

# **FACT SHEET FOR NPDES PERMIT WA-004547-1**

## **Town of Spangle WWTP**

### **PURPOSE of this Fact Sheet**

This fact sheet explains and documents the decisions that Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for The Town of Spangle WWTP.

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for the Town of Spangle WWTP, NPDES permit WA-004547-1 are available for public review and comment from June 3, 2009 until July 6, 2009. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement**.

The Town reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this Fact Sheet as **Appendix D - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Kim H. Sherwood prepared the permit and this fact sheet.

### **SUMMARY**

The Town of Spangle operates a Biolac wastewater treatment plant that discharges to Spangle Creek. Ecology limited the discharge of conventional pollutants to protect the beneficial use of the small intermittent receiving water. Ecology issued the previous permit for this facility on June 28, 2002.

The proposed permit contains the same effluent limits for Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Ammonia, Total Suspended Solids, Fecal Coliform Bacteria, and pH as the permit issued in 2002. Ecology based the limits for total ammonia on the Water Quality Criteria for Surface Waters (Chapter 173-201A WAC). The BOD<sub>5</sub> limits were taken from the Technical Criteria for discharges from Municipal Wastewater Treatment Facilities (Chapter 173-221 WAC). Ecology determined the critical period occurs during the months of May through October.

## TABLE OF CONTENTS

I.	INTRODUCTION .....	1
II.	BACKGROUND INFORMATION .....	2
A.	Facility Description.....	3
	History.....	3
	Collection System Status .....	3
	Treatment Processes.....	4
	Discharge Outfall .....	4
	Residual Solids.....	4
	Permit Status .....	5
	Solid Wastes.....	6
B.	Summary of Compliance with Previous Permit Issued .....	6
C.	Wastewater Characterization .....	6
D.	Description of the Receiving Water.....	7
E.	SEPA Compliance .....	7
III.	PROPOSED PERMIT Limits.....	7
F.	A. Design Criteria .....	8
G.	B. Technology-Based Effluent Limits .....	8
H.	C. Surface Water Quality-Based Effluent Limits .....	10
	Numerical Criteria for the Protection of Aquatic Life and Recreation.....	10
	Numerical Criteria for the Protection of Human Health.....	10
	Narrative Criteria .....	10
	Antidegradation.....	11
	Mixing Zones.....	12
I.	Designated Uses and Surface Water Quality Criteria.....	12
J.	Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria .....	14
K.	Ground Water Quality Limits .....	16
L.	Comparison of Effluent Limits with the Previous Permit Issued on June 28, 2002.....	16
IV.	MONITORING REQUIREMENTS .....	16
M.	Lab Accreditation.....	17
IV.	OTHER PERMIT CONDITIONS .....	17
N.	Reporting and Record Keeping.....	17
O.	Prevention of Facility Overloading.....	17
P.	Operation and Maintenance (O&M).....	17
Q.	Pretreatment .....	18
	Duty to Enforce Discharge Prohibitions .....	18
	Federal and State Pretreatment Program Requirements .....	19
	Industrial User Survey Update.....	19
R.	Solid Waste Control.....	19

*Fact Sheet for NPDES Permit WA-0045471*

*Town of Spangle*

S.	Spill Plan.....	20
T.	General Conditions .....	20
VI.	PERMIT ISSUANCE PROCEDURES .....	20
U.	Permit Modifications .....	20
V.	Proposed Permit Issuance .....	20
VII.	REFERENCES FOR TEXT AND APPENDICES .....	21
	APPENDIX A—PUBLIC INVOLVEMENT INFORMATION .....	22
	APPENDIX B—GLOSSARY .....	23
	APPENDIX C—TECHNICAL CALCULATIONS.....	28
	APPENDIX D—RESPONSE TO COMMENTS .....	35

## I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the State of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to municipal NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC) and for ground waters (chapter 173-200 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of Plans and Reports for Construction of Wastewater Facilities (Chapter 173-240 WAC)

These rules require any treatment facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for requirements imposed by the permit.

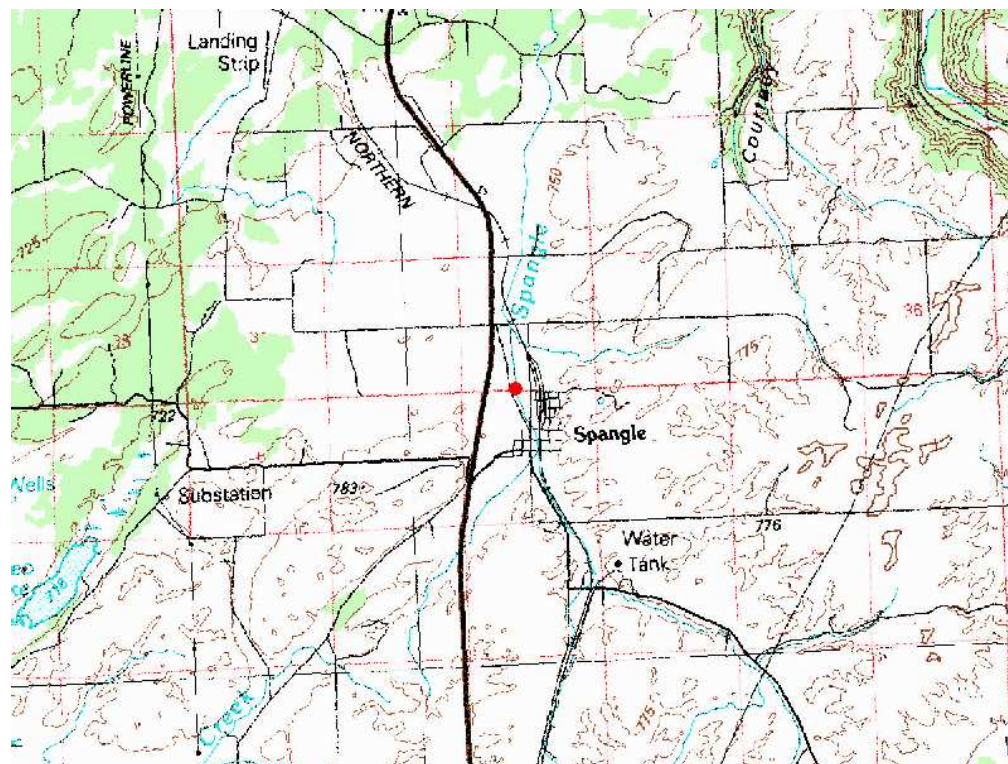
Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A - Public Involvement** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit. Ecology will summarize the responses to comments and any changes to the permit in **Appendix D – Response to Comments**.

## II. BACKGROUND INFORMATION

**Table 1 - General Facility Information**

Applicant: William S. Benner	Town of Spangle
Facility Name and Address:	Town of Spangle WWTP P. O. Box 147 Spangle, WA 99031
Type of Treatment: Biolac denitrifying Activated Sludge	Biolac, Extended Aeration Activated Sludge System
Discharge Location: Spangle Creek East of the Treatment Plant	Spangle Creek Latitude: 47° 26' 04" N Longitude: 117° 22' 54" W
Waterbody ID Number:	1173418475011

**Figure 1. Facility Location Map**



## **A. Facility Description**

### **History**

The Town of Spangle is located 17 miles south of Spokane along Highway 195, the primary route between Spokane and Colfax. North-south tracks of the Burlington Northern Railroad also pass through the town. No additional communities or population centers are located in the immediate vicinity of Spangle. The economy of Spangle depends almost entirely upon the surrounding dry land farming activities. A high percentage of residents are retired while those that are employed have either primary or secondary dependence upon agricultural activities. While this type of economy is not subject to rapid growth, it is relatively stable. With the growth of Spokane, more people are settling into the smaller outlying communities. The ability for Spangle to provide residential and commercial growth depends upon expansion of the sewage system. A vicinity map is attached, figure 1.

Ecology approved a Facility Plan that the Town submitted in 1993. The plan recommended adding a third 5-acre lagoon with a 20-acre spray irrigation field. Local conditions and site availability changed during the following years that prevented the Town from implementing the recommendation. In 1995, Ecology developed a new policy for intermittent streams. This made the discharge of treated wastewater to Spangle Creek an option for the Town and made a wastewater facility upgrade feasible. In 1996, the Town completed an addendum to the Facility Plan which Ecology approved. The final recommended treatment alternative was the existing extended aeration activated sludge process (Biolac System).

### **Collection System Status**

The Town constructed the existing wastewater collection facilities in 1977 when it had a population of 200. According to the new census data (2000) the residential population is now 295. In 1982, a restaurant with a discharge of 30 residential equivalents began discharging to the system. In combination, Spangle now has an equivalent user population of 325.

The collection system transports sewage flow to a lift station at the north end of Town. The lift station consists of two 7.5 hp pumps and wet well. The sewage is pumped approximately 3,000 feet in a 4-inch pressure main to the wastewater treatment facility headworks.

Sewage overflows and combined sewer overflows are not components of the sewage system. The lift station has no provisions for a bypass. The Town measures influent flows using lift station pump time meters.

The Town conducted an infiltration/inflow analysis as a component of the 1996 Addendum to the Facility Plan. Wastewater flow data were collected from January 1994 to April 1996, based on recording of the lift station pump hour meters. It appears that the average infiltration is about 21% and the average inflow is about 18% of the total annual wastewater contribution.

However, the report suggests that the I&I estimates and resultant conclusions appear to be unreliable and inconsistent in many cases, thus calling for additional future sewage flow and water use data in order to substantiate the estimates prior to initiating possible remedial measures. The Spangle collection system does not include any combined sewer overflows.

### **Treatment Processes**

The wastewater treatment facility includes a mechanically cleaned bar screen, a lined earthen aeration basin, and a secondary clarifier. The key component of the Biolac system is the use of aeration chains suspended from floats which allow use of lined earthen basins. The system is effective at various operating conditions (F/M ratios) and hydraulic loadings due to the large basin volume. The aeration chains move across the basin to provide efficient oxygen mixing to promote good nitrification. The aeration chains also allow for anoxic zones which relatively effectively denitrifies most of the nitrate in the wastewater. After advanced secondary treatment, the effluent is disinfected in an ultraviolet disinfection system and discharged to Spangle Creek.

The Town uses an integral clarifier to separate and recycle biological solids. Return activated sludge is air lifted from the bottom of the clarifier back to the influent pipe of the aeration basin while the operators waste a portion of the sludge as needed for process control. The waste activated sludge is sent to a biosolids drying pond. The Town has purchased and will use a belt filter press once it has constructed a loading facility and a storage vault for untreated waste activated sludge.

A certified class II operator is required to operate the plant.

### **Discharge Outfall**

The treated and disinfected effluent flows into Spangle Creek through a lengthy discharge pipe that terminates with a flap gate at the edge of the creek a little north of the Town and directly east of the wastewater treatment facilities.

### **Residual Solids**

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill. The Town plans to use a belt filter press to thicken the residual solids removed from the clarifier and truck them to a beneficial use facility somewhere in eastern Washington. Currently, the Town pumps the waste activated sludge to an abandoned unlined wastewater stabilization pond. The existing permit requires the operator to measure the sludge depth to estimate the stored volume and measure nitrogen content, TKN and  $\text{NO}_3^-$  to estimate the potential impact to groundwater. The permit requires the Town to measure metals to determine that the biosolids meet the beneficial use requirements. The preferred beneficial use is as an agricultural soil amendment. However, as yet the Town has no beneficial use plan.

The Town plans to begin operation of the new belt filter press and emergency sludge storage tank during this permit cycle. The proposed permit requires a new O&M manual to cover these new facilities.

### **Permit Status**

Ecology issued the previous permit for this facility on June 28, 2002. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and Ammonia. Phosphorus monitoring is also required in the effluent and receiving water.

The Town of Spangle submitted an application for permit renewal on *January 4, 2007*. Ecology accepted it as complete on *January 29, 2007*.

The treatment process is schematically shown on Sheet C3. The process begins with a spirally cleaned screen. The screened wastewater is piped to the Biolac activated sludge basin for secondary and tertiary (nitrification and denitrification) treatment. The integral clarifier separates the activated sludge for recycle and wasting. The clarified wastewater is then disinfected by ultraviolet lamps and discharged through a v-notch measurement weir. The waste activated sludge is currently discharged to an abandoned lagoon.

No industries currently contribute to the Spangle WWTP collection and treatment system. One restaurant in town discharges to the WWTP.

A certified Class II operator is required to operate the plant.

Spangle took out a State Revolving Fund federal loan to pay for the new Biolac plant built in 1996. About half of the cost of the \$490,000 Biolac system was covered by a grant. The loan was finalized for a little under \$247,000 dollars at 1% per year for a term of 20 years starting in October of 1997. Spangle has also arranged for a Public Works Trust Fund loan in the amount of \$35,000. In 2006, the town took out another loan to purchase the belt filter press; the loan amount was around \$75,000. Both of these loans were secured in order to address the biosolids treatment and disposal issues.

Rural Community Assistance Corporation has accomplished an income survey in Spangle for the 2006 tax year. The survey showed that over 67% of the Population of the Town of Spangle meets the low income standards. This percentage of low income families in Spangle has increased dramatically since 2006. The sewer rate in Spangle has been raised to cover the obligations on loans to \$50.00 per month. In 2006, roughly 12% of the housing classified as low income housing by the Federal Government. About 6% of this housing was occupied by working families with low incomes. In 2009, many of these people have lost their jobs. Less than 20% of the total population have agriculturally dependent employment. The cost of transportation to Spokane where employment has historically been available has risen considerably. Even paying back current loans for wastewater facilities that have been constructed and solid waste handling facilities that are just now being completed appears to be problematic.



The treated and disinfected effluent flows into Spangle Creek through a lengthy discharge pipe that terminates with a flap gate at the edge of Spangle Creek a little North of the Town and directly East of the Wastewater Treatment Facilities.

### **Solid Wastes**

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings) and at the integral clarifier, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste at the local landfill. Currently the Town does not have a sludge management plan and will need to revise the description of sludge management in the Operations and Maintenance Manual to reflect use of a Belt Filter Press treatment of waste activated sludge. The Town plans to remove solids from the clarifier, treat and dewater them in a belt filter press and land apply them under a permit from the Spokane Health District. Currently Spangle intends to contract with King County to co-mingle monitor and dispose of their biosolids on lands in Central and Eastern Washington.

### **B. Summary of Compliance with Previous Permit Issued**

Ecology staff last conducted a non-sampling compliance inspection on *March 25, 2008*. The Town of Spangle has not continuously and completely complied with the effluent limits and permit conditions throughout the duration of the permit issued on *June 28, 2002*. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections conducted by Ecology. The Spangle WWTP had BOD<sub>5</sub> violations in June and July of 2006, August of 2003, 2004, and 2008, and September of 2003. The Town violated BOD<sub>5</sub> percent removal only once in September of 2003. The Town also violated fecal coliform discharge limits in July of 2007, February, April, and May of 2008. Fecal coliform samples were not taken in March of 2005 and 2007.

### **C. Wastewater Characterization**

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The following tabulated data also includes Ecology inspection monitoring results. The tabulated data represents the quality of the effluent discharged from January 2003 to September 2008. The effluent is characterized as follows:

**Table 2: Wastewater Characterization**

Parameter	Average Value	Maximum Value
Biochemical Oxygen Demand (5 day)	5.2 mg/L	45 mg/L
Total Suspended Solids	2.1 mg/L	9 mg/L
Fecal Coliform Bacteria	47.5 CFU/100 mL	1202 CFU/100 mL
pH	7.91 Maximum	6.55 Minimum

Parameter	Average Value	Maximum Value
Total Ammonia (as NH <sub>3</sub> -N)	0.29 mg/L	5.05 mg/L
Total Phosphate (as P)	3.95 mg/L	13.0 mg/L
Copper	12 ug/L	12 ug/L
Zinc	53 ug/L	53 ug/L

#### **D. Description of the Receiving Water**

The Town of Spangle WWTP discharges to Spangle Creek. No upstream point source outfalls remain since the Upper Columbia Academy now discharges to a Wetland. Significant nearby non-point sources of pollutants include upstream agricultural practices, the Town of Spangle stormwater system, and the Upper Columbia Academy wetland treatment system. The pavement and lawn care at Upper Columbia Academy may also be a measurable source of non-point stormwater nutrient loading to Spangle Creek.

No ambient background data exists for this section of Spangle Creek due to its intermittent flow in this reach of the stream.

#### **E. SEPA Compliance**

Regulation exempts reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than state rules and regulations. The exemption applies only to existing discharges, not to new discharges.

### **III. PROPOSED PERMIT LIMITS**

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants.

Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants.

If significant changes occur in any constituent of the effluent discharge, The Town of Spangle is required to notify Ecology (40 CFR 122.42(a)). The Town of Spangle may be in violation of the permit until Ecology modifies the permit to reflect additional discharge of pollutants.

#### **F. A. Design Criteria**

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology-approved design criteria for this facility's treatment plant were obtained from the engineering report/facility plan/plans & specifications prepared by Varela and Associates 1996.

**Table 4: Design Criteria for the Town of Spangle WWTP.**

<b>Parameter</b>	<b>Design Quantity</b>
Maximum Month Design Flow (MMDF)	.085 MGD
Monthly Average Dry Weather Flow	.068 MGD
Peak Instantaneous Design Flow (PIDF)	.230 MGD
BOD <sub>5</sub> loading for maximum month	155 lb/day
TSS loading for maximum month	155 lb/day
Design Population	600

#### **G. B. Technology-Based Effluent Limits**

Federal and state regulations define technology-based effluent limits for municipal wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for municipal wastewater.

Chapter 173-221 WAC lists the following technology-based limits for pH, Fecal Coliform, BOD<sub>5</sub>, and TSS:

**Table 5: Technology-based Limits.**

<b>Parameter</b>	<b>Limit</b>
pH	The pH must measure within the range of 6 to 9 standard units.

Parameter	Limit
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

Ecology based Spangle's more stringent concentration limits on the design report prepared by Varela and Associates Inc.; this report contains the following statement:

"In general, the proposed Biolac system, if properly operated, should be capable of consistently producing effluent that will comply with the BOD, TSS, Ammonia and pH levels. (In fact, the manufacturer will be required to guarantee the performance of the equipment.)"

The technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

The Monthly effluent mass loading is the more stringent of the design flow and discharge concentration loading calculated as:

Monthly effluent BOD<sub>5</sub> mass loadings (lbs/day) = maximum monthly design flow (.068 MGD) x Concentration limit (10 mg/L) x 8.34 (conversion factor) = mass limit 5.7 lb/day BOD<sub>5</sub>.

Monthly effluent TSS mass loadings (lbs/day) = maximum monthly design flow (.068 MGD) x Concentration limit (15 mg/L) x 8.34 (conversion factor) = mass limit 8.5 lb./day TSS.

Or the influent design loading times the percentage allowed above and beyond the required treatment efficiency calculated as:

Monthly effluent mass loadings (lbs/day) = maximum monthly influent design loading (155 lbs/day) x 0.15 = 23 lbs/day.

The weekly average effluent mass loading = 1.5 x monthly loading = 35 lbs/day.

The limits calculated from the concentration limit are more stringent so Ecology included the monthly effluent mass loadings limits in the permit of 5.7 lbs/day of BOD<sub>5</sub> and 8.5 lbs/day of TSS.

## **H. C. Surface Water Quality-Based Effluent Limits**

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

### **Numerical Criteria for the Protection of Aquatic Life and Recreation**

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

### **Numerical Criteria for the Protection of Human Health**

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other disease, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

### **Narrative Criteria**

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210; 2006) in the State of Washington.

## **Antidegradation**

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

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

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in chapter 173-201A WAC.

Ecology's analysis described in this section of the fact sheet demonstrates that the existing and designated uses of the receiving water will be protected under the conditions of the proposed permit.

### Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge does not interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

The Town of Spangle discharges wastewater to Spangle Creek at times of the year when there is immeasurably small flows in the disconnected pools of water left in Spangle Creek. The discharge is through a flap gate that has no diffuser into Spangle Creek. Ecology has not authorized a mixing zone for the Spangle wastewater discharge.

### I. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). Criteria applicable to this facility's discharge are summarized below in Table 5.

- Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for, the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The Aquatic Life Uses for this receiving water are identified below.

**Table 6. Aquatic Life Uses & Associated Criteria**

<b>Salmonid Spawning, Rearing, and Migration</b>	
Temperature Criteria – Highest 7DAD MAX	17.5°C (63.5°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	8.0 mg/L
Turbidity Criteria	<ul style="list-style-type: none"><li>• 5 NTU over background when the background is 50 NTU or less; or</li><li>• A 10 percent increase in turbidity when the background turbidity is more than 50 NTU</li></ul>
Total Dissolved Gas Criteria	Total dissolved gas shall not exceed 110 percent of saturation at any point of sample collection
pH Criteria	pH shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units

- The recreational uses are extraordinary primary contact recreation, primary contact recreation, and secondary contact recreation. The recreational uses for this receiving water are identified below.

**Table 7. Recreational Uses and Associated Criteria**

Recreational Use	Criteria
Primary Contact Recreation	Fecal Coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL

Spangle Creek is an intermittent stream that flows all the way down to Hangman Creek through the month of May and usually through the month of June. From July until the run-off in the winter or spring of the following year Spangle Creek has a relatively stagnant water table sustained from Upper Columbia Academy down to a mile or so downstream of the Spangle wastewater outfall.

This water does not meet the water quality standards. The proposed permit requires the Town to conduct a receiving water study to supplement the information collected by Ecology for the TMDL described below. It will measure the temperature and the phosphorus concentrations in the effluent and receiving water to identify any downstream impacts to phosphorus concentrations and creek temperatures. The summer time water in the stream is basically shallow wetland water and natural conditions are appropriate conditions to set as the water quality criteria.

The section of Spangle Creek that continues to maintain connected groundwater pools and wetlands from a little above Upper Columbia Creek to a mile or so below the Spangle WWTP discharge is not environmentally sensitive and supports only limited reptilian and amphibian species and a diversity of arthropod organisms in the summer low to no flow period. The water quality in Spangle Creek is considerably degraded by agricultural sediments when the creek is flowing and is quickly degraded by nutrient releases from the wetlands vegetation when the stream slows to intermittent pools of relatively stagnant water.

Ecology prepared “The Hangman (Latah) Creek Water Sampling Data Summary”, dated March 2005 [http://www.ecy.wa.gov/programs/wq/tmdl/HangmanCr/wq\\_final\\_report040505.pdf](http://www.ecy.wa.gov/programs/wq/tmdl/HangmanCr/wq_final_report040505.pdf). The report contains water quality measurements for Spangle Creek when flows occurred in the late winter and spring. Ecology collected samples and measured temperature at the mouth of Spangle Creek at its confluence with Hangman Creek. This data does not represent the conditions at the point of discharge of the Spangle WWTP to Spangle Creek which is miles upstream. It also did not occur during the critical season when Spangle Creek is dry from a mile or so downstream of the outfall location down to the confluence with Hangman Creek.

Ecology plans to complete the fecal coliform/temperature/turbidity and TSS TMDL for Hangman Creek sometime in 2009. Ecology will allocate Total Maximum Daily Loads allowed in Hangman creek from each tributary of Hangman Creek.



According to the Ecology TMDL specialist the technology-based bacteria limits and TSS limits should meet the Spangle Creek allocation. Ecology expects to set the average monthly 7 Day Average Daily Maximum temperature allocations for June, July, and August at 18.2° C, 21.5° C, and 17.7° C respectively.

Ecology started studying the dissolved oxygen and pH in the summer of 2008 and plans to continue through the fall of 2009. Algal and plant growth in the Spokane River/Hangman Creek,/Spangle Creek water shed causes low dissolved oxygen at night and high pH values during the day. Ecology plans to develop wasteload allocations (WLA's) for BOD, fixed nitrogen, and phosphorus inputs to Spangle Creek.

When Ecology completes the TMDL for Hangman Creek it will include a temperature and probably a phosphorus waste load allocation in the Spangle WWTP permit.

#### **J. Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria**

The Town of Spangle has no diffuser on its outfall to Spangle Creek. The effluent pipe ends with a flap gate to prevent back flow into the relatively flat discharge line. Mixing is not controlled by a diffuser. Summer time in stream flows are either immeasurably small or zero at the outfall. For these reasons Ecology did not authorize a mixing zone for the Town of Spangle's wastewater discharge.

During the critical months of July through September flow in Spangle Creek is intermittent and dominated by groundwater flow between isolated stagnant pools. Ecology modeled the discharge with a background concentration of 0.0 pollutant concentration and a dilution factor of 1.0 and included the results in Appendix C. The assumptions Ecology used are equivalent to assuming that the discharged water is the only water in the stream bed. This is a conservative assumption as intermittent pools exist all summer long upstream of the outfall. Ecology has no data on the quality of the water upstream of the outfall but based on its observations Ecology believes the upstream flow is impacted by the agriculture and the Town of Spangle storm water inputs upstream of the outfall. The proposed permit requires upstream and downstream monitoring for phosphorus and temperature. Ecology based the proposed permit limits on the highest quality of treated wastewater it expects from the new Biolac sewage treatment works. Until the Town collects and Ecology analyzes upstream data and until Ecology completes the TMDLs, the proposed permit will impose technology based limits.

**BOD<sub>5</sub>** - Therefore, the proposed permit contains the technology-based effluent limit set in the 1996 engineering report for BOD<sub>5</sub>. This report was prepared by Varela and Associates Inc. (1996) as the facility plan for the Town of Spangle.

**Temperature** - The state temperature standards (WAC 173-201A-200-210 and 600-612) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions

- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits. For this reason the proposed permit requires additional monitoring of effluent and ambient temperatures. Ecology will reevaluate the reasonable potential during the next permit renewal.

### **Fecal Coliform**

The Hangman Creek TMDL will include allocations for fecal coliform bacteria. Based on preliminary data, Ecology believes that when Spangle Creek is flowing in the spring and early summer that the discharge of 100 CFU/100 mL of bacteria from the Spangle treatment plant will meet the final TMDL limits to protect water quality. Therefore, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria.

### **Toxic Pollutants**

Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge: ammonia, copper and zinc. Ecology could not conduct a reasonable potential analysis on these parameters to determine whether it would require effluent limits in this permit. This was due to the lack of any data on the concentration of these pollutants in the receiving wetlands pools. Ammonia discharge from the Spangle WWTP has been set at the technology based level of 1 mg /L Ammonia as Nitrogen. This technological limit for ammonia-nitrogen was taken from the Varela and Associates Inc. facility plan dated January of 1996.

No valid ambient background data was available for ammonia, copper or zinc. Ecology used zero for background. Ecology requires the Town of Spangle (Condition S2 of the proposed permit) to collect background concentrations near the point of discharge. This information may result in a permit modification or additional limits in the next permit renewal.

Ecology determined that ammonia poses no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

### **Human Health**

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36).

The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the applicant's discharge is unlikely to contain chemicals regulated to protect human health.

#### K. Ground Water Quality Limits

The ground water quality standards (chapter 173-200 WAC) protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

The Town of Spangle does not discharge wastewater to the ground. No permit limits are required to protect ground water.

#### L. Comparison of Effluent Limits with the Previous Permit Issued on June 28, 2002

**Table 8. Comparison of Effluent Limits**

Parameter	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
		Average Monthly	Average Weekly	Average Monthly	Average Weekly
Biochemical Oxygen Demand (5-day)	Technology	10 mg/L	15 mg/L	10 mg/L	15 mg/L
Total Suspended Solids	Technology	15 mg/L	23 mg/L	15 mg/L	23 mg/L
Fecal Coliform Bacteria	Technology	100/100 mL	200/100 mL	100/100 mL	200/100 mL
pH	Technology	6<pH<9	6<pH<9	6<pH<9	6<pH<9
Total Ammonia	Technology	1.0 mg/L	1.5 mg/L	1.0 mg/L	1.5 mg/L

### IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-09) for a Biolac treatment facility.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The proposed permit requires the Town of Spangle to measure phosphorus and temperature in the effluent and receiving water and evaluate the impacts of the discharge on the receiving water. The temperature of the effluent could have a significant impact on the organisms in Spangle Creek itself and the phosphorus loading from the treatment plant could have a significant impact on downstream water bodies.

#### **M. Lab Accreditation**

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories* to prepare all monitoring data (with the exception of certain parameters).

Ecology has not accredited the Spangle laboratory for any parameters that require accreditation. The facility uses an accredited contract laboratory.

### **IV. OTHER PERMIT CONDITIONS**

#### **N. Reporting and Record Keeping**

Ecology based permit condition S3 on our authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

#### **O. Prevention of Facility Overloading**

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Town of Spangle to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

#### **P. Operation and Maintenance (O&M)**

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that the Town of Spangle takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment. The Town has documented or suspects inflow, infiltration, and it needs to further characterize the problem.

The proposed permit requires submission of an updated O&M manual for the entire sewage system. In particular the Town needs to include the planned new sludge handling in the Operations and Maintenance of the Spangle WWTP.

Ecology expects leaks are present in the collection system due to its age, materials used and, construction methods for its installation. Therefore, the proposed permit requires the Town of Spangle to characterize the collection system for the presence of leaks by providing the following information:

- Volume of the annual average and peak daily flow under worst conditions (inflow or infiltration) attributed to leaks.
- Whether exfiltration occurs in the system's force mains and/or inverted siphons.

Three good references to aid in these tasks include:

- *American Society of Civil Engineers and Water Environment Federation Manual of Practice FD-6, Existing Sewer Evaluation and Rehabilitation.*
- *U.S. Environmental Protection Agency, Handbook for Sewer System Infrastructure Analysis and Rehabilitation, EPA/625/6-91/030, 1991.*
- *Washington State Department of Transportation, Standard Specifications for Road, Bridge, and Municipal Construction, 2002.*

Following characterization of the leaks, Ecology may require corrective actions by issuing an administrative order following review of the assessment.

## **Q. Pretreatment**

### **Duty to Enforce Discharge Prohibitions**

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes “Pass-through” or “Interference”. This general prohibition is from 40 CFR §403.5(a). Appendix B of this fact sheet defines these terms.
- The second section reinforces a number of specific State and Federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:
  - Are prohibited due to dangerous waste rules.
  - Are explosive or flammable.
  - Have too high or low of a pH (too corrosive, acidic or basic).
  - May cause a blockage such as grease, sand, rocks, or viscous materials.
  - Are hot enough to cause a problem.
  - Are of sufficient strength or volume to interfere with treatment.
  - Contain too much petroleum-based oils, mineral oil, or cutting fluid.
  - Create noxious or toxic gases at any point.

40 CFR Part 403 contains the regulatory basis for these prohibitions, with the exception of the pH provisions which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology.

These discharges include:

- Cooling water in significant volumes.
- Stormwater and other direct inflow sources.
- Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

### **Federal and State Pretreatment Program Requirements**

Ecology administers the Pretreatment Program under the terms of the addendum to the “Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10” (1986) and 40 CFR, part 403. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users (SIUs) discharging to POTWs which have not been delegated authority to issue wastewater discharge permits. Ecology must approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i) and(iii)).

Industrial dischargers must obtain a permit from Ecology before discharging waste to the Town of Spangle (WAC 173-216-110(5)). Industries discharging wastewater that is similar in character to domestic wastewater do not require a permit.

### **Industrial User Survey Update**

This provision requires the POTW to submit an updated list of existing and proposed significant industrial users (SIUs) and potential significant industrial users (PSIUs). This provides Ecology with notice of any new or proposed industrial users in the POTW's service area without a more rigorous “complete” Industrial User Survey. This level of effort is often sufficient for small municipalities which have not seen any adverse effects potentially attributable to industries, have loadings commensurate with domestic flows, and have a small proportion of industrial flow.

## **R. Solid Waste Control**

To prevent water quality problems the facility is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW, chapter 173-308 WAC “Biosolids Management,” and chapter 173-350 WAC “Solid Waste Handling Standards.” The disposal of other solid waste is under the jurisdiction of the Spokane County Health Department.

### **S. Spill Plan**

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released.

Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

The proposed permit requires this facility to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

### **T. General Conditions**

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual municipal NPDES permits issued by Ecology.

## **VI. PERMIT ISSUANCE PROCEDURES**

### **U. Permit Modifications**

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground waters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

### **V. Proposed Permit Issuance**

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

## VII. REFERENCES FOR TEXT AND APPENDICES

### Environmental Protection Agency (EPA)

1992. *National Toxics Rule*. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.
1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.
1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.
1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C.

### Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

### Washington State Department of Ecology.

2006. *Permit Writer's Manual*. Publication Number 92-109  
(<http://www.ecy.wa.gov/biblio/92109.html>)

2008 Ecology Draft 7/17/08 "Hangman (Latah) Creek Fecal Coliform, Temperature, and Turbidity Total Maximum Daily Load—Water Quality Improvement Report

Laws and Regulations  
(<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information  
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

### Water Pollution Control Federation.

1976. *Chlorination of Wastewater*.

### Wright, R.M., and A.J. McDonnell.

1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)



## APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to the Town of Spangle WWTP. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on June 3, 2009 in the Spokesman Review to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice –

- Tells where copies of the draft permit and fact sheet are available for public evaluation (a local public library, the closest regional or field office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period.
- Tells how to request a public hearing about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting* which is available on our website at <http://www.ecy.wa.gov/biblio/0307023.html>.

You may obtain further information from Ecology by telephone at (509) 329-3414 or by writing to the address listed below.

Water Quality Permit Coordinator  
Department of Ecology  
Eastern Regional Office  
4601 North Monroe Street  
Spokane, WA 99205-1295

The primary author of this permit and fact sheet is Kim H. Sherwood.

## APPENDIX B—GLOSSARY

**1-DMax or 1-day maximum temperature** - The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

**7-DADMax or 7-day average of the daily maximum temperatures** - The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

**Acute Toxicity** - The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

**AKART** – The acronym for “all known, available, and reasonable methods of prevention, control and treatment.” AKART is a technology-based approach to limiting pollutants from wastewater discharges which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

**Ambient Water Quality** - The existing environmental condition of the water in a receiving water body.

**Ammonia** - Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Annual Average Design Flow (AADF)** - The average of the daily flow volumes anticipated to occur over a calendar year.

**Average Monthly Discharge Limit** - The average of the measured values obtained over a calendar month's time.

**Best Management Practices (BMPs)** - Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>** - Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

**Bypass** - The intentional diversion of waste streams from any portion of a treatment facility.

**Chlorine** - Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity** - The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)** - The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Compliance Inspection - Without Sampling** - A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling** - A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

**Composite Sample** - A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

**Construction Activity** - Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

**Continuous Monitoring** - Uninterrupted, unless otherwise noted in the permit.

**Critical Condition** - The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor (DF)** - A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report** - A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria** - Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample** - A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

**Industrial Wastewater** - Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Major Facility** - A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limit** - The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Maximum Day Design Flow (MDDF)** - The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

**Maximum Month Design Flow (MMDF)** - The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

**Maximum Week Design Flow (MWDF)** - The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

**Method Detection Level (MDL)** - The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

**Minor Facility** - A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone** - An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)** - The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

**pH** - The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Peak Hour Design Flow (PHDF)** - The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

**Peak Instantaneous Design Flow (PIDF)** - The maximum anticipated instantaneous flow.

**Quantitation Level (QL)** - The smallest detectable concentration of analyte greater than the Method Detection Limit (MDL) where the accuracy (precision & bias) achieves the objectives of the intended purpose.

**Reasonable Potential** - A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

**Responsible Corporate Officer** - A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

**Technology-based Effluent Limit** - A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)** - Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Solid waste** - All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

**State Waters** - Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Stormwater** - That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Upset** - An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit** - A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

## APPENDIX C—TECHNICAL CALCULATIONS

\*\* - Criteria dependent on hardness

Pollutant, Effluent, and Receiving Water Data		Freshwater Quality Criteria		Metals Translators		Facility Receiving Water Design Case		Spangle POTW Spangle Creek Reasonable Potential	
Pollutant, CAS No. & Application Ref. No.									
AMMONIA, unionized									
N	priority pollutant?								
WQ Std	standard								
19890.2	ug/L acute								
2222.4	ug/L chronic								
0.0	acute								
0.0	chronic								
0.95	Probability (0.95 - WQ Based; 0.5 - Human Health)								
407.0	ug/L max effluent concentration (measured)								
20	# of data points								
1.38	Coefficient of Variation								
2	#samples per month for compliance monitoring								
	50% percentile effluent conc for HH RPD, when n>10 (leave blank otherwise)								
	Ambient Concentration								
0.00	ug/L								

Run Date: 1/31/2009

Fact Sheet for NPDES Permit WA-0045471  
Town of Spangle

\*\* - Criteria dependent on hardness

Summary of Effluent Reasonable Potential Determination & Limits		Run Date: 1/31/2009	
POLLUTANT		Receiving Water	Facility Receiving Water Design Case
AMMONIA unionized			Spangle POTW Spangle Creek Reasonable Potential
	priority pollutant?		
	WQ standard		
	Maximum Expected (or 50%) Effluent Concentration, µg/L		
	Does reasonable potential exist?		
	Upstream RW Conc, µg/L		
	RW Acute Criteria, µg/L	Acute Boundary	
	Conc @ Acute MZ Boundary, µg/L		
	RW Chronic (or Human Health) Criteria, µg/L	Chronic Boundary	
	Conc @ Chronic (or Human Health) MZ Boundary, µg/L		
	Daily Maximum Limit, µg/L	Permit Limits	
	Monthly Average Limit, µg/L		



*Fact Sheet for NPDES Permit WA-0045471*  
*Town of Spangle*

Calculation of pH of a mixture of two flows. Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)			
Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93			
<b>pH Calculations</b>			
INPUT	Acute	Chronic	Whole River
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	1.00	1.00	1.00
1. UPSTREAM/BACKGROUND CHARACTERISTICS			
Temperature (deg C):	20.00	20.00	20.00
pH:	8.20	8.20	8.20
Alkalinity (mg CaCO3/L):	100.00	100.00	100.00
2. EFFLUENT CHARACTERISTICS			
Temperature (deg C):	21.00	21.00	21.00
pH:	7.50	7.50	7.50
Alkalinity (mg CaCO3/L):	200.00	200.00	200.00
OUTPUT			
1. IONIZATION CONSTANTS			
Upstream/Background pKa:	6.38	6.38	6.38
Effluent pKa:	6.38	6.38	6.38
2. IONIZATION FRACTIONS			
Upstream/Background Ionization Fraction:	0.99	0.99	0.99
Effluent Ionization Fraction:	0.93	0.93	0.93
3. TOTAL INORGANIC CARBON			
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	101.52	101.52	101.52
Effluent Total Inorganic Carbon (mg CaCO3/L):	215.00	215.00	215.00
4. CONDITIONS AT MIXING ZONE BOUNDARY			
Temperature (deg C):	21.00	21.00	21.00
Alkalinity (mg CaCO3/L):	200.00	200.00	200.00
Total Inorganic Carbon (mg CaCO3/L):	215.00	215.00	215.00
pKa:	6.38	6.38	6.38
pH at Mixing Zone Boundary:	7.50	7.50	7.50

Spangle Reasonable Potential (8-08).xls\pH, Printed 1/31/2009

*Fact Sheet for NPDES Permit WA-0045471*  
*Town of Spangle*

Freshwater un-ionized ammonia criteria based on Chapter 173-201A WAC - Amended November 20, 2006

<b>INPUT</b>	<b>Ambient</b>	<b>@ Acute Boundary</b>	<b>@ Chronic Boundary</b>	<b>@ Whole River</b>
1. Temperature (deg C):	20.0	21.0	21.0	21.0
2. pH:	8.20	7.50	7.50	7.50
3. Is salmonid habitat an existing or designated use?	No	No	No	No
4. Are non-salmonid early life stages present or absent?	Absent	Absent	Absent	Absent
<b>OUTPUT</b>				
1. Unionized ammonia NH3 criteria (mgNH3/L)				
Acute:	0.411	0.321	0.321	0.321
Chronic:	0.028	0.036	0.036	0.036
2. Total ammonia nitrogen criteria (mgN/L):				
Acute:	5.727	19.890	19.890	19.890
Chronic:	0.394	2.222	2.222	2.222

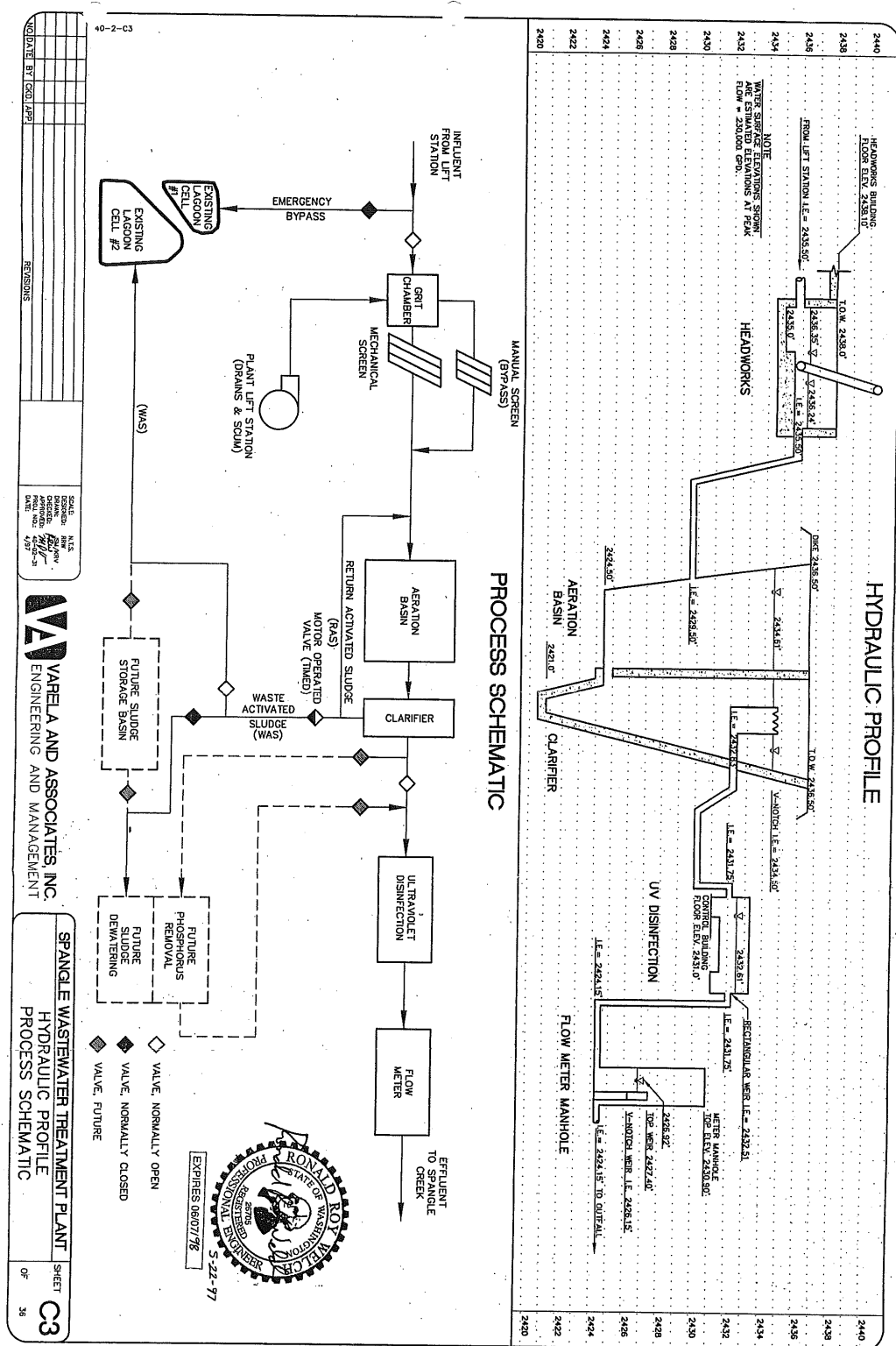
Spangle Reasonable Potential (8-08).xlsm\nh3fresh3, Printed 1/31/2009

Fact Sheet for NPDES Permit WA-0045471  
Town of Spangle

Reasonable Potential Calculations									
Date of Last Modification: Run Date: 1/31/2009				Aug-08		Facility Receiving Water Design Case			
Acute Dfs 1.00				Chronic 1.00		Spangle POTW Spangle Creek Reasonable Potential			
Metal Translator				Freshwater Quality Criteria		Max concentration at edge of...			
Ambient Concentration (metals as dissolved) ug/L				Acute ug/L		Chronic ug/L			
19890.2				2222.4		LIMIT REQ'D?			
Maximum Expected Effluent Concentration ug/L				726.0		NO			
Acute Mixing Zone ug/L				726.0		#NUM!			
Chronic Mixing Zone ug/L				726.0		#NUM!			
LIMIT REQ'D?				NO		#NUM!			
Effluent percentile value				0.95		#NUM!			
Pn				0.861		#NUM!			
Max effluent conc. measured (metals as total recoverable) ug/L				407.00		#NUM!			
CV				1.38		#NUM!			
s				1.03		#NUM!			
n				20		#NUM!			
Multiplier				1.78		#NUM!			
AMMONIA un-ionized				19890.2		#NUM!			
Parameter				ug/L		#NUM!			
Acute				ug/L		#NUM!			
Chronic				ug/L		#NUM!			
Ambient Concentration (metals as dissolved) ug/L				ug/L		#NUM!			
19890.2				2222.4		#NUM!			
Maximum Expected Effluent Concentration ug/L				726.0		#NUM!			
Acute Mixing Zone ug/L				726.0		#NUM!			
Chronic Mixing Zone ug/L				726.0		#NUM!			
LIMIT REQ'D?				NO		#NUM!			
Effluent percentile value				0.95		#NUM!			
Pn				0.861		#NUM!			
Max effluent conc. measured (metals as total recoverable) ug/L				407.00		#NUM!			
CV				1.38		#NUM!			
s				1.03		#NUM!			
n				20		#NUM!			
Multiplier				1.78		#NUM!			

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[illegible]



## APPENDIX D—RESPONSE TO COMMENTS

The public notice that informed the public that a draft permit was available for review was published in the Spokesman Review on June 3, 2009. Ecology did not receive any comments on the draft permit following the 30-day public comment period.