single daily maximum over 20 °C (WQS Section 20.1.5.3.1.7).

From November – April, the maximum effluent temperature is 15.5 °C, which less than the most stringent temperature criterion applicable to the receiving water. From May – October, irrigation is occurring, and there is therefore dilution available from the receiving water and the site-specific criteria are in effect. The maximum projected receiving water temperature at the edge of a mixing zone encompassing 20% of the minimum flow of Harrah Drain is 17.0 °C, which is less than the site-specific criteria that are applicable during the irrigation season. Reasonable potential analyses may account for the dilution of the effluent in the receiving water, where appropriate (40 CFR 122.44(d)(1)(ii)).

The Yakama WQS also state that "in no case shall a human-caused discharge with a temperature ≥32 °C (89.6 °F) be allowed" (WQS Section 20.1.5.3.1.5). The maximum effluent temperature is 24 °C.

Therefore, the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for temperature, and no effluent limits are required for temperature.

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.

EPA. 1996. *Regions 9 & 10 Guidance For Implementing Whole Effluent Toxicity Testing Programs*. May 31, 1996.

Wise, D.R., Zuroske, M.L., Carpenter, K.D., and Kiesling, R.L. 2009. *Assessment of eutrophication in the Lower Yakima River Basin, Washington, 2004–07: U.S. Geological Survey Scientific Investigations Report 2009–5078*. 108 p.

Appendix C: 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 Yakama Nation's water quality standards. EPA uses the process described in Section 3 of the *Technical Support Document for Water Quality-based Toxics Control* or TSD (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:

$$C_dQ_d = C_eQ_e + C_uQ_u \qquad \text{(Equation C-1)}$$

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

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

$$C_d = \frac{C_eQ_e + C_uQ_u}{Q_e + Q_u} \qquad \text{(Equation C-2)}$$

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 water quality standards 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:

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

Where MZ is the fraction of the receiving water flow available for dilution. The Yakama WQS require that mixing zones not utilize greater than 20% of the volume of the stream flow (Section 16.11.4). Therefore, in cases where mixing zones are allowed, "MZ" is equal to 20%, or 0.2.

The Yakama WQS do not allow mixing zones for acute aquatic life criteria (Section 16.3). If a mixing zone is not allowed, dilution is not considered when projecting the receiving water concentration and,

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

Equation C-3 can be simplified by introducing a "dilution factor,"

$$D = \frac{Q_e + 0.2 \times Q_u}{Q_e} \qquad \text{(Equation C-5)}$$

For the Harrah Drain, there are not enough flow data available to calculate the 1Q10, 7Q10, or 30B3. EPA has therefore used the minimum measured flow rate in the Harrah Drain, which is 3 CFS, in place of these critical flows. The harmonic mean flow rate is 8.73 CFS. Dilution factors are calculated with the effluent flow rate set equal to the design flow of 0.055 mgd (0.085 CFS).

The dilution factors are **8.05** for chronic aquatic life criteria (based on the minimum flow rate in the Harrah Drain), and **21.5** for human health criteria (based on the harmonic mean flow rate in the Harrah Drain). The Yakama WQS do not allow mixing zones for acute aquatic life criteria (section 16.3) so dilution was not considered in the reasonable potential analysis for acute criteria.

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

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

Equations C-4 and C-6 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.

Since there are a limited number of data points available, the 99th 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 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 the RPM for ammonia as an example. Reasonable potential calculations for all pollutants can be found in Table D-2.

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

$$p_n = (1 - \text{confidence level})^{1/n} \qquad \text{(Equation C-8)}$$

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 21 ammonia samples collected from the effluent, therefore:

$p_n = (1\text{-}0.99)^{1/21}$
$p_n = 0.803$

This means that we can say, with 99% confidence, that the maximum reported effluent ammonia concentration is greater than the 80th 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 C-9)

Where,
$C = \exp(z\sigma - 0.5\sigma^2)$ (Equation C-10)

Where,
$\sigma^2 = \ln(CV^2 + 1)$ (Equation C-11)
$\sigma = \sqrt{\sigma^2}$
CV = coefficient of variation = (standard deviation) ÷ (mean)
z = the inverse of the normal cumulative distribution function at a given percentile

In the case of ammonia:

CV = coefficient of variation = 0.978
$\sigma^2 = \ln(CV^2 + 1) = 0.6712$
$\sigma = \sqrt{\sigma^2} = 0.8193$
z = 2.326 for the 99th percentile = 0.8527 for the 75th percentile

$C_{99} = \exp(2.326 \times 0.8193 - 0.5 \times 0.6712) = 4.808$
$C_{75} = \exp(0.8527 \times 0.8193 - 0.5 \times 0.6712) = 1.438$

$RPM = C_{99}/C_{80} = 4.808/1.438$
RPM = 3.34

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

$C_e = (RPM)(MRC)$ (Equation C-12)

where MRC = Maximum Reported Concentration

In the case of ammonia,

C_e = 3.34 × 38.2 mg/L = 128 mg/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 C-6:

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

The Yakama WQS do not allow mixing zones for acute aquatic life criteria. Also, from December – February, there is no flow in Harrah Drain upstream from the discharge. Therefore, for ammonia, the acute receiving water concentration, as well as the chronic receiving water concentration from December – February, is:

$$C_d = C_e = 128 \text{ mg/L}$$

For ammonia, the chronic receiving water concentration from March – November is:

$$C_d = \left[\frac{128 - 0.1}{8.05}\right] + 0.1 = 16.0 \text{ mg/L}$$

For March – November, the acute and chronic water quality criteria for ammonia are 4.83 and 1.99 mg/L, respectively. For December – February, the acute and chronic water quality criteria for ammonia are 4.54 and 2.07 mg/L, respectively. The projected receiving water concentrations are greater than the criteria, in all cases. Therefore, water quality-based effluent limits are necessary for ammonia.

Table C-1, below, summarizes the reasonable potential calculations for aquatic life criteria for ammonia and temperature.

D. 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.

Table C-1: Reasonable Potential Calculations

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	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*		*Pn*	*mg/L*	*CV*	*s*	*n*			
Ammonia (December - February)	1.00	1.00	0.10	4.54	2.07	128	128	YES	0.803	38.2	0.978	0.8193	21	3.34	1.00	1.000
Ammonia (March - November)	1.00	1.00	0.10	4.83	1.99	128	16.0	YES	0.803	38.2	0.978	0.8193	21	3.34	1.00	8.05
Temperature, °c (May - October)	1.00	1.00	16.0	20.0	18.0	17.0	17.0	NO	N/A	24.00	N/A	N/A	N/A	1.00	8.05	8.05
Temperature, °c (November - April)	1.00	1.00	N/A	18.0	16.0	15.50	15.50	NO	N/A	15.50	N/A	N/A	N/A	1.00	1.00	1.00

Appendix D: 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 ammonia 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 March – November ammonia 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 C-4 and C-6). 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 C-6 is rearranged to solve for the WLA, becoming:

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

If there is no flow in the receiving water, or if no mixing zone is allowed, the dilution factor is equal to 1, and this equation simplifes to:

$$C_e = WLA = C_d \qquad \text{(Equation D-2)}$$

In the case of ammonia, for March – November, for the acute criterion,

WLA_a = 4.83 mg/L

For the chronic criterion,

$WLA_c = 8.05 \times (1.99 - 0.1) + 0.1$
WLA_c = 15.3 mg/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):

$$LTA_a = WLA_a \times \exp(0.5\sigma^2 - z\sigma) \qquad \text{(Equation D-3)}$$
$$LTA_c = WLA_c \times \exp(0.5\sigma_{30}^2 - z\sigma_{30}) \qquad \text{(Equation D-4)}$$

Where,

$\sigma^2 = \ln(CV^2 + 1)$
$\sigma = \sqrt{\sigma^2}$
$\sigma_{30}^2 = \ln(CV^2/30 + 1)$
$\sigma = \sqrt{\sigma_{30}^2}$
$z = 2.326$ for 99th percentile probability basis

In the case of ammonia,

$\sigma^2 = \ln(0.978^2 + 1) = 0.6712$
$\sigma = \sqrt{\sigma^2} = 0.8193$

$\sigma_{30}^2 = \ln(0.978^2/30 + 1) = 0.0314$
$\sigma_{30} = \sqrt{\sigma_{30}^2} = 0.1772$
z = 2.326 for 99th percentile probability basis

Therefore,

$LTA_a = 4.83 \text{ mg/L} \times \exp(0.5 \times 0.6712 - 2.326 \times 0.8193)$
LTA_a = 1.004 mg/L

$LTA_c = 15.3 \text{ mg/L} \times \exp(0.5 \times 0.0314 - 2.326 \times 0.1772)$
LTA_c = 10.3 mg/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 ammonia, the acute LTA of 1.004 mg/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 D-5)
$AML = LTA \times \exp(z_a\sigma_n - 0.5\sigma_n^2)$ (Equation D-6)

where σ, and σ^2 are defined as they are for the LTA equations (D-2 and D-3) 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 ammonia,

$MDL = 1.004 \text{ mg/L} \times \exp(2.326 \times 0.8193 - 0.5 \times 0.6712)$
MDL = 4.83 µg/L

$AML = 1.004 \text{ mg/L} \times \exp(1.645 \times 0.4630 - 0.5 \times 0.2144)$
AML = 1.93 mg/L

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

As shown in table D-1, EPA has recalculated the effluent limits for chlorine, however, the chlorine effluent limits in the prior permit are more stringent than the re-calculated effluent limits. Therefore, EPA has carried the prior permit's chlorine limits forward in compliance with the Clean Water Act's anti-backsliding provisions (CWA Sections 303(d)(4) and 402(o) and the Yakama Nation's antidegradation policy (WQS Section 14)).

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.

Table D-1: Effluent Limit Calculations

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

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

Permit Limit Calculation Summary											Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations						
PARAMETER	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator Acute	Metal Criteria Translator Chronic	Ambient Concentration	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	Comments	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	Limiting LTA	Coeff. Var. (CV)	# of Samples per Month
																decimal	*n*
Chlorine, µg/L (December - February)	1.00	1.00	1.00	1.00		19.0	11.0	**9.01**	**18.1**		19.00	11.00	6.10	5.80	5.80	0.60	4.00
Chlorine µg/L (March - November)	1.00	8.05	1.00	1.00		19.0	11.0	**9.47**	**19.0**		19.00	88.56	6.10	46.70	6.10	0.60	4.00
Ammonia, mg/L (December - February)	1.00	1.00	1.00	1.00	0.10	4.54	2.07	**1.82**	**4.54**		4.54	2.07	0.94	1.39	0.944	0.9780	4.00
Ammonia, mg/L (March - November)	1.00	8.05	1.00	1.00	0.10	4.83	1.99	**1.93**	**4.83**		4.83	15.3	1.004	10.3	1.004	0.9780	4.00

Appendix E: Effluent Limit Calculations for pH for March – November

The following tables show how EPA calculated the pH limits in the draft permit, for March – November.

Table E-1: Low pH Critical Condition

INPUT	
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	8.051
2. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	12.90
pH:	7.50
Alkalinity (mg CaCO3/L):	36.00
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	24.00
pH:	6.30
Alkalinity (mg CaCO3/L):	354.00
OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.44
Effluent pKa:	6.36
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.92
Effluent Ionization Fraction:	0.47
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	39.12
Effluent Total Inorganic Carbon (mg CaCO3/L):	756.65
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	14.28
Alkalinity (mg CaCO3/L):	75.50
Total Inorganic Carbon (mg CaCO3/L):	128.24
pKa:	6.43
pH at Mixing Zone Boundary:	6.58

Table E-2: High pH Critical Condition

INPUT	
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	8.051
2. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	12.90
pH:	8.08
Alkalinity (mg CaCO3/L):	36.00
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	24.00
pH:	9.00
Alkalinity (mg CaCO3/L):	354.00

OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.44
Effluent pKa:	6.36
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.98
Effluent Ionization Fraction:	1.00
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	36.82
Effluent Total Inorganic Carbon (mg CaCO3/L):	354.80
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	14.28
Alkalinity (mg CaCO3/L):	75.50
Total Inorganic Carbon (mg CaCO3/L):	76.32
pKa:	6.43
pH at Mixing Zone Boundary:	8.39

Table E-3: Low Receiving Water pH at Prior Permit's Upper pH Limit

INPUT	
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	8.051
2. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	12.90
pH:	7.50
Alkalinity (mg CaCO3/L):	36.00
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	24.00
pH:	8.50
Alkalinity (mg CaCO3/L):	354.00

OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.44
Effluent pKa:	6.36
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.92
Effluent Ionization Fraction:	0.99
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	39.12
Effluent Total Inorganic Carbon (mg CaCO3/L):	356.54
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	14.28
Alkalinity (mg CaCO3/L):	75.50
Total Inorganic Carbon (mg CaCO3/L):	78.55
pKa:	6.43
pH at Mixing Zone Boundary:	7.82

Table E-4: Low Receiving Water pH at Proposed Upper pH Limit

INPUT	
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	8.051
2. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	12.90
pH:	7.50
Alkalinity (mg CaCO3/L):	36.00
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	24.00
pH:	9.00
Alkalinity (mg CaCO3/L):	354.00

OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.44
Effluent pKa:	6.36
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.92
Effluent Ionization Fraction:	1.00
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	39.12
Effluent Total Inorganic Carbon (mg CaCO3/L):	354.80
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	14.28
Alkalinity (mg CaCO3/L):	75.50
Total Inorganic Carbon (mg CaCO3/L):	78.33
pKa:	6.43
pH at Mixing Zone Boundary:	7.85

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 Town of Harrah 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 Town of Harrah.* U.S. Environmental Protection Agency. Region 10. June 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 Harrah Drain and Marion 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 Harrah Drain. NPDES permits are established to protect water quality in accordance with water quality standards. 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.