

# CHAPTER 5. REGULATORY REQUIREMENTS

## INTRODUCTION

This chapter presents the regulatory aspects of protecting water quality, examines the water quality requirements for the S. Yamhill River, and presents the anticipated wastewater treatment requirements for the Water Reclamation Facility (WRF).

## REGULATORY FRAMEWORK

The regulatory environment surrounding water quality protection in Oregon is relatively complex, requiring interaction and cooperation between a number of federal, state, and local agencies. The first step in the process is to assign beneficial uses to the water body. This task is the responsibility of the Oregon Water Resources Department (OWRD). A water body's beneficial uses depend on characteristics such as its size and location. The following are the designated beneficial uses for the South Yamhill River. (Oregon Administrative Rules—OAR 340-041-0340)

- Public Domestic Water Supply
- Private Domestic Water Supply
- Industrial Water Supply
- Irrigation
- Livestock Watering
- Fish & Aquatic Life
- Wildlife and Hunting
- Fishing
- Boating
- Water Contact Recreation
- Aesthetic Quality
- Hydro Power

It is the responsibility of the Oregon Department of Environmental Quality (DEQ) to establish and enforce water quality and waste treatment standards that ensure the river's beneficial uses are preserved. The DEQ's general policy is one of antidegradation of surface water quality. Discharges from wastewater treatment plants (WWTPs) are regulated through the National Pollutant Discharge Elimination System (NPDES). All discharges of treated wastewater to a receiving stream must comply with the conditions of an NPDES permit. The Environmental Protection Agency (EPA) oversees state regulatory agencies, and can intervene if the state agencies do not successfully protect water quality.

This section summarizes the regulatory requirements pertinent to wastewater facilities planning for the WRF.

### **Oregon Administrative Rules for Wastewater Treatment**

The state surface water quality and waste treatment standards for the Yamhill River are detailed in the following sections of the Oregon Administrative Rules (OARs):

- OAR 340-041-0004 lists policies and guidelines applicable to all basins. DEQ's policy of antidegradation of surface waters is set forth in this section.
- OAR 340-041-0007 through 340-041-0036 describes the standards that are applicable to all basins.
- OAR 340-041-0340 through 340-041-0350 contain requirements specific to the Willamette basin including beneficial uses, approved Total Maximum Daily Loads (TMDLs) in the basin, water quality standards, and the minimum design criteria for waste treatment.

The surface water quality and waste treatment standards in the OARs are viewed as minimum requirements. Additional, more stringent limits developed through the TMDL-process supersedes the basin standards.

### **Clean Water Act Section 303(d) List**

The 2004/2006 Integrated Report water quality assessment list was approved by the federal Environmental Protection Agency (EPA) in February 2007. This integrated report contains several categories of attainment, as follows:

Category 1: All standards are met. (This category is not used in the assessment).

Category 2: Attaining - Some of the pollutant standards are met.

Category 3: Insufficient data to determine whether a standard is met.

3B: Potential concern - Some data indicate non-attainment of a criterion, but data are insufficient to assign another category.

Category 4: Water is water quality limited but a TMDL is not needed. This includes:

4A: TMDL approved - TMDLs needed to attain applicable water quality standards have been approved.

4B: Other pollution control requirements are expected to address all pollutants and will attain water quality standards.

4C: Impairment is not caused by a pollutant (e.g., flow or lack of flow is not considered a pollutant).

Category 5: Water is water quality limited and a TMDL is needed; Section 303(d) list.

Table 5-1 includes the parameters included in the assessment for the South Yamhill River, river miles 1 – 18.1:

**Table 5-1. South Yamhill River Water Quality Parameters**

Parameter	Applicable Time Period	Category
Alkalinity	Year Around	Category 3B: Potential concern
Ammonia	Year Around	Category 2: Attaining some criteria/uses
Chlorophyll a	Fall/Winter/Spring	Category 3: Insufficient data
Chlorophyll a	Summer	Category 2: Attaining some criteria/uses
Dissolved Oxygen	January 1 – May 15	Category 5: Water quality limited, 303(d) list, TMDL needed
Dissolved Oxygen	Year Around (Non Spawning)	Category 2: Attaining some criteria/uses
E. Coli	Year Around	Category 2: Attaining some criteria/uses
Iron		Category 5: Water quality limited, 303(d) list, TMDL needed
Manganese	Year Around	Category 3B: Potential concern
pH	Year Around	Category 2: Attaining some criteria/uses
Phosphate Phosphorus	Summer	Category 2: Attaining some criteria/uses
Temperature	Summer	303(d)

The category 5 parameters are included in the 303(d) list submitted to EPA for approval. This list, which will become final upon approval by EPA, is as follows:

- Dissolved Oxygen January 1 – May 15
- Iron – Year Around
- Temperature – Summer

DEQ is currently preparing the 2010 integrated report which is due to be submitted to EPA in April 2010.

**Total Maximum Daily Loads**

A phosphorus TMDL was completed for the Yamhill River in the early 1990s. It was developed in response to concerns about high phosphorus levels in the river, leading to algae blooms and high pH in the mainstream Yamhill River below the confluence of the South and North Yamhill rivers. This TMDL led to the effluent limits for phosphorus currently in the City’s NPDES permit for the WWTF. This permit requirement limits total phosphorus in the discharge to:

- 70 µg/L on a monthly median basis when river flow is 100 cfs or less
- 9.6 lbs/day on a monthly median basis when river flow greater than 100 cfs and less than or equal to 250 cfs

The upcoming Yamhill Sub-Basin TMDL, which includes the North, South, and mainstream Yamhill rivers) is scheduled to begin development in 2007, with estimated completion in 2010. The pollutants that are currently scheduled to be addressed include dissolved oxygen, temperature, bacteria, pesticides, iron, manganese, and chlorophyll a<sup>1</sup>. The pesticide concern currently is limited to West Fork Palmer Creek, and thus is not an issue for the City. The iron and manganese concentrations are thought to be a result of natural conditions and thus this should also not be a substantial issue for the City. Manganese and bacteria are not listed for the South Yamhill. Thus, the upcoming dissolved oxygen and temperature TMDLs appear to be most relevant to the City at this time. A revision to the current phosphorus TMDL should be evaluated.

## **WATER QUALITY**

The purpose of the following discussion is to provide a brief summary of conditions as known today to establish background information for the discussion of treatment requirements.

### **Temperature**

Water temperatures throughout most of the basin are warmer than established criteria for designated salmon and trout uses. In these situations, temperature TMDLs developed by DEQ normally seeks to increase shading along stream corridors to reduce temperatures to natural conditions. If wastewater discharges are warmer than criteria or natural conditions, then DEQ also will require either temperature reductions or some way to offset the thermal inputs. Ways to offset the thermal loads can include additional riparian shading, flow augmentation, effluent reuse, and credit trading. Mechanical cooling of effluent is not considered a feasible option.

DEQ conducted extensive field data collection for the temperature TMDL in the summer of 2005. The Yamhill Basin Council also conducted data collection in the summer of 2005 and will do additional aerial data collection after leaf drop this fall. The City also has been collecting temperature data.

DEQ will use the available data to develop a computer model that predicts water temperatures based on the complex variety of factors that affect temperatures, including meteorological conditions, shading (both existing and potential), stream physical conditions and flows, and thermal effects from point and nonpoint sources. The modeling will also develop the natural thermal potential (NTP) of the waterbody – the Oregon temperature standard states that if the natural thermal potential is higher than the biologically based criterion, then the NTP becomes the applicable criterion. It may be important to work closely with DEQ to ensure accurate results of the Natural Thermal Potential are achieved through model parameter selection.

### **Dissolved Oxygen**

The South Yamhill is listed in the proposed 2004 -2006 303(d) list for dissolved oxygen (DO) for January 1 – May 15. Ammonia discharges from the WRF are restricted in the current permit from May 1 through October 31 to protect DO in the River.

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<sup>1</sup> DEQ Website: <http://www.deq.state.or.us/wq/303dlist/docs/tmdlpriorities.pdf#search=oregontmdlschedule>

## **pH**

The 1992 Yamhill TMDL established wasteload allocations for phosphorus to limit algal blooms in the Yamhill River, and prevent pH excursions.

## **Chlorophyll a**

The South Yamhill is listed for summer chlorophyll a in the proposed 2004 – 2006 water quality assessment as Category 2: Attaining some criteria/uses. The 1992 Yamhill TMDL established wasteload allocations for phosphorus to limit algal blooms in the Yamhill River

## **Bacteria**

The South Yamhill is not listed for bacteria at the point of discharge from the WRF in the 2004 - 2006 303(d) list. The NPDES permit requires WRF effluent to meet the water quality standard at the end of pipe.

## **Phosphorus**

The phosphorus limits for the treatment plant have been set based on the current 1992 TMDL. The TMDL for phosphorus is scheduled for revision in 2007 – 2010 and permit limitations may change as a result. Preliminary information indicates total phosphorus concentrations up to 0.9 mg/L in local groundwater, which may allow for changing the permit limitations, as in the Tualatin Basin. Early cooperation and participation with DEQ will be critical to addressing this change.

## **Mixing Zone**

The mixing zone dimensions are defined in the NPDES permit. In 2005, an Outfall Mixing Evaluation was performed by CH2M HILL. This evaluation was designed and conducted to provide site-specific field measurements of the dilution performance of the McMinnville outfall under low river flow conditions, provide measurements of river physical conditions for use in dilution modeling, develop dilution modeling results that are verified with field measurements, and to assess the discharge temperature with water quality standards. The mixing zone evaluation was revised in 2008 to meet the requirements of Oregon DEQ's Regulatory Mixing Zone Internal Management Directive. The findings of the study are summarized below:

- The outfall was externally inspected and found to be in excellent condition. The outfall pipe, terminal port, pipe flanges, and anchor block were all intact and in place, and the pipe was not buried or obstructed. The outfall port was fully functional and as-built.
- Dye concentration measurements were recorded to characterize the dilution and dispersion of the dye plume at the Zone of Immediate Dilution (ZID) or acute zone boundary (10 feet), and at the regulatory Mixing Zone Boundary (MZB) located 100 feet downstream of the outfall.
- The minimum measured and modeled dilutions for the McMinnville outfall are summarized below for the range of seasonal river and effluent flow conditions shown in Table 5-2.

**Table 5-2. Summary of Minimum Dilutions at the McMinnville Outfall ZID and MZB**

Scenario	Case	Minimum Dilution at ZID (Centerline)	Minimum Dilution at MZB (Flux-average)
Field Study	Measured & Modeled River: 256 cfs ; Effluent: 6.5 cfs	2:1	15:1
1Q10 Low Flow	Modeled River: 5.1cfs ; Effluent: 12.8cfs	1.4:1	NA
7Q10 Low Flow	Modeled River: 9.1 cfs ; Effluent: 5.6 cfs	NA	2.6:1
30Q5 (Annual)	Modeled River: 20.8 cfs ; Effluent: 10.1 cfs	NA	3:1
Harmonic Mean	Modeled River: 114 cfs; Effluent: 10.1 cfs	NA	5:1

Based on a range of seasonal river and effluent flow conditions, the minimum dilutions for the McMinnville outfall are 1.4:1 at the acute zone boundary or zone of immediate dilution (ZID) based on 1Q10 low flow conditions, and 2.6:1 at the regulatory mixing zone boundary (MZB) based on critical summer 7Q10 low flow conditions. McMinnville may want to consider requesting river flow-based dilution factors in the development of river flow-based effluent limits in the next NPDES permit. This permit approach could be used since the South Fork Yamhill River already has a real-time river gage of flow and stage.

This Outfall Mixing Evaluation of the McMinnville WRF included all key elements of the Level 3 mixing study as defined in the 2007 Regulatory Mixing Zone-IMD.

### **Toxics**

DEQ has developed an Internal Management Directive “Reasonable Potential Analysis for Toxic Pollutants” (September 2005). This Directive outlines the procedures to be used by permit writers to establish if there is a reasonable potential for a discharge to cause or contribute to an exceedance of water quality criteria in the receiving stream, and if so, how to establish effluent limitations for that pollutant.

The Reasonable Potential Analysis (RPA) for aquatic life criteria has been completed for the WRF effluent for metals and cyanide, and the analysis indicates that there is not a reasonable potential for any metal or cyanide to cause an exceedance of aquatic life criteria in the receiving water. A similar result is obtained for human health criteria, except for arsenic. This is not an unexpected result, due to the very low arsenic human health criteria. The analysis is based on data from June 2004 through June 2008.

The RPA Directive provides a procedure to determine if a point source is a significant contributor to the receiving water concentration of a pollutant. For non-persistent bioaccumulative and toxic pollutants, such as arsenic, if downstream receiving water concentrations are less than 10% greater than upstream concentrations, then the point source is determined to not be a significant contributor of the pollutant. Using the same data set as used for the RPA analysis, and using the average effluent and receiving water concentrations, the McMinnville effluent increases the arsenic concentration in the receiving water by 5.6%, so it can be concluded that the WRF effluent is not a significant contributor of arsenic, and therefore an effluent limitation is not required for arsenic based on human health criteria.

The human health RPA was not conducted for any toxic organic compounds. The city has analyzed three samples for toxic organics, using EPA methods 608, 624, and 625. Results for all compounds in all three samples were non-detect.

The aquatic life criteria RPA analysis is shown below in Figure 5-1, and the human health criteria RPA in Figure 5-2.

Notes on RPA Analysis: South Yamhill River background for cadmium, silver, and thallium set to zero – all data less than MRL (per RPA IMD page 69.)

Cyanide effluent maximum set to one half of MRL – all data less than MRL.

### **Summary Table**

Water quality regulations, and potential impact on treatment and the permit are summarized in Table 5-3 below. The Table lists water quality parameters alphabetically, followed by regulatory issues listed alphabetically.

## **TREATMENT REQUIREMENTS**

DEQ has the responsibility to establish wastewater treatment requirements which ensure the protection of the river's beneficial uses and compliance with all water quality standards. This section discusses the current discharge requirements and provides an estimate of likely future requirements for low river flow period discharge at the WRF.

**Figure 5-1. Reasonable Potential Analysis for Aquatic Life Criteria**

**Facility Name: McMinnville**

**Date: 06/06/2008**

<b>Dilution Values? (Y/N)</b>	y	calculated
Dilution @ ZID	1.4	#DIV/0!
Dilution @ MZ	2.6	#DIV/0!
If no dilution values enter info below		
Facility Effluent Flow		MGD
7Q10		CFS
1Q10		CFS
% dilution at ZID		%
% dilution at MZ		%
Fresh Water? (Y/N)	y	

<b>Hardness</b>	mg/L CaCO <sub>3</sub>
Effluent	68
Stream	52
<b>Mixed</b>	
ZID	63
MZ	58

Confidence Level	99%
Probability Basis	95%

PARAMETER	# of Samples	Highest Conc. <small>See IMD</small>	Coef. of Variance	Calculated Max Effluent Conc.	Background Conc. <small>See IMD</small>	Maximum Conc. at ZID	Maximum Conc. at MZ	WQ CRITERIA		REASONABLE POTENTIAL ?			
								1 Hour (CMC)	4 Day (CCC)	ACUTE	CHRONIC	ZID	MZ
		µg/l		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l				
ANTIMONY *	15	0.26	0.25	0.34	0.054	0.26	0.16	9000	1600	NO	NO		
ARSENIC V * (inorganic)	30	1.32	0.43	1.72	0.8	1.46	1.16	850	48	NO	NO		
ARSENIC III (inorganic)	30	1.32	0.43	1.72	0.8	1.46	1.16	360	190	NO	NO		
CADMIUM +	30	0.13	0.74	0.19	0.04	0.15	0.10	2.35	0.74	NO	NO		
CHROMIUM III +	30	1.00	0.63	1.40	0.77	1.22	1.01	1196	133	NO	NO		
CHROMIUM VI	30	1.00	0.63	1.40	0.77	1.22	1.01	16	11	NO	NO		
COPPER +	30	5.70	0.37	6.84	2.7	5.66	4.29	11.5	7.4	NO	NO		
CYANIDE	25	2.50	0.60	3.75	3.60	3.71	3.66	22.0	5.2	NO	NO		
IRON ‡	14	46.10	0.60	82.98	402.00	174.13	279.30	2000	1000	NO	NO		
LEAD +	30	1.19	0.45	1.55	0.16	1.15	0.69	46	1.60	NO	NO		
MERCURY	33	0.02	1.12	0.03	0.001	0.02	0.01	2.40	0.012	NO	NO		MZ
NICKEL +	30	1.34	0.37	1.61	0.79	1.37	1.10	965	100	NO	NO		
SELENIUM	30	3.00	1.10	5.10	1.50	4.07	2.88	260	35	NO	NO		
SILVER +	27	0.13	0.61	0.18	0.04	0.14	0.09	1.85	0.12	NO	NO		MZ
THALLIUM *	15	0.05	1.00	0.12	0.01	0.08	0.05	1400	40	NO	NO		
ZINC +	30	61.00	0.39	73.20	1.30	52.66	28.95	80	67	NO	NO		MZ

**NOTES :**

- All units in ug/L
- \* Insufficient data to develop criteria; value presented is the Lowest Observed Effect Level
- + Fresh water criterion is hardness dependent
- ‡ - No acute standard. The CMC is estimated as 2X the CCC.
- † - Not DEQ Criteria
- ^ Marine acute criterion has insufficient data to develop criteria; value = LOEL



**Figure 5-2. Reasonable Potential Analysis for Human Health Criteria**

Facility Name: **McMinnville**

Date: 6/6/2008

Dilution Values?	N	Dilution	
		Model	Calculated
Harmonic Mean Flow (cfs)	(See IMD)	114	4.3
30Q5 (cfs)	(See IMD)	21.3	1.6
Effluent Flow (mgd)	(See IMD)	5.6	
% Dilution		25%	

Confidence Level	95%
Probability Basis	95%

PARAMETER	Carcinogen? Y or N	# of Samples	Effluent Conc. <u>See IMD</u> µg/l	Coef. of Variance	Calculated Max Effluent Conc. µg/l	Background Conc. <u>See IMD</u> µg/l	Maximum conc at regulatory boundary µg/l	WQ CRITERIA		Reasonable Potential?	
								Water and Fish Ingestion µg/l	Fish Consumption ug/L	Water and Fish Ingestion	Fish Consumption
ANTIMONY	N	15	0.26	0.25	0.31	0.045	0.2100	5.6	640	NO	NO
ARSENIC	Y	30	0.61	0.43	0.70	0.53	0.5697	0.0022	0.0175	YES	YES
BERYLLIUM	Y	15	0.08	0.92	0.15	0.06	0.0804	6800	117000	NO	NO
CADMIUM	N	30	0.13	0.74	0.16	0.021	0.1076	10	N/A	NO	*
CHROMIUM III	N	30	1.00	0.63	1.21	0.42	0.9113	170000	3433000	NO	NO
CHROMIUM VI	N	30	1.00	0.63	1.21	0.42	0.9113	50	N/A	NO	*
CYANIDE	N	25	2.50	0.60	3.18	3.60	3.3397	140	140	NO	NO
LEAD	N	30	1.19	0.45	1.37	0.11	0.8927	50	N/A	NO	*
MERCURY <sup>P</sup>	N	33	0.02	1.12	0.02	0.001	0.0147	0.144	0.146	NO	NO
NICKEL	N	30	1.34	0.37	1.51	0.39	1.0840	13.4	100	NO	NO
SELENIUM	N	30	3.00	1.10	4.04	0.74	2.7843	10	4200	NO	NO
SILVER	N	27	0.13	0.61	0.16	0.03	0.1121	50	N/A	NO	*
THALLIUM	N	15	0.05	1.00	0.09	0.01	0.0589	0.24	0.47	NO	NO

Notes:  
<sup>P</sup> PBT

**Table 5-3. Water Quality Regulations and Impacts – Current and Future**

Issue	Treatment Impact	Permit Impact
<b>PARAMETERS</b>		
<p><b>Ammonia:</b>                      Summer ammonia concentration and mass limitations vary with S. Yamhill River flow, with three flow tiers.                      Toxicity criteria: Oregon has approved revisions to the toxicity criteria for ammonia, based on EPA’s 1999 guidance. These revisions have not yet been approved by EPA. EPA is beginning the process to consider a change to the 1999 recommended criteria. If this proceeds, it may result in criteria lower than the 1999 guidance, and lower than the current Oregon criteria. Toxicity-based limitations are not included in the current permit.</p>	<p>WRF has experienced effluent ammonia compliance problems, which are thought by facility staff to be related to industrial discharge inhibiting nitrification process.</p>	<p>Ammonia requirements apply May 1 through October 31.                      Outside ammonia reduction requirement period, still need to meet toxicity-based water quality standards for ammonia in river.</p>
<p><b>Bacteria:</b>                      Indicator organism was changed in permit renewal to <i>E. coli</i>. Plant has been in compliance with new limitation.</p>	<p>Current disinfection processes appear to be adequate (see Blending section).</p>	<p>OAR 340-041-0009 requires compliance with sanitary sewer overflow requirements by January 1, 2010.</p>
<p><b>Dissolved Oxygen:</b>                      S. Yamhill River DO drives several permit requirements.</p>	<p>Related to ammonia, phosphorus, and BOD requirements.</p>	
<p><b>Mass Limitations - CBOD and TSS:</b>                      Summer, and low flow winter (monthly average flow less than 8.4 MGD), mass limitations in the current permit are based on average dry weather design flow of 5.6 MGD. High flow winter mass limitations are based on two year, maximum wet weather monthly average daily design flow of 14.45 MGD. Current permit maintains waiver of daily mass limitation when daily flow exceeds twice average dry weather design flow (11.2 MGD).</p>	<p>Any increases in plant flows above the design flows would result in the need to discharge CBOD and TSS at concentrations below the concentrations listed in the permit.</p>	<p>Potential for change in permit effluent limitations.                      If plant improvements result in an increase in the design average dry or wet weather flows, this would provide justification for requesting an increase in permitted mass limitations of CBOD and TSS. Any such request for an increase in mass limitations would require Environmental Quality Commission (EQC) approval according to OAR 340-41-0120. EQC approval of a mass load increase may not be granted – it is EQC’s policy to not allow increases in mass loads except under specific circumstances.                      An increase in the average dry weather design flow could potentially result in the loss of the daily mass limitation waiver for high flows.</p>

**Table 5-3. Water Quality Regulations and Impacts – Current and Future, cont’d...**

Issue	Treatment Impact	Permit Impact
<p><b>Mercury:</b>                      A TMDL for mercury in the Willamette Basin was issued in September 2006. The Yamhill River is included in this TMDL. The TMDL includes a phased approach, with sector requirements, which initially requires NPDES permittees to monitor for mercury in discharges and develop and implement mercury reduction plans as interim implementation measures. .                      Numeric mercury WLAs may be implemented following issuance of the revised 2011 mercury TMDL.</p>	<p>N/A</p>	<p>Potential for new permit effluent limitations for mercury following TMDL revision planned for 2011.</p>
<p><b>Metals - Effluent and Biosolids:</b>                      Current effluent and biosolids metals concentrations are well below any regulatory thresholds, with the possible exception of arsenic human health criteria.                      Effluent and river data being collected for use in pretreatment program local limits development, and for Reasonable Potential Analysis. New metals criteria were adopted by the EQC in April 2004, including metals criteria expressed as dissolved. These new criteria have not been approved by EPA, and are not available for use in permitting decisions.                      New more restrictive criteria for Cadmium are being considered by EPA.</p>	<p>N/A</p>	<p>If effluent metals become an issue in the future, site-specific criteria could be proposed for approval by Oregon DEQ, based on water effect ratio or other mechanisms. If desired, data could be collected to establish a value for the “translator” to convert dissolved criteria to total recoverable permit limitations, in anticipation of the next permit renewal cycle.                      DEQ is not currently including in permits effluent limitations based on the human health criteria for arsenic.</p>
<p><b>Micro-Contaminants:</b>                      Increasing attention is being paid to the presence of pharmaceuticals, hormones, and other organic contaminants such as caffeine, insect repellent, and fire retardant in treated wastewater discharges. The effects of these compounds in receiving waters are currently not known.</p>	<p>No treatment impact in near future. If environmental effects of these trace organic contaminants in treated wastewater effluents are confirmed in the future, then treatment technologies will be researched and developed, and may eventually be required.</p>	<p>No impact to permit in near future. If this issue continues to evolve, likely first permit impact would be a monitoring requirement.</p>

**Table 5-3. Water Quality Regulations and Impacts – Current and Future, cont'd...**

Issue	Treatment Impact	Permit Impact
<p><b>Phosphorus:</b> Existing TMDL sets phosphorus WLAs for the WRF. City is tracking DEQ activity for TMDL revision.</p> <p>There is a potential for phosphorus land application limitations for biosolids in the future.</p>	<p>Tertiary process beyond BNR may not be needed to meet a 0.07 mg/L limitation if expressed as ortho-P. The mass load that applies at certain river flows is not as significant an issue for operations today, but will become more problematic over time with growth.</p> <p>No impact on plant operations.</p>	<p>The desired outcome for the NPDES permit would be conversion of the phosphorus limitation to being expressed as ortho-phosphate – P. If expressed as ortho – P, current 0.07 mg/L limitation would be satisfactory.</p> <p>May be a future permit issue.</p>
<p><b>Temperature and Thermal Load:</b> Permit contains an excess thermal load limitation (weekly average of 160 Million kcals/day). Anticipated Temperature TMDL for the S. Yamhill will result in a revision to this thermal load limitation.</p>	<p>No direct impact on treatment – although any opportunities to reduce temperature impacts of treatment should be considered in the planning process.</p>	<p>New thermal load limitation from new TMDL will be imposed at the permit renewal which follows TMDL implementation. Based on current information from DEQ, the next permit renewal may occur prior to TMDL completion).</p>
<p><b>Total Dissolved Solids:</b> Oregon has a TDS guidance value of 100 mg/L which may not be exceeded without specific authorization.</p>		<p>The permit contains an effluent limitation of 500 mg/L.</p>
<p><b>Turbidity:</b> Oregon’s water quality standard for turbidity is currently being reviewed. The latest draft of a revised standard would restrict turbidity increases at the edge of the mixing zone to 3 NTU as monthly average, or 5 NTU averaged over one hour.</p> <p>The facility complies with current standard, which is based on an allowable percentage increase (10%) in turbidity from an activity.</p>	<p>Most recent draft of new turbidity standard should not result in any new treatment requirements.</p>	<p>If draft of new turbidity standard is approved, new turbidity effluent limitation and monitoring requirement would be added to permit, probably at next renewal.</p>
<p><b>REGULATORY ISSUES</b></p>		
<p><b>85 Percent Removal:</b> Schedule A in the current permit requires 85% monthly average removal of CBOD and TSS when monthly average daily influent flow is 8.4 MGD or less; or 65% monthly average removal of CBOD and TSS when monthly average daily influent flow is greater than 8.4 MGD.</p>	<p>This requirement has not been a compliance issue.</p>	

**Table 5-3. Water Quality Regulations and Impacts – Current and Future, cont’d...**

Issue	Treatment Impact	Permit Impact
<p><b>Blending:</b> Also known as “split flow” “select treatment” etc., this refers to the practice of diverting flow around a treatment component (usually secondary treatment) during high flows. The WRF was designed to operate using blending when flow exceeds the secondary system capacity. The practice is not specifically authorized in the NPDES permit. EPA issued a proposed policy on blending in late 2003. Recently this policy has been withdrawn, and the future national EPA position on blending is uncertain at this time. NACWA and NRDC have collaborated on a proposed guidance document on blending (October 2005) which has been presented to EPA for consideration as a replacement for the withdrawn EPA policy. EPA released for public comment a draft blending policy based on the NACWA/NRDC agreement in December 2005. NACWA and other stakeholders continue to urge the Administration to issue a final blending policy.</p>	<p>The future legality of blending remains uncertain. However, alternatives considered for improvements to the treatment facility should include the possibility of no future blending.</p> <p>It has been noted that during blending events, disinfection is not as effective as it should be, perhaps due to flows not being distributed evenly across uv channels.</p>	<p>Potential for future change in permit language.</p>
<p><b>Design Flows:</b> Any treatment plant improvements resulting in a change to the facility’s design flows may result in a change to limitations and dilution ratios and potentially provide justification for a change in CBOD and TSS mass limitations.</p>	<p>N/A</p>	<p>Potential for change in permit effluent limitations.</p> <p>Changes to the design flows will need to be approved by Oregon DEQ. A change to the average dry weather design flow will result in changes to the allowable dilution ratios for the mixing zone, which are based in part on the design flow. Changes to these dilution ratios could result in changes to water quality-based effluent limitations, probably at next permit renewal. CBOD and TSS mass limitations are based on average dry weather and average wet weather design flows. Increases to these permitted mass limitations require EQC approval. It is EQC’s policy to not allow mass load increases, except under specific circumstances.</p>
<p><b>Effluent Toxicity:</b> No current problems complying with toxicity requirements in the permit.</p>	<p>N/A</p>	<p>See Mixing Zone. Any future reductions in approved mixing zone dilution ratios or banning of mixing zones could affect toxicity compliance.</p>

**Table 5-3. Water Quality Regulations and Impacts – Current and Future, cont'd...**

Issue	Treatment Impact	Permit Impact
<p><b>Mixing Zones:</b>                      Mixing Zone dimensions are included in the permit.                      Legislative action to ban mixing zones was not successful in the most recent session, but SB 737 was passed, which requires DEQ to develop a list of priority persistent pollutants, and by 2011 requires permittees to develop and implement a plan to reduce these pollutants. There is still a potential for an initiative petition in the future.</p>	<p>Potential ban on mixing zones would have significant impact on treatment. This scenario should be included in planning process as a potential scenario. Focus of any MZ prohibition will likely be on Persistent Bioaccumulative Toxics (PBTs).</p>	<p>Potential for change in permit effluent limitations.                      Preliminary results from mixing zone study are presented above in this memorandum.</p>
<p><b>Sanitary Sewer Overflows:</b>                      This is another area with some regulatory uncertainty. There is continued pressure from EPA for moving toward zero SSOs, including an April 2005 Fact Sheet.                      Oregon’s current SSO rules are embedded in the bacteria water quality standard, which prohibits overflows from less than a five-year 24-hour winter storm, and from a less than ten-year 24-hour summer storm. The Oregon rules require elimination of all winter SSOs not meeting the storm event criteria by January 1, 2010.</p>	<p>Fundamental driver for wet weather improvements. Collection system and treatment facility capacity improvements to reduce or eliminate the potential for SSOs. Difference between proposed federal standard of zero overflows versus Oregon’s approach.</p>	<p>Potential for change in permit language.                      Any changes to federal regulations for SSOs or CMOM requirements will be permit issues.</p>
<p><b>Use Attainability Analysis:</b>                      UAA is a process authorized by the Clean Water Act to modify designated uses under certain conditions. For the Yamhill, the existing designated uses for fish could perhaps be more easily changed through an administrative process – changing the fish use maps that are now part of the water quality standards rules. Any UAA or similar activity should be approached with a watershed perspective – focusing on the uses are attainable in the basin.</p>	<p>Not considered a driver for the facilities planning process.</p>	<p>Potential future permit issue.</p>

## **Current Discharge Permit**

The City's current NPDES permit for the WRF was issued on March 2, 2004. The effluent limitations vary with South Yamhill River flow and season, and are summarized in Table 5-4.

## **Compliance with Water Quality Criteria**

The current permit also contains a general statement requiring compliance with all applicable water quality standards and criteria, except as allowed by the mixing zone.

## **Anticipated Future Treatment Requirements**

Future treatment requirements are not expected to be significantly different from the current permit requirements, with the possible exception of the following:

**Phosphorus:** This will be examined in the next TMDL, and effluent limitations may change. Also, the City is interested in pursuing a change to ortho-phosphorus.

**Thermal Load:** A temperature TMDL is scheduled to be developed this year, and this will have an impact on the excess thermal load limitation.

**Blending:** Blending, or split flow, refers to the practice of diverting flow around a treatment component (usually secondary treatment) during high flows. The WRF designed to operate using blending when flow exceeds the secondary treatment system capacity. This practice is not specifically acknowledged and authorized in the City's NPDES permit. The practice of blending has been under review by EPA for some years. In late 2003, EPA issued for public comment a proposed blending policy, which if promulgated would clarify that blending is a legal practice, subject to some "principles" outlined in the proposal. The proposal focused on the practice of routing high flows around secondary treatment units, and left up in the air the question of routing flows around primary clarification units. The proposal also required that re-routed flows be blended together before discharge. However, the future of the blending proposal is somewhat uncertain. The EPA has withdrawn the 2003 draft policy, and recent congressional action prohibited EPA from spending any funds to implement the policy.

In October 2005, the National Association of Clean Water Agencies (NACWA) and the National Resources Defense Council (NRDC) delivered to EPA a proposal for guidance on blending. This proposal was the result of a negotiation process between NACWA and NRDC. In December 2005 EPA released a draft policy on blending for public comment, based on the NACWA/NRDC agreement (<http://www.epa.gov/fedrgstr/EPA-WATER/2005/December/Day-22/w7696.htm>). EPA received only 62 comments on this proposal, mostly in favor, compared to 98,000 mostly negative comments received on the draft 2003 policy. Final action on this policy has not yet occurred, but is still being actively pursued by stakeholder groups such as NACWA.

If in the future the practice of blending is determined to be illegal, this will have significant impact on the wet weather capacity of the facility, and additional capacity improvements will be required.

**Table 5-4. Effluent Permit Limits, Permit No. 101062**

Parameter	Average Effluent Concentrations		Monthly* Average, lb/day	Weekly* Average, lb/day	Daily* Maximum, lbs
	Monthly	Weekly			
<b>May 1-October 31:</b>					
(1) When Monthly Average Flow in the South Yamhill River is measured above the STP outfall is 100 cfs or less:					
CBOD <sub>5</sub> ***	5 mg/L	7.5 mg/L	230	350	470
TSS	5 mg/L	7.5 mg/L	230	350	470
Ammonia-N	0.5 mg/L	0.75 mg/L	23	35	47
Total Phosphorus	70 µg/L (See Note 1)	—	—	—	—
Dissolved Oxygen	Shall not be less than a daily average of 6.5 mg/L				
(2) When Monthly Average Flow in the South Yamhill River is Measured above the STP outfall is greater than 100 cfs but does not exceed 250 cfs:					
CBOD <sub>5</sub> ***	10 mg/L	15 mg/L	470	700	930
TSS	10 mg/L	15 mg/L	470	700	930
Ammonia-N	3.0 mg/L	4.5 mg/L	140	210	280
Total Phosphorus	—	—	9.6 (See Note 2)	—	—
(3) When Monthly Average Flow in the South Yamhill River as measured above the STP outfall is greater than 250 cfs:					
CBOD <sub>5</sub> ***	10 mg/L	15 mg/L	470	700	930
TSS	10 mg/L	15 mg/L	470	700	930
Ammonia-N	5.0 mg/L	7.5 mg/L	230	350	470
Total Phosphorus	No Limitations	—	—	—	—
(4) CBOD <sub>5</sub> and TSS (on a monthly average concentration basis) shall not be less than 85 percent.					
<b>November 1-April 30:</b>					
(1) When Monthly Average STP influent flow is 8.4 MGD or less:					
CBOD <sub>5</sub> ***	25 mg/L	40 mg/L	1200	1800	2300
TSS	30 mg/L	45 mg/L	1400	2100	2800
(2) When Monthly Average STP influent flow is greater than 8.4 MGD:					
CBOD <sub>5</sub> ***	25 mg/L	40 mg/L	3000	4500	6000
TSS	30 mg/L	45 mg/L	3600	5400	7200
(3) CBOD <sub>5</sub> and TSS Removal Efficiency (on a monthly average concentration basis):					
(a) When monthly average daily influent flow is 8.4 MGD or less, shall not be less than 85 percent.					
(b) When monthly average daily influent flow is greater than 8.4 MGD, shall not be less than 65 percent.					



**Table 5-4. Effluent Permit Limits, Permit No. 101062, cont'd...**

<p>* Mass Load limits for CBOD5, TSS and Ammonia-Nitrogen are based on average dry weather design flow of 5.6 MGD. The daily mass load limit is suspended on any day in which the flow to the treatment facility exceeds 11.2 MGD (twice the design average dry weather flow).</p> <p>** Mass load limits for CBOD5 and TSS are based on two year, maximum wet weather monthly average daily design flow of 14.45 MGD. The daily mass load limit is suspended on any day in which the flow to the treatment facility exceeds 11.2 MGD (twice the design average dry weather flow).</p> <p>*** The CBOD5 concentration limits are considered equivalent to the minimum design criteria for BOD5 specified in Oregon Administrative Rules (OAR) 340-041. These limits and CBOD5 mass limits may be adjusted (up or down) by permit action if more accurate information regarding Cbod5/BOD5 becomes available.</p>	
<b>Other Parameters (year-round except as noted):</b>	
Parameter	Limitations
E.coli Bacteria	Shall not exceed 126 organisms per 100 ml monthly geometric mean. No single sample shall exceed 406 organisms per 100 ml (See Note 3).
pH	Shall be within the range of 6.0-9.0.
Total Dissolved Solids	Shall not exceed a monthly average of 500 mg/L.
Excess Thermal Load (May-October)	Shall not exceed a weekly average of 160 million kcals/day (See Note 4).
<p>Chlorine and chlorine compounds shall not be used as a disinfecting agent of the treated effluent and no chlorine residual shall be allowed in the discharged effluent due to chlorine used for maintenance purposes.</p> <p>NOTES ON OTHER PARAMETERS:</p> <ol style="list-style-type: none"> <li>1. Compliance with the total phosphorus concentration limit shall be determined on a monthly median basis in accordance with OAR 340-041-0470(10)(a).</li> <li>2. This mass load limitation for total phosphorus is based upon dry weather minimum monthly average design flow in 1995 of 2.6 MGD and has not changed from the previous permit. When this permit is being considered for renewal, the Department may recalculate this mass load limit based upon the dry weather minimum monthly average flow expected during the life of the renewed permit. Compliance with the total phosphorus mass limit shall be determined on a monthly median basis in accordance with OAR 340-041-0470(10)(a).</li> <li>3. If a single sample exceeds 406 organisms per 100 mL, then five consecutive re-samples may be taken at four-hour intervals beginning within 28 hours after the original sample was taken. If the log mean of the five re-samples is less than or equal to 126 organisms per 100 mL, a violation shall not be triggered.</li> <li>4. The thermal load limit was calculated using the average dry weather design flow and an estimated maximum weekly effluent temperature. This permit may be re-opened, and the maximum allowable thermal load modified, when more accurate effluent temperature data becomes available. In addition, upon approval of a Total Maximum Daily Load for temperature for this sub-basin, this permit may be re-opened to establish new thermal load limits and/or new temperature conditions or requirements.</li> </ol>	

**Mixing Zones:** Mixing zones are areas in the receiving waters where water quality criteria can be exceeded while mixing of the treated effluent and the receiving water takes place. Mixing Zones are specifically authorized in federal and state regulations, subject to certain requirements. The NPDES permit contains a definition of the mixing zone for the WRF effluent.

Mixing zones were a priority for environmental groups in the 2005 legislative session, with bills being introduced to ban mixing zones, or to mark mixing zones in rivers with buoys. These bills did not pass. In the 2007 legislative session, the subject was again debated, resulting in the passage of SB 737, which focused on persistent, bioaccumulative, and toxic pollutants. The bill requires DEQ to develop a list of priority persistent pollutants, and requires permittees by 2011 to develop and implement a plan to reduce these pollutants.

**Mass Load Increases:** It is the policy of the Oregon Environmental Quality Commission to not approve increased mass loads for a municipal wastewater treatment facility except under specific conditions. These requirements are found in OAR 340-041-0004(9)(a) and 340-041-0061(10). A “no mass load increase” scenario is included in the planning process because of the uncertainty of EQC approval of any increase in permitted mass loads for CBOD and TSS.